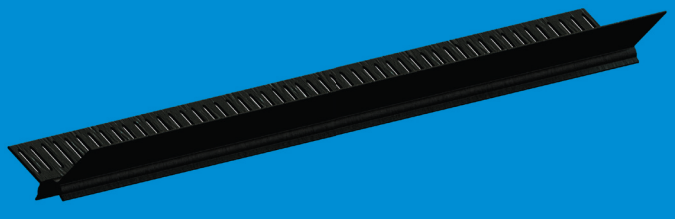
Convector Wings

Additional Performance for Radiant Ceiling Sails

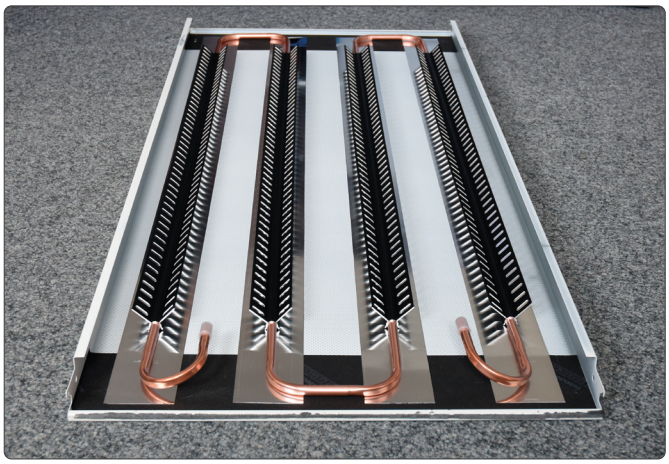


Tailor-made solutions for indoor climate

BARCOL-AIR

Additional Performance for Radiant Ceiling Sails

Convector Wings are matt black anodized aluminum profiles with slotted “wings” on both sides. With the profile that opens downwards, the Convector Wings can be attached to the straight sections of a pipe meander. This significantly increases the heat exchange surface of a radiant ceiling, which leads to an increase in the water capacity and a simultaneous activation of the concrete mass via thermal radiation.



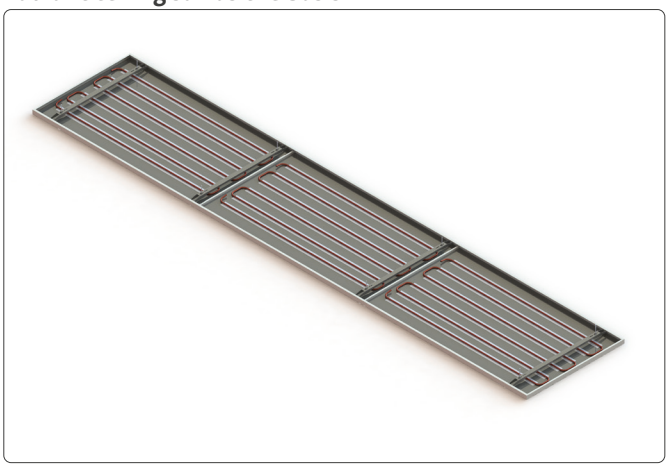
- Increase in water capacity by multiplying the heat exchanger surface
- Radiation exchange enables the concrete to be included
- Can be combined with acoustic insulation without loss of capacity
- All common fixtures (e.g. lights) can be integrated

Designed for use with ceiling sails

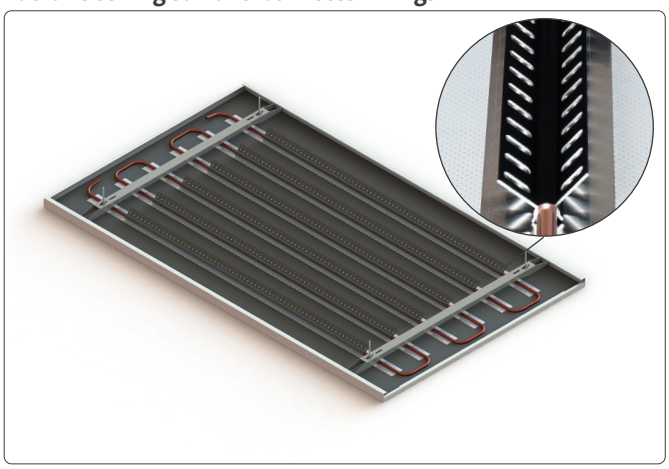
Convector Wings are particularly suitable for ceiling sail systems. The greatest increase in capacity is achieved by sail solutions in which an increase in the air speed is created between the sail and the ceiling, as is the case with the radiant ceiling sail with supply air element (Aquilo) or with a nozzle channel. With these, the energy from the room is supplied to the Convector Wings extremely effectively. In addition, the high radiation emission factor increases the radiation power. The increase means that energy is diverted from the concrete and that it is always kept at a low temperature level. This can prevent the storage mass from oscillating, even during long periods of heat.

When combining radiant ceiling sails with nozzle channel and Convector Wings, there is active concrete management, which enables free cooling over a longer period of time. Energy is temporarily stored during the day so that it can be discharged at night.

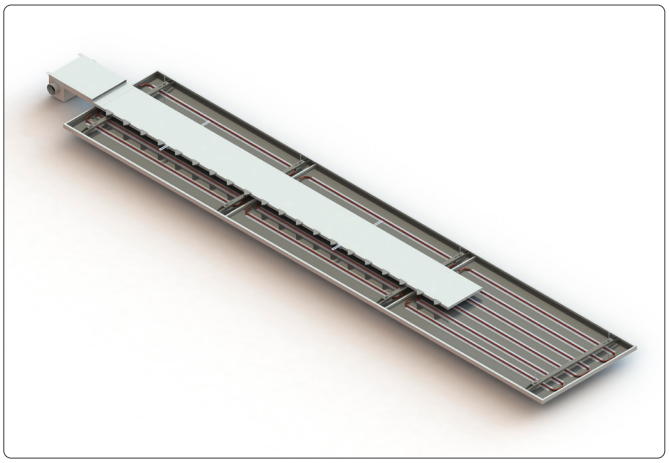
Radiant ceiling sail as the basis



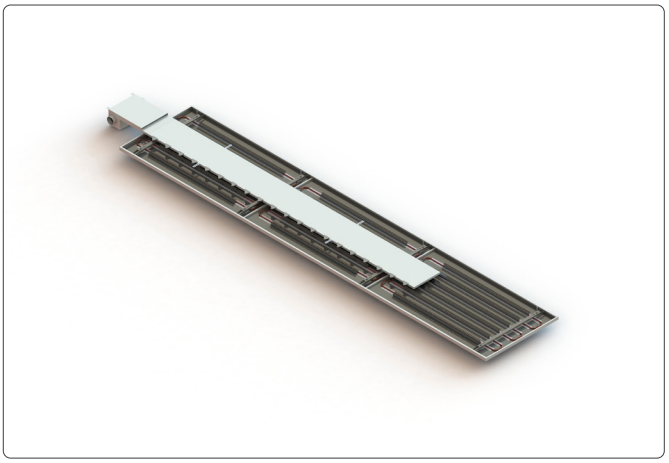
Radiant ceiling sail and Convector Wings



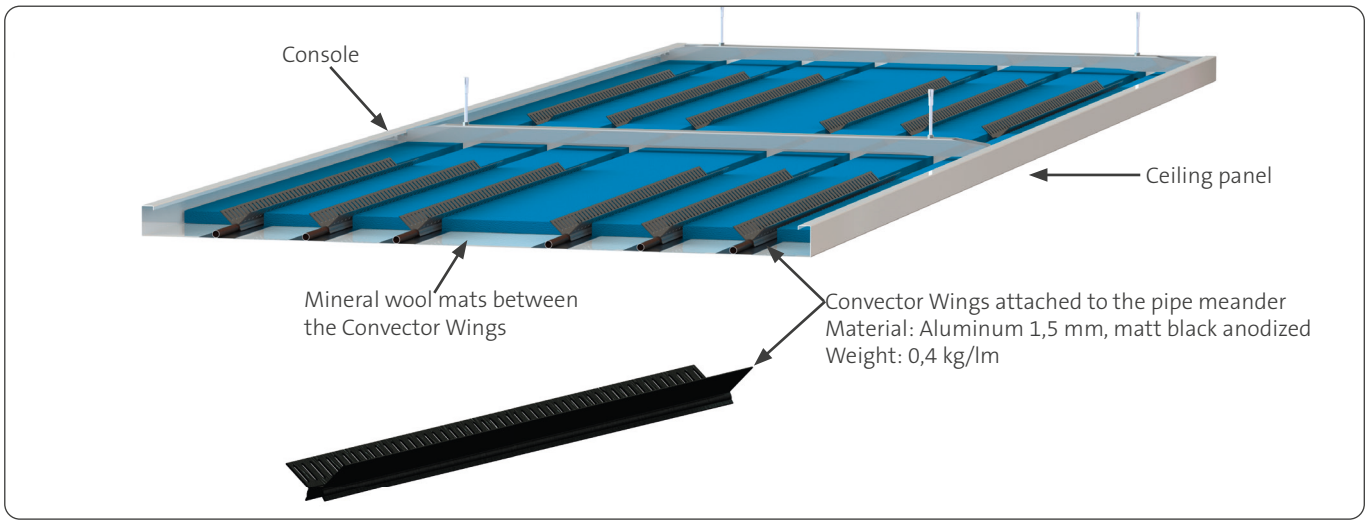
Radiant ceiling sail + nozzle channel



Radiant ceiling sail + nozzle channel and Convector Wings



Construction ceiling panel with Convector Wings

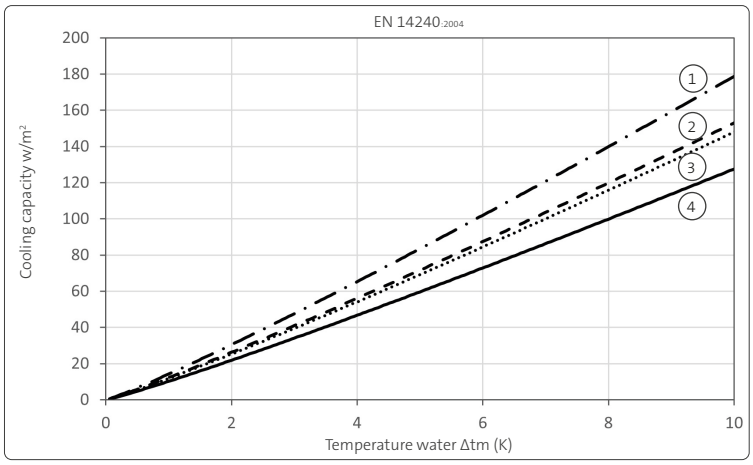


Capacities in a system comparison

Initial data: Ceiling panel made of steel, entire area covered with fleece, distance between heat conducting rails 100 mm.
1) Radiant ceiling sail + nozzle channel and Convector Wings (in supply air mode)
2) Radiant ceiling sail + nozzle channel (in supply air mode)
3) Radiant ceiling sail and Convector Wings
4) Radiant ceiling sail
(Capacity information without object-specific and capacity-influencing factors.)

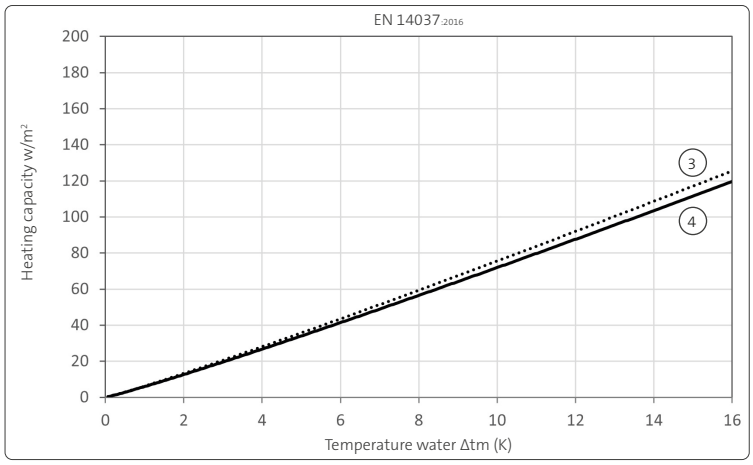
Cooling

Depending on the configuration, with 1) and 2) an additional capacity of 20 W/m² panel area is achieved through concrete management.



Heating

When the supply air is running, the heating capacity is 20 to 40% higher.



Notice
- SN EN 14240: The cooling capacity is related to the active area according to SN EN 14240:2004. The active area is calculated according to SN EN 14240 from the number of heat-conducting rails x length of heat-conducting rail x distance between heat-conducting rails.
- SN EN 14037: The heating capacity is related to the active area according to SN EN 14037:2016. The active area is calculated according to SN EN 14037 from the length of the ceiling panel x the width of the ceiling panel.

Energy saving potential of a high water flow temperature

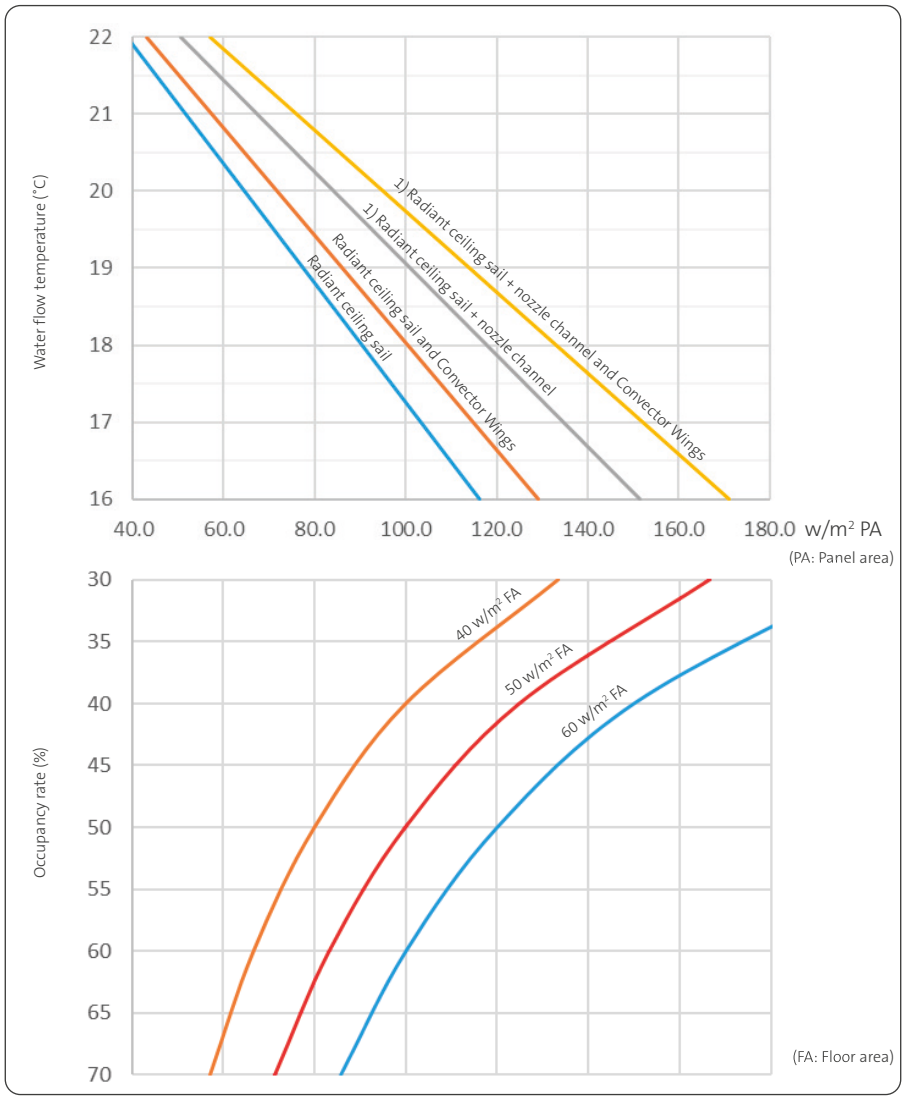
In terms of energy efficiency, the water flow temperature plays an important role. The early planning of a higher water flow temperature over the service life of an object can realize great energy-saving potential:

- High COP value of the refrigeration machine, since the electrical energy consumption is smaller compared to the environmental energy used.
- Free cooling operation for a larger part of the year.

Cooling capacity depending on the water flow temperature

The diagram shown is divided into two parts:
The lower part of the diagram shows the interaction between system capacity and occupancy rate.

The upper part of the diagram shows the interaction between system capacity and cold water temperature.



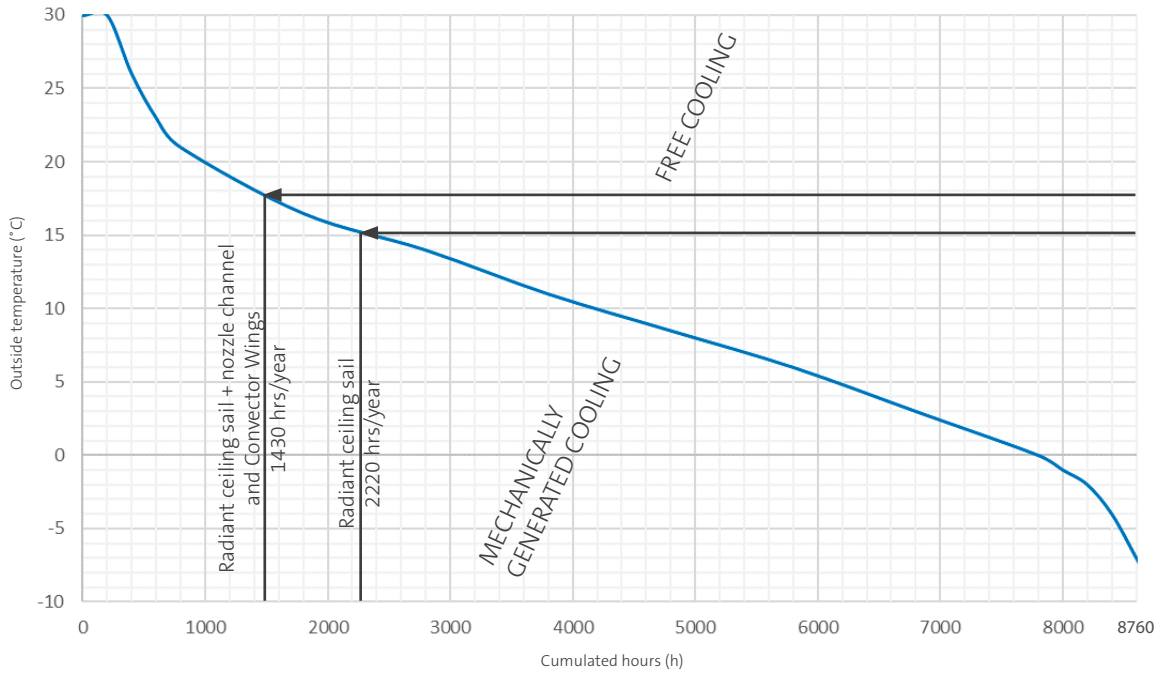
[1] The load temporarily stored by the concrete management when using the nozzle channel as well as the nozzle channel and Convector Wings was taken into account.

Free cooling depending on the water flow temperature

The use of high-performance radiant ceiling sails can greatly increase the proportion of free cooling. The cumulative frequency diagram of the outside temperatures in Zurich serves as an illustration.

- Free cooling operation can be assumed if the outside air temperature is 2K below the flow temperature of the cooling water.

The diagram also shows that **increasing the water flow temperature** from 17 °C to 19.7 °C **reduces the need for mechanically generated cooling by up to 36 %**.



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