



**NEWCOLD**  
ADVANCED COLD LOGISTICS



## OxyReduct<sup>®</sup>

Reference solution

Fire prevention

High-bay cold storage  
warehouse

Active fire prevention  
protects the largest fully  
automated high-bay cold  
storage warehouse in  
Germany against fire.

**WAGNER<sup>®</sup>** 

## THE CUSTOMER

For fire prevention purposes, KLM has chosen a comprehensive fire prevention concept by WAGNER for the largest fully automated high-bay cold storage warehouse in Germany.



The KLM site in Rheine

**KLM Kühl- und Lagerhaus Münsterland GmbH based in Rheine has been supplying consumer markets with frozen foods and ice cream for more than 25 years.**

Its range includes products of renowned manufacturers like apetito and Coppenrath & Wiese, and licensed products like Landliebe, Mars and Snickers as well as a wide range for discount stores. KLM, a subsidiary of the logistics service provider NewCold Advanced Cold Logistics, offers services including storage, consignment sale, packing and distribution as well as the import and export of frozen foods.

**Top of the range high-bay cold storage warehouse**

KLM decided to increase its storage capacities in order to expand its range of services for its customers. With an area of 8,535 m<sup>2</sup> and a height of 38 m, the new high-bay cold storage warehouse offers a volume of around 380,000 m<sup>3</sup>, which is enough space for 68,400 pallets. This makes it the largest fully automated high-bay cold storage warehouse in Germany at present, according to the builder NewCold Advanced Cold Logistics. As a result of this expansion to the existing warehouse in Rheine, KLM was able to increase its total capacity to 90,000 pallets. The €40 million new construction

is equipped with an automatic loading and unloading system that allows a truck to be fully loaded with 32 pallets in only two minutes. Also, a temperature-controlled and partly automated packing plant quickly configures mixed boxes. This means that it can process a good 5,000 pallets a day. KLM's customers have always relied on punctual and reliable delivery. Ensuring the processes run smoothly was therefore of particular importance in the selection of the optimal fire protection solution for the new warehouse commissioned in May 2013.

## RISK ANALYSIS

Ensuring logistical processes was the top priority when selecting a suitable fire protection solution.



Construction of a new warehouse

The risk of fire from cables, overheating on the conveyor drives or technical defects in cooling systems is naturally higher in a high-bay cold storage warehouse. Whether a fire develops as a result is determined both by the structural nature of the warehouse

itself and by the individual ignition thresholds and fire loads of the goods stored. A dry atmosphere and packaging materials such as paper, cardboard and plastic shrink wrap make for a particularly high fire load. At the same time, the narrow and high gaps between the shelves can cause fires to spread vertically ("stack effect") and jump over to other pallet spaces. Burning parts falling from higher shelves could ignite goods stored below and also endanger fire fighters and rescue services, which can make local fire fighting very difficult or even impossible. In extreme cases, fire fighters even have to let the warehouse burn down under controlled conditions.

#### **Destruction of goods and disruption of delivery capability**

A fast and reliable fire protection solution is indispensable, especially in food logistics. The contamination of stored goods by smoke and soot or by extinguishing water containing antifreeze would inevitably cause the entire contents of the warehouse to be lost. This would result in delivery problems and disruptions in logistical processes.



Georg Grewe,  
Managing Director KLM Logistik

“ In Rheine, we built the largest fully automated high-bay cold storage warehouse in Germany. Even before the planning stage, it was certain that the investment and the stored goods had to be protected from fire and that our business processes and automatic logistics processes in the warehouse in particular had to be maintained in any event. At the same time, the fire protection solution also had to be cost effective and absolutely be VdS-approved.

The protection objective was therefore very comprehensive. The resulting solution speaks for itself: in our new high-bay cold storage warehouse, nothing can burn thanks to active fire prevention using oxygen reduction. Thanks to the high energy efficiency of the VPSA technology installed, we not only score points in term of security, we also keep operation costs down. ”

## THE SOLUTION

Proactive fire protection using active fire prevention offers numerous advantages.



S 6040001

WAGNER has VdS system approval S 6040001 for the OxyReduct® fire prevention system.



E 1905001

WAGNER is also an accredited system integrator for the OxyReduct® fire prevention system with VdS accreditation E 1905001.

WAGNER's OxyReduct® active fire prevention system reduces the oxygen content in the high-bay cold storage warehouse to 16.2 vol% by way of controlled introduction of nitrogen. This oxygen-reduced protected atmosphere is extremely fire retardant, which means the warehouse and the goods stored are effectively protected from the effects of a fire. The reduction of the oxygen concentration to 16.2 vol% (normal breathing air contains 20.9 vol%) required in the protection concept was determined in collaboration with the independent testing institute VdS Schadenverhütung GmbH using fire tests at WAGNER laboratories. The fire protection solution was therefore tailored to KLM's requirements in the best possible way and has the maximum protective effect at the lowest possible cost.

### Optimal security and high energy efficiency

The nitrogen required to reduce the oxygen content is produced directly on-site by generators with the latest VPSA (Vacuum Pressure Swing Adsorption) technology in a particularly energy-efficient and climate-friendly manner. Under optimal conditions, the new system can generate energy savings of up to 80% compared to systems with conventional membrane technolo-

gy, which makes it cost-effective for the operator. Another plus point: In contrast to membrane technology, low operating costs amortize the higher investment costs of the VPSA system after only two years.

Three VPSA generators with a nitrogen output of approximately 240 m<sup>3</sup>/h each were installed in KLM's high-bay cold storage warehouse. Only two VPSA systems are required to maintain the protection level of 16.2 vol%.

The third VPSA system serves as 50 % redundancy in order to fulfil the requirements of an emergency concept, which is expressly required in the building permit. The warehouse area is monitored by OXY-SENS® oxygen sensors, which continually check the oxygen concentration in the air and transmit it to the OxyControl control centre. Any unplanned deviations can therefore be responded to immediately.

### Active fire prevention offers numerous advantages

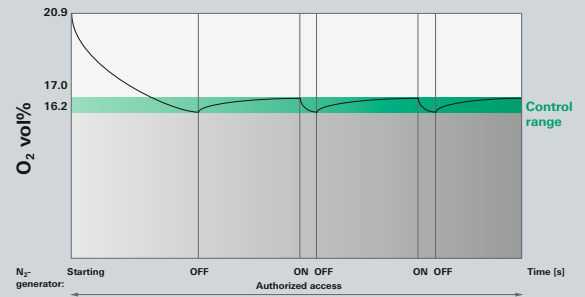
The use of natural nitrogen in fire prevention means that the food stored by KLM is not affected. The active fire prevention system OxyReduct® starts before a fire arises, thus providing full protection from the effects of a fire. This means that the reduction of the oxygen content does not pose



any problem when accessing the warehouse. The warehouse areas are still fully accessible to authorized personnel. The use of active fire prevention thus effectively protects the goods, the supply chain and the reputation of the service provider.

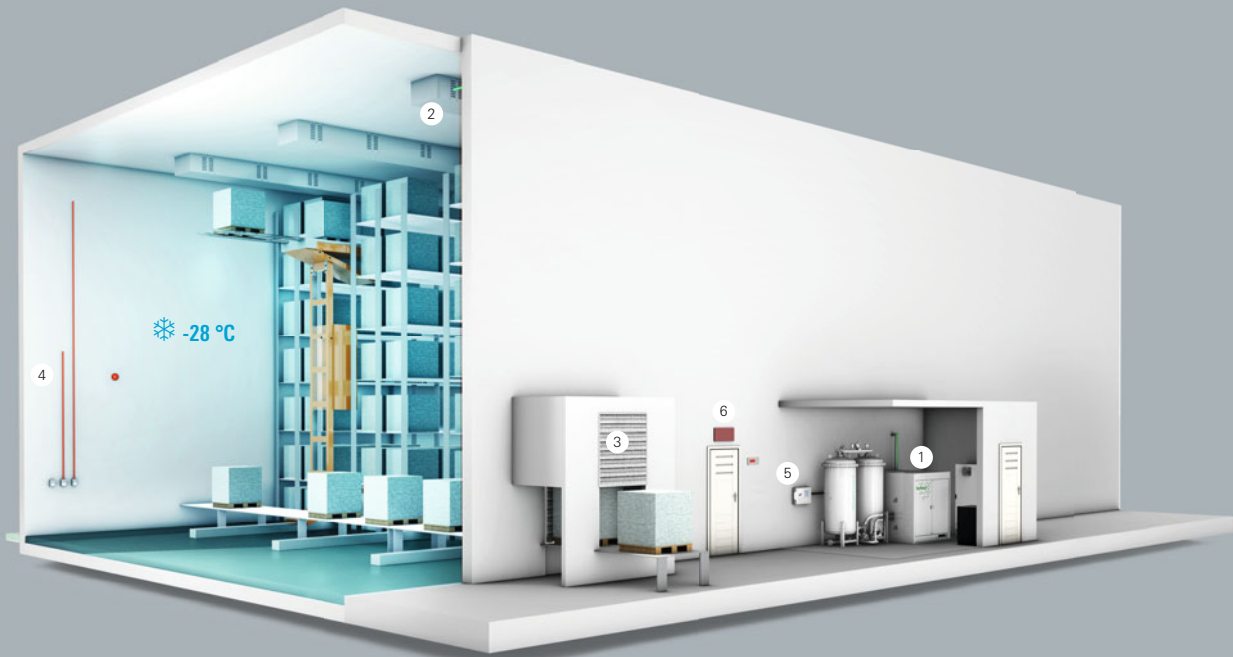
The final decision in favour of OxyReduct® VPSA did not come down to the fact that WAGNER was a VdS-accredited installer, but to the excellent energy efficiency, which makes it very cost-effective and sharply reduces the operator's expenses. OxyReduct® therefore combines numerous advantages into a single secure, reliable and efficient fire protection solution.

OxyReduct® has not only established itself as the standard solution in the frozen foods sector, it has been used in the most varied areas of application for many years. Operators of warehouses of all kinds and sizes use the fire protection solutions of the Langenhagen-based technology leader.



Using OxyReduct®, the oxygen concentration in the protected area in KLM's high-bay cold storage warehouse is reduced to approx. 16.2 vol% and constantly maintained at this level.

## DIAGRAM OF A VPSA SYSTEM



The thick building envelopes in the cold storage warehouse provide ideal conditions for OxyReduct® VPSA: the fire prevention system **1** reduces the oxygen level in the cold storage area by introducing nitrogen, meaning that a fire effectively cannot develop. The nitrogen is produced on-site using nitrogen generators with VPSA technology from the ambient air. The nitrogen is distributed by the warehouse ventilation system **2**. This balances losses from the building envelope and the loading ducts **3**. Sensors positioned at different heights monitor the oxygen concentration **4** and report this to the OxyControl control centre **5**. Current values are displayed on a display next to the warehouse entrance. A light indicator over the door notifies the personnel of the reduced oxygen concentration in the warehouse area **6**.



WAGNER sets standards for innovative and comprehensive solutions in fire protection: with very early fire detection systems, TITANUS® for aspirating smoke detection, FirExting® for fire-extinguishing, OxyReduct® to actively prevent fires from breaking out and VisuLAN® for hazard management. [www.wagner.eu](http://www.wagner.eu)

**Headquarters  
Sales International**

**WAGNER Group GmbH**  
Schleswigstraße 1-5  
D-30853 Langenhagen  
Germany  
Phone +49 511 97383 0  
info@wagner.eu

**Subsidiaries Worldwide**

**Austria**  
**WAGNER Austria GmbH**  
Am Hafen 6/1/12  
A-2100 Korneuburg  
Phone +43 2262 64262 0  
office@wagner-austria.com

**Benelux**  
**WAGNER Nederland B.V.**  
Computerweg 10  
NL-3542 DR Utrecht  
Phone +31 346 5580 10  
info@wagner-nl.com

**Great Britain**  
**WAGNER UK Limited**  
Unit H  
Suites 3&4 Peek Business Centre  
Woodside, Dunmow Road  
Bishop's Stortford  
Hertfordshire CM23 5RG  
Phone +44 870 333 6116  
info@wagner-uk.com

**Poland**  
**WAGNER Poland Sp. z o.o.**  
ul. Puławska 38  
PL 05-500 Piaseczno  
Phone +48 22 185530 0  
info@wagnerpoland.pl

**Russia**  
**WAGNER RU GmbH**  
Businesscentre SMART PARK  
117246, Moscow  
Nauchnij Projezd  
14 A, Building 1, Office 4.12.  
Phone +7 495 96767 69  
info@wagner-russia.com

**Singapore**  
**WAGNER Asia**  
No. 61 Tai Seng Avenue  
#B1-01 Crescendas Print Media Hub  
Singapore 534167  
Phone +65 6296 7828  
info@wagner-asia.com

**Switzerland**  
**WAGNER SCHWEIZ AG**  
Industriestrasse 44  
CH-8304 Wallisellen  
Phone +41 44 832540 0  
info@wagner-schweiz.ch

**USA**  
**WAGNER Fire Safety, Inc.**  
135 Beaver Street #402  
Waltham, MA 02452  
Phone +1 781 899 9100  
info@wagner-us.com

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