References

The Kastelli community utilises smart building services

Uponor involvement

- Pipe size 20 mm, heatable premises approx. 16,000 m2 in total

The Kastelli community utilises smart building services

The Kastelli community centre, which was completed in 2014, is the City of Oulu's educational, leisure and culture centre that serves the residents of the city in many different ways. Uponor's underfloor heating system has been installed in the building. The Kastelli community centre, which was completed in 2014, is the City of Oulu's educational, leisure and culture centre that serves the residents of the city in many different ways. The building houses a day-care centre, a comprehensive school, an upper secondary school, an upper secondary school for adults, an adult education centre, a library and a youth centre. The schools' sports facilities are also open to other leisure and sports groups. The combined gross area of the premises is about 24,000 square metres and the net floor area is just under 16,000 square metres.

Project Facts:

Location	Completion
Oulu, Finland	2014
Building Type	Product systems
Office	Radiant Heating & Cooling
Project Type	
New building	

Partners

Constructor and lifecycle contractor:
Lemminkäinen
HVAC planning: Plan-Air
Installation: Lakeuden Kotilämpö Oy

The planning of Oulu's first project implemented with the lifecycle model had clear starting points: long-term, safe and multi-purpose premises with structural solutions created to last were needed for residents of different ages. Special attention has been paid to energy efficiency and indoor air quality.

Durability and cost efficiency in a key role

The lifecycle model ensures a good price/quality ratio: durability of materials and low maintenance costs for the building have been taken into account in all decisions. Lemminkäinen is liable for maintenance for a service period of 25 years and coordinates the cooperation between the building's users and service providers, such as cleaning and food service companies. The careful planning and construction of the site are a top priority not only for the customer but also for the constructor committing to long-term liability.

The total costs of the project are spread out over the long term. Therefore, the city's initial investments are lower than usual. Kastelli's lifecycle costs for 25 years have been calculated at about EUR 86 million, including the cost of construction (about EUR 46 million).

Underfloor heating as part of smart building services

The Kastelli community centre, which is the first Nordic school to be awarded the Gold-level LEED for Schools certificate and the Finnish Association of Civil Engineers' 2014 RIL award, is an energy-efficient building that utilises smart building services solutions: each classroom is equipped, for example, with temperature and carbon dioxide sensors, which help control heating and air conditioning. Lighting is controlled by occupancy sensors.

The building is heated by energy-saving underfloor heating. The solution is an excellent fit for sites where the youngest users spend a lot of time sitting or crawling on the floor. In underfloor heating, heat rises evenly from the whole floor area, which means that there is no air circulation or sensation of draft.

– Kastelli has a large floor area, which serves well as a heat reservoir. Thanks to even heat distribution, room temperature can be kept slightly lower without compromising comfort, states Jouni Riikola, who worked as regional HVAC manager at Lemminkäinen during the project and currently works at Are.

Challenging installation, good end result

Uponor has supplied the Kastelli community centre with underfloor heating on a turnkey basis. The contract included both planning and installation; the latter was performed by Uponor's partner Lakeuden LVI-asennus. Furthermore, Uponor delivered drainage pipes and wells as well as soil and waste pipes to the site.

Uponor planned heat outputs and designed piping and flow rates for the given outputs. During planning, special attention was paid to pipe routes and the heat emissions of underfloor heating in order to prevent excess output. It took over three months to complete the installation, and the operation was tricky at times.

– The installation was exceptional insofar as the entire surface of pipes was fastened to fixing rails, which were then shot into the base slab. This meant more work compared to the traditional method, says Uponor's WehoPEX business sales manager Ville Mäkelä.

Moreover, manifolds were installed on the suspended ceiling instead of on the floor and wall, which was not particularly troublesome.
– Good work planning makes possible even the most unusual solution, states Riikola.

Comprehensive and affordable package

Uponor was selected as partner for the lifecycle project thanks to its excellent and comprehensive turnkey delivery.

– We offered an exceptionally cost-efficient and comprehensive package for the site, including planning, installation and implementation. In the planning solution, underfloor heating was optimised in order to minimise heat loss, says Mäkelä.

– The site was one of the single largest underfloor heating projects ever undertaken in Finland. Construction according to the lifecycle model is still fairly new. In public projects, credibility is also required from system providers, states Mäkelä.

Jouni Riikola was also very satisfied with the project.
– The guys promised to complete the planning rapidly. The plan arrived on time and was excellent – as were the materials.

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