

EDEKA Ladenburg: thoroughly efficient

The refrigeration system for this grocery market was conceived with a clear focus on lifecycle costs and energy efficiency.



The new branch was opened at the start of 2010.

Line of Business:	Commercial Refrigeration
Application:	Supermarket Cooling
Country / City:	Germany / Ladenburg
Fluid:	CO ₂ , R134a
Product:	Slimline unit cooler GDF, Condenser GVX

In grocery retail, new refrigeration systems are required for two reasons: Firstly, of course, new branches open. Secondly, existing shops are expanded and the enlargement of the sales floor area means that the refrigeration system concept has to be revised or replaced. At the Ladenburg EDEKA branch, the old premises had become too small and for the new building, a new refrigeration system also had to be designed. For the new branch concept, there was already an emphasis on sustainability and energy efficiency during planning of the building. The new location on the edge of the township of Ladenburg, with a sales floor area of 1,600 m², provides enough space to present the approximately 20,000 articles optimally and to establish a customer-friendly atmosphere.

Energy savings from the refrigeration units to the condenser

In order to save energy, Epta Cosmos ECO refrigeration units were used in the new shop's deep-freeze department. These units are equipped with sliding glass covers, EC fans and electronic expansion valves. Although the refrigerated shelving is implemented in the form of open refrigerated sales cabinets, very good energy efficiency was also achieved here by means of the new Zero° technology, which enables optimal product temperature with an evaporating temperature of 0 °C.



Zero° technology ensures temperature quality in the refrigeration units.

In addition, an evaporating temperature of 0 °C means that no ice forms at the evaporator, so these refrigeration units do not require any defrosting phase at all. Another positive aspect is the use of energy-saving fans and electronic expansion valves. But actual efficiency is only achieved if all components in the circuit are coordinated with each other in an energy-optimised way.

Use of refrigerant and system control

The centrepiece of the supermarket refrigeration installation is the cascaded combination refrigeration system with the refrigerant CO₂ for deep freezing and R134a for normal refrigeration. The natural refrigerant CO₂ enables highly efficient operation as regards deep freezing, whereby supercritical operation is prevented by the cascade circuit. The refrigerant R134a has only a third of the global warming potential of R404A (which was previously the most commonly used refrigerant)

and also has material properties which enable optimal utilisation of heat recovery. The refrigeration system's heat recovery is used to heat service water and is also used for building heating. Thus, the heat can be recovered almost completely. The way in which the system is controlled represents another efficiency factor. In order for the output to be optimally adapted to suit the respective requirements, a compressor with a frequency converter is provided for each pressure stage. All electronic controllers in the system are interconnected and linked to a remote maintenance centre via remote data transmission. The remote maintenance and monitoring of operating parameters guarantees that the whole system runs reliably, deviations which could cause faults can be counteracted in good time and, last but not least, energy-efficient system operation is ensured on a permanent basis.

Energy efficiency as an overall concept

Attention was paid to energy efficiency in the cold storage rooms as well. For instance, the evaporators used are from the Güntner GDF series, which includes EC fans as standard and enables particularly quick and easy cleaning. The units also have TÜV-HACCP certification, so they are precisely the right choice for hygienically sensitive areas such as those used for food storage. For the R134a stage's heat dissipation, the new Güntner GVX condenser with microox® was selected. In comparison to tube-fin heat exchangers, this new technology significantly reduces the condenser's refrigerant charge, in this case by more than 50 % from 122 to 59 litres. This reduction has a positive effect on the total refrigerant charge and the refrigeration system's TEWI rating. The unit has special flaps which allow thorough cleaning to be conducted quickly. The fans are controlled by means of Güntner Motor Management (GMM EC), here in slave mode. This has the advantage that, compared to AC fans, the power consumption of the EC fans is 56 % lower. In addition, the GMM has special functions such as bypass operation, so as to improve operational reliability. Moreover, the GMM al-

so has a clear text display to convey messages and information, e.g. present consumption levels. These can be forwarded via bus connections and analysed.



The GVX condensers have EC fans.