References

Uponor's head office is a model example of energy efficiency



Uponor involvement

- G12 energy collectors 11 pcs, Comfort Panel 590x590x20 ceiling cooling panels, Uponor Wirsbo PePEX 17x2.0 mm underfloor heating and cooling pipes in Weber thermal floor structure

Uponor's head office is a model example of energy efficiency

The indoor air of Uponor's two-storey head office in Vantaa is produced by an energy-efficient heating and cooling system. Uponor, which is known for its high-quality and energy-efficient products, is one of the leading providers of indoor air and pipe systems for residential and commercial buildings in Europe and North America. It comes as no surprise that the company's premises at Plaza Business Park Loiste, which was completed in 2012, are full of advanced technology.

Project Facts:

Location
Vantaa, Finland

Completion
2012

Vrsta objekta
Office building

Product systems
Površinsko grejanje i hlađenje

Project Type
New building

Partners

Partners:
NCC Property Development Oy
Optiplan Oy
Consti Talotekniikka Oy

Plaza Business Park, which is located along the Ring III highway in Vantaa, includes five modern office buildings: Pilke, Hehku, Loiste, Tuike and Halo. In January 2013, Uponor moved to Loiste, which has been awarded the "Very Good" certification as per the BREEAM environmental classification system. The building also qualifies for the A class in the Finnish energy classification system.

The indoor air of the two-storey head office is produced by an energy-efficient heating and cooling system. In addition to normal building services – including domestic water supply through Uponor's system – the premises also have solutions representing the latest technology, such as ceiling cooling and combined underfloor heating and cooling. The solutions speak volumes for sustainable development and energy efficiency.

Pleasant, modifiable working environment

Plaza Loiste is one of the first office buildings without radiators in Finland. Uponor's hydronic underfloor heating, which is connected to the district heating network and where heat rises evenly from bottom to top across the whole floor area, has been installed in the building. At Uponor's premises, the underfloor heating system is also used to cool the premises.

About 60 people work at Uponor's head office. The premises are modifiable, which has been taken into account when planning the underfloor heating and cooling system.

– Underfloor heating is a surprisingly flexible solution. The room layout can be easily modified as long as the module layout of the underfloor heating system is planned taking various operational requirements into account. The circuits can be installed so that the premises serve as one large open office or they can be, for example, changed into five separate office rooms, such as it has been done at Plaza Loiste, states Uponor Finland Ltd's planning manager Mikko Laamanen.

Free cooling is easy on both the wallet and nature

In summer, free cooling keeps the head office cool. Under the building's foundations there are 11 bore wells, on which Uponor's G12 energy collectors have been installed. The collectors, whose output is enough to cover the annual cooling needs, are combined with the underfloor heating and cooling system of the two upper floors.

The basic principle of the cooling solution is simple: the solution cooled in the bore wells is circulated through the heat exchanger in the piping installed in the floor, and excess heat is transferred from the building to the ground. Compressor technology and refrigerants with adverse effects on the environment are not used in the system. The underfloor heating solution is circulated by a circulation pump.

– Underfloor cooling is a very pleasant way to cool office buildings. It is fully draft- and sound-free; in practice, it is unnoticeable. The service man said that the number of cooling draft complaints coming from our floors is clearly the lowest among all offices in the housing company, says Laamanen.

Ceiling cooling increases comfort

Surface cooling is considered a better alternative than an air-conditioning system that blows cold air into the premises through the ducts: there is no draft, indoor air contains less dust and temperatures are more balanced. Surface cooling also helps avoid the sound problems of air-conditioning equipment.

Comfort ceiling panels have been installed on Uponor's floors. The cooling energy that flows in the panels comes from the water cooler that cools the whole building. The acoustic boards fastened to the panels make the head office pleasantly quiet.

With underfloor and ceiling cooling, it is possible to slowly raise the temperature of indoor air during the working day to minimise the temperature difference between indoor and outdoor air even when the temperature of outdoor air rises by several degrees during the day. This has been proven to be beneficial both physiologically and comfort-wise as large temperature differences are unpleasant.

Pioneer in energy efficiency

Compared to the central air-conditioning solution, Uponor's underfloor-ceiling cooling combination only takes a fraction of the electricity normally required by cooling.

– If correctly dimensioned and installed, underfloor cooling connected to bore wells can be up to seven to eight times more energy efficient than traditional mechanical cooling. When there is no need to purchase actual cooling energy, the only costs are those incurred to operate the circulation pump. A circulation pump typically consumes 5–10% of the energy produced for cooling, while the power consumption of traditional mechanical cooling is about one-third or one-fourth, states Uponor's development and corporate responsibility director Ilari Aho.

The solution saves not only energy but also money.

– All sites need some kind of heating solution in any case. It is very convenient that there is no longer the need to acquire a separate system for cooling as it is combined with hydronic underfloor heating. Cooling costs almost the same, says planning manager Laamanen.

The measurement results speak for themselves

The systems' technical operations and the building's energy consumption have been monitored in detail for two years in cooperation with Aalto University and VTT.

– The results show that capacity is adequate. This is the first time that a system like this has been implemented in its entirety in Finland. Therefore, there is certainly room for fine-tuning but the overall performance of the system has been great, says Aho.

There has been no need to use the additional cooling equipment for negotiation facilities installed in the whole building upon the customer's request – not even during summer heat waves.

– Underfloor and ceiling cooling has been adequate. Employees have been extremely satisfied with the systems, and positive feedback has been received – especially in summer, states Aho

Cautious interest in next-generation building services

Uponor's underfloor and ceiling cooling solution has aroused interest, but cooperation is off to a cautious start so far.

– Traditionally, the equipment provider may not have been considered a provider of comprehensive solutions. Especially on the investment side, careful thought is given to how to produce square metres in the cheapest way possible. In construction, the main thing is not always an energy-efficient solution that brings long-term savings – it is the fulfilment of the minimum requirements set out in laws and regulations. Unfortunately, the cost efficiency of the heating technology or the lifecycle costs of the building do not often get much more attention than that, says Laamanen.

When somebody has premises built for their own use, they are more prone to invest in energy efficiency and lifecycle thinking. Cooling combined with underfloor heating is also considered a worthy solution in Central Europe.

– A lot of systems like this are made, for example, for Germany, the Netherlands and Austria. There, surface cooling is a very popular solution for office and commercial buildings, states Aho.

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