KAP EUROPA
Frankfurt am Main

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CLIENT | ARCHITECT
ECE Projektmanagement GmbH, Hamburg | Eike Becker_Architekten, Berlin

GRAVIVENT®
Silent gravity cooling

Platinum for Kap Europa

Made for the future. "Kap Europa" is the world's first congress centre that has been awarded the Platinum Certificate of the German Sustainable Building Council (DGNB). Located adjacent to the Messe Frankfurt (Frankfurt Trade Fair), its facilities and intelligent partitioning effectively complement the large spaces of the congress centre.

"Kap Europa" is made for the future because planning, construction and operation are consistently aimed at conserving resources. ECE Projektmanagement GmbH and Eike Becker_Architects systematically implemented this ambitious overall concept by using environmentally sustainable materials and resources, energetically optimized windows and facades, power from renewable sources, LED lighting. In addition, 1000 square metres of green roofing improve the carbon footprint. The high number of measures also includes the conscious use of natural and physical phenomena: glass fronts create brightness inside the building. Better and cheaper than artificial light. The comfortable temperatures in the two large halls of the congress centre are based on using GraviVent® – a well-engineered product for gravity cooling from TTC Timmler Technology GmbH. Originally designed for use in sound and television studios, this technical solution provides the benefit of ensuring a good climate and pleasant temperatures without producing any noise at all. The energy demand of the water-fed system is 50 to 70 percent lower than with traditional systems. And it has a higher performance than chilled ceilings.

This is an important aspect because the divisible "Meridian" congress hall on level 2 covers 660 square metres and the "Horizont" hall on level 4 can accommodate around 1000 people. That many persons in one place heat a space within a very short period of time. Usually. But thanks to the GraviVent® cooling units installed in the walls, hidden from the visitor's eye, nobody works up a sweat. The rising heated air is cooled down to 16 degrees by the water-fed system and sinks to the bottom through the duct below. It then exits again as a fresh breeze through horizontal outlets at the foot of the wall. Almost unnoticeably, because the low-impulse displacement ventilation efficiently keeps the room at a moderate temperature.

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GRAVIVENT® – SILENT GRAVITY COOLING
"Meridian" hall + terrasse

AIR CON SYSTEM DESIGN

The generous room heights are another reason why GraviVent® works so well: The longer the duct behind the wall panelling, the stronger the cooling effect. To achieve the desired temperature and 30 kW of cooling power, 15 AISI cooling units were installed in the "Meridian" hall (ceiling height 7.30 metres). For the even larger "Horizont" hall (ceiling height 8.40 metres) 34 kW of cooling power had been specified and 21 cooling units now provide a pleasant airiness.

Naturalness and high tech, coolness and comfort: in the "Kap Europa" these terms merge in an exemplary fashion – this innovative congress centre provides an ideal environment to focus on your work, in perfect surroundings, with a perfect climate.

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GRAVIVENT® – SILENT GRAVITY COOLING
"Horizont" hall

AIR CON SYSTEM DESIGN

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TASK
GraviVent® – Silent gravity cooling

AIR CON SYSTEM DESIGN

GraviVent® | Technical Specification

Dimensioning Silent Cooling

"Meridian" Hall

→ Room height 7500 mm | required cooling efficiency 30 kW

→ 16°/19°–26° C | H_{eff} (effective duct height) >7.0 m

→ 15 units type AISI 24.51 = 36 m
Effective length 34.8 m x 884 W/m = 30.76 kW

"Horizont" Hall

→ Room height 8400 mm | required cooling efficiency 34 kW

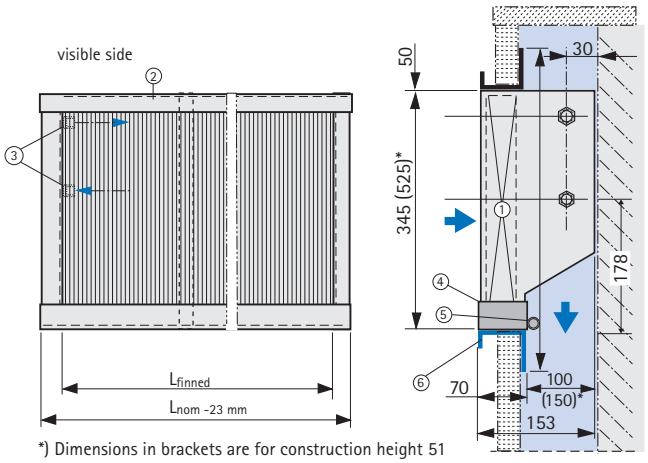
→ 16°/19°–26° C | H_{eff} (effective duct height) >7.0 m

→ 14 units type AISI 24.51 = 33.6 m
Effective length 31.78 m x 884 W/m = 28.04 kW

→ 3 units type AISI 22.51 = 6.6 m
Effective length 6.36 m x 884 W/m = 3.27 kW

→ 4 units type AISI 18.51 = 7.2 m
Effective length 6.88 m x 884 W/m = 4.02 kW

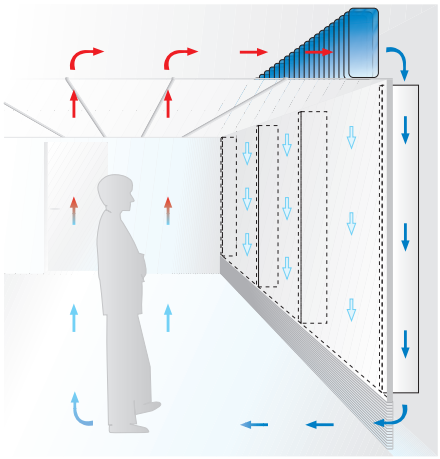
→ Total hall 35.83 kW

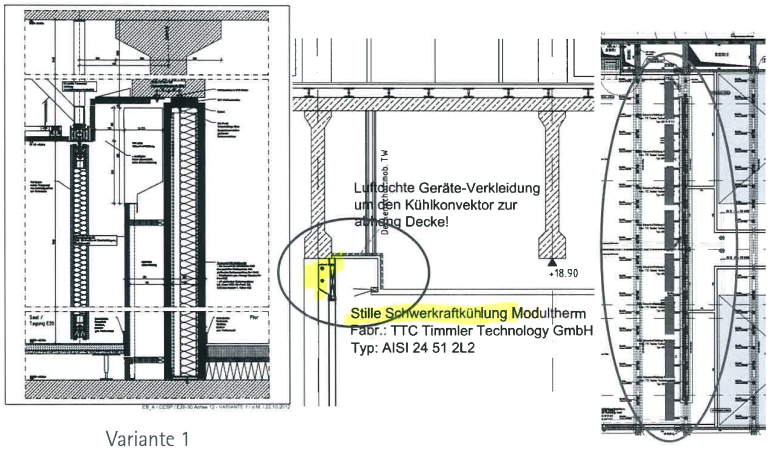


*) Dimensions in brackets are for construction height 51

"Meridian" hall
Level 20/30
Q_{req} 30 kW

"Horizont" hall
Level 40/50
Q_{req} 34 kW





Cooling
"Meridian" hall
Level 20/30

Variante 1