ECOTHERM
HEAT TRANSFER SOLUTIONS

Model EHRE
water / water
50 - 2,000 kW

Model EHSF
water / water
50 – 1,000 kW

Model EDRE
steam / water
50 - 2,000 kW

3 High Capacity Water Heaters

www.ecotherm.com

Ecotherm is the leading brand for turnkey hot water, steam and solar systems for hotels, hospitals and the industry.

Ecotherm amazes with "Individual Heat Transfer Solutions" for hot water and steam generation.

Individuality
Ecotherm produces extensive turnkey systems as well as separate components. Each plant is specifically aligned to the customer's individual requirements. The base is our own production facility in Austria and a wide product portfolio, which enables the combination of all relevant energy sources such as oil, gas, electricity and renewable energies.

Premium quality
Amongst others, our High Capacity Water Heaters are made of high-class duplex stainless steel and guarantee a long-life cycle and perfect hygiene. Ecotherm is certified to ISO 9001 : 2015 with all European standards. Our own test bench assures highest quality and reliability.

Innovation
We are always open to new ideas, we constantly investigate new technologies and we develop path-breaking and future-oriented products. Many patents are the result of the in-house innovation management. With an elaborated 3D visualization, Ecotherm systems can be guided and controlled at all times.

Premium service
Clients benefit from our extensive service at consulting, planning, engineering, supervision and training. Ecotherm regularly improves the know-how of its partners and clients with selective trainings.

Efficiency
The Ecotherm Group, managed by the owner, has slim decision-making structures. Consequent research and development work permanently optimize the energy efficiency and the durability of the products. Ecotherm turnkey solutions offer an optimal cost-benefit ratio.

Experience
With thousands of installations in the last 30 years in Europe, the Middle East, Asia, North Africa and Central America, Ecotherm has become the leading brand in technology and innovation for individual hot water, steam and solar solutions. The Ecotherm team is continuously refreshing their know-how with exceptional trainings and seminars that the Ecotherm Academy provides.

Reliability
Ecotherm systems are monitored all around the clock and can be serviced at low cost, quickly and efficiently with an advanced control panel. Our products and plants have low maintenance requirements .

Sustainability
Ecotherm products help our customers save energy and money. We save valuable resources by using renewable energies. Ecotherm high-performance plants have minimal space requirements and provide maximum energy savings. When planning new products, Ecotherm engineers take all the qualitative and economic principles into account in accordance with the ecological principles.

Partnership
We live in a partnership with all our customers, suppliers and employees. This relationship is characterized by honesty, commitment, openness, trust and reliability. The object is a joint long-term success.

Internationality
The international alignment of Ecotherm with branches in Dubai, Mexico and Hungary and further partners in more than 25 countries is the base for our flexible and efficient project implementation.

ECOTHERM High Capacity Water Heaters

Find your optimal solutions Pages 6 – 7

Products:

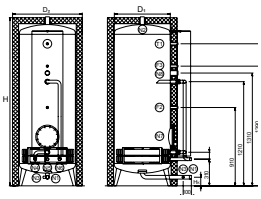
- **Model EHRE: High Capacity Water Heater**
  50 kW – 2.000 kW
  High Capacity Water Heater for water / water operation
  with external heat exchanger with free floating turbulator rods
  Pages 8 – 11

- **Model EDRE: High Capacity Water Heater**
  50 kW – 2.000 kW
  High Capacity Water Heater for steam / water operation
  with external heat exchanger with free floating turbulator rods
  Pages 18 – 21

- **Model EHHE: Hybrid High Capacity Water Heater**
  50 kW – 2.000 kW
  Hybrid High Capacity Water Heater for water / water or
  steam / water operation with two separate primary connections
  Pages 22 – 23

- **Model EHSF: High Capacity Water Heater**
  50 kW – 1000 kW
  High Capacity Water Heater for water / water operation
  with internal flat heating coils
  Pages 24 - 25

Advantages Pages 26 – 35



Technical Specifications Pages 36 – 45

Product Overview

Turnkey Hot Water, Steam and Solar Systems

High Capacity Water Heaters
with Shell & Tube Heat Exchangers
50 - 2,000 kW & Storage 300 - 20,000 L

Hot Water & Combination Tanks
with patented Flat Heating Coils
50 - 1,000 kW & Storage 300 - 20,000 L

Electric Water Heaters
up to 2,000 kW & Storage 300 - 20,000 L

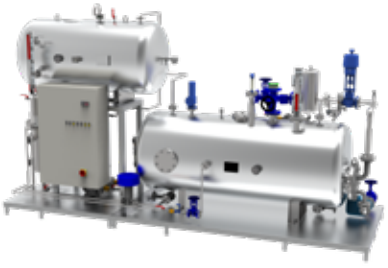
Shell & Tube Heat Exchanger
with turbulator rods
up to 2,000 kW

Direct Fired Water Heaters
80 - 150 kW & Storage 1,000 - 5,000 L

Solar Thermal & Solar Steam Solutions
for solar heating, solar cooling & process
heating for villas, hotels & industry

Fibre-Fleece Insulation
with patented closure strips
100 liters to 20,000 liters

Triple Pass Boilers, Steam Boilers
for gas or oil operation
up to 21 MW & 20,000 kg/h



Clean Steam Generators
steam/steam or electric
up to 5,000 kg/h

ECOTHERM®
High Capacity Water Heaters

ECOTHERM high capacity water heaters are the result of more than 20 years of research and development. All components of these premium quality products are made of high quality stainless steel. Each system is individually tailored to the needs of the customers, respectively the project. ECOTHERM engineers use a self-developed design software in order to design and optimize the system to yield maximum efficiency, minimal floor space requirements and maximum savings concerning energy and maintenance costs.

With thousands of installations in Europe, the Middle East, Asia, North Africa and Central America, ECOTHERM has become one of the technology and innovation leaders for individual solar, hot water and steam solutions on the market.

Among these are some of the most prestigious buildings of the world as e.g. Burj Khalifa in Dubai - the highest building in the world, Abraj Al Bait Towers and Royal Clock Hotel Tower in Mecca - the second highest building in the world or JW Marriott Marquis Hotel in Dubai - the highest hotel building in the world.

*) Sizing acc. to DIN 4708 or ASHRAE possible with ECOTHERM's "ECOSIZE" Sizing Software

Find your optimal ECOTHERM solution

ECOTHERM high capacity water heaters are premium quality products. All components are made of high-quality stainless steel at the production facility at the ECOTHERM headquarters in Austria. The models EHRE and EDRE use an external shell and tube heat exchanger with patented free floating turbulator rods. Due to this innovation ECOTHERM high capacity water heaters are leading the market. Within only one second the water flowing through the heat exchanger is heated up from 12°C to 60°C.

Therefore, ECOTHERM systems have minimal floor space requirements. The model EHSF uses the patented ECOTHERM flat heating coils. The available hot water volume reaches 97% of the tank volume.

Start

What kind of water heaters do you need? What is your primary energy source?

Water

The primary energy source is water in order to generate hot water.

Steam

If steam is available, the efficiency of the system is higher than using water as primary energy source.

Hot Water Demand

What is your hot water demand?

More details for calculating the demand according to DIN 4708 on page 44 and for calculating the demand according to ASHRAE on page 45.

Nominal Power Rating

What is the nominal rating of your hot water system?

You can use our online software ECOSIZE at ecosize.ecotherm.com in order to calculate the nominal power rating.

ECOSIZE

Use our self-developed software "ECOSIZE" in order to design your optimal ECOTHERM solution.

Apply for your personal login in the member area of our website to have access to the online version of ECOSIZE.

ecotherm.ecosize.com

Hot Water Demand

What is your hot water demand?

More details for calculating the demand according to DIN 4708 on page 44 and for calculating the demand according to ASHRAE on page 45.

Nominal Power Rating

What is the nominal rating of your hot water system?

You can use our online software ECOSIZE at ecosize.ecotherm.com in order to calculate the nominal power rating.

Highest performance

The EHRE water heater is perfectly suitable for a continuous high hot water demand, where a guaranteed temperature has to be supplied all over the day. Use the EHRE high capacity water heater e. g. for hotels, hospitals, residential homes or the industry.

EHRE

High capacity water heater 50 – 2,000 kW for water / water operation.

with tank

More details on pages 8 – 9.

without tank

More details on pages 10 – 11.

Highest heat transfer

The EHSF water heater with the internal spiral flat heating coil is perfectly suitable for efficiently heating up the water for high peak demands.

Use the EHSF high capacity water heater e. g. for sport stadiums, guest houses, schools.

EHSF

High capacity water heater 50 – 1,000 kW for water / water operation.

EHHE

Hybrid High capacity water heater 50 – 2,000 kW for water / water or steam / water operation with two different primary sources.

Highest efficiency

The efficiency of EDRE water heaters is higher than for EHRE or EHSF water heaters. Use the EDRE high capacity water heater if hot steam is already available or for very high hot water demands as e. g. in hospitals, hotels (laundry) or the industry.

EDRE

High capacity water heater 50 – 2,000 kW for steam /water operation.

with tank

More details on pages 18 – 19.

without tank

More details on pages 20 – 21.

Model EHRE: High Capacity Water Heater Domestic Hot Water Charging System

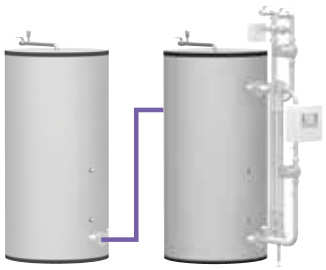
50 - 2,000 kW for water / water operation

"The Green Calorifiers"

Description

- Pressure-resistant storage tank and external shell & tube heat exchanger made of high quality corrosion resistant stainless steel 1.4571/Duplex. The systems comply with the SVGW guidelines for reducing a Legionella infection risk at large-scale systems.
- Optimum hygiene through short storage time of the hot water, low standby losses and small space requirements of the compact system due to high performance of the heat exchanger and small storage capacity.
- Fibre-Fleece insulation of storage tank with robust outer sheathing made of PP (RAL 7037), patented aluminum closure strips and self-fixing closure caps, quick and easy installation, 80 mm insulation up to 1,000 liters and 100mm above. 100% recyclable, fire protection class B2 (B1 upon request)
- Highly efficient heat transfer and most extensive prevention of liming
  and scaling through self-cleaning effect of patented shell & tube heat exchangers with free floating turbulator rods made of stainless steel.
- Constant hot water temperature and highest comfort at the hot water supply by primary flow adjusting by a motorized three-way control valve. Heat exchanger unit is pre-assembled and pre-wired. Primary pump and control valve are provided loosely for flexible on-site assembly.
- Safe plant operation without danger of creeping performance decrease due microprocessor controlled storage regulation with differential pressure monitoring of the shell & tube heat exchanger. The internal and external (optional) cold water flushing after completion of the charging process minimizes effectively scaling by the rapid cooling of the heat exchanger.
- Microprocessor control with touch screen for clear and easy use. Possible remote monitoring and remote control of the system through Ethernet interface. Logging and monitoring of the performance of the system and the individual components.
- Production by TÜV certified welding company according to HP-0 and ISO 3834-2, approval to SVGW and certified according to ISO 9001: 2015.
- Simple installation and short mounting time due to pre-assembled units.
- Maximum pressure: secondary 6, or 10bar; primary 6 or 10bar; higher ratings possible on request

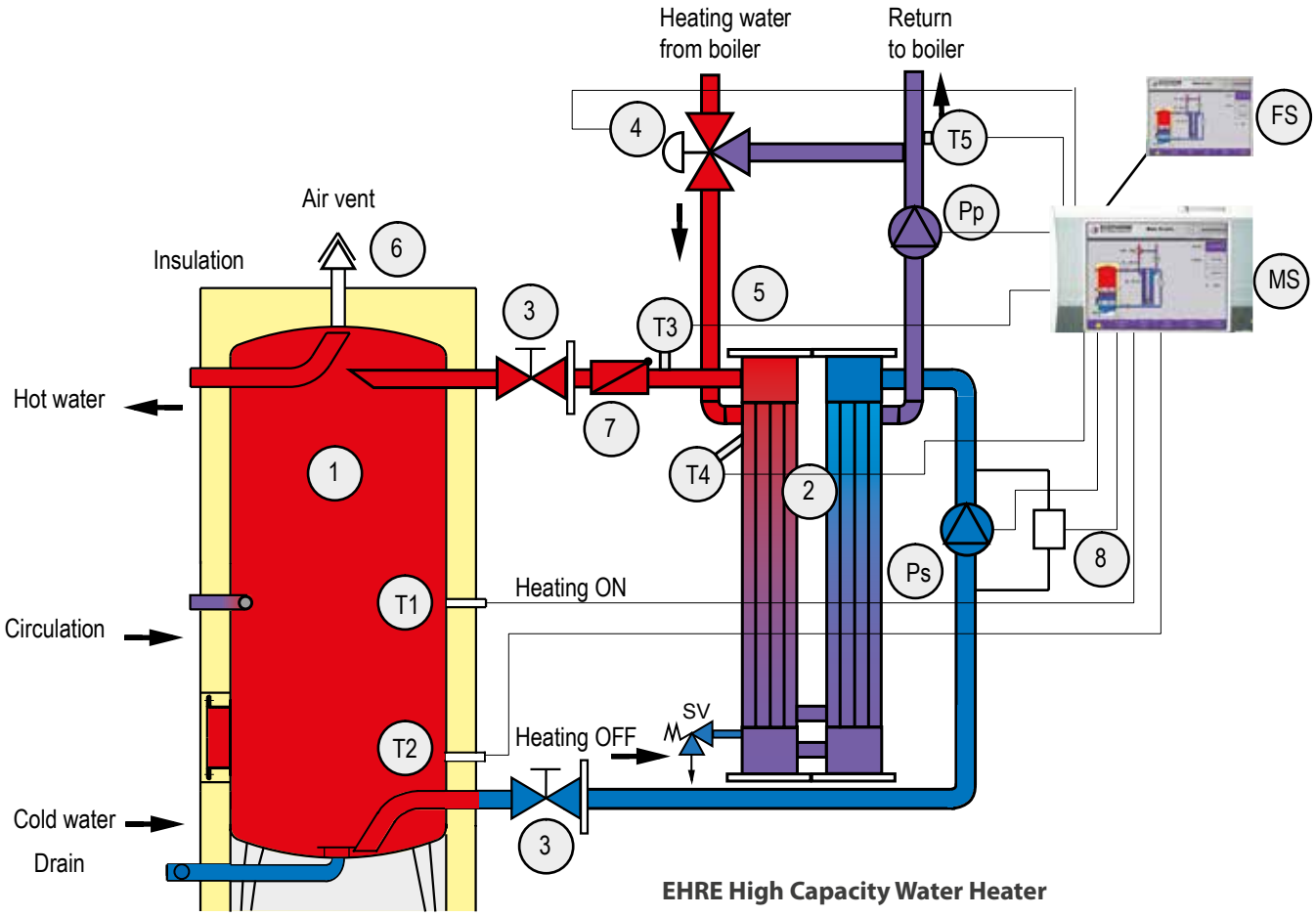
Optional: Additional Storage



If more storage capacity is required and/or the height of the boiler room is too low, the EHRE heat exchanger can also be operated with two storage tanks or more.

Lime scale protection through external cold water flush

Read more on page 30



EHRE High Capacity Water Heater

1 **Stainless steel hot water storage tank**, standing, with removable fibre-fleece insulation

2 **Stainless steel heat exchanger** with patented free floating turbulating rods, pre-assembled with piping

3 **Manual gate valve** for inspection or removal of heat exchanger without draining the tank or losing service

4 **3 way control valve with electric actuator** controlled by T3 to regulate the hot water supply temperature

5 **Safety pressure valve** set at 10 or 6 bar, corresponding to maximum tank operating pressure

6 **Automatic air vent** and vacuum breaker, with manual cock for rapid air expulsion during tank filling

7 **Non-return valve** for prevention of hot water convection back flow during standby

8 **Differential pressure sensor** for monitoring heat exchanger fouling

T1 **Temperature sensor "heating on":** Signal to start preheating and charging

T2 **Temperature sensor "heating off":** Signal that heating is complete. Activation of anti-fouling cycle

T3 **Temperature sensor to regulate the temperature of domestic hot water entering the tank** by controlling the 3 way control valve (item 4). Used also to monitor the anti-fouling cycle

T4 **Temperature sensor monitoring the incoming boiler water temperature** to ensure that sufficient heat is available to produce domestic hot water at the required temperature. Also for monitoring the anti-fouling cycle.

T5 **Strap-on temperature sensor** for district heating with limited return temperature rule **(opt)**

P_p **Primary circuit pump** connected to the boiler return line and the primary circuit return outlet of the heat exchanger **(opt)**

P_s **Secondary circuit pump** circulates cold domestic water from the bottom of the tank into the heat exchanger

MS **Microprocessor control unit**

FS **Remote control software** for control and monitoring using a PC or BMS via TCP/IP network, or internet.

M **Motorized valves** for external cold water flushing

B **BUS** (ModBus, BacNet) **(opt)**

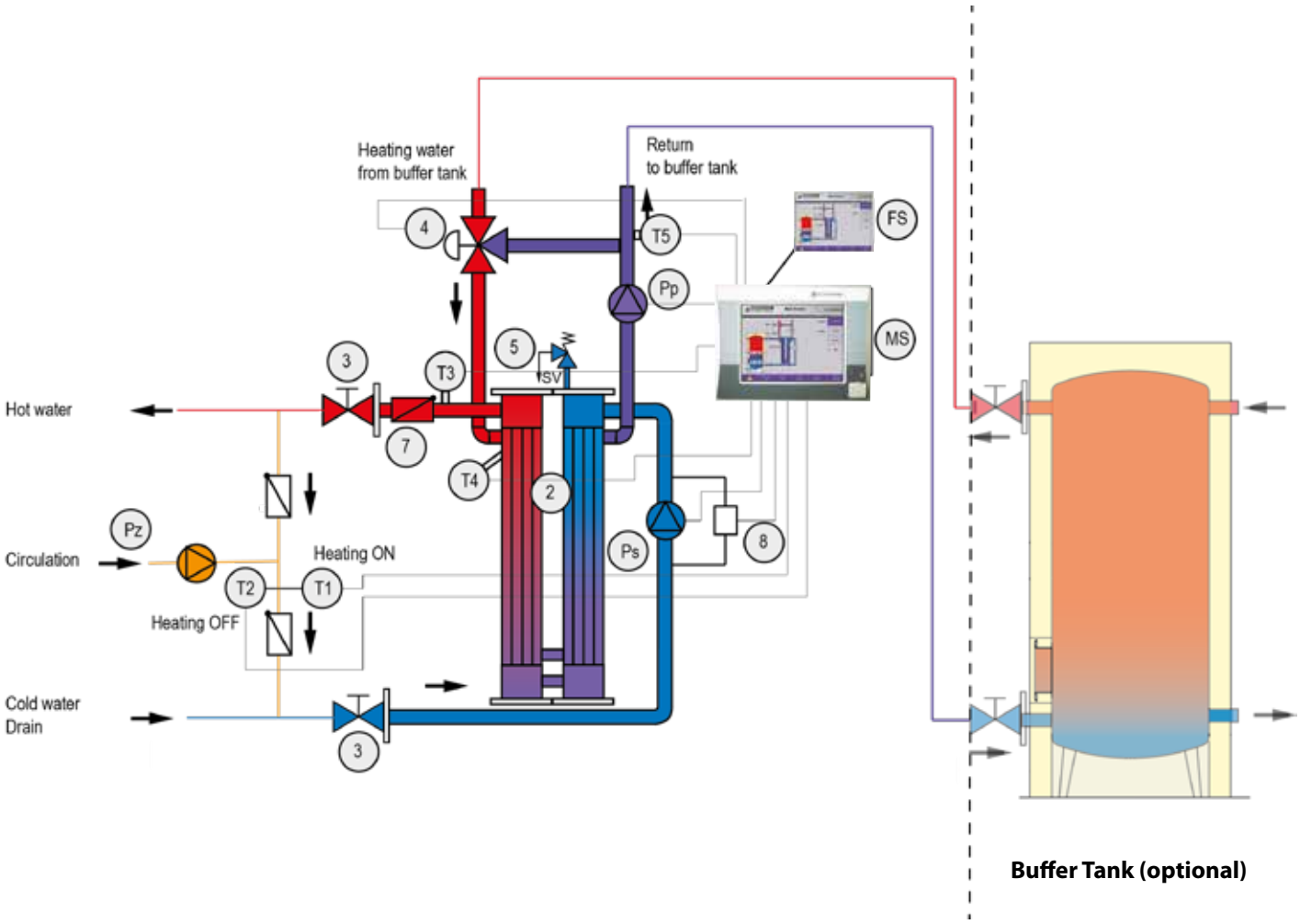
Model EHRE: High Capacity Water Heater
Instantaneous Water Heater

50 - 2,000 kW for water / water operation

EHRE (without storage tank)

Description

- Optimum hygiene through short storage time of the hot water, low standby losses and small space requirements of the compact system due to high performance of the heat exchanger and small storage capacity.
- Highly efficient heat transfer and most extensive prevention of liming
  and scaling through self-cleaning effect of patented shell & tube heat exchangers with free floating turbulator rods made of stainless steel.
- Constant hot water temperature and highest comfort at the hot water supply by primary flow adjusting by a motorized three-way control valve. Heat exchanger unit is pre-assembled and pre-wired. Primary pump and control valve are provided loosely for flexible on-site assembly.
- Safe plant operation without danger of creeping performance decrease due microprocessor controlled storage regulation with differential pressure monitoring of the shell & tube heat exchanger. The internal and external (optional) cold water flushing after completion of the charging process minimizes effectively scaling by the rapid cooling of the heat exchanger.
- Microprocessor control with touch screen for clear and easy use. Possible remote monitoring and remote control of the system through Ethernet interface. Logging and monitoring of the performance of the system and the individual components.
- Production by TÜV certified welding company according to HP-0 and ISO 3834-2, approval to SVGW and certified according to ISO 9001: 2015.
- Simple installation and short mounting time due to pre-assembled units.
- Maximum pressure: secondary 6, or 10bar; primary 6 or 10bar; higher ratings possible on request



2 **Stainless steel heat exchanger** with patented free floating turbulating rods, pre-assembled with piping

3 **Manual gate valve** for inspection or removal of heat exchanger without draining the tank or losing service

4 **3 way control valve with electric actuator** controlled by T3 to regulate the hot water supply temperature

5 **Safety pressure valve** set at 10 or 6 bar, corresponding to maximum tank operating pressure

6 **Automatic air vent** and vacuum breaker, with manual cock for rapid air expulsion during tank filling

7 **Non-return valve** for prevention of hot water convection back flow during standby

8 **Differential pressure sensor** for monitoring heat exchanger fouling

T1 **Temperature sensor "heating on":** Signal to start preheating and charging

T2 **Temperature sensor "heating off":** Signal that heating is complete. Activation of anti-fouling cycle

T3 **Temperature sensor to regulate the temperature of domestic hot water entering the tank** by controlling the 3 way control valve (item 4). Used also to monitor the anti-fouling cycle

T4 **Temperature sensor monitoring the incoming boiler water temperature** to ensure that sufficient heat is available to produce domestic hot water at the required temperature. Also for monitoring the anti-fouling cycle.

T5 **Strap-on temperature sensor** for district heating with limited return temperature rule **(opt)**

P_p **Primary circuit pump** connected to the boiler return line and the primary circuit return outlet of the heat exchanger **(opt)**

P_s **Secondary circuit pump** circulates cold domestic water from the bottom of the tank into the heat exchanger

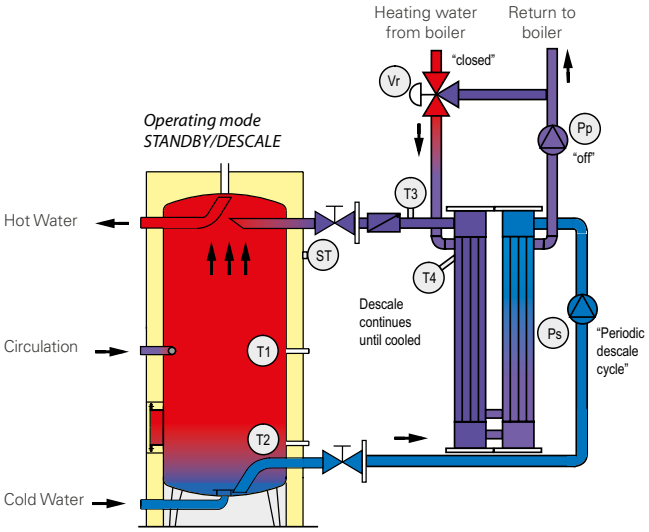
MS **Microprocessor control unit**

FS **Remote control software** for control and monitoring using a PC or BMS via TCP/IP network, or internet.

M **Motorized valves** for external cold water flushing

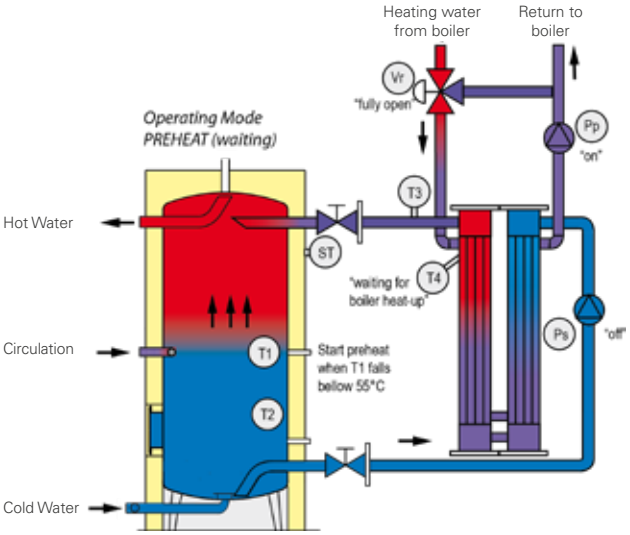
EHRE: 3 Operating modes

Models EHRE & EDRE utilize the temperature layering property of water. These stable temperature layers enable the microprocessor to automatically switch its operating mode to quickly match fluctuating demand and substantially increase fuel efficiency by significantly reducing the number of boiler "cold starts".



1. Operating mode STANDBY / DESCALE

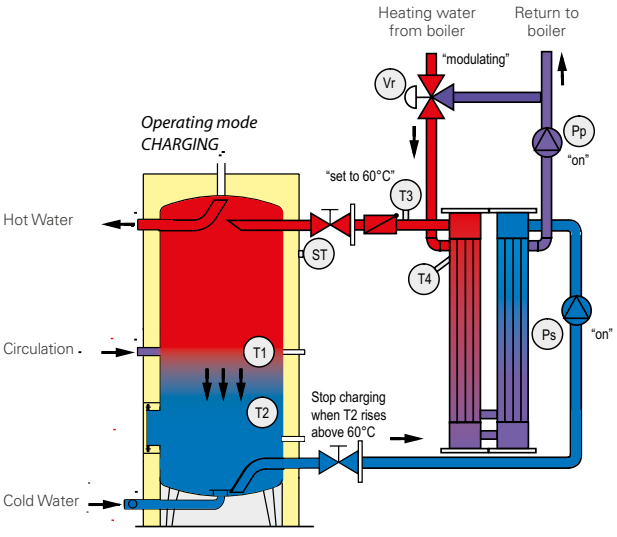
Hot water is stored in the upper parts of the tank for usage. Due to the increased fouling risk in the heat exchanger due to stationary hot water, the periodic anti-fouling cycle is activated until the temperatures of T3 & T4 fall to a safe level. In the tank, the water temperature remains constant due to its temperature layering property, which prevents significant mixing with the pool of cold water in the lower parts of the tank. As usage continues and the pool of cold water rises past T1, the operating mode is changed to PREHEAT.



2. Operating mode PREHEAT

(Display shows "WAITING")

The pool of cold water has risen past T1 and the signal to start the boiler has been sent. The modulating two way valve V_r opens fully and the primary pumps circulates heating water through the primary circuit of the heat exchanger. The system monitors T4, waiting for the temperature of the incoming heating water from the boiler to rise sufficiently, before the operating mode is switched to CHARGING.



3. Operating mode CHARGING

The temperature of the incoming water from the boiler is high enough for the domestic hot water to be allowed to circulate through the secondary circuit of the heat exchanger, by activating the secondary pump P_S. The cold water from the bottom of the tank is heated to the final temperature (of say 60°C) in a single pass through the heat exchanger. The temperature of the hot water entering the tank is exactly controlled by using T3 to modulate the two way valve V. The tank is charged to meet current hot water demand, or to fill the tank with hot water. When the pool of cold water falls below the level of T2, the operating mode returns to STANDBY / DESCALE. To minimize immediate risk, the periodic anti-fouling cycle is activated immediately. Using the (optional) external cold water flushing, the heat exchanger is cooled down after completion of the charging process. Therefore the two valves at the tank are automatically closed, and the two valves of the cold water flushing are opened. After T4 falls below a defined temperature, the flushing is stopped and the valves "M" are closed/opened again.

ELC11 ECOTHERM Logic Controller

The 2D visualization at the ECOTHERM 5.7" touch panel allows easy operation and provides maximum clarity.

For larger turnkey facilities with many systems, the system is 3D visualized together with the building on the ECOTHERM 19" touch panel.

On multiple levels, measured values of the system can be checked on the touch panel.

ECOTHERM high capacity water heater models EHRE and EDRE are equipped with own ELC logic control unit to ensure permanent control and performance monitoring of hot water output at all times.

The control panel is an intelligent terminal for programming and visualization of automated processes. The process of diagnosis and the operation and monitoring of automated processes are simplified by this installation terminal.

A touch screen is used to enter data and process parameters. The output is displayed on a 5.7" VGA TFT color display.

The operator has complete control of all water heater functions via the keypad and display on the front of the control unit. The operator sets the desired performance parameters, and the control unit operates the water heater fully automatically, constantly monitoring temperatures and controlling the pumps and valves to match the current hot water demand with the lowest possible fuel consumption. All automatic functions can be adjusted, switched on/off or manually overridden by the operator at any time.

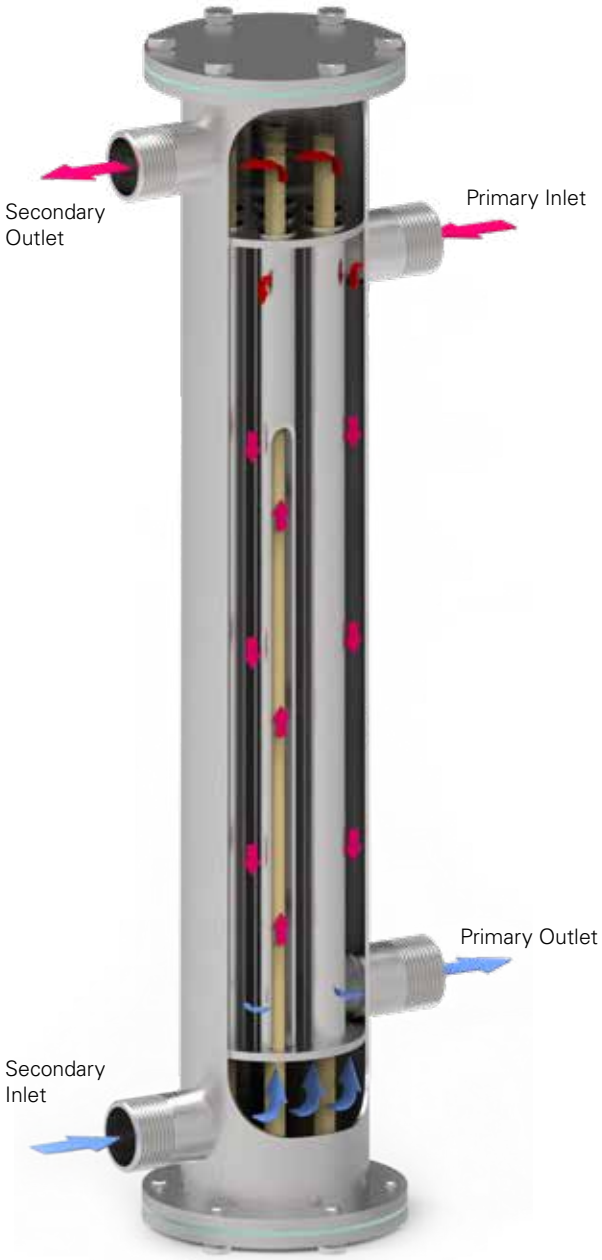
Features:

- Temperature sensors
- Control of pumps and valves
- Exact temperature control
- Flexible control facilities
- Performance logging
- Fuel saving program
- Anti-fouling cycle
- Legionella decontamination cycle
- Early warning fouling alarm
- Remote control and BMS
- ModBus, BacNet **(opt)**

With a browser the user interface can be accessed via Internet for remote maintenance of the system.

High Performance Shell & Tube Heat Exchangers

with free floating turbulator rods



ECOTHERM heat exchangers with their patented free floating turbulator rods are the most superior heat exchangers available. They incorporate all of the advantages and none of the disadvantages of other types of heat exchangers or heating coils.

High performance

Unlike conventional shell and tube heat exchangers, ECOTHERM's high performance heat exchangers contain patented free floating turbulator rods. The rods significantly increase the performance and reduce the size of the heat exchanger. The domestic hot water flows through the heat exchanger at high speed in less than 1 second. The cold water is heated up from 12°C to 60°C in one pass.

Compact

ECOTHERM's high capacity water heaters are extremely compact compared to conventional water heaters. With a floor space saving potential of up to 95%, ECOTHERM's high capacity water heaters are fully compliant with the current building trend for lower building costs through more compact heating systems. The very small surface area of the heat exchanger minimizes radiation heat loss and therefore enhances the overall fuel efficiency of the water heater.

Anti-fouling

The high speed of water flow and the oscillating action of the free floating turbulator rods help prevent fouling deposits from collecting inside the heat exchanger. Maximum efficiency and optimum hygiene are maintained throughout the life of the water heater.

Lifelong corrosion free service

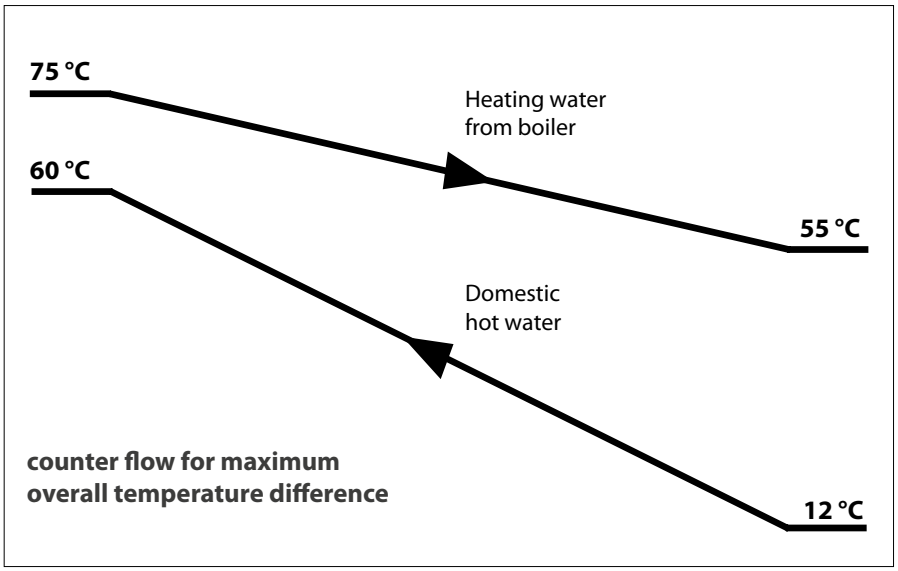
ECOTHERM Stainless Steel 1.4571 / duplex gives lifelong corrosion free service. Stainless steel is a valuable raw material for recycling.

Fast maintenance access with no down time

The external configuration makes it unnecessary to drain the water heater to access and clean the heat exchanger. For inspection and cleaning purposes, simply close the shut-off valves to the tank, open the end flange and pull out the free floating turbulator rods for inspection. Inspection and cleaning can be accomplished in a fraction of the overall time required for conventional water heaters. Thanks to the stored hot water in the tank, there is no interruption of service.

Turbulent flow, counter flow

ECOTHERM high capacity heat exchangers employ the principle of turbulent flow for optimum heat transfer. A thin film of domestic water flows with turbulent flow at high speed through the secondary circuit. It flows in the opposite direction to the fluid in the primary circuit, resulting in the highest average temperature gradient across the tube walls over the whole length of the heat exchanger. The turbulent flow prevents lime scaling.



Patented free floating turbulator rods

The free floating turbulator rods are hard wearing and designed for extremely long life. They fulfill many important functions:

Efficient heat transfer

The free floating turbulator rods in the center of the heat exchanger tubes force thin films of water to flow along the walls of the tubes. The high water surface exposure per volume makes efficient heat transfer possible.

Thanks to the fast flow rate, ECOTHERM high capacity heat exchangers perform at around 3,500 to 5,000 W/m² K, which enables even low temperature output from the boiler perfectly satisfactory for efficient operation.

Turbulent flow

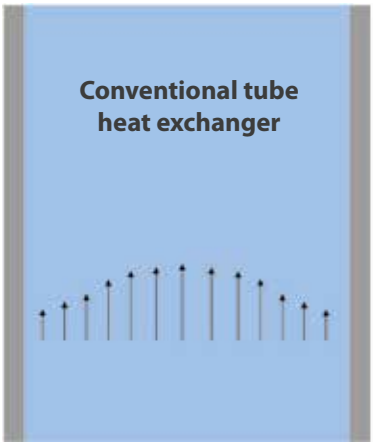
The free floating turbulator rods constantly oscillate from side to side. This lateral movement causes turbulent water flow in the tubes, which is beneficial for efficient heat transfer. (Poor mixing caused by laminar water flow would greatly reduce heat transfer efficiency).

High flow speed

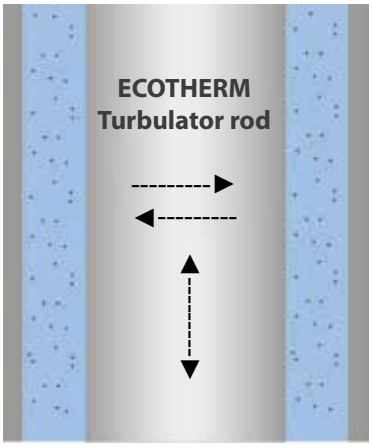
Thanks to the free floating turbulator rods, domestic water passes through the heat exchanger at a speed of approximately 1.6 m/s. This high speed and turbulent flow helps prevent fouling. (Lime scale deposits would act as a heat insulator, greatly reducing the heat transfer capacity of the heat exchanger)

Self cleaning action

The constantly oscillating rods inhibit the formation of fouling on the walls of the tubes, thus further ensuring that maximum efficiency is maintained.



Cross section of conventional heat exchanger tube showing laminar flow of domestic hot water. Low heat transfer to water flowing in center of tube.



Cross section of ECOTHERM heat exchanger tube with oscillating turbulator rod. High speed turbulent flow of the thin film of domestic hot water enables higher rate of heat transfer.

ECOTHERM Fibre-Fleece Insulation

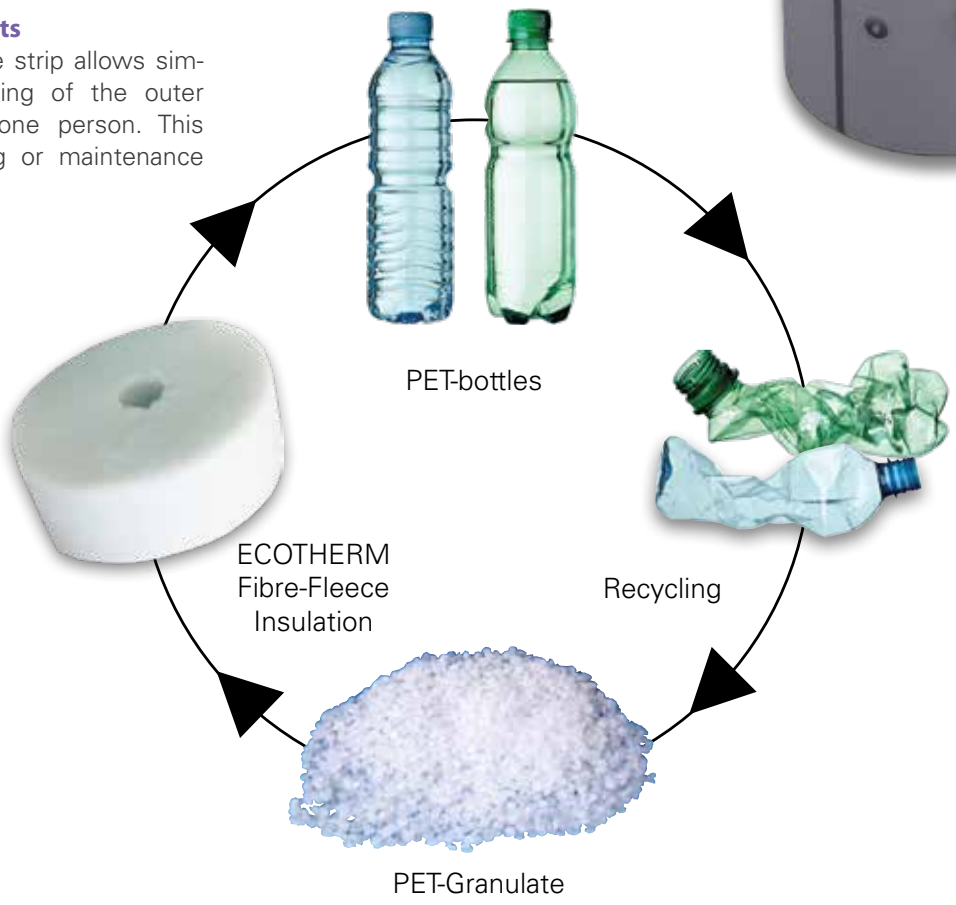
ECOTHERM offers an outstanding price/performance ratio with its self-developed fibre-fleece insulation solution. Compared to standard foam insulations the ECOTHERM insulating polyester fibre-fleece reduces the heat loss in the standby mode for up to 30 percent. This material is produced from recycled PET bottles with no chemical additives and is itself 100% recyclable. The insulation is flame retardant according to DIN 4102-1 class B2, and is available upon request in B1. The robust outer PP cover is food safe, can easily be transported and is extremely impact resistant.

Patented components

The patented closure strip allows simple and quick opening of the outer sheathing by only one person. This means any servicing or maintenance work can be carried out easily and quickly. The newly developed covering rosettes for the connecting sleeves provide an optimal and completely reliable seal while the tight and secure fit prevents any heat loss at the connection points.

Individual Design

ECOTHERM can print the sheathing individually to your wishes. This visual enhancement is particularly useful for storage tanks in the visible interior or exterior.



The patented aluminum closure strips enable easy and fast opening of the outer sheathing by a single person.

Patented closure strips

The patented closure strips allow simple and quick opening of the outer sheathing by only one person. Therefore, subsequent installations, service and maintenance work can be carried out easily and quickly. The aluminum closure strip provides a secure lock and prevents an autonomous opening.

The H-shaped bars made of plastics connect the single parts of the outer PP sheathing. The parts have barbs (marked red in the picture on the right), which secure them from slipping out after fixing. No glue has to be used, which preserves the environment.

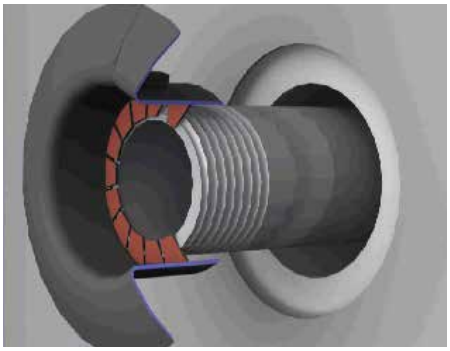
Patented covering rosettes

The ECOTHERM self-developed covering rosettes for connecting sleeves ensure through their self-locking seat for optimum sealing and prevent heat loss at the connecting points.

The rosette is pushed over the connecting pipe. The patented barbs (marked red in the pictures on the left) prevent the rosette to loosen from its position on the pipe.

ECOTHERM rosettes can be opened and closed along its circumference. Therefore, it is also possible to mount the rosettes on the pipes of already finished connections.

For unused connections, there are optional caps, which help minimize heat loss.



Fire tests of insulation components

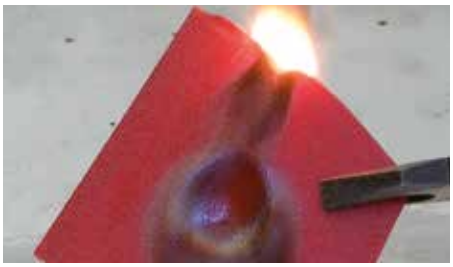
ECOTHERM insulation solution

Polypropylene corresponds to the fire protection class B2.

Aluminum laminated PE or Alucobond fulfills the fire protection class B1.

Fibre fleece B1/B2 melts and develops no fire or dangerous gases

Conventional insulation



Polystyrol

Polystyrol

Melamin foam

Model EDRE: High Capacity Water Heater Domestic Hot Water Charging System

50 - 2,000 kW for steam / water operation

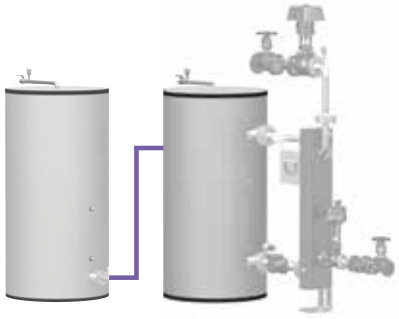
"The Green Calorifiers"

Enameling · Lining · Copper Lining · Solvents

Description

- Pressure-resistant storage tank and external shell & tube heat exchanger made of high quality corrosion resistant stainless steel 1.4571/Duplex. The systems comply with the SVGW guidelines for reducing a Legionella infection risk at large-scale systems.
- Optimum hygiene through short storage time of the hot water, low standby losses and small space requirements of the compact system due to high performance of the heat exchanger and small storage capacity.
- Fibre-fleece insulation of storage tank with robust outer sheathing made of PP (RAL7037), patented aluminum closure strips and self-fixing closure caps, quick and easy installation, 80mm insulation up to 1,000 liters and 100mm above. 100% recyclable, fire protection class B2 (B1 upon request)
- Highly efficient heat transfer and most extensive prevention of liming and scaling through self-cleaning effect of patented shell & tube heat exchangers with free floating turbulator rods made of stainless steel.
- Constant hot water temperature during charging and thus the highest comfort at the hot water supply by primary flow adjusting by condensate control valve. Steam-side barrier prevents overheating of the hot water in the heat exchanger. The heat exchanger block is pre-assembled and pre-wired at the factory with strainer, condensate drain, non-return valve, safety valve and shut off valve.
- Safe plant operation without danger of creeping performance decrease due microprocessor controlled storage regulation with differential
pressure monitoring of the shell & tube heat exchanger.
- Microprocessor control with touch screen for clear and easy use. Possible remote monitoring and remote control of the system through Ethernet interface. Logging and monitoring of the performance of the system and the individual components.
- Production by TÜV certified welding company according to HP-0 and ISO 3834-2, approval to SVGW and certified according to ISO 9001: 2015.
- Simple installation and short mounting time due to pre-assembled units.
- Maximum pressure: secondary 6, or 10bar; primary 6 or 10bar; higher ratings possible on request

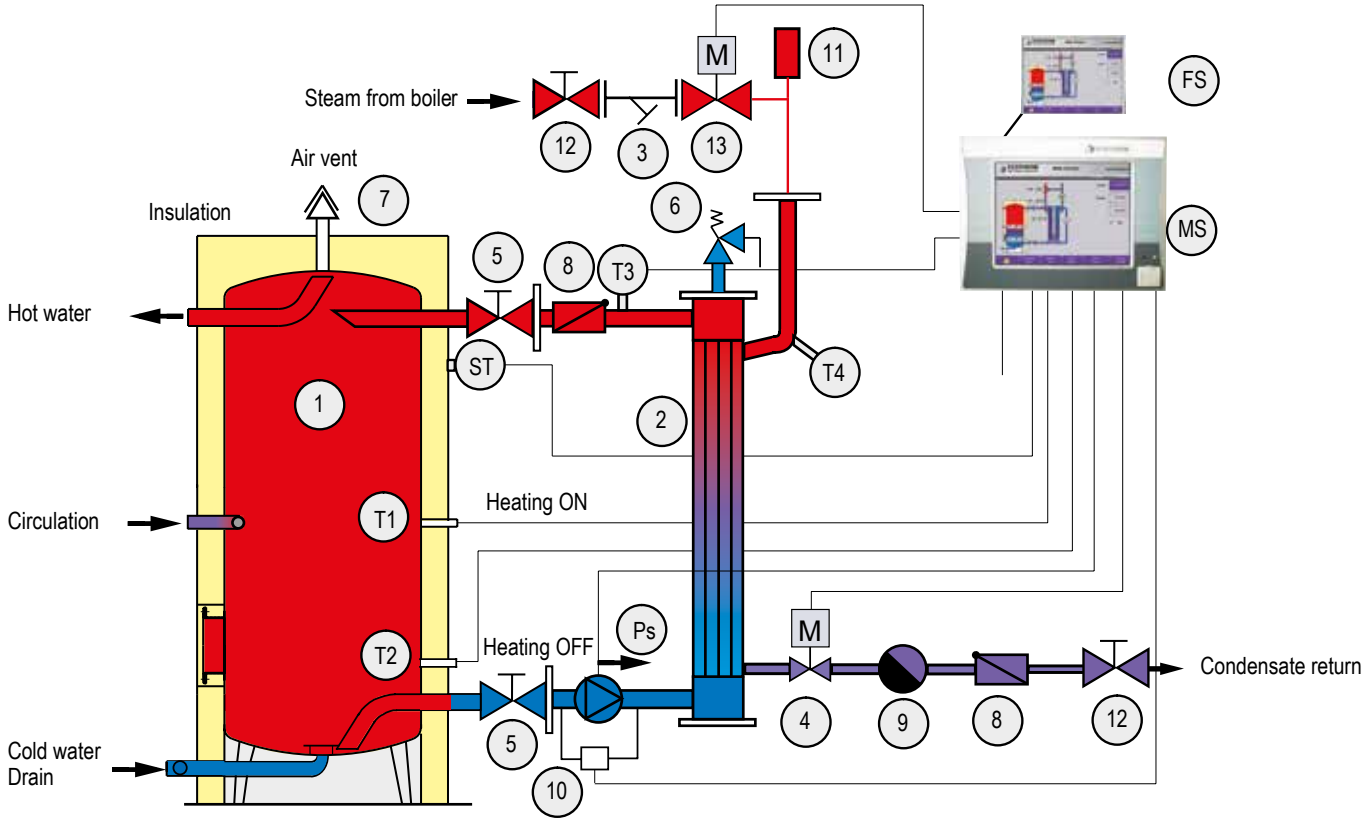
Optional: Additional Storage



If more storage capacity is required and/or the height of the boiler room is too low, the EDRE heat exchanger can also be operated with two storage tanks or more.

Limescale Protection via external cold water flush

Read more on page 30



EDRE High Capacity Water Heater

1 **Stainless steel hot water storage tank**, standing, with removeable fibre-fleece insulation shell

2 **Stainless steel heat exchanger** with patented free floating turbulating rods, pre-assembled with piping

3 **Strainer** to protect control components

4 **2 way condensate control valve with electric actuator** controlled by T3 to regulate the hot water temperature

5 **Manual gate valve** for inspection or removal of heat exchanger without draining the tank or losing service

6 **Safety pressure valve** set at 10 or 6 bar, corresponding to maximum tank operating pressure

7 **Automatic air vent** and anti-vacuum valve, with manual cock for rapid air expulsion during tank filling

8 **Non-return valve** for prevention of hot water/ condensate convection back flow during standby

9 **Steam trap** ensures protection of control components from steam

10 **Differential pressure sensor** for monitoring heat exchanger fouling

11 **Vacuum breaker**

12 **Shut off valve:** Shut off from steam and condensate system

13 **Two way high temperature safety and shut off valve** with electric actuator

T1 **Temperature sensor "heating on":** Signal to start preheating and charging

T2 **Temperature sensor "heating off":** Signal that heating is complete. Activation of anti-fouling cycle.

T3 **Temperature sensor to regulate the temperature of hot water entering the tank** by controlling the 2 way condensate control valve (item 4). Used also to monitor the anti-fouling cycle.

T4 **Temperature sensor monitoring the incoming steam temperature** to ensure that sufficient heat is available to produce hot water at the required temperature. Also for monitoring the anti-fouling cycle.

P_s **Secondary circuit pump** circulates cold domestic water from the bottom the the tank into the heat exchanger

ST **Safety thermostat** shuts down system if manually set temperature is exceeded

MS **Microprocessor control unit**

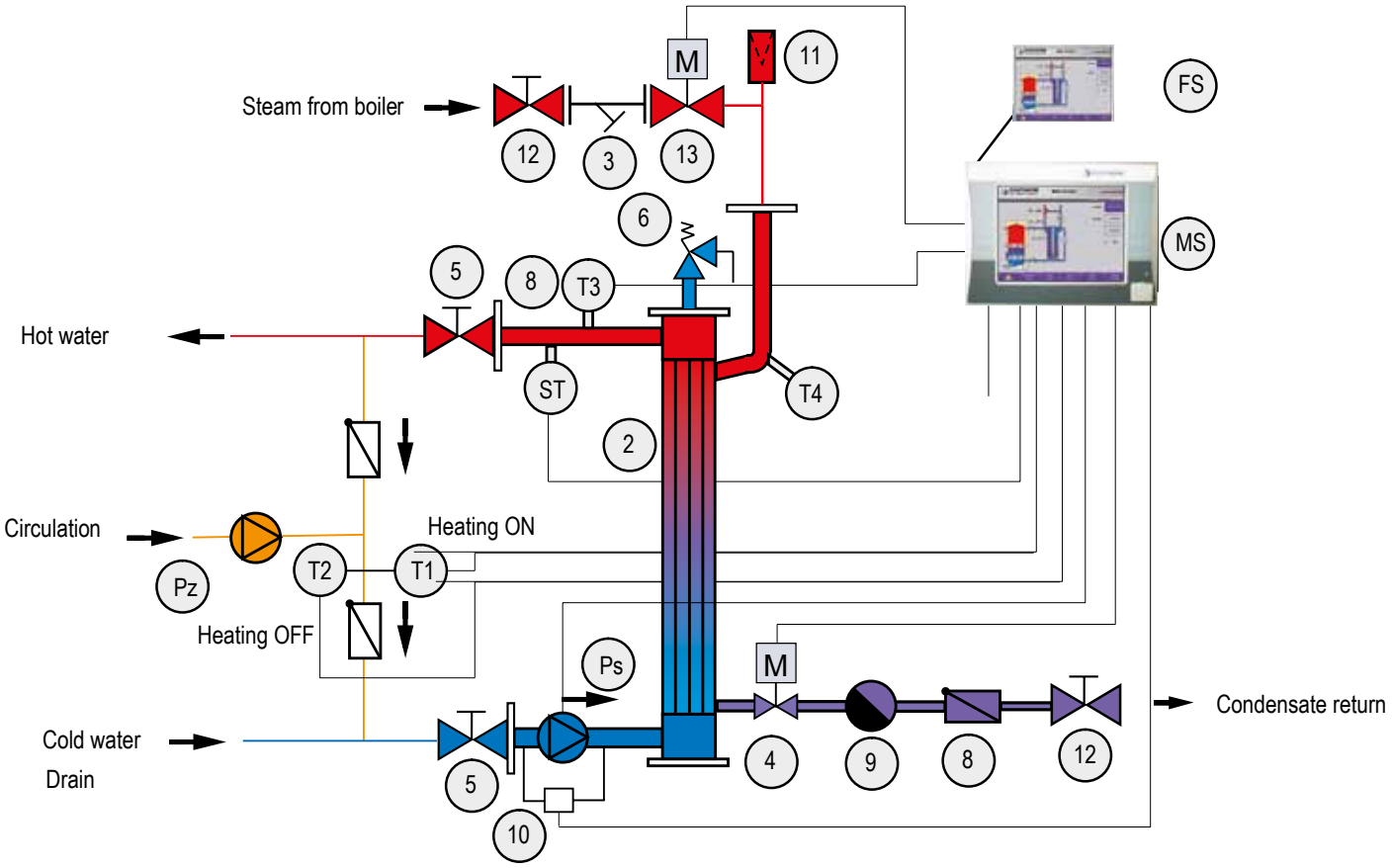
FS **Remote control software** for control and monitoring using a PC or BMS via TCP/IP network, or internet.

Model EDRE: High Capacity Water Heater
Instantaneous Water Heater

50 - 2,000 kW for steam / water operation

Description

- Optimum hygiene through short storage time of the hot water, low standby losses and small space requirements of the compact system due to high performance of the heat exchanger and small storage capacity.
- Highly efficient heat transfer and most extensive prevention of liming
  and scaling through self-cleaning effect of patented shell & tube heat exchangers with free floating turbulator rods made of stainless steel.
- Constant hot water temperature and highest comfort at the hot water supply by primary flow adjusting by condensate control valve. Steam-side barrier prevents overheating of the hot water in the heat exchanger. The heat exchanger block is pre-assembled and pre-wired at the factory with strainer, condensate drain, non-return valve, safety valve and shut off valve.
- Safe plant operation without danger of creeping performance decrease due microprocessor controlled storage regulation with differential
  pressure monitoring of the shell & tube heat exchanger.
- Microprocessor control with touch screen for clear and easy use. Possible remote monitoring and remote control of the system through Ethernet interface. Logging and monitoring of the performance of the system and the individual components.
- Production by TÜV certified welding company according to HP-0 and ISO 3834-2, approval to SVGW and certified according to ISO 9001: 2015.
- Simple installation and short mounting time due to pre-assembled units.
- Maximum pressure: secondary 6, or 10bar; primary 6 or 10bar; higher ratings possible on request



2 **Stainless steel heat exchanger** with patented free floating turbulating rods, pre-assembled with piping

3 **Strainer** to protect control components

4 **2 way condensate control valve with electric actuator** controlled by T3 to regulate the hot water temperature

5 **Manual gate valve** for inspection or removal of heat exchanger without draining the tank or losing service

6 **Safety pressure valve** set at 10 or 6 bar, corresponding to maximum tank operating pressure

7 **Automatic air vent** and anti-vacuum valve, with manual cock for rapid air expulsion during tank filling

8 **Non-return valve** for prevention of hot water/ condensate convection back flow during standby

9 **Steam trap** ensures protection of control components from steam

10 **Differential pressure sensor** for monitoring heat exchanger fouling

11 **Vacuum breaker**

12 **Shut off valve:** Shut off from steam and condensate system

13 **Two way high temperature safety and shut off valve** with electric actuator

T1 **Temperature sensor "heating on":** Signal to start preheating and charging

T2 **Temperature sensor "heating off":** Signal that heating is complete. Activation of anti-fouling cycle.

T3 **Temperature sensor to regulate the temperature of hot water entering the tank** by controlling the 2 way condensate control valve (item 4). Used also to monitor the anti-fouling cycle.

T4 **Temperature sensor monitoring the incoming steam temperature** to ensure that sufficient heat is available to produce hot water at the required temperature. Also for monitoring the anti-fouling cycle.

P_s **Secondary circuit pump** circulates cold domestic water from the bottom the the tank into the heat exchanger

ST **Safety thermostat** shuts down system if manually set temperature is exceeded

MS **Microprocessor control unit**

FS **Remote control software** for control and monitoring using a PC or BMS via TCP/IP network, or internet.

Model EHHE:
Hybrid High Capacity Water Heater
50 – 2.000 kW for water / steam operation

"The Green Calorifiers"

Enameling · Lining · Copper Lining · Solvents

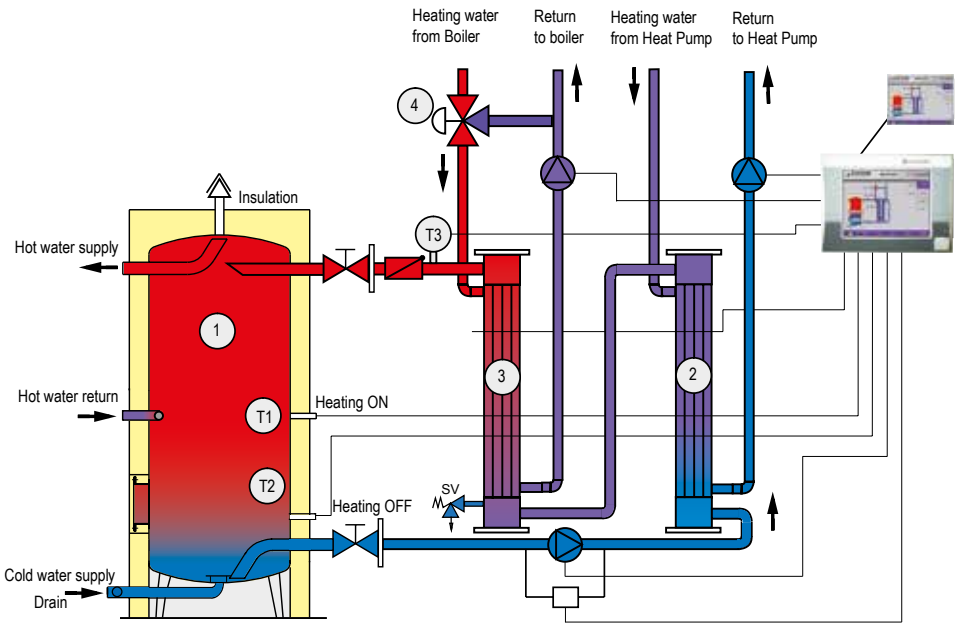
Two primary heat sources, one secondary connection

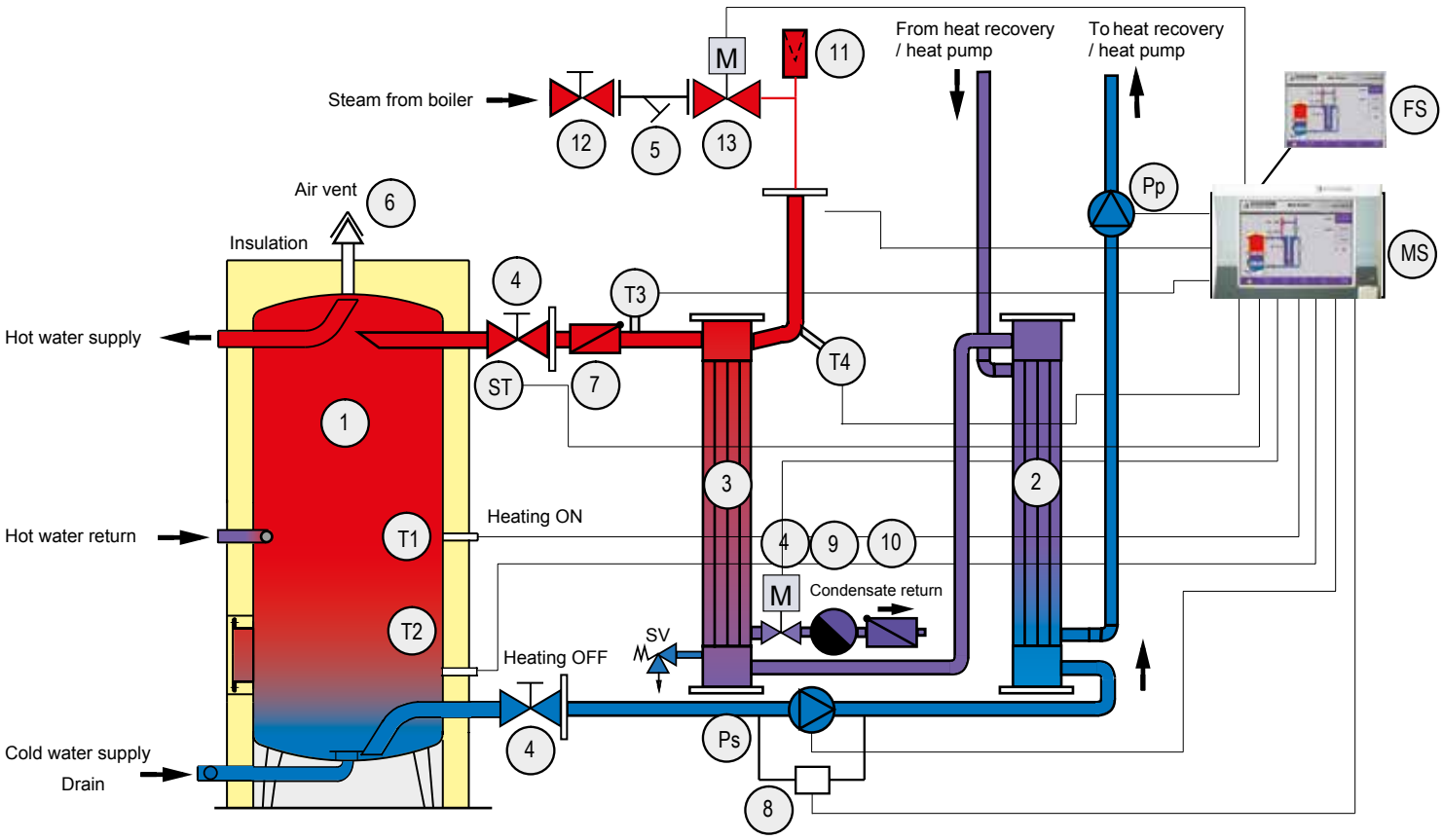
Description

- Multiple-stage heating of water in two shell and tube heat exchangers by individual and independent primary heat sources
- Efficient utilizing of the available heat sources with maximum hygiene since no stagnation of water with less than 60°C will occur
- Possibility of thermal disinfection of the water at >70°C in the second heat exchanger
- Highly efficient heat transfer and most extensive prevention of liming and scaling through self-cleaning effect of patented shell & tube heat exchangers with free floating turbulator rods made of stainless steel.
- Fibre-Fleece insulation of storage tank with robust outer sheathing made of PP (RAL 7037), patented aluminum closure strips and self-fixing closure caps, quick and easy installation, 80 mm insulation up to 1,000 liters and 100mm above. 100% recyclable, fire protection class B2 (B1 upon request)

Example

- Pre-heating of the water to e.g. 45°C by utilizing e.g. a heat pump or heat recovery of a chiller or any other waste heat
- Systems can be designed that the entire heating can be accomplished by the second primary source only, if the first primary source is not available





1 **Stainless steel hot water storage tank**, standing, with removable fibre-fleece insulation

2 **Stainless steel heat exchanger** for pre-heating with patented floating tubular rods, pre-assembled with piping

3 **Stainless steel heat exchanger** for after-heating with patented floating tubular rods, pre-assembled with piping

4 **2 way condensate control valve with electric actuator** controlled by T3 to regulate the hot water temperature

5 **Manual gate valve** for inspection or removal of heat exchanger without draining the tank or losing service

6 **Safety pressure valve** set at 10 or 6 bar, corresponding to maximum tank operating pressure

7 **Automatic air vent** and anti-vacuum valve, with manual cock for rapid air expulsion during tank filling

8 **Non-return valve** for prevention of hot water/ condensate convection back flow during standby

9 **Steam trap** ensures protection of control components from steam

10 **Differential pressure sensor** for monitoring heat exchanger fouling

11 **Vacuum breaker**

12 **Shut off valve:** Shut off from steam and condensate system Kondensatsystem ab

13 **Two way high temperature safety and shut off valve** with electric actuator

14 **Strainer** to protect control components

Model EHSF: High Capacity Water Heater with Spiral Flat Heating Coil

50 - 1,000 kW for water / water operation

"The Green Calorifiers"

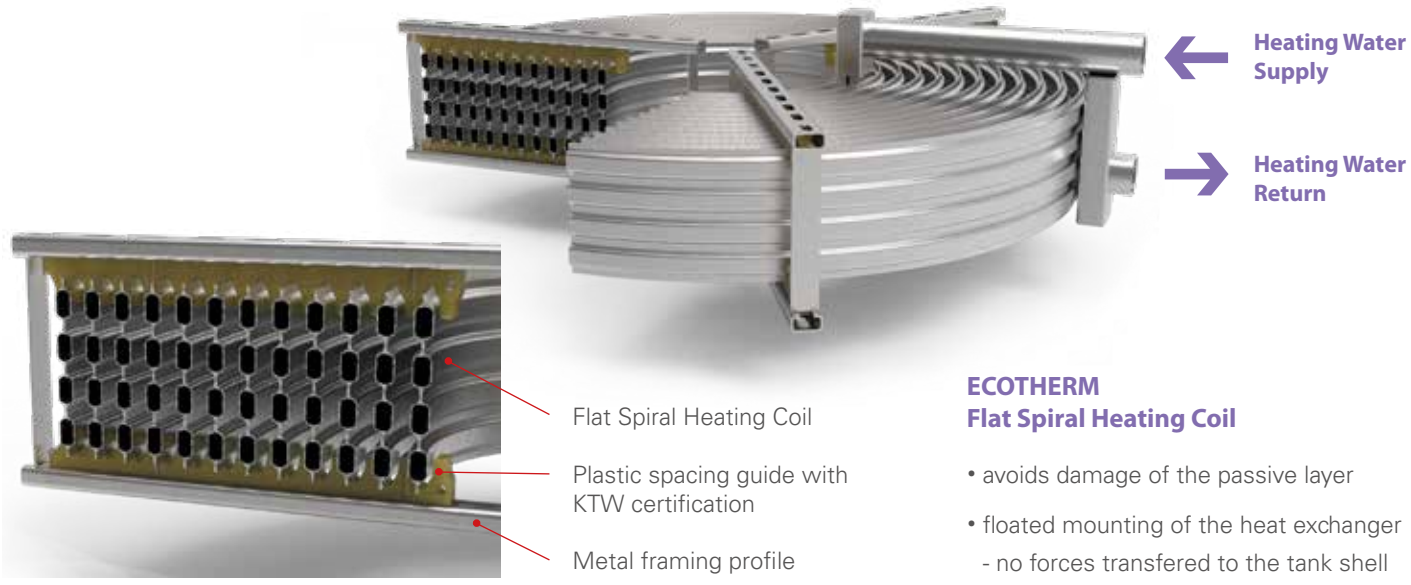
Enameling · Lining · Copper Lining · Solvents

EHSF 2000L

Description

The ECOTHERM's new patented high-performance spiral coil has a maximum heat exchange area in the cold water zone or in the desired temperature zone due to its design and horizontal installation.

- Storage water heater made of stainless steel duplex / V4A with patented high-performance flat heating coil welded at the bottom of the tank.
- Optimal performance and layering, almost 100% storage volume available, bath pickled, low maintenance, improved hygiene, flange DN 200 (and DN100 up 500 liter) at front for cleaning purpose or for mounting an additional heat exchanger or screw-in heating element, sleeve 6/4" for screw-in heating element in the upper third, sleeves ½" for thermometers and temperature sensors, cold water connection at the front, hot water outlet at the center top.
- Fibre-fleece insulation of storage tank with robust outer sheath made of PP (RAL7037, dusty grey), patented aluminum closure strips and self-fixing closure caps, quick and easy installation, 80mm insulation up to 1,000 litres and 100mm above. 100% recyclable, fire protection class B2 (B1 upon request)
- Production by TÜV certified welding company according to HP-0 and ISO 3834-2, approval to SVGW and certified according to ISO 9001: 2015.
- Simple installation and short mounting time due to pre-assembled units.
- Maximum pressure/testing pressure: secondary 6/9bar; primary 3/6bar



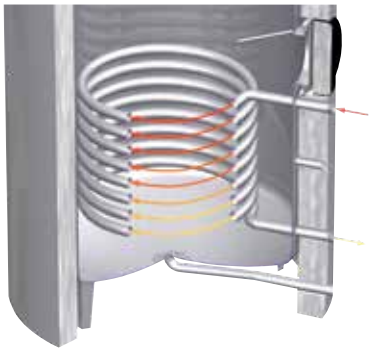
ECOTHERM
Flat Spiral Heating Coil

- avoids damage of the passive layer
- floated mounting of the heat exchanger - no forces transfered to the tank shell

Patented Spiral Flat Heating Coil

Conventional heating coils

Conventional heat exchangers are always in mixing temperature zones from 10°C to 60°C and thus have a reduced heat transfer rate. During the heating phase heating coils produce circulations in the storage tank and need more primary energy. The available standby volume is usually only about 70% of the capacity of the storage tank.

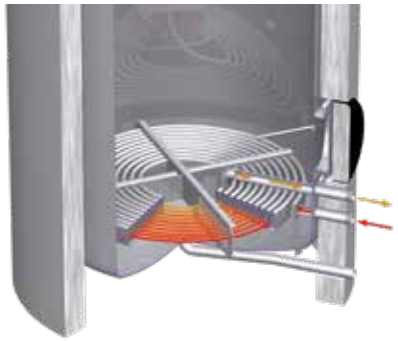


- Up to 30% reduced effective volume & risk of legionella
- Reduced power consumption and poor heat layering
- Limited heat exchanger surfaces and reduced installation options
- Increased primary energy consumption

ECOTHERM Spiral Flat Heating Coils

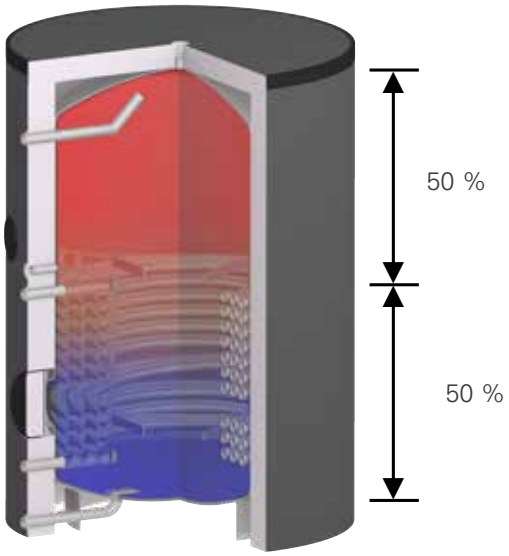
The patented spiral heating coil is mounted horizontally at the bottom of the storage tank. It is 100% in the cold water zone, respectively only in one temperature zone.

The installation directly above the tank bottom and the low height (13cm) allow an almost complete heating of the storage tank.



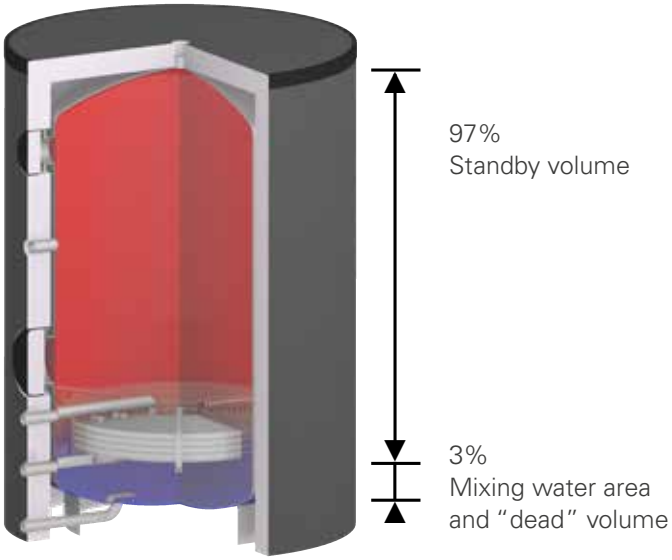
- The special construction of the register ensures:
- High standby volume (97% of the tank capacity)
- Hygienic water
- High efficiency due to efficient heat transfer
- Optimized heat layering
- Primary energy savings

Conventional heating coils



- 50% Standby volume
- 50% Mixing water area and "dead" volume

ECOTHERM Spiral Flat Heating Coils



- 97% Standby volume
- 3% Mixing water area and "dead" volume

Advantages

The requirements for a hot water system are quite clear: low initial costs, long life-time, stable operation, hygienic hot water, low maintenance costs, easy control and energy savings. ECOTHERM high capacity water heaters perfectly meet these requirements - and even more.

Due to the individual design of each system and the shell & tube heat exchanger with patented free floating turbulator rods, the system needs minimal floor space - this reduces the initial costs. Using high quality stainless steel together with automatic anti-fouling cycles results in perfect hygienic hot water. The experience of thousands of installations guarantees a stable operation with low maintenance costs. The modern ELC11 microprocessor control unit provides easy monitoring the system.

Since ECOTHERM hot water systems use minimal storage tank capacities, water is saved as well as energy. The self-developed fibre-fleece insulation reduces the heat losses up to 30 percent.

Top-12-Advantages

ECOTHERM
"The Green Calorifiers"
Energy & Space Saving

Sustainability

Insulation
From recycled PET-bottles, 100% recyclable, not flammable

Water Heaters
Stainless Steel, 100% recyclable

Maximum savings
Energy efficient, minimal maintenance costs

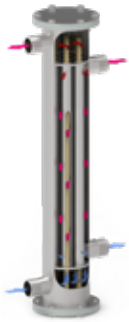
Minimal floor space requirements
E.g. Less than 20 m² for a 500 room hotel

Hygienic fresh water system
Hot water is generated on demand, low capacity of calorifiers, anti-legionella and anti-fouling cycle

Premium quality
Water heaters and heat exchangers made of stainless steel 316 or duplex stainless steel

Simple on-site assembly
Pre-installed, wired, compact packaging

Individuality
Each system is individually designed and optimized



Efficiency
High capacity shell & tube heat exchanger with patented free floating turbulator rods

12°C to 60°C in one second

Easy control
Microprocessor control touch panel, remote control, BMS, Anti-Legionella & Anti-Fouling-Cycle

Experience
Thousands of installations worldwide

ECOTHERM Academy
Best training and support

ECOTHERM design tools

ECOTHERM's leading edge technology is based on solid foundations. Thanks to decades of experience gained from thousands of high capacity water heater installations, ECOTHERM has created unique design databases using modeling software based on actual installations and over 65,000 performance measurements taken on their purpose built testing. The software ECOSIZE individually designs your system according to these data. Dimensioning according to DIN 4708 or ASHRAE is possible.

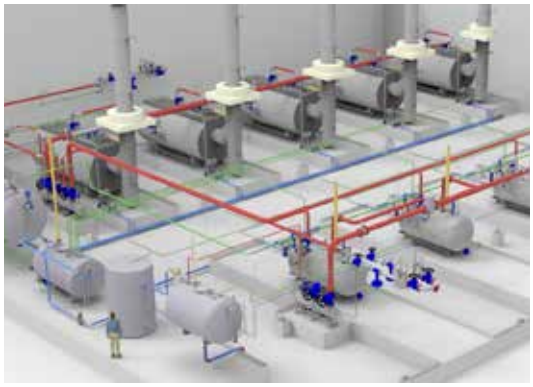
ECOSIZE

Use our self-developed software "ECOSIZE" in order to design your optimal ECOTHERM solution. Apply for your personal login in the member area of our website to have access to the online version of ECOSIZE.

ecosize.ecotherm.com

Virtual Reality

Virtual or Augmented Reality is an interactive computer-generated experience within a simulated environment. It allows new forms of communication between companies and their customers, supporting current manners of customer service. Ecotherm offers virtual reality models of complete turnkey systems for realistic product presentations and simple cooperation without on-site presence.



Scan this QR-Code for a VR model of a complete Ecotherm Turnkey System.

Simple on-site assembly

All components are pre-installed and wired in kit form for simple assembly by the customer. Delivery packages are designed small and lightweight enough to be carried to the installation site through normal doorways without the necessity for special lifting gear wherever possible.

A Lightweight stainless steel storage tank
B Fibre-fleece insulation
C Pre-assembled and wired heat exchanger, pumps, control unit etc.

Problem: Fouling & Legionella

It is important to consider fouling when choosing a water heater. Lime scale fouling leads to reduced energy efficiency and potential hygiene hazards. Regular cleaning of heat exchangers and removal of lime scale results in high maintenance costs.

Lime scale encrusts heating coils

Performance and efficiency of conventional storage water heaters decay rapidly after a while in service. This is caused by lime scale encrusting the heating coils and acting as an undesirable thermal insulator.

Even ½ mm of lime scale significantly reduces overall heat transfer efficiency, as shown in the sample calculation below.

Effects of lime scale on heat transfer efficiency

Sample calculation showing the reduction of performance caused by ½ mm layer of lime scale

$$\text{Heat transfer rate} = \frac{1}{\frac{1}{\alpha_1} + \frac{s_1}{\lambda_1} + \frac{s_2}{\lambda_2} + \frac{1}{\alpha_2}} \ \text{W/m}^2\text{K}$$

α_1	= 10,000 W/m²K	Primary circuit (steam)
α_2	= 4,600 W/m²K	Secondary circuit (water)
s_1	= 1 mm	Wall thickness of heat exchanger element
λ_1	= 20 W/m²K	Heat conductivity of heat exchanger element
s_2	= 0.5 mm	Thickness of lime scale
λ_2	= 0.81 W/mK	Heat conductivity of lime scale

No lime scale
Heat transfer rate

$$= \frac{1}{\frac{1}{10000} + \frac{0.001}{20} + \frac{0}{0.81} + \frac{1}{4600}} = \mathbf{2.721} \ \text{W/m}^2\text{K}$$

½ mm lime scale
Heat transfer rate

$$= \frac{1}{\frac{1}{10000} + \frac{0.001}{20} + \frac{0.0005}{0.81} + \frac{1}{4600}} = \mathbf{1.015} \ \text{W/m}^2\text{K}$$

Reduction of heat transfer rate = **62%**

What is Legionnaires' disease?

Legionnaires' disease is one of a group of diseases collectively known as legionellosis. Legionella pneumophilla is the bacterium responsible for two types of diseases named Pontiac fever and Legionnaires' disease. The majority of people exposed to the bacteria will contract pontiac fever. A small percentage will contract the much more serious legionnaires' disease.

Who is most at risk?

Most at risk are smokers, elderly people and people suffering from chronic respiratory diseases.

Where is Legionella found?

Legionella bacteria is commonly found in many recirculating and hot and cold water systems. It is transmitted by airborne aerosol from showers, cooling towers, spa pools, fountains etc. and inhaled by the person affected. Water temperatures between 20°C and 45°C favors the growth of legionella micro-organisms.

ECOTHERM high capacity water heaters after 12 months in operation: almost no lime scale.

Tube heat exchanger after 12 months in operation: completely calcified. On the left: new exchanger for replacement

Plate heat exchanger after 6 months in operation: a large part of the paths are calcified – intensive cleaning is necessary.

Avoidance due to innovative ECOTHERM solutions

ECOTHERM for maximum heat transfer efficiency

ECOTHERM high capacity water heaters are equipped with features that effectively combat fouling.

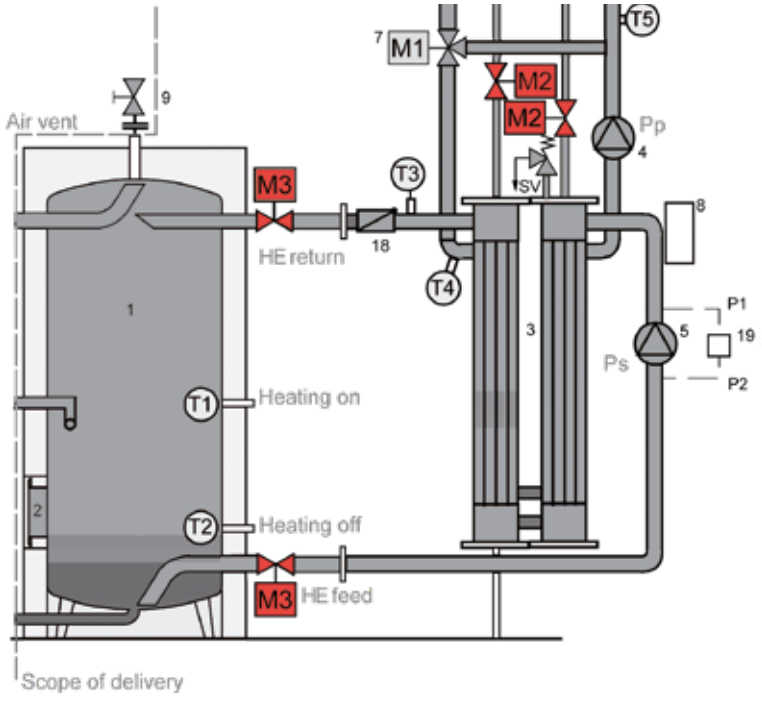
- Free floating turbulator rods with self cleaning effect
- Microprocessor anti-fouling cycle
- External cold water flushing

The heat transfer efficiency of ECOTHERM high capacity water heaters does not decay due to fouling build up. Efficiency is maintained at maximum level throughout the whole life of the water heater.

External cold water flush

ECOTHERM high capacity water heaters have an internal cold water flush, which is automatically activated by the microprocessor control. For water with a German hardness from 13 dH ECOTHERM recommends an additional external cold water flushing.

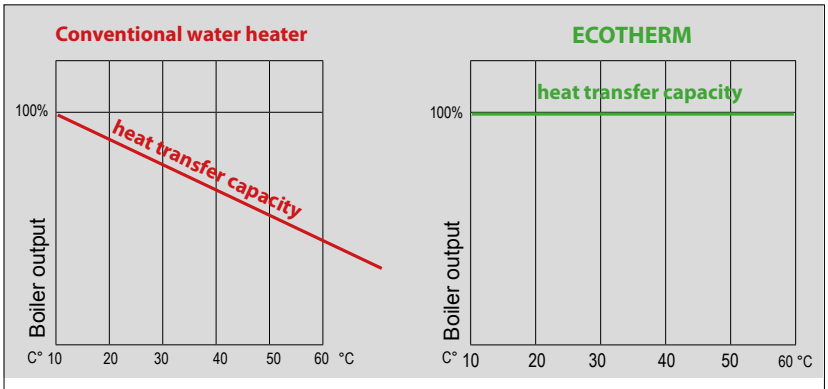
When the system stops operation after loading the storage tank (at 60°C), the heat exchanger is very hot. Two motorized valves to the storage tank are automatically closed, two motorized valves at the additional cold water connection are opened. Then the heat exchanger gets flushed with cold water and cooled down to 40°C. Thus, the building of scaling significantly is reduced.



M2 *)... Motorized valve for flushing the heat exchanger with fresh cold water
M3 *)... Motorized valve cuts off the heat exchanger from the storage tank

Energy efficiency

It is important to consider energy efficiency when choosing a water heater. Energy wastage will lead to high operating costs due to unnecessary fuel consumption.



The rate of heat absorption by conventional water heaters diminishes as the temperature of the hot water rises. ECOTHERM absorbs full boiler output at all temperatures.

Conventional Water Heaters

Surplus hot water availability
Conventional water heaters with their large storage cylinders and long heat-up times must store the maximum peak volume of heated water at all times, even during periods of low demand. Maintaining this peak volume at full temperature at all times leads to high rates of energy consumption as explained below.

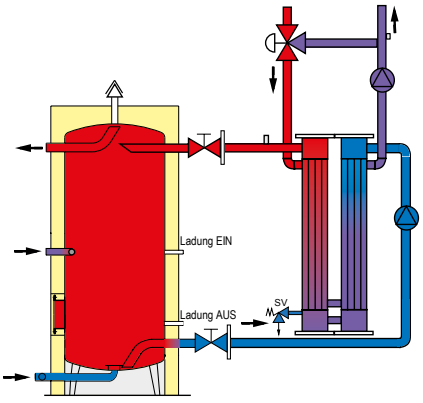
Poor thermal conductor
Since static water is a moderately poor thermal conductor. High boiler output temperatures and large heating coil surface areas are necessary for adequate heat transfer performance, higher boiler temperatures aggravate the problem of lime scaling, which act as a heat insulator and significantly reduce the performance of the heating coil. The formation of lime scale combined with cool zones in conventional cylinders endanger water hygiene and increase the risk of legionella contamination.

Fuel wastage during periods of low hot water demand
A major problem with conventional storage cylinders is high energy consumption during periods of low hot water demand. As the water heats up towards its final temperature, the diminishing temperature difference to the output temperature of the boiler results in a reduced rate of heat absorption from the boiler. This low level of energy requirement causes the boiler control system to repeatedly trigger on and off. Boilers that repeatedly cycle on and off cannot reach normal operating temperature and therefore suffer from high fuel consumption.

Cascading conventional cylinders
Switching off some of the cascaded cylinders to standby during the low season brings only sluggish improvement to the problem of high energy consumption. In most applications demand fluctuates regularly between lowest and highest levels on a daily or weekly cycle. Stagnating warm water in the standby cylinders gravely endangers hygiene by enabling rapid growth of legionella bacteria.

ECOTHERM High Capacity Water Heaters

ECOTHERM Domestic Hot Water Charging Systems
ECOTHERM systems are fresh water modules although they use a stainless steel storage tank. The storage tank is used as a hygienic switch, allows a optimal integration of the circulation and spares a cascade system. In addition, the storage tank optimally compensates minimum and peak demands. The microprocessor control monitors the temperature level and ensures the hygiene of the system.



ECOTHERM efficiently meets fluctuating demand
ECOTHERM high capacity water heaters do not store hot water inefficiently during periods of low demand, but are capable of instantaneous reaction to short term demand fluctuations without wasting fuel.

ECOTHERM high capacity water heater save primary energy (oil, gas or electricity). Additional maintenance costs are minimized.

ECOTHERM's temperature layering
ECOTHERM's vertical storage buffers with their ability to form very stable temperature layers are a useful tool for saving fuel during periods of low demand. Low level hot water demand will not trigger the boiler until the storage buffer has used up about half of its hot water.

ECOTHERM buffer tanks have a long life time due to the high quality workmanship and the high quality stainless steel 1.4571/Duplex.

Space saving & perfect hygiene

Grosvenor House Hotel, Dubai – ECOTHERM Turnkey Hot Water System

The design proposal from the MEP consultant on the project in Tower One for the hot water system had a capacity of 64,000 liters. The hot water system specialists of ECOTHERM decided to redesign the entire system so as to reduce its storage capacity.

ECOTHERM reduced the hotel's storage capacity for its hot water system from 64,000 to 8,000 liters as part of its plan to reduce space and make the system more efficient, thereby helping the client to increase its energy savings. "It's about energy saving, because with a conventional system, when it is at full capacity or at peak demand, the hot water temperature will go down and you'll require a heat up time of about half an hour, and everyone is waiting under the shower till the hot water comes. But with our system, we produce hot water instantly, at the required temperature," Herbert Bremstaller, CEO of ECOTHERM Austria GmbH, explains. "The energy being used to heat up 64,000 liters, and keep it holding at 60°C throughout the day, we save that by heating on demand," Bremstaller adds. Because of the use of the shell and tube exchanger with free floating turbulator rods, the system can heat up water in one second. In comparison conventional hot water systems, where internal heat exchangers require a long time to heat up and the boiler's burner will have to be constantly turned off and on, waste a lot of energy.

744 Rooms, 45 floors, two towers

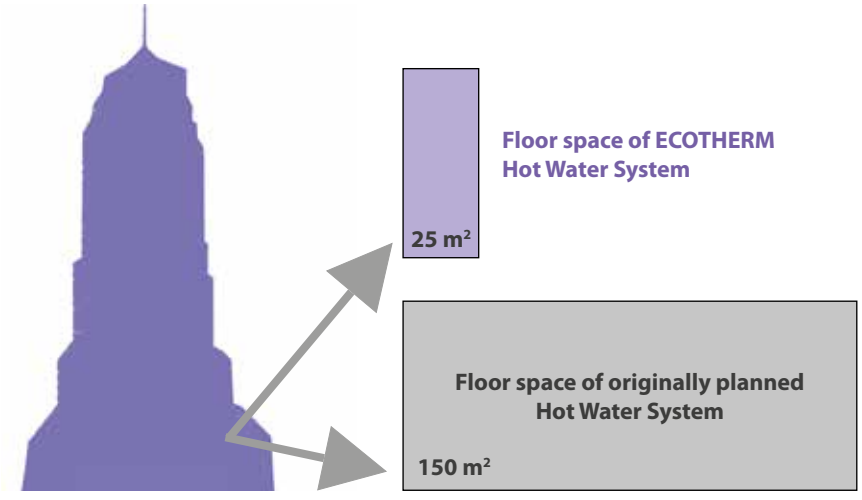
Tower One: ECOTHERM Turnkey Hot Water System

- 2x gas fired triple pass boilers, each 1,900 kW
- 4x ECOTHERM high capacity water heaters, each 2,000 l and 800 kW
- Total capacity: 3,200 kW and 8,000 liters
- Maximum system capacity: 76,500 liters hot water at 60°C/h

Tower Two: ECOTHERM Turnkey Hot Water System

- 2x gas fired triple pass boilers, each 1,200 kW
- 2x ECOTHERM high capacity water heaters, each 2,000 l and 1,000 kW
- Total capacity: 2,000 kW and 4,000 liters
- Maximum system capacity: 47,000 liters hot water at 60°C/h

This reduction in energy usage is especially useful because during the peak hot water demand, the hotel uses around 28,000 liters of water per hour at 60°C. This happens around four times a day.



ECOTHERM's hot water system at Tower Two of Grosvenor House Hotel in Dubai with two gas fired triple-pass boilers and two stainless steel high capacity water heaters.

Originally the hot water system for Tower One was proposed with a capacity of 64,000 liters. ECOTHERM redesigned the system using only 4,000 liters reaching the same desired hot water output.

Refurbishment: enormous savings

ECOTHERM water heaters also of ECOTHERM water heaters also offer a variety of advantages at refurbishment. The following example will illustrate this.

Example: Hotel

A hotel in Mexico with 750 rooms. The old hot water system in the basement consisted of four storage tanks, each with 10,000 liters capacity. After heating up the water, it stagnated in the storage tanks for a long time and then cooled down quite rapidly due to the large surface of the tanks. The risk for the development of legionella was very high. In addition, this circumstance gave rise to fouling which further leads to corrosion of the storage tanks.

Refurbishment needed

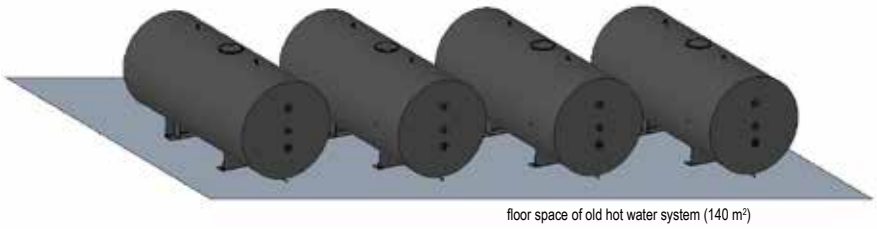
Thus, after 30 years of operation, the refurbishment of the system was necessary. It was not possible to transport storage tanks at the same size into the boiler room. Searching for an alternative solution the hotel owner decided for a hot water system of ECOTHERM.

Highest quality and efficiency

One single EDRE High Capacity Water Heater from ECOTHERM with 2x 1,250 kW & 1,000 liters capacity can supply the required hot water in just 8m² floor space. The advantages: high quality stainless steel, optimal hygiene providing fresh hot water just on demand, prevention of fouling due to shell & tube heat exchanger with patented free floating turbulator rods with self cleaning effect, microprocessor control with monitoring of all important parameters, highly efficient use of the burner.

Old hot water system

- 4x 10.000 liters storage tanks
- 140 m² floor space
- stagnating hot water
- danger of forming legionella
- corrosive storage tanks
- high energy loss by heat radiation
- high primary energy consumption
- by burner due to inefficient combustion



floor space of old hot water system (140 m²)

After heating the water in the huge storage tanks, the hot water stagnated over a long period. Legionella and fouling caused serious problems.

Four hot water storage tanks, each with a capacity of 10,000 liters, were situated in the 140 square meters boiler room (high radiation losses due to the large surface).

New ECOTHERM hot water system

- 1x 1.000 liters storage tank
- 2x shell & tube heat exchangers each with 1,250 kW
- 8m² floor space
- fresh water unit
- perfect hygiene
- components made of stainless steel
- 22 percent savings at fuel
- minimal fouling
- minimal maintenance costs

Floor space of new ECOTHERM system (8 m²)

The ECOTHERM High Capacity Water Heater EDRE with 2x 1,250 kW requires only 8 m² floor space and one storage tank with 1,000 liters.

Saving money when buying an ECOTHERM system

Turnkey systems from ECOTHERM meet highest quality demands and are highly efficient. Therefore, the investment costs are higher compared to other systems.
But the annual savings of the primary energy (oil, gas or electricity), reduced heat losses at the storage tank, lower maintenance costs and a significantly longer service life compared to conventional systems are convincing arguments for an ECOTHERM system.

Save up to 95% floor space

One of the most convincing arguments is in addition the small floor space requirements. Due to the ECOTHERM high performance shell & tube heat exchangers with the patented free floating turbulator rods, the required hot water is produced mainly on demand. Thus only very small storage volumes are required.

This saves space in the boiler room, and therefore saves also money. Below we present an example and calculate the cost savings only due to the space savings. We used recent square metre prices for new built properties as a basis (minus 75 percent as price per square metre for the boiler room).

Example: Hotel (400 rooms)
- Hot water demand: 25,000 liters/hour at 60 °C

Conventional system:
- 4x 10,000 liters storage tank = € 65,000
- Required space 140 m² = € 101,500 building costs
- Total investment = **€ 166,500**

ECOTHERM system:
- 2x EHRE systems with 100% backup = € 99,000
- Required space 12 m² = € 8,700 building costs
- Total investment = **€ 107,700**

Savings at investment costs: € 58,800

Source for real estate prices: immopreisatlas.at

An ECOTHERM hot water system with a 2,000 liters storage tank and two heat exchangers, each with 1,500kW, supplies up to 25,000 liters of perfect hygienic hot water per hour at 60°C with 100 percent backup - sufficient for a 500 room hotel.

Saving money during operation of an ECOTHERM plant

In the following example, the savings of a hot water system with ECOTHERM high performance water heaters are compared with a conventional system.

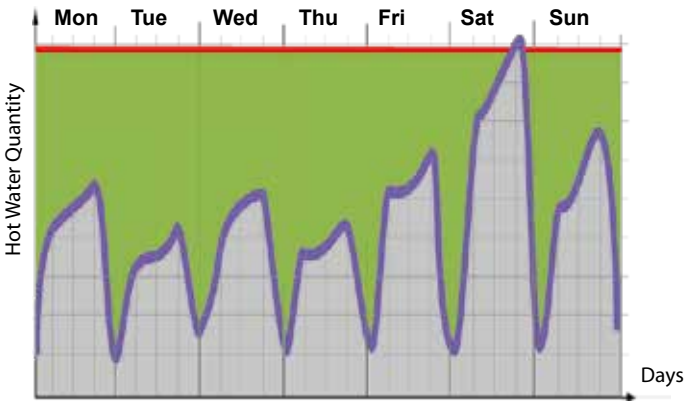
Example

- Hotel with 400 rooms
- Boiler with 1,200kW, 80°C > 70°C
- Continuous hot water demand: 20,000 liters/hour, 12°C > 60°C

Specification	Conventional	ECOTHERM
Hot water storage capacity	20000 litres	3000 litres
Surface area of heat exchanger	50 m²	8,5m²
Heat transfer rate	500W/m2K	3890W/m2K
Total heat transfer capacity	900kW	1200kW
Burner starts per day	33	13
Overall fuel efficiency	60%	76%
Annual energy demand	2122MWh	2122MWh
Annual fuel energy demand	2970MWh	2631MWh
Annual storage heat loss	20MWh	1,75MWh
Annual scaling heat loss	up to 25%	
Annual boiler heat loss	up to 2%	
Annual burner heat loss	up to 20%	
Loss of heating performance due to fouling	yes	no
Major maintenance costs	yes	no

Hot water on demand

The following chart shows the undesirable surplus availability of hot water caused by conventional storage water heaters. Due to their large storage capacities and long heat-up times they are forced to store the peak volume of heated water at all times, even during periods of low demand. This surplus availability of hot water means higher operating costs due to higher fuel consumption.



shows hot water availability with conventional storage tanks. Peak availability at all times, even during periods of low demand. Dark grey area represents unnecessary hot water availability causing excessive heat loss and fuel wastage.

shows how the ECOTHERM high capacity water heater exactly match energy expenditure to fluctuating demand. Minimal energy wastage during periods of low demand.

Light gray area shows large fluctuation of hot water demand in an apartment house with shared water heating. Similar patterns apply for hospitals and hotels.

energy saving potential

ECOTHERM EHRE and EDRE

- Save fuel
- Save floor space
- Save maintenance costs
- Improve water hygiene

Burners provide the necessary energy for the water heaters to produce domestic water at 60°C.

ECOTHERM Academy

The aim of the ECOTHERM Academy is the strategically planned training of all employees and partners. The ECOTHERM Academy systematically identifies the needs and wishes of all participants for trainings and seminars. The strategic aims of the company for the next three years are also be considered at planning. In addition, the Academy offers optional courses from different areas.

THE ECOTHERM International Support Centre in Dubai plays a central role in the implementation of the courses on an international level. The basis for the training courses is a library of so-called "ECOCELLS". These presentations or videos cover all important issues that have to be trained.

Model EHRE: Performance data

Performance data model EHRE (hot water / water)
for secondary temperatures of 20/60°C
for primary temperatures of 85/65°C, 75/55°C and 70/40°C (hot water)

Model	Nominal rating *)	Primary flow [m^3/h]			Continuous hot water output [l/h]
Model	kW	70°C - 40°C	75°C - 55°C	85°C - 65°C	20°C - 60°C
EHRE	50	1,4	2,1	2,1	1.075
EHRE	75	2,1	3,2	3,2	1.612
EHRE	100	2,9	4,3	4,3	2.150
EHRE	150	4,3	6,4	6,4	3.224
EHRE	200	5,8	8,6	8,6	4.299
EHRE	250	7,2	10,7	10,7	5.374
EHRE	300	8,6	12,9	12,9	6.449
EHRE	350	10	15	15	7.524
EHRE	400	11,5	17,2	17,2	8.598
EHRE	450	12,9	19,3	19,3	9,673
EHRE	500	14,3	21,5	21,5	10.748
EHRE	550	15,8	23,6	23,6	11.823
EHRE	600	17,2	25,8	25,8	12.898
EHRE	700	20,1	30,1	30,1	15.047
EHRE	800	22,9	34,4	34,4	17.197
EHRE	900	25,8	38,7	38,7	19.347
EHRE	1000	28,7	43	43	21.496

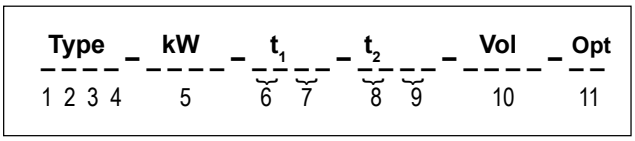
**) higher or other nominal ratings available on request*

If hot water is required at a temperature of 45°C, ECOTHERM recommends that the water is heated up to 60°C in the storage tank and then reduced to 45°C using a mixing unit and cold water. The high temperature of 60°C prevents the development of Legionella and guarantees hygienic hot water.

Conversion factor for Imp. gallon:

1 liter = 0.22 gallons
1 gallon = 4.546 liters

EHRE: key to model number



Type

1st digit: **E** = ECOTHERM high capacity water heater
2nd digit: **H** = heating water type boiler
3rd digit: **R** = shell and tube heat exchanger
4th digit: **E** = electronic control

kW
5th digit: heat exchanger nominal rating in kilowatt

t_1
6th digit: feed temperature from boiler in °C
7th digit: return temperature to boiler in °C

t_2
8th digit: domestic cold water inlet temperature in °C
9th digit: domestic hot water output temperature in °C

Vol
10th digit: tank capacity in liters

Opt - Options
11th digit: F = violet front cover, **D** = double tank,
N = network remote control, **M** = modem remote control,
A = electric anode, **T5** = sensor for district heating, **E** = external anti-fouling cooling, **S** = heat exchanger sludge flushing kit

Model EDRE: Performance data

Performance data model EDRE (steam / water)
for secondary temperatures of 20/60°C
for primary temperatures of 155/95°C (over pressure 4.5bar(g), condensate pressure 0.5bar)

Model	Nominal rating *)	Primary flow [kg/h]	Continuous hot water output [l/h]
Model	kW	155°C (4,5 bar) - 95°C	20°C - 60°C
EDRE	100	172	2.150
EDRE	200	344	4.299
EDRE	300	516	6.499
EDRE	400	688	8.598
EDRE	500	860	10.748
EDRE	600	1.032	12.898
EDRE	700	1.204	15.047
EDRE	800	1.376	17.197
EDRE	900	1.548	19.347
EDRE	1000	1.720	21.496
EDRE	1250	2.150	26.870
EDRE	1500	2.580	32.244
EDRE	1750	3.010	37.618
EDRE	2000	3.440	42.992

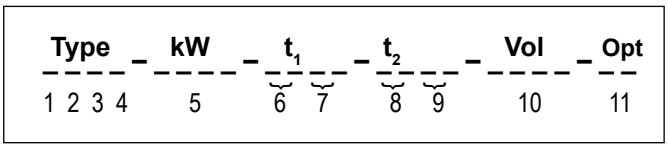
**) higher steam pressure or other nominal ratings available on request*

Performance parameters: saturated steam 4,5 bar(g)/155°C, cold water 20°C,
hot water 60°C in tank, 45°C after the mixing unit
The boiler performance rating (kilowatt) must at least match the required performance rating of the overall system to ensure correct operation.

Conversion factor for Imp. gallon:

1 liter	=	0.22	gallons
1 gallon	=	4.546	liters

EDRE: key to model number



Type

1st digit: **E** = ECOTHERM high capacity water heater
2nd digit: **D** = steam boiler
3rd digit: **R** = shell and tube heat exchanger
4th digit: **E / M** = electronic control / mechanical control

kW
5th digit: heat exchanger nominal rating in kilowatt

t_1
6th digit: feed temperature from boiler in °C
7th digit: return temperature to boiler in °C

t_2
8th digit: domestic cold water inlet temperature in °C
9th digit: domestic hot water output temperature in °C

Vol
10th digit: tank capacity in liters

Opt - Options
11th digit: **D** = double tank, **N** = network remote control,
M = modem remote control, **A** = electric anode,
E = external anti-fouling cooling, **S** = heat exchanger sludge flushing kit

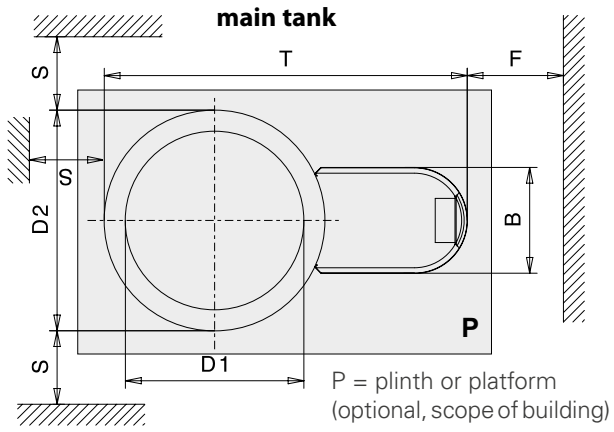
Floor space requirements EHRE & EDRE

The required floor space of mechanical and electrical equipment plays an important role when it comes to determining the overall building costs. Conventional storage type water heaters require a large amount of space. ECOTHERM EHRE & EDRE high capacity water heaters require up to 95 % less floor space. These savings can lead to a significant reduction of the total costs of the establishment of a new building.

space requirement for main tank

storage capacity	B*	D1	D2	F min.	S min.	T	P min.	tank weight (empty)
liters	mm	mm	mm	mm	mm	mm	mm	kg
300	500	500	660	1000	600	1460	1860 x 1060	50
540	500	650	810	1000	600	1610	2010 x 1210	65
750	500	750	910	1000	600	1710	2110 x 1310	85
1000	500	890	1050	1200	600	1910	2250 x 1450	115
1250	500	950	1150	1200	600	1950	2350 x 1550	150
1500	500	1100	1300	1200	600	2100	2500 x 1700	200
2000	500	1250	1450	1400	600	2250	2650 x 1850	235
2500	500	1350	1550	1400	600	2350	2750 x 1950	300
3000	500	1350	1550	1400	600	2350	2750 x 1950	335
4000	500	1500	1700	1600	600	2500	2900 x 2100	460
5000	500	1650	1850	1600	600	2650	3050 x 2250	500

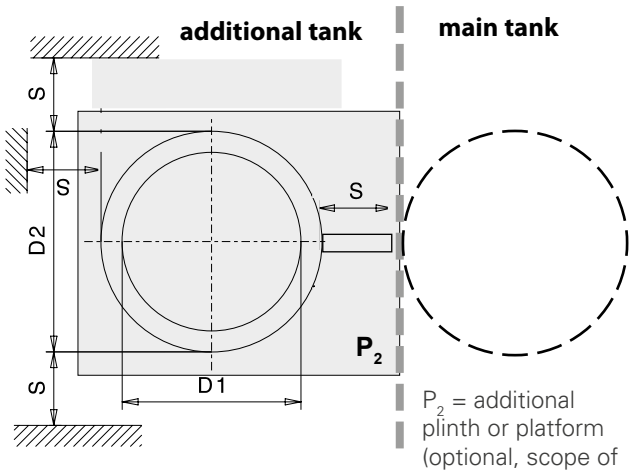
) heat exchanger > 300 kW B= 710 mm



P = plinth or platform (optional, scope of building)

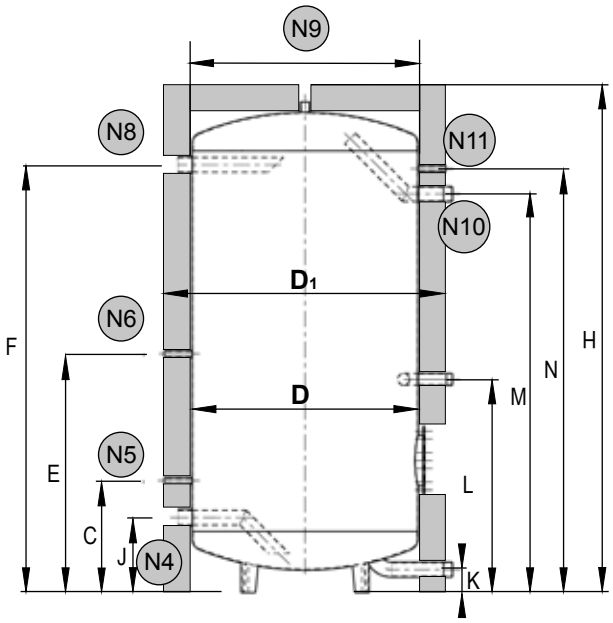
space requirement for each additional tank

storage capacity	D1	D2	S Minimum	additional plinth P_2 Minimum
liters	mm	mm	mm	mm
300	500	660	600	1530 x 1060
540	650	810	600	1710 x 1210
750	750	910	600	1810 x 1310
1000	890	1050	600	1950 x 1450
1250	950	1150	600	2050 x 1550
1500	1100	1300	600	2220 x 1700
2000	1250	1470	600	2350 x 1850
2500	1350	1550	600	2450 x 1950
3000	1350	1570	600	2470 x 1970
4000	1500	1700	600	2600 x 2100
5000	1650	1850	600	2750 x 2250



P_2 = additional plinth or platform (optional, scope of building)

Port dimensions and heights



piping port sizes

port Nr.	port size	function description
N1/N2	2" AG	cold water port / drain
N3 smaller than 3.000 l	Di 200	purification flange
N3 bigger than 3.000 l	Di 400	manhole
N4	2" IG	outlet to external heat exchanger
N5/N6	1/2" IG	temperature sensors (N6=T1/ein, N5=T2/aus)
N7	6/4" AG	circulation port
N8	2" IG	inlet from external heat exchanger
N9	1" IG	air vent
N10	2" AG	hot water port

piping connection heights, overall height

Storage Capacity	D	D1	H	F	J	C	E	K	L	M	N	Weight
Liter	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
300	500	700	1922	1685	295	440	940	90	840	1570	1580	71
540	650	850	1942	1685	295	440	940	90	840	1570	1580	85
750	750	950	1952	1685	295	440	940	90	840	1570	1660	113
1000	890	1090	1963	1685	295	440	940	90	840	1570	1660	147
1250	950	1190	1969	1685	295	440	940	90	840	1570	1660	197
1500	1100	1340	2003	1705	315	460	960	90	860	1590	1660	228
2000	1250	1490	2040	1705	315	460	960	90	860	1590	1660	335
2500	1350	1590	2100	1705	315	460	960	90	860	2090	1660	417
3000	1350	1590	2615	1705	315	460	960	90	1060	2190	2160	470
4000	1500	1740	2630	1805	415	560	1060	90	1160	2190	2210	557
5000	1650	1890	2900	1805	415	560	1060	90	1160	2190	2210	662
6000	1650	1890	3000	1840	450	600	1100	90	1300	2500	2230	740
7000	1900	2140	3500	1840	450	675	1175	90	1430	2821	2230	825
8000	1900	2140	4100	1920	530	675	1175	120	1580	3121	2230	910

Type: EHSF
Performance Data

One heating coil

Type	volume [l]	temperature primary 75°C - 55°C / temperature secondary 20°C - 60°C		temperature primary 85°C - 65°C / temperature secondary 20°C - 60°C		temperature primary 60°C - 55°C / temperature secondary 20°C - 55°C	
		capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]
EHSF-400-2,5	400	54	1161	77	1655	35	752
EHSF-630-3	630	64	1376	92	1978	42	903
EHSF-800-4,2	800	90	1935	129	2773	59	1268
EHSF-1000-5,5	1000	117	2515	169	3633	77	1655
EHSF-1250-7	1250	149	3203	215	4622	98	2107
EHSF-1500-9,4	1500	200	4299	288	6191	131	2816
EHSF-2000-11,2	2000	238	5116	344	7395	156	3353
EHSF-3000-13,2	3000	281	6040	405	8706	183	3934
EHSF-4000-15,3	4000	325	6986	469	10082	213	4579

Two heating coils

Type	volume [l]	temperature primary 75°C - 55°C / temperature secondary 20°C - 60°C		temperature primary 85°C - 65°C / temperature secondary 20°C - 60°C		temperature primary 60°C - 55°C / temperature secondary 20°C - 55°C	
		capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]
EHSF-400-5,1	400	109	2343	157	3375	71	1526
EHSF-630-6,1	630	130	2794	187	4020	85	1827
EHSF-800-8,4	800	179	3848	258	5546	117	2515
EHSF-1000-11	1000	234	5030	337	7244	153	3289
EHSF-1250-14	1250	298	6406	429	9222	195	4192
EHSF-1500-18,8	1500	400	8598	576	12382	261	5610
EHSF-2000-22,4	2000	476	10232	687	14768	311	6685
EHSF-3000-26,4	3000	561	12059	809	17390	366	7868
EHSF-4000-30,6	4000	650	13972	938	20163	425	9136

Three heating coils

		temperature primary 75°C - 55°C		temperature primary 8 5°C - 65°C		temperature primary 60°C - 55°C	
		temperature secondary 20°C - 60°C		temperature secondary 20°C - 60°C		temperature secondary 20°C - 55°C	
Type	volume [l]	capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]
EHSF-400-7,6	400	162	3482	233	5009	106	2279
EHSF-630-9,1	630	194	4170	279	5997	127	2730
EHSF-800-12,6	800	268	5761	386	8298	175	3762
EHSF-1000-16,5	1000	351	7545	506	10877	229	4923
EHSF-1250-21	1250	447	9609	644	13844	292	6277
EHSF-1500-28,2	1500	599	12876	864	18573	391	8405
EHSF-2000-33,6	2000	714	15348	1030	22141	466	10017
EHSF-3000-39,6	3000	842	18100	1213	26075	549	11801
EHSF-4000-45,9	4000	975	20959	1406	30224	637	13693

Four heating coils

		temperature primary 75°C - 55°C		temperature primary 85°C - 65°C		temperature primary 60°C - 55°C	
		temperature secondary 20°C - 60°C		temperature secondary 20°C - 60°C		temperature secondary 20°C - 55°C	
Type	volume [l]	capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]	capacity [kW]	continuous hot water output [l/h]
EHSF-400-10,1	400	215	4622	310	6664	140	3009
EHSF-630-12,2	630	260	5589	374	8040	170	3654
EHSF-800-16,8	800	357	7674	515	11071	233	5009
EHSF-1000-22	1000	468	10060	674	14488	305	6556
EHSF-1250-28	1250	595	12790	858	18444	389	8362
EHSF-1500-37,6	1500	799	17175	1152	24764	522	11221
EHSF-2000-44,8	2000	952	20464	1373	29514	621	13349
EHSF-3000-52,8	3000	1122	24119	1618	34781	732	15735
EHSF-4000-61,2	4000	1300	27945	1875	40305	849	18250

EHSF: key to model number

Type					kW				t_1			t_2			Vol			Opt	
1	2	3	4		5				6	7		8	9		10			11	

Type
1st digit: **E** = ECOTHERM
2nd digit: **H** = high capacity water heater
3rd digit: **S** = spiral internal heating coil
4th digit: **F** = flat

kW
5th digit: heat exchanger nominal rating in kilowatt

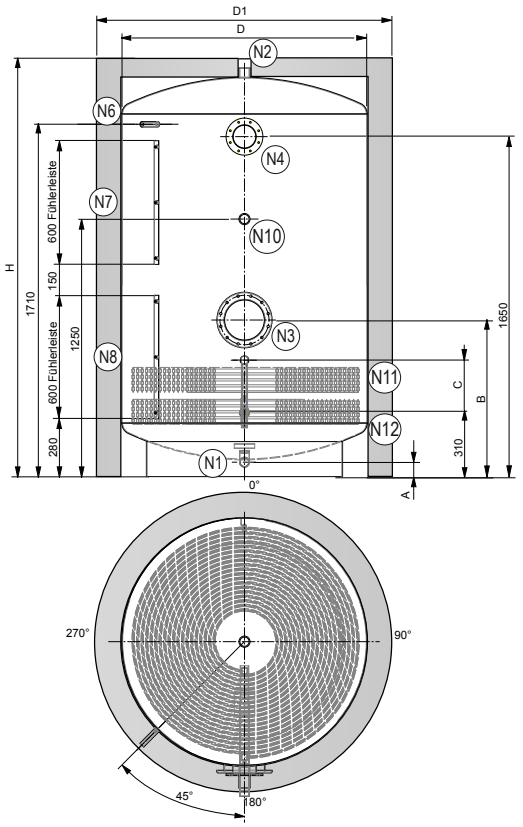
t_1
6th digit: feed temperature from boiler in °C
7th digit: return temperature to boiler °C

t_2
8th digit: domestic cold water inlet temperature in °C
9th digit: domestic hot water output temperature in °C

Vol
10th digit: tank capacity in liters

Opt - Options
11th digit: **E ... kW** = electric heating element ... kW,
G ... kW-t_1 = tube heat exchanger ... kW + t_1 boiler feed & return °C,
A = electric anode

Measurements and ports



Storage tank ports

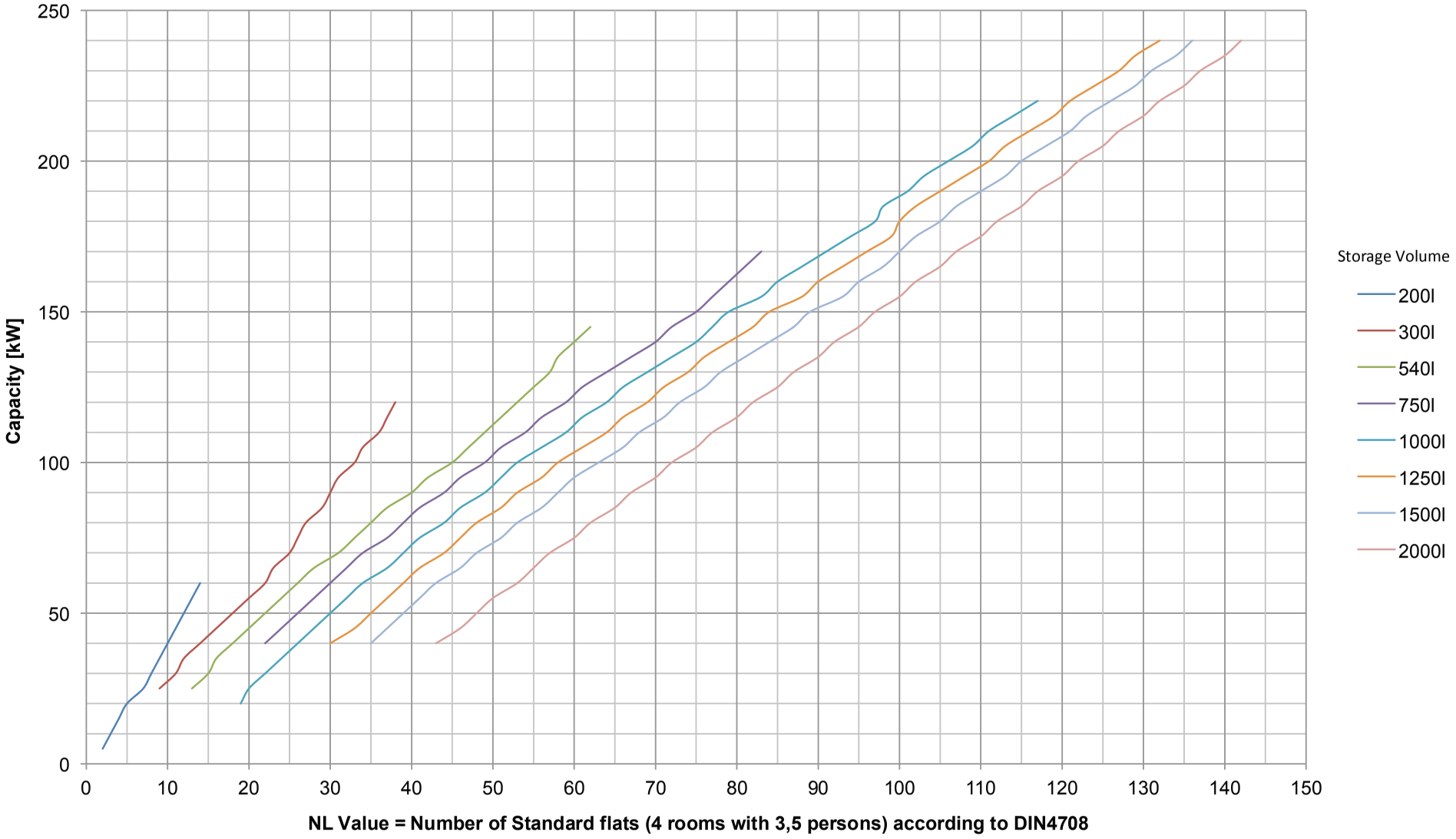
port		size	angle°	description
N1	50-75 kW	1“ ext	180°	cold water inlet
N1	100-150 kW	5/4“ ext	180°	cold water inlet
N1	200-250 kW	6/4“ ext	180°	cold water inlet
N1	300-450 kW	2“ ext	180°	cold water inlet
N1	500-800 kW	DN65	180°	cold water inlet
N1	900-1000 kW	DN80	180°	cold water inlet
N2	50-75 kW	1" int	top	hot water outlet
N2	100-150 kW	5/4" int	top	hot water outlet
N2	200-250 kW	6/4“ int	top	hot water outlet
N2	300-450 kW	2“ int	top	hot water outlet
N2	500-800 kW	DN65	180°	hot water outlet
N2	900-1000 kW	DN80	180°	hot water outlet
N3		DN 200	180°	purification flange (up to 3000 l)
N3		DN 400	180°	manhole (ab 4000 Liter)
N4		DN 100	180°	purification flange (from 630 l)
N6		1/2" IG	225°	thermometer
N7		-	225°	temperature sensors on top
N8		-	225°	temperature sensors on bottom
N10		6/4" IG	180°	circulation, electric element
N11 N12	50-100 kW	1“ ext	180°	boiler feed boiler return
N11 N12	100-150 kW	5/4" ext	180°	boiler feed boiler return
N11 N12	200-250 kW	6/4“ ext	180°	boiler feed boiler return
N11 N12	300-450 kW	2“ ext	180°	boiler feed boiler return
N11 N12	500-800 kW	DN65	180°	boiler feed boiler return
N11 N12	900-1000 kW	DN80	180°	boiler feed boiler return

Storage tank dimensions

storage capacity		weight empty*	A	B	C 1/2/3/4 Reg.	D	D_1	H	tipping mass	insulation thickness
Model	Liter	kg	mm	mm	mm	mm	mm	mm	mm	mm
EHSF-..-..-400	400	80	90	610	100/250/400/550	650	890	1920	1840	120
EHSF-..-..-630	630	105	90	610	100/250/400/550	700	940	1980	1920	120
EHSF-..-..-800	800	120	80	610	100/250/400/550	790	1030	1980	1945	120
EHSF-..-..-1000	1000	147	70	610	100/250/400/550	890	1130	1980	1945	120
EHSF-..-..-1500	1500	228	70	610	100/250/400/550	1100	1340	2025	2010	120
EHSF-..-..-2000	2000	335	70	610	100/250/400/550	1200	1440	2050	2045	120
EHSF-..-..-3000	3000	470	115	660	100/250/400/550	1350	1590	2615	2490	120
EHSF-..-..-4000	4000	557	165	740	100/250/400/550	1500	1740	2630	2750	120
EHSF-..-..-5000	5000	662	165	740	100/250/400/550	1680	1920	2900	2960	120

*) weight of empty storage tank excl. internal heating coil

Hot water demand calculation for residential buildings according to DIN 4708



Guide to hot water demand according to European standards and DIN 4708

Using these guidelines as a rough check for your hot water requirement. The actual requirement can vary depending on usage patterns. Refer to your planning consultant for further information.

Maximum demand rates (liters of hot water per hour at 60°C)

building	demand factor	bath tub	shower	bidet	private washbasin	public washbasin	kitchen sink	bar sink	slop sink
hotel & hostel	0,5	50	50	10	10	15	80	100	50
hospital	0,7	60	70	10	10	15	80	-	50
restaurant	1,0	-	-	-	5	25	140	100	100
sport center	1,0	-	220	-	5	15	80	100	40
day school	0,8	-	180	-	5	20	80	-	40
university	0,8	-	220	-	5	25	80	-	40
offices	1,0	-	-	-	5	10	40	-	40
factory	1,0	-	120	-	5	20	80	-	50

Calculation example

Hotel with 300 rooms			Liters / Hour at 60 °C
300	bath tub / shower	=	15.000
300	private washbasin	=	3.000
300	bidets	=	3.000
60	public washbasin	=	900
25	kitchen sink	=	2.000
15	bar sink	=	1.500
15	slop sink	=	750
total		=	26.150 x demand factor 0,5 (hotel)
demand		**=**	**13.075 liters / hour continuous at 60 °C**

Demand capacity for apartments (with shared water heating)

ECOTHERM Stainless Steel Water Heaters are often used apartments and other building with shared water heating. The maximum number of standard apartments (according to DIN 4708) that each ECOTHERM Water Heater will serve is indicated in the performance tables.

Hot water demand

for standard apartments (DIN 4708*)

number of apartments	cont. requirement (liters per hour)	
	60 °C	45 °C
50	3000	4300
100	5200	7500
150	7200	10400
200	9100	13200
250	10700	15500
300	12000	17400

Standard Apartment (DIN4708*)

A standard apartment is defined as having 4 rooms, 3-4 persons, 150 liters bath (filling time 10 min.), 1 washbasin and 1 kitchen sink.

***) DIN4708**

specifies that the performance of the heat exchanger and the hot water storage capacity are both significant factors in determining the number of apartments a water heater can serve.

Guide to hot water demand according to ASHRAE

Use this guide for a rough check of your hot water demand. The actual requirement can cary depending on usage patterns. Refer to your planning consultant for further information.

Maximum demand rates (liters of hot water per hour at 60 °C)

building	demand factor	bath tub	shower	bidet	private wash-basin	public wash-basin	kitchen sink	pantry sink	service sink	storage capacity factor
hotel	0,25	76	284	7,6	7,6	30	114	38	114	0,8
hospital	0,25	76	284	7,6	7,6	23	76	38	76	0,6
school	0,4	-	850	7,6	7,6	57	76	38	76	1,0
gymnasium	0,4	114	850	7,6	7,6	30	-	-	-	1,0
offices	0,3	-	114	7,6	7,6	23	76	38	76	2,0
factory	0,4	-	850	7,6	7,6	45,5	76	-	76	1,0
apartment house	0,3	76	114	7,6	7,6	15	38	19	38	1,25

Quelle: ASHRAE HVAC 1991 Applications Handbook

for more informations about hot water demand per fixture for various types of buildings see Ashrae handbook chapter 50, table 10.

Calculation example

Hotel with 300 rooms		liters / hour at 60 °C	
300	shower x 284	=	85.200
300	private wash basin x 7,6	=	2.280
300	bidets x 7,6	=	2.280
60	public wash basin x 30,3	=	1.818
25	kitchen sink x 113,6	=	2.840
15	service sink x 113,6	=	1.704
15	pantry sink x 37,9	=	568,5
total		=	96.690,5 x demand factor 0,25 (hotel)
demand		**=**	**24.172,6 liters / hour continuous at 60 °C**
storage tank capacity		**=**	**24.172,6 x 0,8 = 19.340 liters**

Nominal Power Rating NL1

The nominal dwelling unit is a 4 room apartments with 3,5 (3 to 4) persons and a sanitary equipment with a bath tub, a washstand and a kitchen rinse. The hot water requirement for each dwelling with Wb=5820 Wh includes that of a bath tub (small bath tub with typical capacity of 140 liters) and a minimum temperature increase of 35K from cold water. Occupation or equipment deviations from nominal parameters are to be compensated by adjusting the number of nominal dwellings according to DIN 4708 part 2. The nominal power rating according to DIN 4708 part 3 must correspond to the nominal demand using DIN 4708 part 2.

ECOSIZE

Use our self-developed software "ECOSIZE" in order to design your optimal ECOTHERM solution. Apply for your personal login in the member area of our website to have access to the online version of ECOSIZE.

ecosize.ecotherm.com

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Turnkey Hot Water & Steam System

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KSU - Riyadh, Saudi Arabia
Turnkey Hot Water & Steam System

Sidra Med. & Research Center - Doha, Qatar
Turnkey Hot Water & Steam System

Four Seasons - Bangalore, India
Turnkey Hot Water & Steam System

The Royal Caribbean - Cancun, Mexico
Hot Water Boilers & Heat Exchangers

Sheraton Hotel & Towers - Hong Kong
Turnkey Hot Water & Steam System

Grand Hotel - Kitzbühel, Austria
High Capacity Water Heaters

Beau-Rivage Palace - Lausanne, Switzerland
High Capacity Water Heaters

Hilton Bomonti Hotel - Istanbul, Turkey
High Capacity Water Heaters

Philosophy

Our Mission
ECOTHERM amazes its customers with individual solutions for hot water, steam and solar systems.

Our Vision
ECOTHERM is the leading brand for individual hot water, steam & solar solutions for hotels, hospitals and industry in Europe, Middle East, Asia, North Africa and Central America.

Our Values
Quality
Experience
Innovation
Individuality
Sustainability
Partnership

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Individual Heat Transfer Solutions

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