

SCALABLE CLIMATE SOLUTION WITH FREE COOLING

STULZ

CLIMATE. CUSTOMIZED.



Cooling in perpetuity

STULZ implements air conditioning solution for RAG data center at the former colliery Pluto

More demanding efficiency and safety requirements meant the RAG company needed a new data center. For its air conditioning, RAG chose a solution from STULZ. The new units enable Mixed mode with an infinitely variable combination of Free Cooling and DX cooling, for greater energy efficiency.

THE CUSTOMER

RAG Aktiengesellschaft was founded in 1968 and for decades provided a safe and reliable supply of coal. After more than 200 years, industrial coal mining in Germany came to an end in 2018. This led to the closure of RAG's last two mines, Prosper-Haniel and Anthrazit Ibbenbüren. However, the company's responsibility did not end at this turning point. Rather, RAG focused on the task of seeking sustainable solutions for the post-mining landscape.

These involve in-perpetuity work to deal with the consequences of mining. This work includes management of mine water, polder areas, groundwater treatment and monitoring systems on the Ruhr and Saar rivers and in Ibbenbüren. However, the requirements for management and monitoring have grown ever more stringent over the years, and this also applies to the control centers that were formerly operated locally at the various mining sites.

THE FACTS

Client

RAG Aktiengesellschaft

Hardware

- 1 × CyberCool Indoor A system (CSI 84 1A)
- 1 × condenser for the A system
- 2 × CyberCool Indoor GE system (CSI 662 GES)
- 8 × CyberRow CW System (CRS 210CW)
- 2 × speed-controlled recoolers and pump sets

Task

- Efficient cooling for IT infrastructure and cooling circuit for comfort cooling
- Cooling system not visible from the outside
- Maximum Free Cooling mode
- Variable cooling due to scheduled increase in IT load



THE PROJECT

To centralize management and safety monitoring processes and make them more efficient, RAG decided to build a new control room at the Pluto site in Herne-Wanne. Here, modern monitoring systems should enable all water management sites in the Ruhr, on the Saar river and in Ibbenbüren to be monitored centrally in future. A key feature of this project was the appreciably higher level of safety required for this in-perpetuity work. The IT infrastructure is fully redundant in structure, for example. The two server rooms are 100 percent redundant, with each server room additionally having a separate UPS and battery room.

The cooling solution was also extremely important, as cooling circuits needed to be installed both for the IT infrastructure and for comfort cooling in the building. The requirements were clear: the cooling system must not be visible from the outside, and it must run on Free Cooling. Moreover, the system must be designed for an IT load that was initially still low due to the new build. The changing loads posed a particular challenge. Finally, RAG Aktiengesellschaft decided on a solution from STULZ. The possibility of Mixed mode combining Free Cooling and DX cooling was a primary factor in their decision.



STULZ CyberCool Indoor (with up to 100 kW) with Integrated Free Cooling Function and small footprint for indoor installation

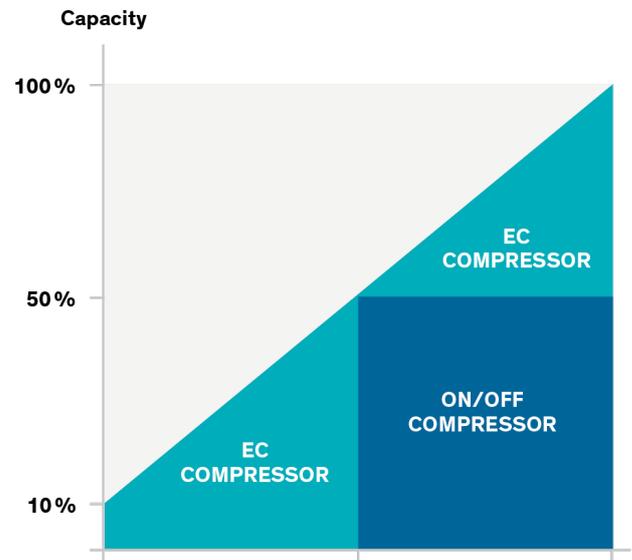


IMPLEMENTATION

In all, STULZ supplied a CSI 84 1A indoor chiller with condenser for comfort cooling, two CSI 662 GES indoor chillers with integrated Free Cooling function, two matching dry coolers and eight CyberRow CRS 210CW row coolers for the IT infrastructure.

The air conditioning was installed by Dr. Starck Gebäude- und Umwelttechnik GmbH from Siegburg. One important aspect was the need to keep the chilled water circuit for the comfort cooling completely separate from the IT cooling. The varying load conditions were another factor: the initially low load of 12 kW, comprising 3 kW from the monitor wall and 9 kW in total from the server rooms, UPS and battery, will increase to approximately 72 kW when all building is complete.

The two water-cooled CSI 662 GES chillers support the Indirect Free Cooling demanded by the client and each delivered a cooling capacity of 76 kW. Therefore, one unit can already cover the entire future load, providing N+1 redundancy and ensuring availability. What's more, the STULZ systems can cope with fluctuating loads and therefore the initial low load of just 12 kW without problem. At the same time, RAG gains particular benefits from the engineering prowess of the STULZ specialists.



Schematic diagram of the infinitely variable and precise mode of operation of the two compressors in a CSI 662 GES

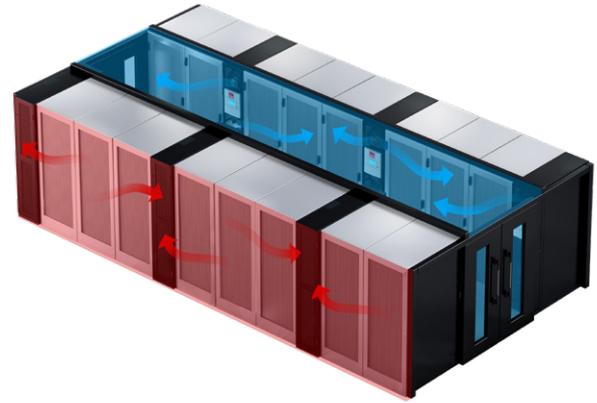
For the chillers have two compressors – an On/Off compressor and a modern EC compressor that can work in partial load mode – which share the load between them. This is a real bonus for these project requirements. If the load increases between 15 and 50 percent, the capacity of the EC compressor rises to 100 percent, while the On/Off compressor remains off. If, on the other hand, the load rises by 50 percent, on comes the On/Off compressor, and gets straight to 100 percent of its capacity, to cool the load. A rise in load from 50 to 100 percent causes the On/Off compressor to deliver another 100 percent of capacity.

In addition, the EC compressor switches itself back on, and can increase capacity steplessly to 100 percent. Moreover, the CSI 662 GES is equipped as standard with a Free Cooling brazed plate heat exchanger. Therefore, the compressor and associated DX brazed plate heat exchanger can be fully bypassed and switched off based on the outside temperature, controlled by a three-way valve. Rising outside temperatures are no problem either. This is thanks to Mixed mode, which enables an infinitely variable combination of Free Cooling mode and DX mode.



STULZ CyberCool Indoor with GES system (interior view)

For row cooling (cold aisle solution), the intelligent standby manager used in the STULZ solution is impressive. As four CRS 210CW CyberRows each with a capacity of 9.8 kW were installed in each IT room, three of the four installed row coolers are already able to cool down the maximum heat load. This way, N+1 redundancy has also been achieved for the row coolers. However, thanks to the STULZ standby manager, the fourth unit does not remain on standby, but also runs continuously. The STULZ solution therefore achieves greater energy efficiency: since four units are in operation, each individual row cooler has less to do, and the amount of moving air per unit also decreases.



STULZ CyberRow as a cold aisle installation

THE RESULT

The air conditioning solution in the new data center at the Pluto site in Herne-Wanne satisfied the requirements of RAG in every respect. At higher temperatures, Mixed mode with its infinitely variable combination of Free Cooling mode and DX cooling guarantees reliable cooling of the IT infrastructure at all times. Since system temperatures are 16/22°C, the desired Free Cooling can be used 100 percent up to a temperature of roughly 10 °C. Additionally, reduced compressor operation saves on energy costs. Finally, even in the years to come, during which capacity will increase by more than 500 %, the system will not require any modifications.



STULZ CyberRow CRS 210CW

ABOUT STULZ

STULZ is one of the world's leading solution provider of energy efficient temperature and humidity management technology, specifically for mission critical applications. Backed by over 40 years of experience, STULZ is one of the foremost pioneers in the field of air conditioning solutions for dependable applications and Data Centers. STULZ air conditioning equipment is developed and manufactured primarily in Germany, to the very highest standards of quality and in line with exceptionally stringent testing criteria.

The STULZ product range includes traditional room cooling, high-density cooling, chillers, container modules and air handling units with adiabatic cooling.

All systems are available with Indirect Free Cooling. STULZ offers Direct Free Cooling for CRAC systems, air handling units and modular Data Centers. Together with its various sizes, extensive additional options and modularity, STULZ therefore boasts a product range that is unique in the world and can make optimum air conditioning a reality for practically every Data Center project.

For further information about our services and products please visit our website www.stulz.com