

Deutsche Bahn ICE-Maintenance depot in Cologne (Nippes), Germany



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Project description



- Project location: DB Fernverkehr AG
Longericher Strasse 202
D-50739 Cologne
- Purpose: The maintenance depot is heated or cooled by a system consisting of several heat pump modules (including hydraulics).
The used Zent-Frenger system has a cooling capacity of up to 3.9 MW or a heating capacity of ~5 MW.
- Funding:
- Environmental relevance: The main energy source of the used system is groundwater. Covering the entire energy demand with green energy is of highest priority.

Especially for the cooling operation, only the cooling energy of the groundwater is used. This means that only a small amount of additional energy (e.g. electricity for the operation of the required feed pumps) is necessary to cool the building, which reduces the power consumption of the system to a minimum.

Further, the system is capable of a dual operation, which uses internal building energy to heat and cool the building simultaneously.



Technical details (1/2)

The Zent-Frenger system (Geozent Profi line) provides a maximum capacity of 3x 1.3 MW heating and natural cooling capacity. An additional module is able to provide 1x 1.0 MW of heating capacity.

Dimensions (length x width x height):	7.01 x 2.00 x 3.00 m
Modules:	4
Weight:	11 tons per module
Refrigerant circuits:	2 separate circuits

Each module is separated into two elements, which allows an easier insertion.

Equipped with highly efficient screw compressors (Bitzer GmbH)

High-quality compact plate heat exchangers (SWEP)



Technical details (2/2)

Built-in internal hydraulic ready for connection to a Zortström accumulators
incl. frequency controlled pumps, control valves and sensors

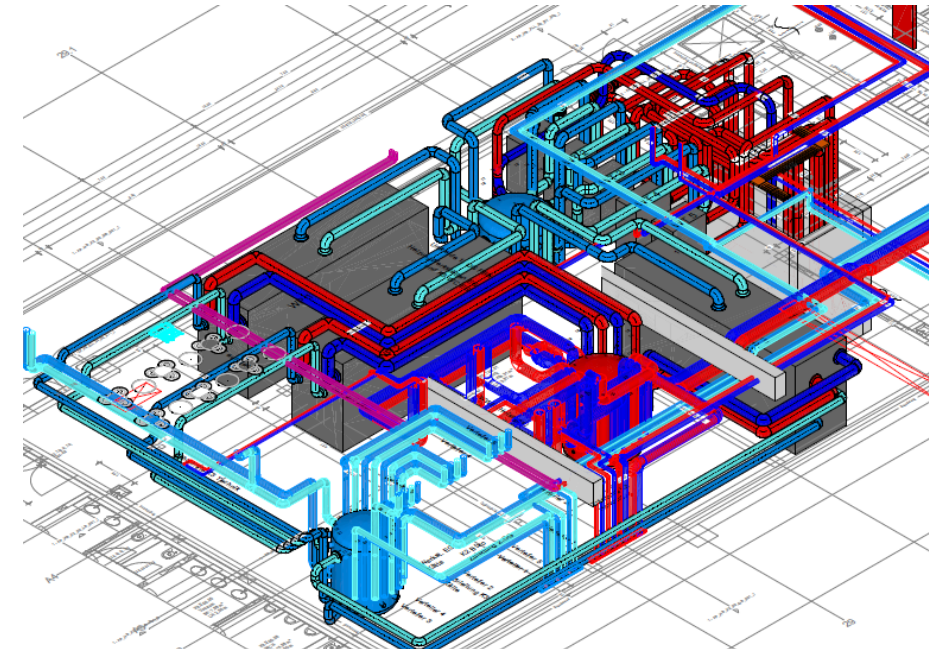
COP (dual operation): 6.7

A decisive part of the system is the built-in control system including a visualization. The used control system is ready to communicate with the building management system. Additionally, the built-in control system offers an encrypted remote access which provides transparency about the operation of the system and a fast access in case of occurring problems.

Energy Source: Groundwater
(5 pumping wells, 5 shallow wells)

CO₂ neutral heating and cooling for building temperature control

The used system in combination with a solarthermie (180 m²) and photovoltaic system (2.100 m²) provides an annual saving potential of 1245t CO₂.



Multiplication potential

- Environmentally friendly heating and cooling of an industrial building
- Since Geozent systems are designed based on customer specifications, this system could be combined with other energy sources (air, ice storage, etc.)

Further, even a combination of different energy sources is possible due to the advance hydraulic

