



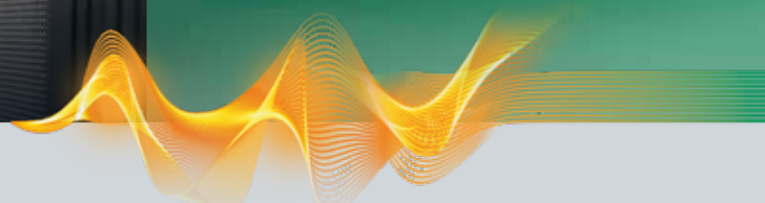
**noris network**

Reference solution

## Fire protection for data centre

**TITANUS<sup>®</sup>**

**OxyReduct<sup>®</sup> with  
quick release**



Europe's most modern  
data centre uses energy-  
saving KyotoCooling<sup>®</sup> and  
innovative fire prevention  
technology.

**WAGNER<sup>®</sup>** 

## THE CUSTOMER

The noris network AG range of services is based on the redundant design of security systems, high-availability equipment and customised service.



**Noris network AG, founded in 1993, is one of the German pioneers in the modern IT services sector. Their portfolio includes tailored information and communications technology solutions in the areas of IT outsourcing, cloud services, as well as network & security.**

### **The building**

With the NBG6 data centre, noris network AG, in Nuremberg, has built one of the most modern data centres in Europe for which eco-Verband der deutschen Internetswirtschaft e.V., has issued the maximum possible rating of five stars in the eco Datacenter Star Audit. The two-year design phase

primarily consisted of finding the best appropriate technology – starting with the servers, the uninterruptible power supply, the climate control system all the way to the security and fire prevention technology.

### **The aims**

noris network AG already had clearly defined priorities. Maximum availability of computer output and data, as well as high energy efficiency was paramount. The latest redundant security systems, would provide comprehensive physical protection for NBG6.

### **New approaches to cooling**

To achieve the lowest possible

operating costs, noris network chose indirect free cooling provided by the modular KyotoCooling® technology. The giant aluminium circulation heat exchanger, with a diameter of 6 metres, removes the heat energy from the IT room air and releases it outside. KyotoCooling® takes advantage of the fact that the outside air temperature is lower than the ambient air in the IT centre 95 % of the year. The only running costs are the drive energy of the heat exchanger impeller and the fans. Air-water heat exchangers can be switched on as a backup system and operated for the few hours of the year in which the outside air is too warm for cooling.

## RISK ANALYSIS

The climate control in one of Europe's latest high-security computer centres employs free cooling for maximum energy-saving.



The heat generated by the IT racks and the high density of the installed electrical systems, which are common in IT centres, are considered the greatest fire risk. The main cause of fires are from commonly occurring technical faults.

to IT operation due to the power shut-down was a greater fear than fire damage – their customers have contracts that ensure very high levels of service availability. A power shut-down was therefore out of the question.

Therefore, in the event of a fire, the power supply is disconnected as quickly as possible in order to withdraw the supporting energy from a fire. However, for the data centre the idea of an interruption

The engineers at WAGNER had to develop a unique fire protection solution for the innovative KyotoCooling® technology

## THE PROTECTION OBJECTIVE

### High availability even in case of fire

The high-performance data centre deploys a comprehensive and state-of-the-art approach to guarantee permanent availability and security for its customers.

- Potential re-ignition must be prevented.
- Regular performance checks of the fire prevention system must take place automatically at defined intervals so that the sealing of the protected area is tested.

- In the event of a fire, it should be guaranteed that the IT operation is not interrupted and a power shut-down is not necessary.

- A potential fire must be brought under control and contained immediately.

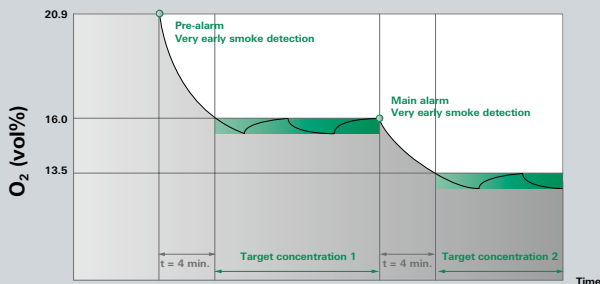


Ingo Kraupa,  
Chairman of  
noris network AG

” The combination of the very early fire detection with a reduced pressure and safe oxygen reduction, as well as the inertisation of the protected area with OxyReduct®, that allows us to bridge the time to refill extinguishing cylinders, has us complete convinced. ”

## THE SOLUTION

The choice of cooling technology posed additional challenges for the fire prevention.



Developed for data centres with free cooling technology: free accessibility, highest energy efficiency, unlimited extinguishing hold time.



S 6040001



E 1905001

When Langenhagen-based WAGNER Group GmbH was asked to submit a bid for the fire prevention in NBG6, the company had already gained extensive experience with the use of KyotoCooling® together with OxyReduct® in a two-year series of tests conducted in a testing centre of Dutch telecommunications company Royal KPN NV. Therefore, in this case it was already known that the conventional concepts of the gas extinguishing and/or fire prevention would not be sufficient on their own.

There is a great deal of leakage with the operation of a circulation heat exchanger, which makes the use of an OxyReduct® system with constant oxygen reduction inefficient due to the outward flow losses.

However, with the use of traditional gas extinguishing and the very high pressure differences during operation of their cooling system fans, an extinguishable O<sub>2</sub> concentration could not be maintained over a sufficient time period.

The potential admittance of contaminated outside air via the free cooling was also a major worry for the planners. A tailored and comprehensive solution was required to overcome these technical issues and concerns.

An important cornerstone for the protection of the two areas covering a total of 16,000 m<sup>3</sup> was the earliest possible fire detection. For this purpose, the TITANUS® air sampling smoke

### The Task

WAGNER engineers faced five significant challenges in searching for a suitable fire prevention solution:

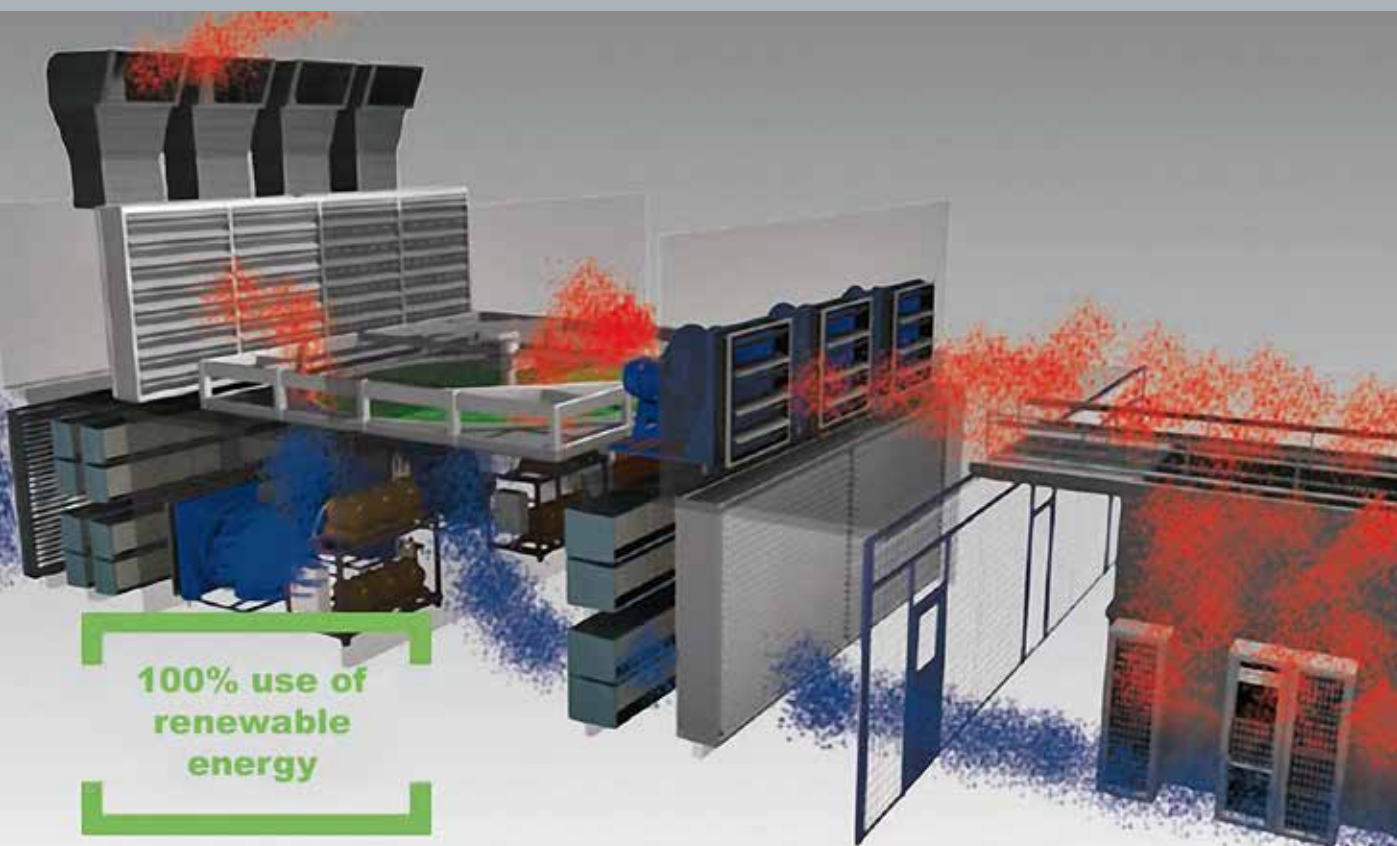
- Monitoring of any contaminated outside air
- Air exchange due to leakage at the Kyoto impeller
- Compensation of extinguishing gas losses due to pressure differences during operation of the required cooling
- Maintenance of the necessary gas concentration in order to prevent re-ignition
- No shut-down of the power supply in order to guarantee the availability of the data centre even in the event of a fire.

detection systems were used that have highly-sensitive two-detector dependency and can detect a fire at the earliest stage while preventing false alarms. These were also installed for the monitoring of the air quality in the outside air circuit of the KyotoCooling® system.

The solution is based on the following detailed process: With the triggering of the very sensitive pre-alarm, the first fire control systems are already initiated (stopping of the Kyoto impeller, activation of seals, changeover to backup cooling and closing of fire doors).

The initial fire alarm triggers the first stage of the FirExting® extinguishing system and introduces nitrogen from 70 compressed gas canisters to the area for four minutes. The quick release from 20.9 vol% to 16.0 vol% O<sub>2</sub> results in significantly diminished fire behaviour, and the normal materials in an IT room no longer ignite. The connected OxyReduct® system continuously maintains the oxygen content at this level. If a second air sampling smoke detection system recognises that the fire has not been entirely extinguished, a second fire alarm

and the second stage of the extinguishing system are triggered. The O<sub>2</sub> level is then reduced to a concentration of 13.5 vol% within another four minutes - theoretically OxyReduct® can maintain this level indefinitely. This prevents re-ignition without having to switch off the power in the area.



100% use of  
renewable  
energy

### The Trick

Only in a sealed room can the necessary gas concentration be maintained long enough that the extinguishing takes place effectively and safely in the event of a fire. Even if a sufficient seal has been verified at the time of commissioning, leaks arise over the course of time, e.g. due to hardware changes or movement of the building, which can dramatically endanger the fire prevention.

With OxyReduct® the leak integrity of the area and thus the effectiveness of the extinguishing system can be tested regularly. For this purpose, the system is switched over to the backup cooling and the oxygen content is reduced slightly from the normal level. Inferences about the current tightness of the area can be drawn from the time required to build up the predefined oxygen concentration – an additional feature not to be underestimated.



TITANUS® air sampling smoke detectors were installed to monitor the data centre



The innovative KyotoCooling® replaces conventional double floors for efficiency and energy savings. The CECC principle (Combined Energy & Cooling Cell)® comprises of modular energy cells for the individual areas of the 11,000 m<sup>2</sup> data centre, each consisting of a heat exchanger impeller, a transformer, a generator and cold compressors, as well as an uninterruptible power supply in order to enable automatic operation.

### Award-winning fire prevention concept

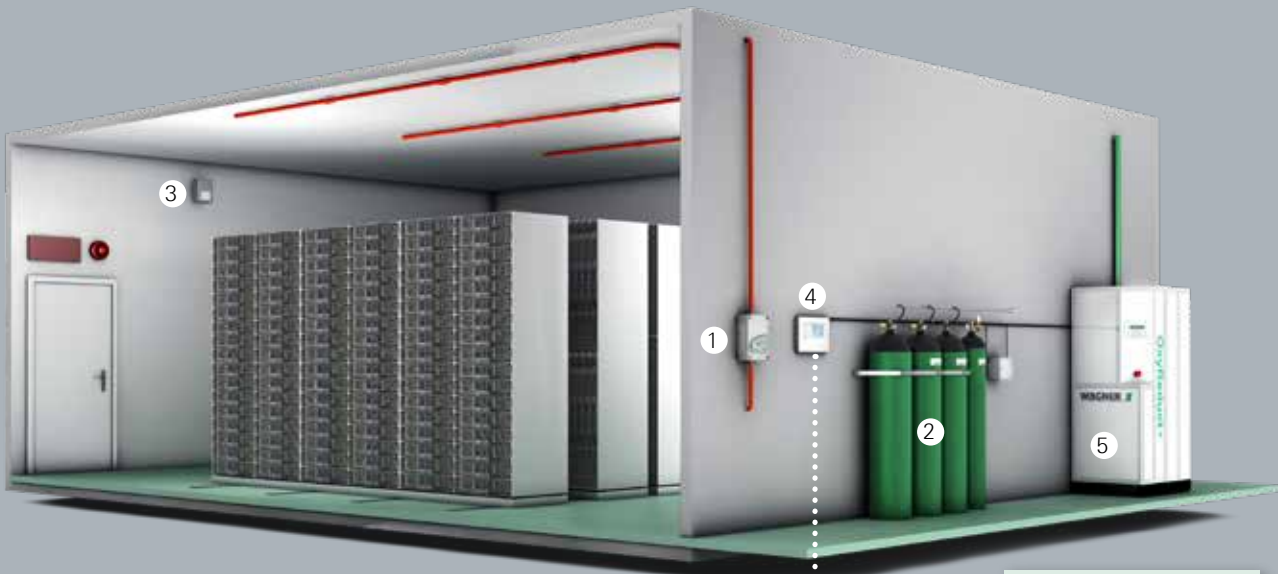
The solution for noris network gives the operator an optimum combination of energy-efficient cooling and effective fire prevention.

WAGNER was awarded the 2012 German data centre prize for IT security for its fire prevention solutions.



The OxyReduct® active fire prevention system (left) maintains the oxygen content at 16 vol% if a fire is detected. In the event of an additional detection, further nitrogen is introduced to the protected area from cylinders (right) by means of a quick release and the oxygen content is further reduced to 13.5 vol%

## SAMPLE SYSTEM IN DATA CENTRE

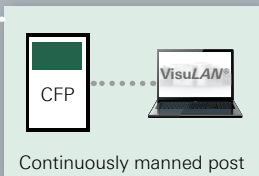


### Fire Prevention Solution

The TITANUS® air sampling smoke detection system **1** detects the earliest signs of a fire forming. If a fire is detected, the CFP is notified and nitrogen cylinders **2** are used to initiate the quick release process which reduces the oxygen level to 16 vol%. The CFP is connected directly to the VisuLAN® risk management system.

If a second TITANUS® air sampling smoke detector should still recognise a fire which has not been fully extinguished, the O<sub>2</sub> level is further reduced to 13.5 vol%.

The OXY-SENS® oxygen sensor continuously **3** monitors the oxygen content in the protected area and transmits this information to the control panel **4**. This controls the oxygen concentration maintained by the OxyReduct® fire prevention system **5**.



# WAGNER Group Plant Engineering & Construction



---

## WAGNER Group GmbH (Headquarters)

Schleswigstraße 1–5  
30853 Langenhagen, Germany  
Phone: +49. 511. 97383-0  
E-Mail: [info@wagnergroup.com](mailto:info@wagnergroup.com)

---

Find your personal contact at  
[www.wagnergroup.com](http://www.wagnergroup.com)



---

WAGNER sets standards in fire protection – with innovative and comprehensive solutions

---

### Fire detection and alarm systems

---

Very early fire detection systems (TITANUS®)

---

Active fire prevention (OxyReduct®)

---

Fire extinguishing (FirExting®)

---

Hazard management (VisuLAN®)