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**ALFA LAVAL'S CO₂
REFRIGERATION SYSTEM
AT THE S-MARKET
BUILDING IN HELSINKI,
FINLAND**

— CASE STUDY

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Alfa Laval's CO₂ refrigeration system at the S-Market building in Helsinki, Finland

INTRODUCTION

At the new S-Market building in Helsinki, Finland, cooling and terminal rooms are full of evaporators labeled and manufactured by Alfa Laval. Alfa Laval was able to help S-Market become one of the few supermarkets in Finland to use CO₂ refrigerant.

"In this very interesting project our customer, the S-Group, gave us a few prerequisites for the type of cooling equipment they wanted. The most crucial requirement was carbon dioxide, which had to be used as the refrigerant," says Taisto Tolonen, project manager at Norpe Finland, the company that installed the supermarket's cooling system. "You know, the most commonly used refrigerant in Finnish supermarkets is still artificial. The challenge is that it does not meet the upcoming F-gas legislation, which will be enforced in a few years."

Currently there are no more than 50 supermarkets in Finland where carbon dioxide is used as a refrigerant. According to Tolonen, Norpe and Alfa Laval have been cooperating since the 1970s. This latest project started with a visit to Alfa Laval Italy in December 2011, where the carbon dioxide evaporators are manufactured. "Although carbon dioxide is nature's own gas, it does not act like traditional, more commonly used refrigerants," says Hannu Viikilä, Alfa Laval Nordic and project owner.

ABOUT THE SYSTEM

S-Market's cooling system includes an Optigo CC air heat exchanger in their freezer, and Optigo CD coolers in their fish, chicken, ready-food, fruit and vegetable cold storage rooms. Both models are part of Alfa Laval's Optigo range of energy efficient and environmentally friendly air heat exchangers.

There are currently three models available in the range, which have been optimized for CO₂ and are easy to install, making them ideal for small to medium commercial applications, such as supermarkets, restaurants and chilled food storage.

Optigo CD

For cooling and freezing rooms where high activity demands increased airflow, the Optigo CD provides double airflow, but low air velocity and noise levels. As with the other products in the Alfa Laval Optigo product line, the CD model is easy to install and clean and follows HACCP guidelines for food safety.



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ABOUT THE COMPANY

Alfa Laval is a leading global provider of specialized products and engineered solutions. The company's equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Condensers, evaporators and gas coolers from Alfa Laval make transcritical CO₂ and cascading systems responsible, efficient, reliable and safe. Alfa Laval has the products and expertise, from air coolers to complete transcritical CO₂ solutions with heat recovery. Alfa Laval's worldwide organization works closely with customers in almost 100 countries to help them stay ahead.



S-Market's cooling system consists of one Optigo CD cooler in the fish cold room (0-2°C or 32-35.6°F), chicken cold room (0-2°C or 32-35.6°F), ready-food cold room (3-5°C or 37.4-41°F), fruit and vegetable cold room (6-8°C or 42.8-46.4°F), as well as three coolers in the terminal area (2-4°C or 35.6-39.2°F).

Optigo CC

Optigo CC is the perfect single flux choice for larger-volume applications.

It has a clever design with a new highly efficient coil (for reduced refrigerant content) and the same footprint as the previous series. This makes it easy to install and connect, while high energy efficiency gives low lifecycle costs. An Optigo CC has been installed in S-Market's freezing room (-20 to -18°C or -4 to -0.4°F).

RESULTS

"In order to guarantee the highest possible quality for our products, we tested certain units and then created design programs with which to secure exact capacities," says Hannu Viikilä. Carbon dioxide has good heat exchanging ability, but its drawback has always been its 'high working pressures'. However, Viikilä points to the isolated bunker that Alfa Laval has built at its manufacturing site in Alonte, Italy, where long gas coolers can be pressure tested with 172 bar.

"I can proudly say that our clear strength is the ability to combine theory and praxis," adds Hannu Viikilä. "We are able to show how carbon dioxide reacts at different pressures and our global development team was strongly committed to the correct CO₂ calculation methods."

Norpe also knows that Alfa Laval has a long reference list concerning challenging refrigeration environments, including supermarkets. "us, as an installer and contractor, it was of great importance to have a reliable and experienced component supplier," states Lasse Silvan, project engineer from Norpe. "We also appreciate the quick service in our native language, as well a high level of technical know-how on the part of Alfa Laval's contact persons."

According to Silvan, the project did not meet any significant challenges. Supplies came as agreed, and there were no surprises during the pressure and leak tests, which Norpe carried out after installation in November 2012. "

SUMMARY

Lasse Silvan, Project Engineer, Norpe Finland:

“Alfa Laval's high commitment to new environmentally friendly cooling solutions is admirable. After many years of close co-operation I can say that they are honestly interested in customers' needs and are ready to fulfill those to the smallest detail.”

Hannu Viikilä, Segment Manager, Alfa Laval Nordic:

“I appreciate Norpe's openness to the new and sustainable solutions we can offer. When operating with such a challenging refrigerant like carbon dioxide, it is rewarding that our partner also wants to see our R&D environment with all of its frills.”





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