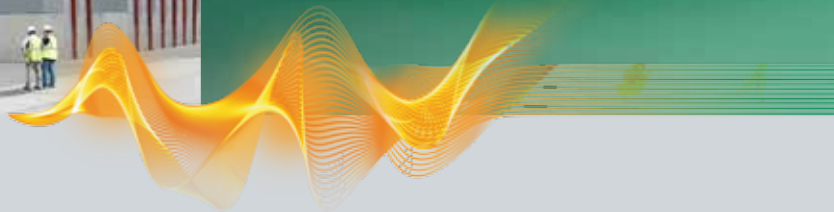




Reference solution

Fire protection in high-bay warehouses: OxyReduct® VPSA-Technology



Hayat opts for top-notch
fire protection – thus
reducing its overhead.

THE CUSTOMER

Hayat, the largest logistics provider for consumer products from powder detergents and dishwashing agents to all wood based products like toilet paper or handkerchiefs, erects an automated high-bay warehouse of superlative dimensions in Izmit.



Based in Istanbul, Turkey, the Hayat Group is the market leader and largest producer of health and sanitation products in Turkey. Founded in 1937, this completely family-owned company exports its goods to 70 different countries.

Hayat has built one of the world's largest fully automated ambient temperature high-bay warehouses and logistics centres (total volume:

598,000 m³) near to one of its main production facilities. In order to take full advantage of its space, this immense high-bay warehouse was built as a "cladded rack" construction. This means that the shelf elements form the building's supporting structure. The 46 m tall building was completed at the end of 2013. Since then, the warehouse has been running at full steam with hundreds of storage and retrieval operations each hour.

The goods are stored in approx. 165,000 pallet spaces and run the full range of sanitary and detergent products. These include wood based products, like paper tissues, household cleaning products and personal care products, among many others. Hayat produces and stores a wide range of high-quality brands which fall into the categories: "Home Care," "Hygiene" and "Tissue".

RISK ANALYSIS

Fire not only poses a risk to the goods in storage – it also jeopardizes the producer’s capacity to deliver, and thus the downstream business processes as well.



A large fire in 2001 caused the Hayat Group immense financial losses and harm to its image. But the company has recovered from it in the meantime. The serious fire damage shows that the risk of fire should not be underestimated in warehouses. The large quantities of personal care products and household cleaning products stored at the Hayat’s warehouse contain surfactants and water-soluble alcohols which have a low flashpoint. Other flammable materials include paper tissue, as well as packaging made out of paper, cardboard and plastic. Once alight, there is a great risk that the fire will spread quickly due to the “chimney effect.”

Accelerated fire spreading increases the extent of damages

The “chimney effect” describes a situation in which the air heated up by a fire rushes upward, causing suction which draws in fresh air at the base of the fire – like it does in a chimney. If a fire breaks out in a warehouse, the narrow passages between the high-bay shelves will cause this physical effect. Dangerous gases and smoke can rise and the flames can rapidly jump to other pallet spaces. The fresh air being drawn in by suction contains more oxygen to feed the fire. The fact that full use is made of every inch of the warehouse’s space means that scale of the damage would be devastating.

THE PROTECTION OBJECTIVE

Ensure that the warehouse will be able to deliver.

The bad experience from the past gave Hayat clear objectives in its fire protection requirements. No matter what the source of ignition could be, it should not jeopardize the company’s ability to deliver. The goods had to be kept available and the warehouse’s logistics

had to be maintained even in the event of a fire. To achieve this, the fire protection measures had to meet the following requirements:

- Prevent a fire in the warehouse wherever possible
- Minimize spreading if a fire should still break out

- Ensure that the system does not significantly disrupt or limit ongoing operations
- Avoid using water to extinguish fires wherever possible
- Make sure that authorized personnel can safely access the warehouse, even though it is fully automated

THE SOLUTION

Increased safety through anticipatory fire prevention. The energy-efficient OxyReduce® VPSA makes this possible – and reduces operating costs at the same time.



WAGNER has VdS system and VdS manufacturing accreditation for OxyReduce®.

The usage of water for conventional extinguishing with a sprinkler system was ruled out from the very beginning. The large number of sprinkler outlets would not only have caused a huge amount of installation and maintenance work, but the required safety clearance between the sprinkler outlets and the stocked goods would have reduced the storage capacity by 15%. In case of a fire smoke would contaminate the goods and the extinguishing water would cause severe damage, thus jeopardizing delivery capability.

OxyReduce® protects stored goods – as well as delivery processes

OxyReduce® is based on a simple principle: a fire always needs enough fuel, (heat) energy and

oxygen. Therefore, reducing the oxygen concentration in the protected space prevents a fire from forming or spreading. OxyReduce® generates the nitrogen needed to reduce the oxygen level directly from the ambient air. 78% of it already comes from the air we breathe. The system routes the produced nitrogen into the protected area, thus continuously reducing the oxygen concentration to the required level. The protective atmosphere created this way protects the stored goods from fire hazards and safeguards logistics processes. Nitrogen is a natural inert gas which will not harm the stored goods in any way. The OxyReduce® system feeds in nitrogen to reduce the oxygen concentration at Hayat's warehouse to a protective level of approx. 14.0 vol% from a normal level of 20.9 vol%. This means the area can still be accessed by authorized personnel.

OxyReduce® VPSA cuts costs by up to 80%

The sheer size of the protected area and the air exchange rate caused by the hundreds of stock entries and retrievals every hour posed exceptional challenges to maintaining the necessary oxygen concentration in an energy-efficient manner. The by WAGNER consistently further developed VPSA



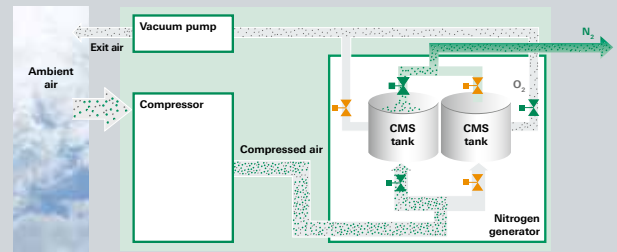
technology handled this task: The nitrogen required to reduce the oxygen level is taken directly from the ambient air on site using highly energy-efficient OxyReduct® Vacuum Pressure Swing Adsorption (VPSA) technology. Under optimal conditions, the new system can cut energy costs by up to 80% compared to systems with conventional membrane technology.

Summary

WAGNER achieved the protection objective required for Hayat's automated high-bay warehouse

– and provided a fire protection solution at much lower investment costs than a sprinkler system would have caused. The proven OxyReduct® fire prevention system requires less space and keeps the building, its systems, goods and delivery processes safe with its permanent protective atmosphere. This was the first time the active fire prevention principle was used in a 600,000 m³ ambient temperature warehouse and it proved to be a highly cost-effective solution as of its size.

How nitrogen generation through VPSA technology works



Ambient air is being drawn in and compressed to process pressure by a compressor. The compressed air is then fed into one of two alternating operating CMS (Carbon Molecular Sieve) tanks. The separating agent in the tanks binds the oxygen molecules to it. The enriched nitrogen can now be fed into the protected area. In order to regenerate the charged separating agent in the second vessel a vacuum pump discharges the bonded oxygen to the outside.

INTERVIEW



Teoman Duman,
HAYAT Logistics Director

Mr. Duman, why did you choose WAGNER?

Selecting the right fire protection concept was an essential factor when we built our warehouse – one of the most sophisticated fully automated high-bay warehouses in the world. We knew that WAGNER was a leader in fire prevention and has successfully installed a great number of fire prevention systems all over the world. Those were the decisive criteria for us.

What do your safety concepts focus on?

The bad experiences we had in the past make fire protection concepts extremely important to us. After the big fire in 2001, we had large investments to make. It also took a great deal of effort to win back the market shares we lost.

Why did you choose fire prevention over a conventional fire protection solution?

OxyReduct® is indisputably one of the best fire protection solutions on the market. Our products are highly flammable, which makes it absolutely crucial to have effective fire protection. It's good to have a system which fights a fire once it breaks out. But it's much better to have a system which prevents a fire from spreading in the first place and protects our goods that way.

What do you think are the main benefits of OxyReduct®?

Conventional fire protection solutions cannot prevent a fire, they can only detect it and fight it. A fire prevention system works 24/7 and continuously monitors the oxygen concentration itself. WAGNER developed a tailor-made solution for us with a fire protection system which met all of our requirements. But the key benefit for us is that OxyReduct® gives us the security of knowing that we've minimized the risk, so that our supply chain will never be broken so badly again by a fire in our warehouse. There's nothing more important than that in our business.



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

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