



Efficient Heating with a Modern Energy Concept.

ENGIE Refrigeration supplies a geothermal heating system with QUANTUM heat pumps.

Environmentally friendly, renewable methods of energy generation are increasingly used to ensure an efficient heat supply to production facilities: the new production hall at the Mercedes-Benz plant in Rastatt is one such example. In addition to the usage of waste heat from production processes, the plant also extracts heat from the ground - called geothermal energy- for heating purposes. Two QUANTUM chillers used as efficient heat pumps, each with a thermal output of 1,807kW under full load conditions, present the heart of this heating concept.

An annual saving of 5 million kWh and 800 t of carbon dioxide has been made possible by using the QUANTUM and other heat recovery components. This equates to the electricity consumption of 1,000 single-family houses. The groundwater is not only used to heat the building in winter but also to cool it in the summertime. A total of 11 wells were bored and 2.6 km of pipes laid for the geothermal system. The system can make a thermal use of 800,000 m³ of groundwater in a temperature window ranging from 6 to 20 °C annually.

Selling points for the QUANTUM

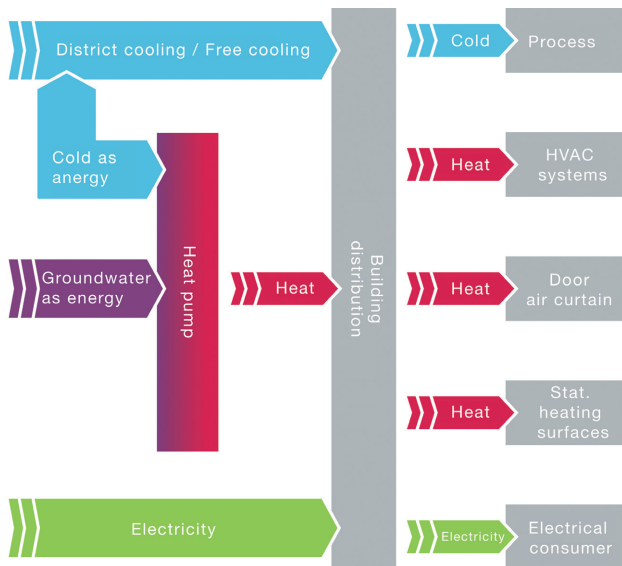
The main selling points contributing to the buying decision were the outstanding efficiency values and associated CO₂ reductions as well as the stepless variable power control

and the absence of oil. Two QUANTUM B150 models with 5 compressors each were installed and integrated into the building management system. The nominal cooling capacity is 1,420 kW, the nominal heating capacity 1,807 kW per unit. The start-up of the system was effected in the summer of 2010. After twelve months of operational experience, an excellent efficiency level of the heat pumps has been verified on the basis of recorded measurements. An average COP of over 5 was achieved in monovalent operation, and over 10 in bivalent operation.

Environmental friendliness and additional benefit

A particular advantage is the usage of the cold water generated during heat pump operation in the production cycle.

Schematic Diagram of Energy Supply



Technical Data Heat Recovery

Heating capacity	%	100	75	50	25	11
Cooling capacity	kW	1.420	1.065	710	355	156
Heating capacity	kW	1.807	1.339	894	447	198
Electrical power consumption	kW	387	274	184	92	41

Technical data of a QUANTUM B150-PSC-LL oil-free turbo chiller with cold water temperatures at 12/6 °C and heating water at 30/45 °C, decreasing cooling water inlet temperatures in partial load operation.

Dimensions, Weight & Filling

- LxBxH: 4.712 x 2.137 x 2.185 mm
- Shipping weight: 6.560 kg
- Operating weight: 7.485 kg
- Refrigerant filling R-134a: 550 kg
- Sound pressure level in 1 m distance according to DIN EN ISO 3744: 72,3 ± 3 dB (A)
- Sound power level according to DIN EN ISO 3734-1: 92,2 ± 3 dB(A)



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