



# Water (R718) The Safe & Natural Refrigerant

---

**eChiller**  
Future Proof  
Refrigeration



efficient energy  
be part of tomorrow

# eChiller – the refrigeration system with the safe and natural refrigerant water (R718)

The eChiller is the perfect answer to the F-Gas Regulation, the Ecodesign Directive and the anticipated trends in refrigerant and energy costs.

Its high energy efficiency and the use of water as a refrigerant fulfils even the strictest guidelines – because none of the system-relevant environmental and safety regulations for operating and maintaining conventional chillers apply.



## A multiple award-winning product



# Benefits of the eChiller at a glance



The eChiller is perfectly suited for cooling of industrial processes, server and switching rooms and technical building equipment.



## COST EFFICIENT



Low energy costs



Water (R718) – economical and highly available



Eligible for BAFA funding



## ENERGY EFFICIENT



Up to 80 % energy savings



Integrated, fully-adjustable free cooling



High chilled water temperatures



No minimum compression ratio



Extremely low noise emissions



Low start-up current



## SUSTAINABLE



Drinking water as a refrigerant



Environmentally friendly



No toxic refrigerants



Oil-free



No flammable refrigerants



No high operating pressures



## RELIABLE IN OPERATION



Low maintenance



Few wearing parts



Maintenance friendly



HTML5 Web visualisation



Integrated data monitoring



Easy to integrate into the building management system

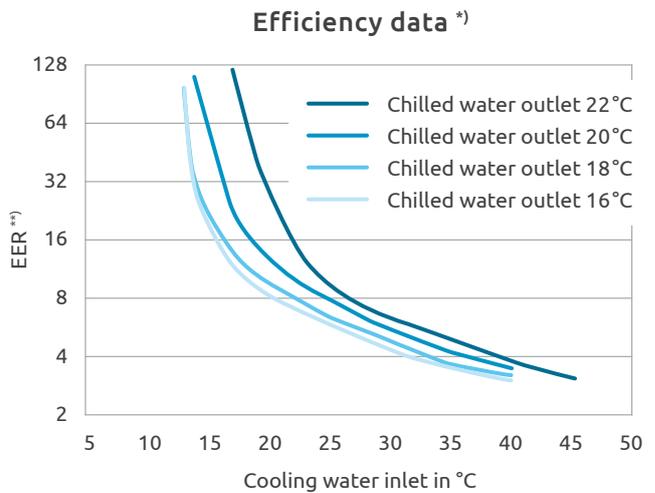
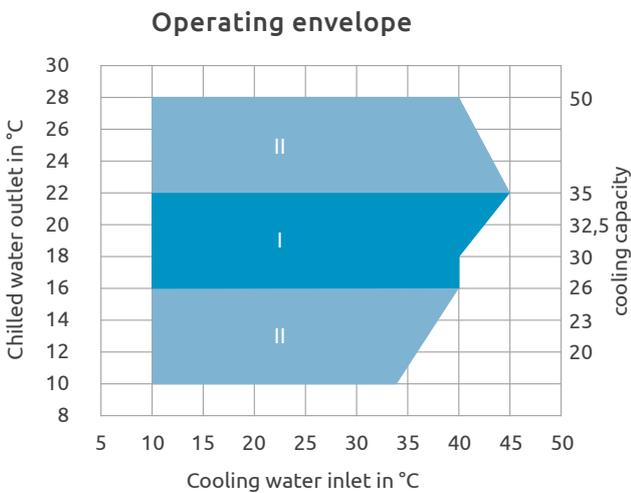
**A real plus for your company**  
future-proof, efficient, climate-friendly

# Sustainable refrigeration technology

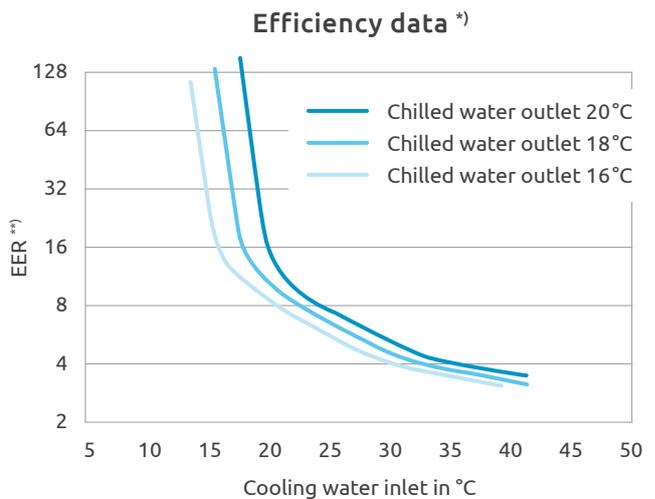
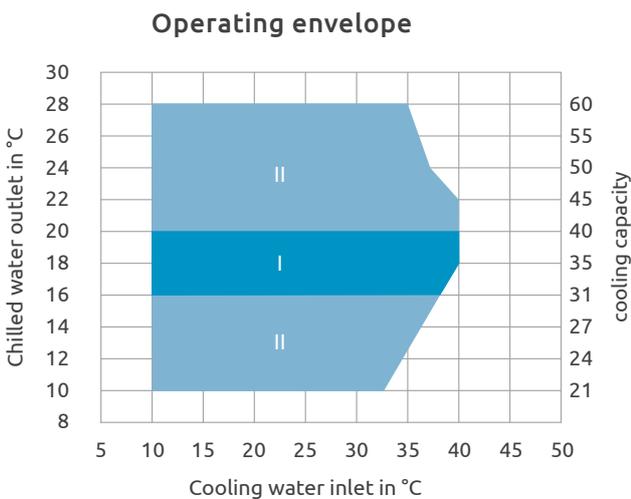
## Rethink your strategy – it's worth it!

The eChiller is currently the only chiller worldwide that uses water (R718) as its refrigerant, is highly energy efficient and available in mass production. The eChiller is available with cooling capacities ranging from 20 kW to 45 kW and can be scaled modularly up to more than 300 kW.

### eChiller – Type 35



### eChiller – Type 45



**Envelope I:** optimal operating limits (dark area)  
**Envelope II:** the chilled water output temperature can be optionally adjusted (light area)

\*) Efficiency values at full capacity

\*\*) The EER (energy efficiency ratio) defines the level of efficiency in terms of cooling capacity related to electric power input.

# The technology

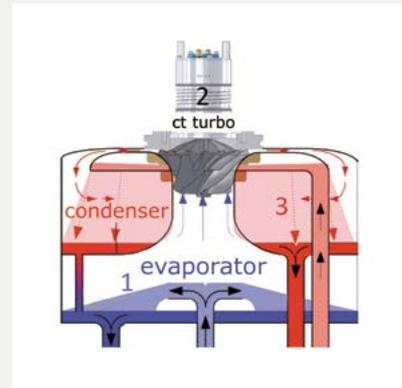
The eChiller generates cooling by direct evaporation of water in a vacuum atmosphere. Its hydronic cycle is decoupled from the cooler and refrigeration application by braze plate heat exchangers.

## The cooling process

The eChiller comprises two identical cooling modules that use the safe and natural refrigerant water (R718).

How the modules work:

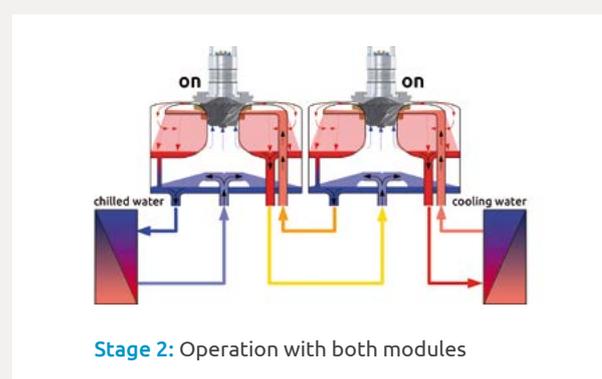
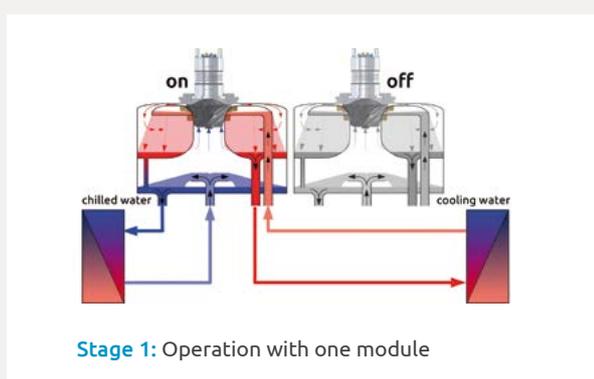
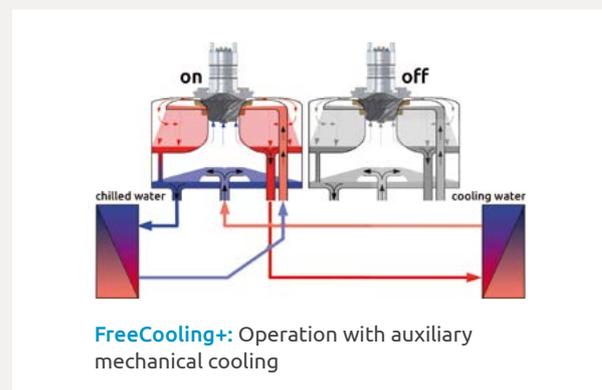
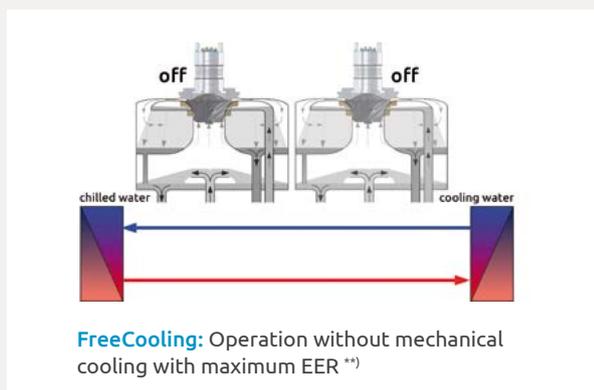
1. **Evaporator:** Water enters the evaporator. A small part of the water evaporates, drawing energy from the remaining water and causing it to cool down.
2. **Compressor:** The water vapour is then compressed by the centrifugal compressor increasing the vapour pressure and temperature.
3. **Condenser:** The compressed water vapour is cooled down and condenses in the condenser, heating the cooling water.
4. **Expansion:** The condensed water is fed back into the evaporator.



## Modes of operation

The system connects the modules depending on the cooling water temperature, allowing the required chilled water temperatures and cooling capacities to be achieved with minimum energy consumption.

The eChiller has four operating modes:



# Challenges of the refrigeration industry

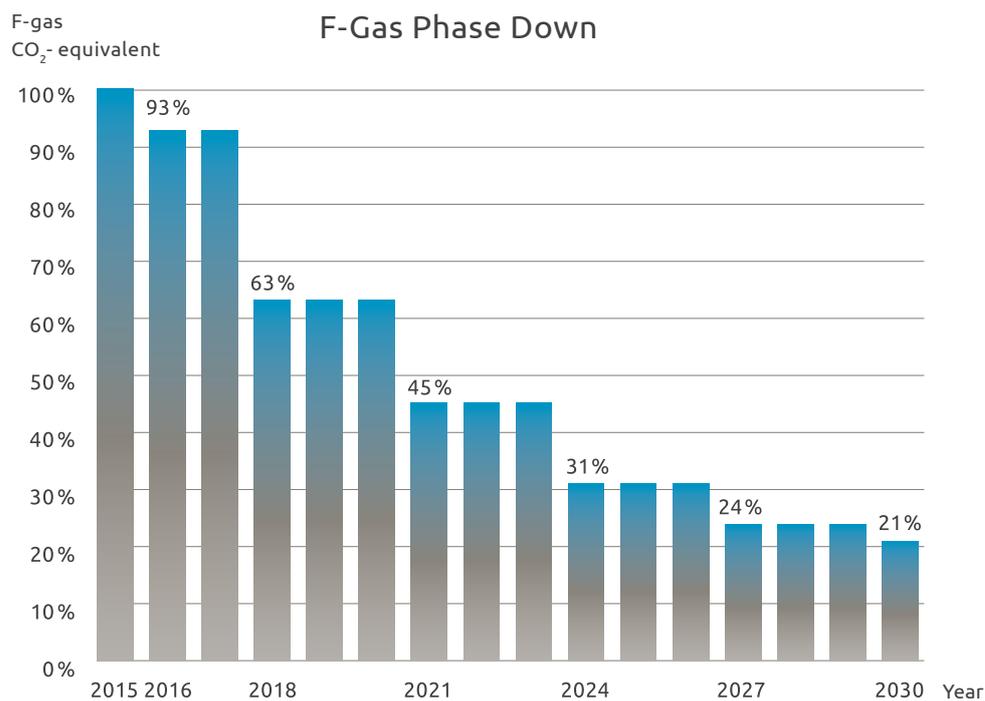
## It's time for a new strategy

Many chillers will fail to comply with the regulatory requirements of the coming years. There are also many uncertainties regarding HFC refrigerants and electricity cost increases. It is therefore all the more important to invest in new strategies today.

### Climate protection requirements for refrigerants

#### F-Gas Regulation (EU) N° 517/2014

The F-Gas Regulation will reduce stepwise the CO<sub>2</sub>-equivalent of HFCs brought into the market by almost 80 % up to 2030.



The CO<sub>2</sub>-equivalent is a measure of the global warming potential of the refrigerant in relation to CO<sub>2</sub>.

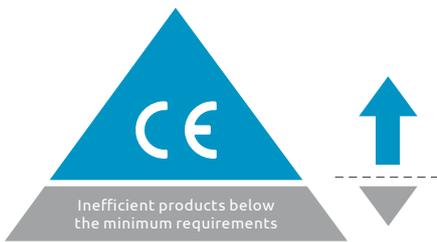


F-Gas  
Regulation  
not relevant

The CO<sub>2</sub>-equivalent value for the global warming potential of water (R718) is "0". As such, the refrigerant water supports the EU's climate goals.

## Energy efficiency requirements for chillers

### Ecodesign Directive (EU) / Regulation No. EN2016 / 2281



The Ecodesign Directive defines the requirements for the environmentally-friendly design of energy-using products (Energy-related Product – ErP) within the EU, and also prescribes minimum efficiencies for chillers.



In “comfort cooling” the eChiller fulfils the current and future requirements of the Ecodesign Directives. For process cooling, the eChiller works in a temperature range that is not addressed by the Ecodesign Directive.

### Certainty of investment and operating costs

The eChiller’s high energy efficiency ensures long-term savings in operating costs. Moreover, by using the safe and natural refrigerant water (R718), the cost of fulfilling statutory, refrigerant-related maintenance requirements is avoided. Finally, the eChiller’s eligibility for BAFA funding results in lower overall investment costs.



Any questions?  
We’d be happy  
to advise you.

#### Water (R718)

- Economical
- Natural
- Highly available
- One-off charge: 60 litres

### Chiller safety requirements (operator obligations)

EN 378 (installation, operating, monitoring) does not apply to water (R718), nor does the German operating and monitoring directive.

A machine room is not required, and no statutory leakage tests or measurement of gas sensors are required. Unrestricted installation in any building is possible.



#### Water (R718)

- Non-toxic
- Non-flammable
- No global warming potential

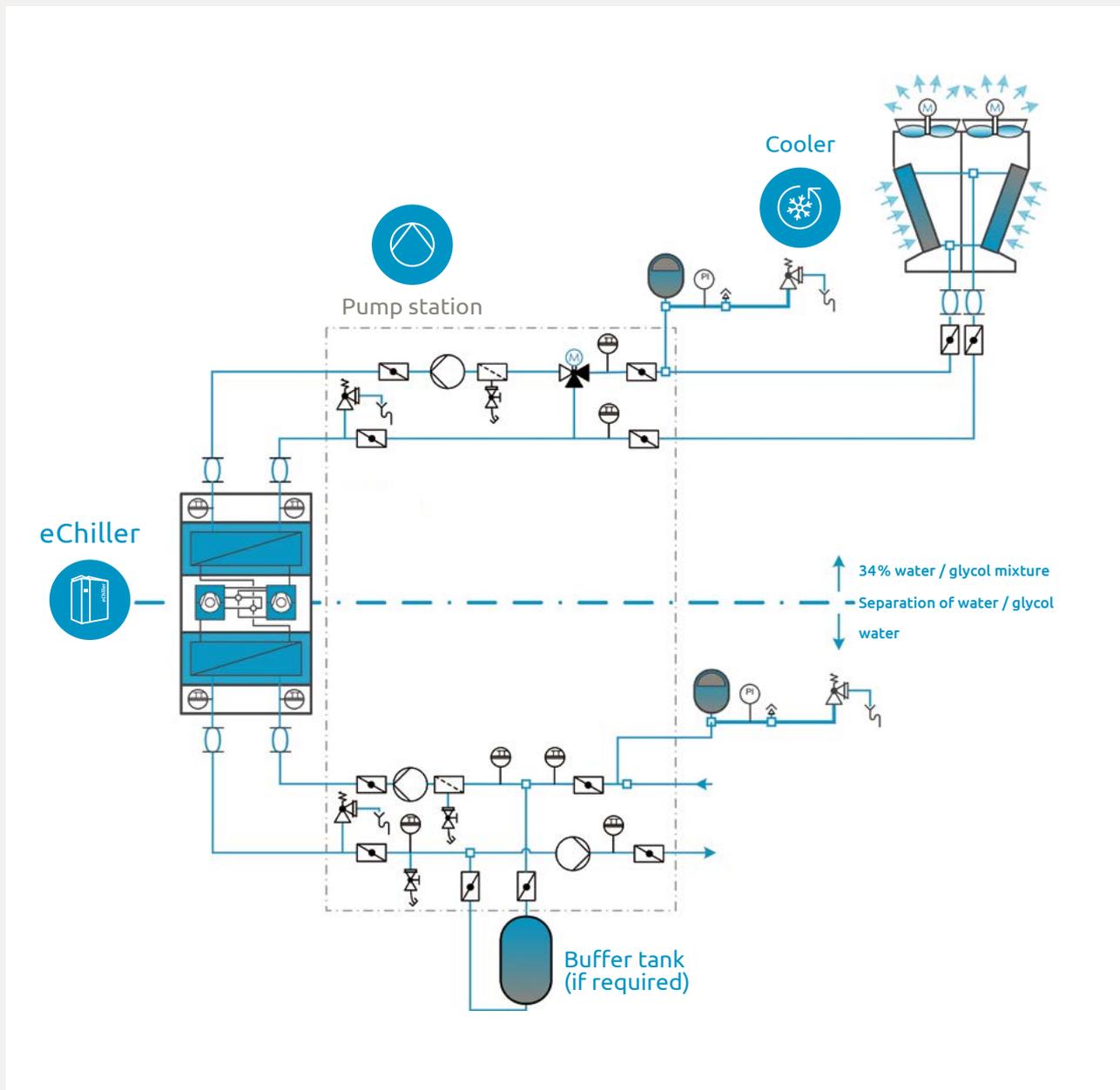
## The intelligent alternative

### The safe and natural refrigerant water (R718)

# eChiller – a scalable system easy to integrate into your facilities

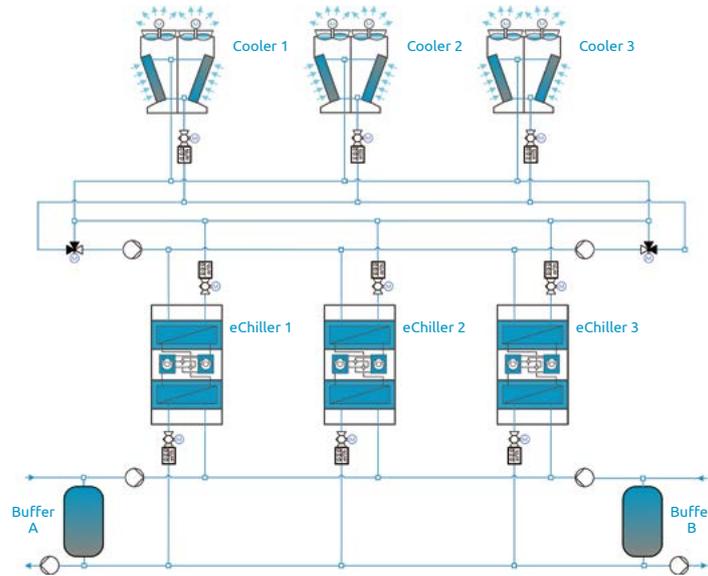
The eChiller is equipped with interfaces for integration into a facility management system and for controlling auxiliaries (cooler, cooling- and chilled-water pumps and cooling water valves for frost protection).

## Case example: industrial cooling



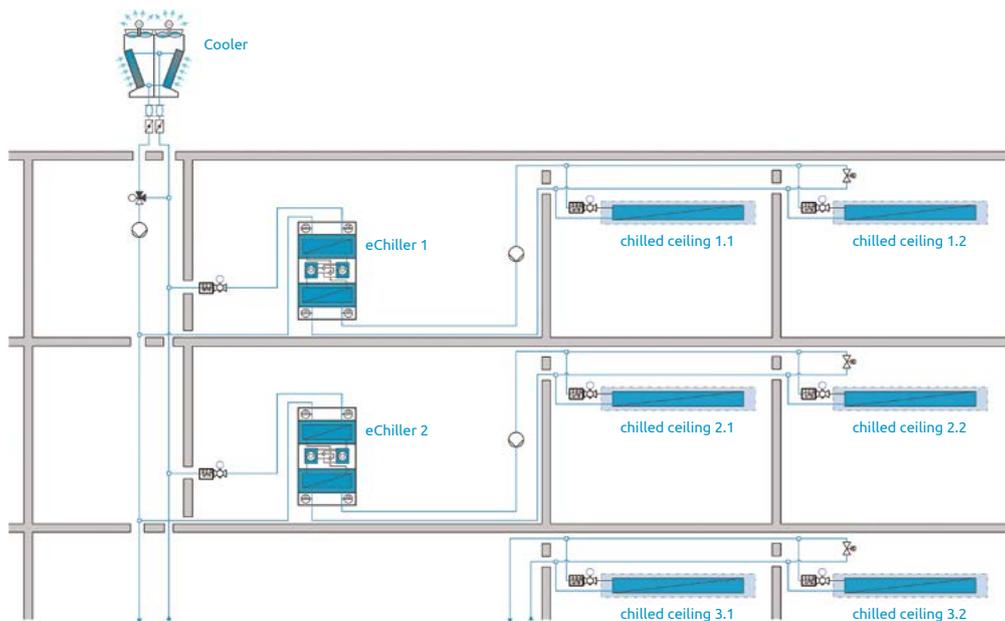
- Compact, variable, simple
- High accuracy of chilled water temp.  $\pm 0.1\text{K}$
- Variable water volumes for chilled water temperature spreads between 2 and 20K

## Case example: IT server room/electric cabinet cooling



- Operating certainty through redundant and scalable system design
- Free cooling
- High chilled water temperatures
- Easy to integrate into your data centre infrastructure management (DCIM)
- Integrated HTML5 web visualisation for easy access

## Case example: component core activation/area cooling



- Low chilled water temperature spreads (2K)
- Compact dimensions for easy installation
- Machine room not required
- Very low noise emissions; acoustic pressure level 42.5 dB at 5m distance
- Easy to integrate into your BMS

# The eChiller system solution

## Our Full-Service-Package for you

We offer not only the best future-proof refrigeration technology, but also a Full-Service-Package. We'll support you in your overall planning process and, if required, also deliver all the components needed for chilled water generation and distribution.

### Our modular system for easy integration into your application

Regardless of whether you have a permanent installation or a variable one with hose connections – all that's necessary is to connect the components.



### Our services at a glance



**Consulting** – Together with you, we'll check the feasibility of integrating the eChiller into your overall system, and advise you on obtaining BAFA funding if applicable.



**Maintenance** – We offer you the option of remotely monitoring your systems in accordance with the maintenance contract.



**Planning** – We'll support you and your consultant with respect to the eChiller. If necessary, we'll take responsibility for planning the integration of the eChiller into your application.



**Spare parts** – You can order any necessary spare parts directly from us.



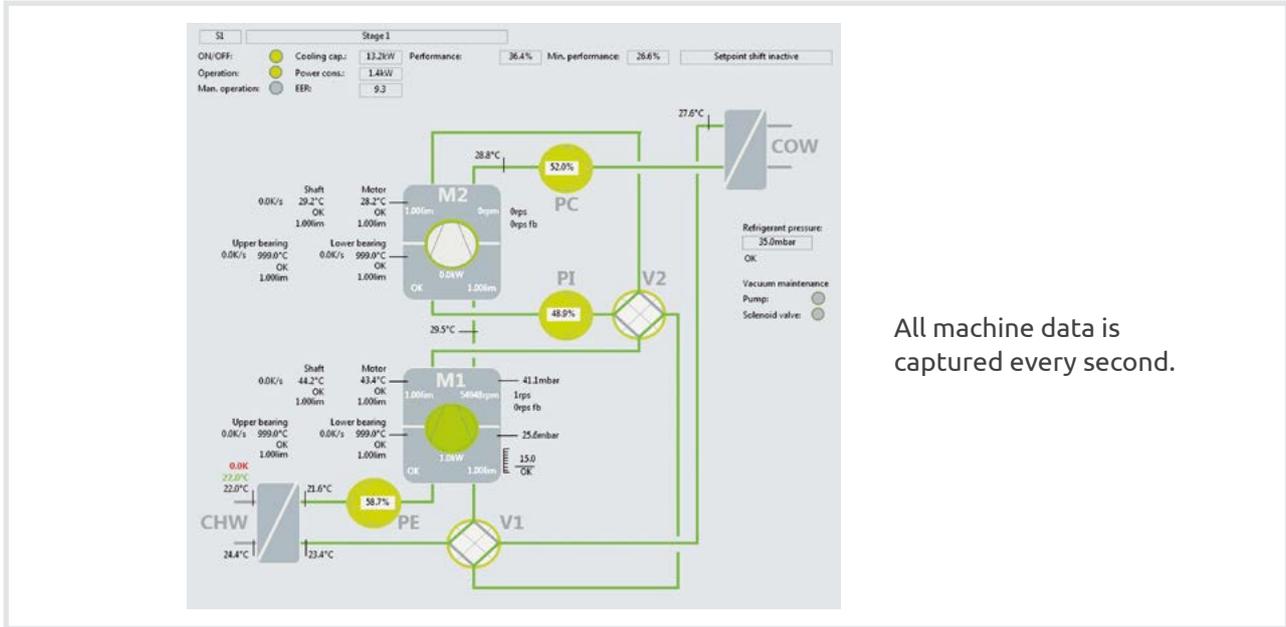
**Startup** – One of our service technicians will commission your eChiller on site.



**Profitability**  
**TCO** – Total cost ownership  
**LCC** – Life cycle costs

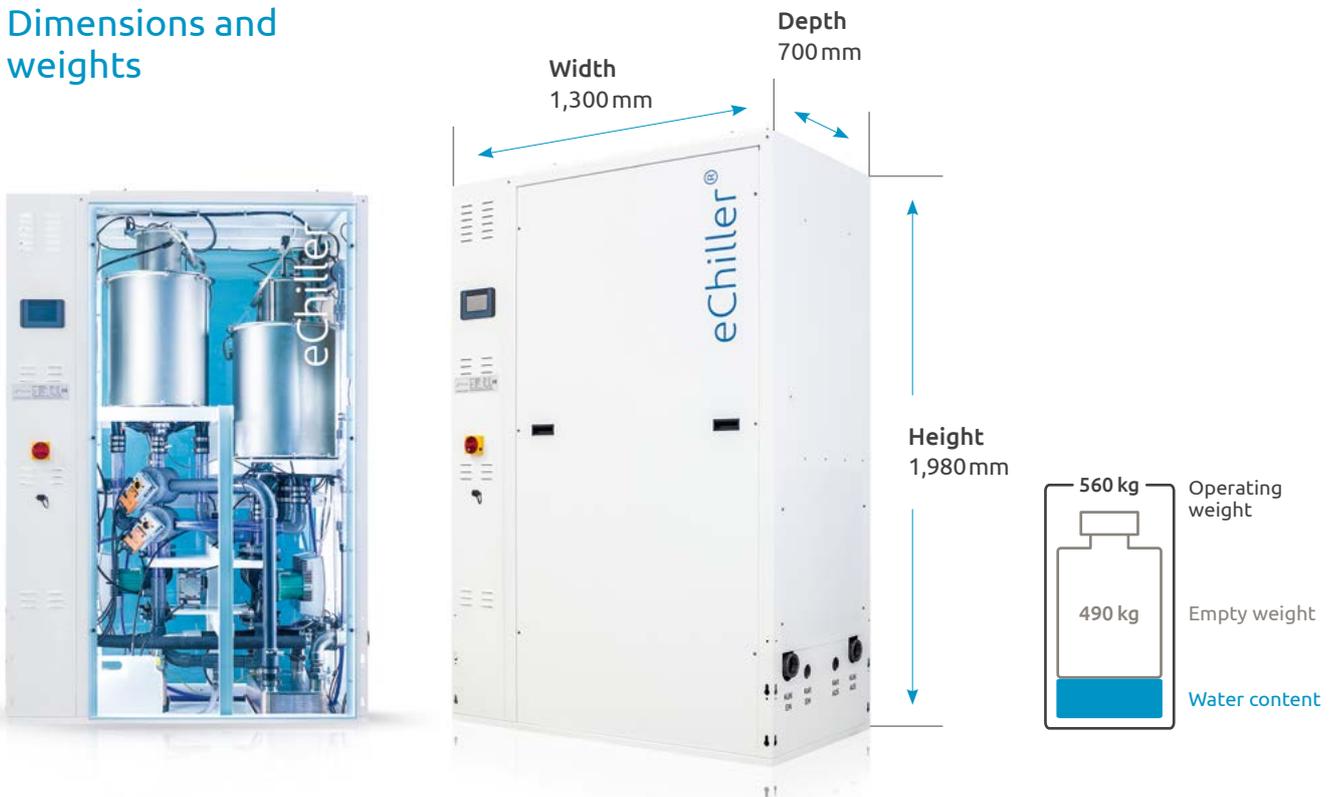
## Monitoring and energy management

The eChiller Control Panel offers realtime system status information directly in a web browser.



All machine data is captured every second.

## Dimensions and weights



Invest in the future of refrigeration  
Count on us

**Your decision today will result in  
long-term benefits for your business**

**Have we sparked your interest?  
Feel free to contact us:**

Efficient Energy GmbH  
Hans-Riedl-Str. 5 | 85622 Feldkirchen | Germany  
Tel.: +49 89-693369-500  
Fax: +49 89-693369-8610

[info@efficient-energy.de](mailto:info@efficient-energy.de)  
[www.efficient-energy.de](http://www.efficient-energy.de)

