

System solution for data centres

Economical
Ecological
Straightforward

ServeCool – the solution for cooling data centres



Hoval

The most compact system of its kind.

Hoval ServeCool air-conditions data centres and has minimum space requirements. Standalone compact units contain all components necessary to provide highly efficient cooling for the IT environment. What's more, they can be linked seamlessly so that the total output of the system can be scaled.

Enormous space savings.

ServeCool uses the interaction of different resources to cool the IT environment with minimal energy consumption:

- Indirect free cooling with fresh air
- Indirect adiabatic cooling
- Mechanical cooling via cooling coil

All components for generating and distributing cooling energy and for treating air are particularly space-saving in stand-alone, ServeCool compact units each with an installation area of 11 m². And if you include the maintenance area too, the space required is just 14 m² per unit. Only the cold-water production for covering load peaks is supplied separately.

Flexible modular system.

ServeCool has a modular structure. It is made up of multiple ServeCool compact units with an integrated control system. These have no connections or maintenance points on the sides, making it possible to arrange multiple units directly next to one another to save space. This means that the total cooling output of the system is freely scalable. It can be flexibly adjusted to the current growth phase of the data centre, allowing investment to be made in stages.

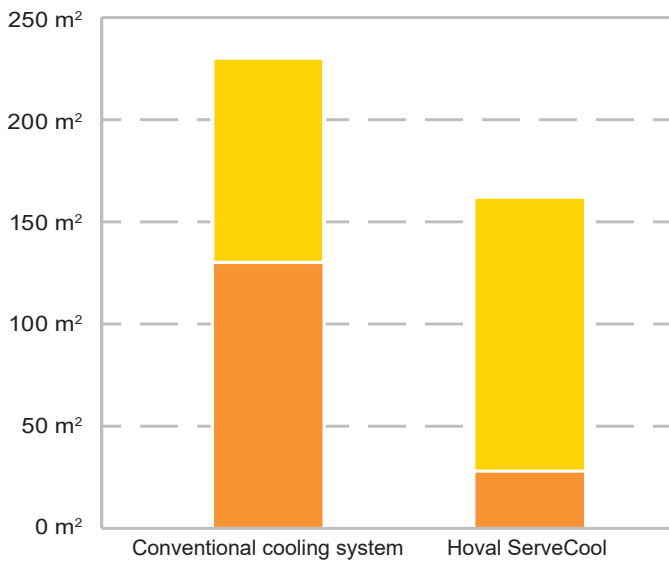


Simply more compact.

Hoval ServeCool cools the IT infrastructure with minimum space requirements and extreme energy efficiency. The system makes use of indirect free cooling with fresh air in combination with adiabatic and mechanical cooling.

Thanks to the high efficiency of the heat exchangers and a sophisticated condensation prevention system, Hoval ServeCool uses free cooling much more intensively than comparable systems. The result of this is an intelligent cooling solution that guarantees operators of data centres the lowest total cost of ownership and maximum reliability.

Data-centre cooling 1000 kW cooling capacity



This graph shows a comparison of the space required (including maintenance areas):

■ Indoor installation ■ Outdoor installation

If you assess the area inside with 1400 €/m² and the area outside with 500 €/m², the comparison shows that ServeCool is ahead of its competitors.

		Conventional cooling system		Hoval ServeCool	
Area inside	Water-cooled	Hoval ServeCool			
	Chilled water systems	38 m²	Compact devices	134 m²	
	Air-conditioning units	62 m²			
Area outside	Dry coolers	130 m²	Chilled water systems	28 m²	
	Total	Space requirements	230 m²	Space requirements	162 m²
	Costs	205,000 €	Costs	201,600 €	



Incredibly easy to maintain.

Hoval ServeCool is incredibly easy for the operator to maintain. Maintenance-relevant components are easily accessible, wear parts are commercially available and no special tools are required. All of this avoids unnecessarily high service and maintenance costs.

Easily accessible.

The sophisticated ServeCool compact unit design ensures that maintenance can be carried out quickly and efficiently. Maintenance-relevant components, such as the filter, spray nozzles and actuators, can easily be accessed directly via the large service hatch. No dismantling necessary.

Available on site.

All maintenance-relevant components (such as control units, sensors and fans) as well as wear and spare parts are standard products. They are generally available from specialist retailers, meaning that they are quickly available on site. There are no downtimes due to missing parts.

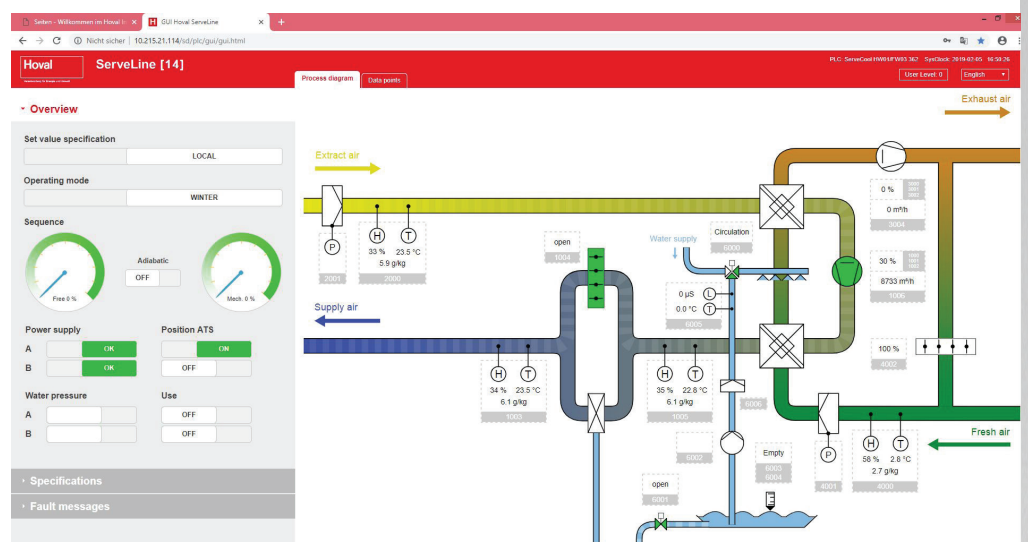
Robust structure.

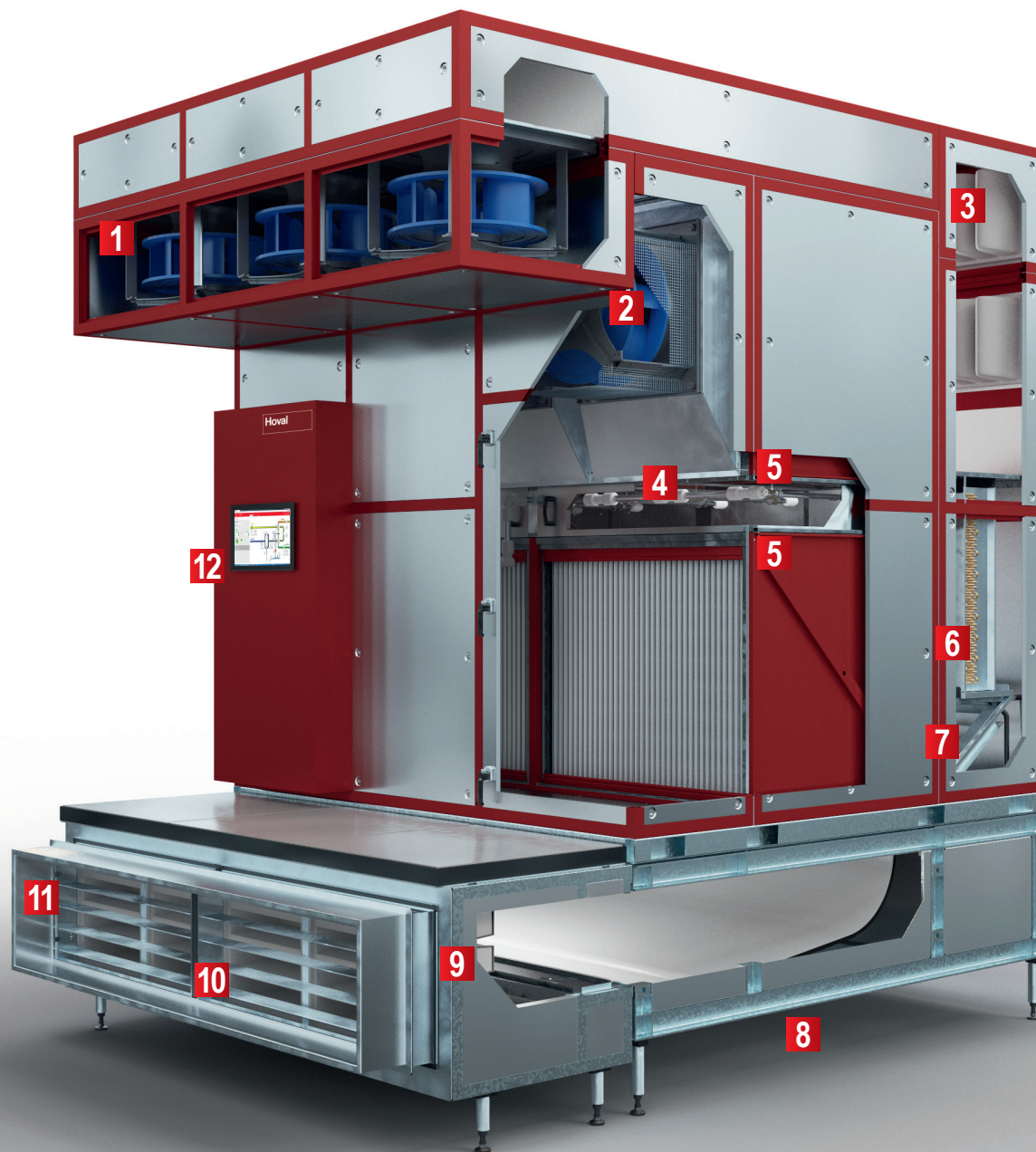
Only high-quality components are installed in the compact units. The plate heat exchangers in this design, for example, are used in even the harshest conditions on offshore wind farms. The fans boast highly efficient EC motors, have direct drive and are maintenance free.

Communication via web browser.

The control box with the integrated control system is easy to access from the front. The software can be accessed on site directly via a LAN cable and a standard unit with any browser.

The graphical user interface of the control system can be displayed on any web browser.





- 1 Exhaust air fan**
3 high-efficiency EC fans, maintenance-free with direct drive
- 2 Supply air fan**
3 high-efficiency EC fans, maintenance-free with direct drive
- 3 Extract air filter** (class G4 or M5)
- 4 Spray nozzles and piping** for the adiabatic cooling (evaporative cooling)
- 5 Twin plate heat exchangers**
for indirect fresh air cooling and indirect adiabatic cooling; separating the air flows protects the IT infrastructure against dust and humidity
- 6 Cooling coil** for mechanical aftercooling at peak load

- 7 Bypass damper** for reducing air-side pressure drop
- 8 Compact design** with an installation area of just 11 m², no side connections or maintenance points for direct side-by-side arrangement of multiple individual ServeCool modules
- 9 Fresh air filter** (class M5)
- 10 Fresh air damper** for closing the fresh air opening during maintenance work
- 11 Pump, trough and valve** for adiabatic cooling
- 12 Control box with integrated control system**, ensures maximum energy efficiency due to continuous comparison of the efficiency of the individual cooling processes, visualisation via Web browser, easy integration into BMS and DCIM systems

Optional (not shown here):
Mixed-air duct as **condensation prevention system** for 100% sensitive cooling capacity without dehumidification even at low temperatures

The big advantage of free cooling.

Hoval ServeCool is setting standards with regard to using fresh air for free cooling. The high efficiency of the plate heat exchangers and the innovative condensation prevention system make this possible: cooling is performed with nothing but fresh air for over 90% of the operating time.

Ultra-high efficiency.

ServeCool cools indirectly with high-efficiency twin plate heat exchangers. The exchangers are certified to Eurovent standards and, with a total exchanger surface area of 1200 m², achieve an efficiency of 80%. As a result, the free-cooling limit is only just below the supply air temperature supplied in the server room. For over 90% of the operating time, switching on the adiabatic system or the chiller is not necessary.

Sophisticated solution.

On request, ServeCool can be fitted with a condensation prevention system. This is controlled automatically and prevents humidity in the circulating air from condensing even when fresh air temperatures are very low. Free cooling can therefore be used throughout the year without the costly rehumidification of the supply air.

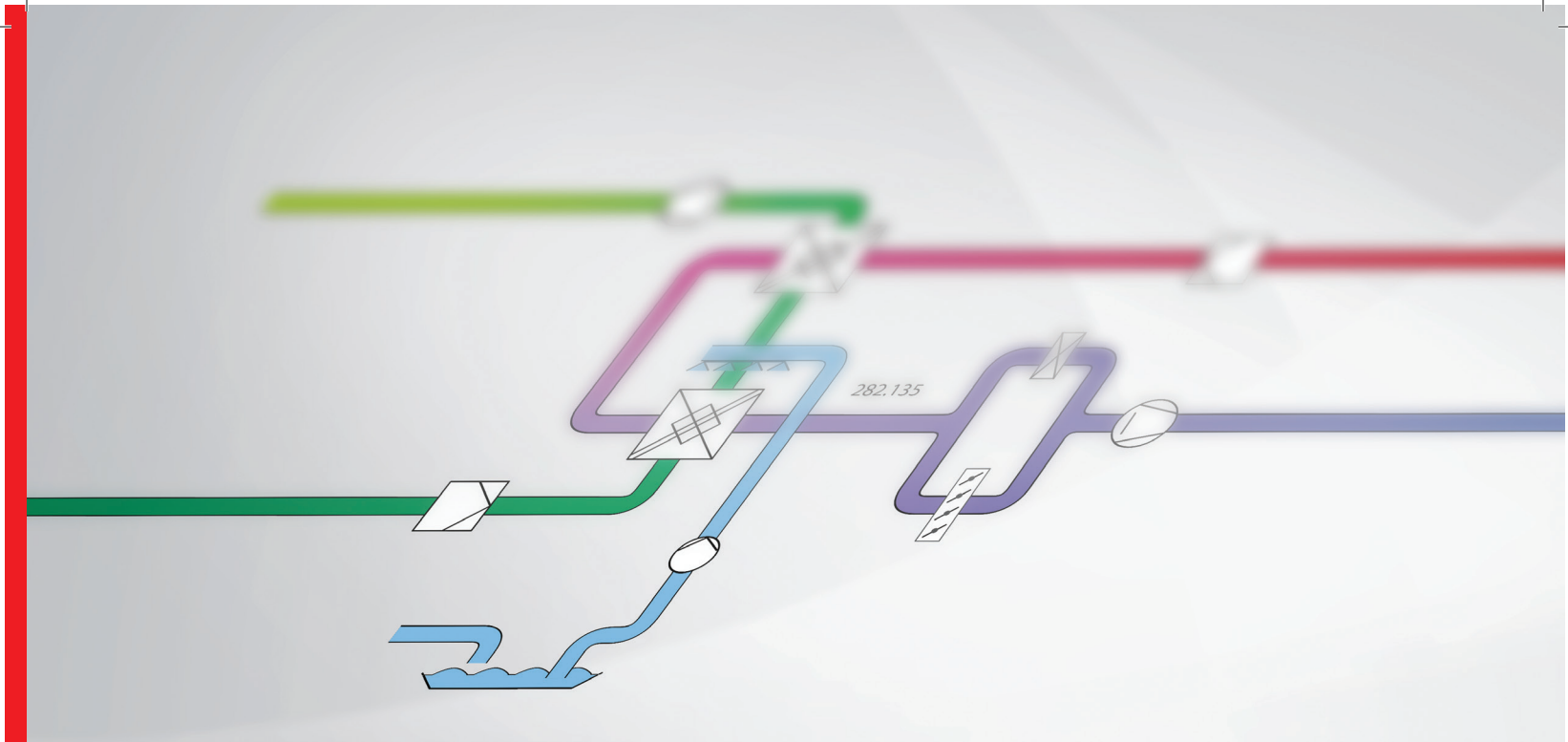
Huge energy savings.

In the example below, a comparison of the annual curve of ServeCool with that of a conventional cooling system clearly shows the huge potential for savings:

- ServeCool reaches its full cooling capacity using only indirect free cooling up to a temperature spread of 3 K between fresh air and supply air.
- ServeCool only runs in mixed mode with free, adiabatic and mechanical cooling when the temperature and humidity values of the fresh air are high.
- Depending on location, the proportion of cooling via cooling coil is so low that in applications where slightly increased temperatures in the server room are permissible a chiller is not necessary at all.

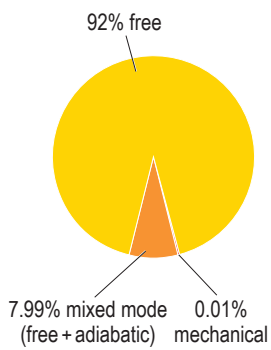
Economical in water consumption

The innovative solution can work almost all year round exclusively with indirect free cooling due to the large exchanger surface of the Hoval plate heat exchangers of 1200 m², with a spread of 3 K between outside air and the data centre supply air. The adiabatic cooling is only needed for a few hours a year. The WUE (Water Usage Effectiveness) of this solution is unmatched by any comparable device. Hoval recommends the use of rainwater for adiabatic applications, as it is inexpensive, almost pH-neutral and has a low conductivity, making it ideal for adiabatic cooling. Storage in large cisterns enables rainwater to be stored economically and efficiently.

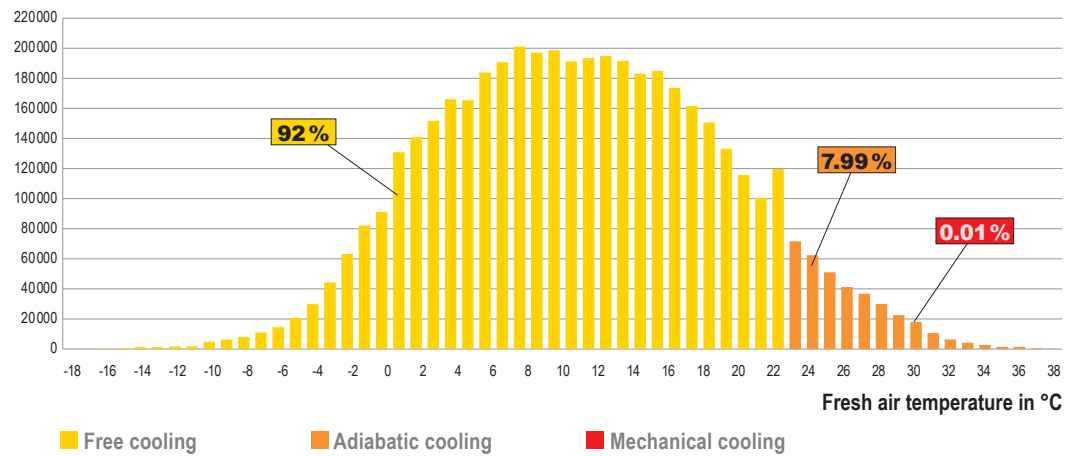


Annual curve of Hoval ServeCool

Operating modes



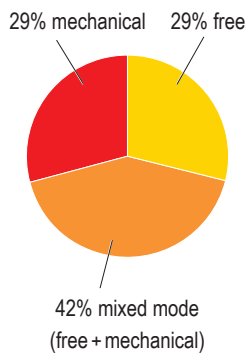
Cooling performance in kWh



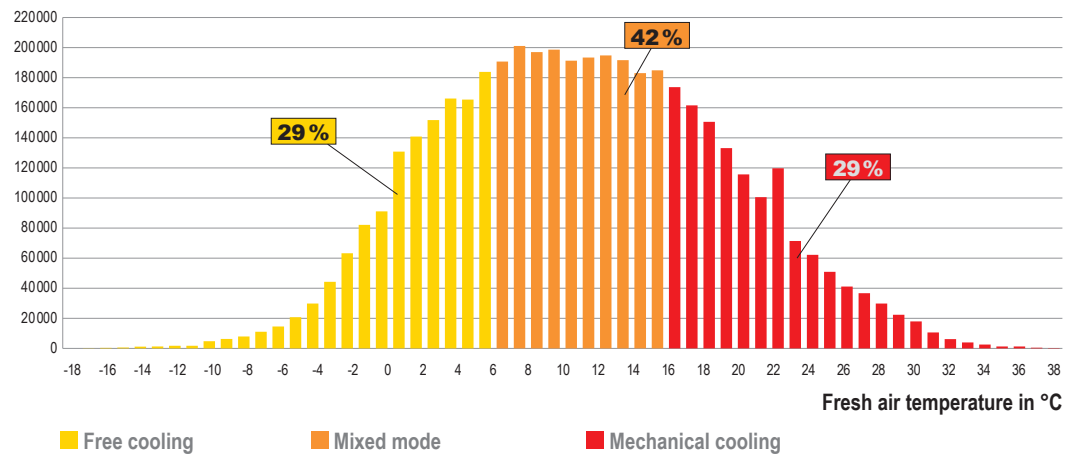
Reference: Extract air temperature36 °C
 Supply air temperature.....24 °C
 Cooling capacity.....500 kW
 LocationMannheim (climate zone 12)
 Climate data according to VDI 4710

Annual curve of conventional cooling system (water-cooled chilled water systems with dry cooler)

Operating modes



Cooling performance in kWh



Reliable planning with SECA.

The ServeCool Efficiency Calculator (SECA) quickly and reliably calculates the annual curve of Hoval ServeCool for any location. The calculation is based on certified measured values and fine-grained weather data, meaning that it provides maximum planning reliability.

Efficiency in focus.

SECA is the name of the user-friendly tool for quickly and reliably designing ServeCool air-conditioning systems for data centres. Based on meteorological data for the planned location and the required cooling capacity, it calculates all data that is crucial for dimensioning the plant. In doing so, it makes it possible to simulate and compare different scenarios with regard to redundancy of the cold supply.

The planner receives detailed data about the annual energy requirements, the distribution of operating hours in the various cooling modes, the water consumption for the adiabatic cooling, air volume currents, the free-cooling limit and more so that the plant can be optimised for the particular project (and for the gradual expansion) based on comprehensive information.

Precise values.

SECA uses precise weather data according to VDI4710. Unlike in specially compiled data sets that are intended to represent an average weather pattern typical for the year, the calculations are based on exact temperature and humidity values that are recorded every 6 minutes. As a result, the calculated performance data is significantly more accurate, especially with regard to extreme weather conditions, and provides increased security during the design phase.

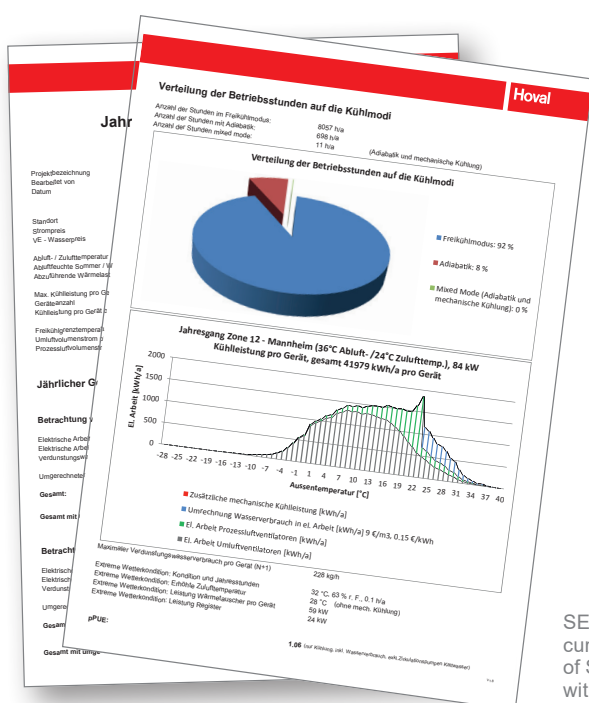
With regard to expected climatic changes, SECA also provides the possibility of using weather data that has been generated based on regional climate models for 2021 to 2050 in calculations (TRY data 2035).

Reliable data.

All calculations made using SECA are based on secured data. It uses Eurovent-certified databases and manufacturers' own performance libraries for calculating the plate heat exchangers and cooling coils. The theoretically calculated coefficients of performance have been measured and confirmed in a practical trial in the DMT laboratory in Essen (TÜV Nord).

Theoretically calculated data is checked again and again and verified with the utmost precision at both independent test institutes and at our in-house ServeCool testing facility.

SECA calculates the annual curve and energy consumption of ServeCool for any location with a high level of accuracy.





CE-Colo DC7 Czech Republic

The Czech provider CE-Colo (a subsidiary of T-Mobile) has opened a new, large colocation data centre.

The DC7 data centre (Data-center7) will reach a maximum capacity of approx. 6 MW in its final configuration. The energy consumption of the new installation is significantly lower than that of comparable systems. For air conditioning, CE-Colo relies on the adiabatic cooling solution developed by Hoval.



The Czech T-Mobile subsidiary CE-Colo equips its data centre with 64 ServeCool devices and benefits from:

- The experience, know-how and advice of Hoval for tailor-made solutions
- Highest reliability with extreme energy efficiency
- Unbeatable free cooling limit (difference between fresh air/supply air: 3 K)
- Switchover to purely mechanical operation without fresh air in emergencies
- Designed for modular growth
- Zone control over multiple devices per server room



CE-Colo has used coloured arrows to illustrate the different air types and cooling functions of the ServeCool unit. CE-Colo's customers are thus shown and explained the innovative solution.

SAK data centre, eastern Switzerland

The most energy-efficient data centre in Switzerland is located on the edge of the Appenzell village of Gais. The efficiency is based on sustainability – also with the adiabatic cooling system from Hoval.

Energy efficiency redefined

SAK (Sant Gallisch-Appenzeller Kraftwerke) has carefully chosen the Gais site: Situated at 919 metres above sea level, the location is climatically ideal for a data centre. Free cooling with intake fresh air and adiabatic cooling are sufficient to permanently cool the server rooms. Mechanical cooling is not necessary. The ServeCool air conditioners do not require a chilled water system for aftercooling in Gais and therefore do not require compressors.

The data center RZO Eastern Switzerland utilizes the Hoval Solution for purely adiabatic cooling because of:

- safety purely adiabatic cooling, without mechanical re-cooling, to guarantee the safe cooling of the data center
- Highest reliability with high energy efficiency
- unbeatable free cooling limit (difference outdoor air / supply air: 3Kelvin)
- Design based on modular growth, on the two floors 16 devices will be installed at the end
- the possibility of waste heat utilization in the adjoining one cheese dairy

The technological double-act at this data centre in eastern Switzerland shows the scalability of the ServeCool solution. There are already five devices installed, out of a possible eight if the system were to be extended over the full area the ground floor.

In Gais, rainwater is collected in an upstream cistern for adiabatic cooling.

The waste heat from the data centre is raised to a high temperature level by a heat pump and used by the adjacent cheese dairy to pasteurise the milk, meaning that it is employed efficiently in cheese production.



Hoval quality. You can count on us.

As a specialist in heating and air-conditioning technology, Hoval is your experienced partner for system solutions. For example, you can heat water with the sun's energy and your rooms with oil, gas, wood or a heat pump. Hoval ties together the various technologies and also integrates room ventilation into the system. You can be sure to save both energy and costs while protecting the environment.

Hoval is one of the leading international companies for indoor climate solutions. Spanning more than 70 years, our experience continuously motivates us to design innovative system solutions. We export universal systems for heating, cooling and ventilation to more than 50 countries.

We take our responsibility for the environment seriously. Energy efficiency is at the heart of the heating and ventilation systems we design and develop.

Responsibility for energy and environment

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