

Deep freezing with high efficiency

GEA refrigeration systems reduce energy consumption in a Bonduelle cold-storage complex at Estrées-Mons

Bochum, Germany, 23 January 2012 – The Bonduelle Group, suppliers of canned vegetables, deep-frozen vegetables, and processed salads, has modernized and expanded cold-storage facilities at its location in Estrées, close to Péronne (80) France. In the refrigeration plant of the existing Bonduelle facilities, the company replaced the previous refrigerant R22 (known for its great ozone depletion potential) by the natural alternative ammonia (R717). At the same time, Bonduelle constructed a new cold-storage facility, 35 meters high, that offers around 24,000 pallet storage slots and that is equipped with advanced refrigeration technology. The company awarded GEA Refrigeration France with the refrigeration contracts for upgrading the old plant, as well as for the new high-bay storage facility. The value of the contract was a total of almost two million euros.

25% efficiency gain in existing refrigeration plant

At Bonduelle, it was possible to achieve immense energy savings with the existing refrigeration plant alone. During replacement of R22 by ammonia, GEA not only converted the refrigeration systems during uninterrupted operation, but the customer and refrigeration specialists from GEA have also equipped the old air coolers with frequency inverters. The speed of the fans on the cooling units is controlled according to actual cooling requirements. On the whole, the new measures resulted in efficiency improvements of around 25 %.

Energy consumption at half levels for the new facilities

GEA implemented the refrigeration technology for the new, fully automatic high-bay cold-storage facilities – with even greater efficiency gains. Even with its capacity of 24,000 storage slots, the pallet facility operates with cooling duty of a mere 2,100 kW – provided by two screw type GEA YR-Y2655S-28 ammonia refrigeration units that provide temperatures of –28 °C. These units support five GEA Goedhardt air coolers from the segment GEA Heat Exchangers. These air coolers, designed to stimulate the thermo-syphon effect, blow cold air coming from the ceiling downwards and assure effective penetration of the cold-storage unit, with a volume of about 150,000 m³. Designers of the solution took care that the shelf rows, with their 14 storage levels, as well as the six storage and retrieval systems, would have minimal influence on temperature distribution.

The especially dedicated air-flow system induces a “refrigeration lake”, which ensures that minimal temperature stratification results, and that the plant reliably maintains the required storage temperature of –20 °C. It is essential here to provide air movement with minimal flow speed – while preventing hotspots at the same time. The implemented solution accordingly assures the required temperature with

an air-outlet temperature of only $-25\text{ }^{\circ}\text{C}$. Frequency inverters on the fans and speed-controlled screw compressors ensure demand-driven operations and great efficiency in partial-load operating zones.

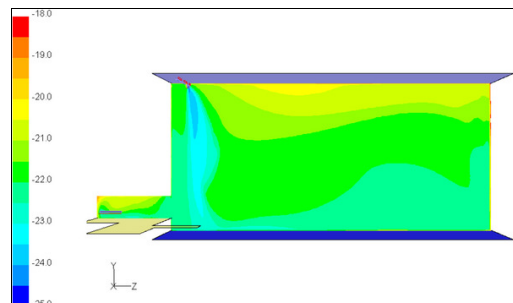
The refrigeration principle implemented here for Bonduelle had earlier been installed in a high-bay, deep-freeze facility, where it proved its effectiveness. This deep-freeze system has been in operation since spring of 2011, during which time consumption of only approx. $15\text{ kWh}/(\text{m}^3\text{ a})$, suffices – in comparison to requirements of around $40\text{ kWh}/(\text{m}^3\text{ a})$ for comparable, conventional large-scale cold-storage plants.



The new deep-freeze facility at Bonduelle offers capacity for 24,000 pallets. Thanks to sophisticated air-flow routing, the solution reduced energy requirements for refrigeration by half. (Photo: Bonduelle)



The key components of the Bonduelle cold-storage plant are two ammonia refrigeration systems from GEA Refrigeration France, with total cooling duty of 2,100 kW.



GEA Goedhart air coolers, installed under the ceiling, which stimulate the thermo-syphon effect, assure homogeneous temperature distribution and enable an energy-saving air-inlet temperature. These coolers are also provided with high efficient coils and optimized circuiting. (Picture: GEA)

Press Relations and Public Affairs:

GEA Refrigeration Technologies GmbH
Maren Schneider
Dorstener Str. 484 – 44809 Bochum – Germany
Phone: +49 (0)234-980-2862
maren.schneider@geagroup.com
www.gearefrigeration.com

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If you do not want to receive any further information from GEA Refrigeration Technologies, please send us an e-mail to maren.schneider@geagroup.com or call us at (Tel.: +49-(0)234-980-2862).