Energy efficiency at Fruchthansa

Cooling of fruit and vegetables in optimised system

The new Fruchthansa site near the A555

Line of Business:	Industrial Refrigeration
Application:	Fruit and Vegetable Cooling
Country / City:	Germany / Wesseling
Fluid:	R134A, R404A, Glycol
Product:	Ceiling air cooler DGN, Wall/ ceiling air cooler GGHN, Condenser GVH

Energy efficiency and energy savings are topical issues in all walks of life. One example from Rhineland convincingly demonstrates that the implementation of these concepts is by no means synonymous with the reduction of flexibility: when building its new cold storage facility, the company Fruchthansa in Wesseling near Cologne chose a holistic concept, not just for the preservation of their products in storage, but with a sophisticated concept for optimal energy efficiency and thus significantly lower operating costs.

Initial situation

The company Fruchthansa, founded in 1968 in Cologne, offers comprehensive services in the fruit and vegetables sector on an international scale. This family business places considerable value on product quality and sustainability. Due to steady growth in recent years, the site at the Grossmarkt in Cologne had become far too small. The decision was made to build a new facility in Wesseling, which is easy to reach as it is situated on the A555 motorway.

Holistic energy concept

On the new site (area: 12000 m²), a holistic energy concept was to be pursued, with the two-pronged strategy of reducing cooling energy consumption as well as putting the extracted heat energy to good use. The company Müller Kälte- und Klimatechnik GmbH was in charge of the conceptual design and planning.

Werner Müller, Executive Planner

As energy efficiency was in the foreground, it was decided that the usual subdivision into a cooling system and a heating system was not to be realised, although this would have entailed less initial outlay. Meanwhile, the utilisation of the building's internal heat meant that there was no need for a gas connection at all (which saved having to pay the high connection costs) and that the transformers could be smaller (thus also reducing the supply costs to be paid to the power company). Electrical defrosting was completely done away with. Instead, a holistic, sustainable system was implemented. "It wasn't just about insulating the building in compliance with EnEV (German Energy Savings Act) and thus saving costs," says Werner Müller, Executive Planner. "Our goal was much more to do with bringing the cold consumers and the heat consumers into harmony with each other. For instance, the energy from the heat sources is stored centrally and, when needed, it is delivered to the consumption points, such as heating systems, ventilation systems, the banana ripening facility and the defrosting of cooling units. A well-water heat pump is integrated into the air-conditioning circuit, just for exceptional cases when there is not enough energy available."

Installed Components

All components of the cooling and air-conditioning circuits were to be coordinated with each other and optimally controlled, so as to adhere to the principle of maximum energy efficiency. Therefore, quality units from Güntner were used in most areas.

For instance, in the cold storage rooms (up to -1 °C), ceiling-mounted air coolers from the GGHN series are operated with cold brine, and defrosting in the drip tray is realised with warm brine. Not only do these units operate in an energy-efficient way, they are also highly suitable for cooling sensitive goods (such as fruit) for preservation, without causing excessive moisture losses, because the adequately dimensioned heat exchanger surfaces and continual control ensure that the operating temperature difference remains low. Even with open doors, room temperatures of +/- 0.2 K can be maintained.

Cooling for preservation with low moisture loss

For the picking area, ceiling-mounted air coolers with dual discharge from the DGN series were used. The units' routing of air flow ensures draught-free cooling and good distribution of the cold inside the room.

Picking area: good distribution of the cold

Units from the GVH series were chosen as the condensers. These condensers are positioned on the roof and are kept separate from the surroundings by means of noise protection measures. As allotment gardens are situated on the other side of the motorway, noise protection requirements had to be adhered to. Despite this construction measure, the condensers still operate efficiently and enable sliding reduction of the condensation temperature to 28 °C in ambient temperatures of up to 20 °C, which are only exceeded in summer.

"The achieved energy savings are enormous," says Werner Müller. "If you compare the operating costs, it is clear that the higher investment costs amortise very quickly."

New storage facility saves operating costs

Although the cooled volume is now 2.3 times that of the old facility, the energy costs are only a third as high. The systems' connected load has almost halved, which also enables cost savings.