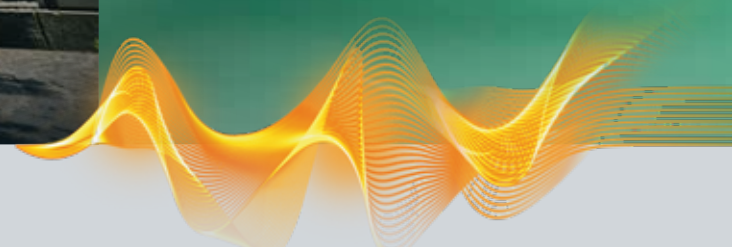




OxyReduct[®] FirExting[®] *SILENT*

Reference solution
Fire prevention and
soft flooding in
a data centre



Tailor-made fire
protection for
maximum-security
data centres

THE CUSTOMER

In a former vault building, DARZ GmbH operates a data centre with what is likely to be the highest level of building security in Germany.

Founded in 2010, DARZ GmbH is a full service provider that offers colocation/housing, managed services and data centre solutions in an extraordinary environment at its data centre in Darmstadt. This is located in the former vault building of the Hessian State Bank and has what is likely to be the highest level of building security of any data centre in Germany.

Erected in the late 1980s, the centrally located building with its striking white facade housed the Hessian State Bank's gold and cash reserves from 1988 to 2005. The building's physical security is evident in its structure with metre-thick walls and bullet-proof tank windows as well as the design of the vault area as a 'building in a building' able to withstand explosions and earthquakes. This provides optimum basic structural protection. Following extension renovations, in particular the installation of new, redundant building technology for use as a data centre, the new data centre with a total output of 5.2 MW was put into operation by DARZ GmbH in July 2014.

Award-winning green IT data centre with high availability

We supplemented the building protection that we inherited with



DARZ founder and Managing Director Sergey Mirochnik with the German Data Centre Award 2015

a suitable, high-security infrastructure", explains DARZ founder and Managing Director Sergey Mirochnik, clarifying: "Our concept aims at avoiding risks before they arise. This also involves huge costs. However, in these dangerous times, especially for data, we believe that our customers value our efforts and investments."

The site's suitability as a colocation data centre was also based on its location: Darmstadt is only about 30 kilometres from the world's largest internet exchange DE-CIX in Frankfurt am Main and, with its technical university, three Fraunhofer Institutes, several local IT associations and a city IT cluster facility, an important place for the ITC sector. The short distance with a both fully redundant and

intersection-free fibreglass connection to Frankfurt furthermore enables the realisation of dual data centre solutions in accordance with the highest protective category for banks and insurance companies (Basel III, Luxembourg regulation). DARZ GmbH sought to round out this IT landscape by constructing a high-grade data centre infrastructure (TÜV Level III+/Tier 3+), true to its motto: "Data is worth more than gold!". From a green IT perspective, the overall concept, with its indirect free cooling, has already been awarded the 2015 German Data Centre Award in the "Overall Energy Efficiency in Data Centres" category.

THE RISK ANALYSIS

In today's world, constant data availability and the prevention of as much downtime as possible are vital for companies.



If a company acts as a service provider that offers data centre capacities, as in the case with DARZ GmbH, maintaining 24/7 availability is essential to survival. The company is not only responsible for its own data but also, and in particular, for that of its customers. Accordingly, the associated liability risks can be high. A full-service provider such as DARZ GmbH which stores customer-owned hardware in its data centre is also responsible for the physical safety of this hard-

ware. A fire prevention concept was therefore required for the high-security building in order to minimise the internal risks. The technical fire prevention solution should detect any outbreak of fire at the earliest possible moment in order to enable a rapid response. Optimum fire suppression methods should also prevent consequential damages caused by the extinguishing process itself.



THE PROTECTION OBJECTIVE

Certified maximum safety

All areas of the building had to be equipped with fire prevention solutions, which take the various structural conditions into account.

- The safety level needed to be approved by an expert from the Property Insurers Organization VdS in order to support DARZ's sales team with a credible guarantee promise.
- Instant effectiveness of the extinguishing equipment

and the avoidance of consequential damage in the form of downtime and hardware defects that could lead to data losses are of the utmost importance.

- A suitable solution was also required for the special structure of the vault room not usually found in normal buildings as it was not possible to create pressure relief surfaces for a gas extinguishing solution.



THE SOLUTION

The energetically-optimised choice of cooling technology posed special challenges with regard to fire prevention.

Gaseous extinguishing agents which fight fires effectively without leaving residue are ideally suited to the IT sector. When fed into the extinguishing zone, the inert gas nitrogen displaces oxygen until there is no longer enough of it to sustain a fire.

As a natural component of the air we breathe (78% vol.), nitrogen is non-toxic and has a density similar to that of air. It is also simple and compact to store in extinguishing cylinders and can be distributed quickly and homogeneously around the room without residues when used for extinguishing purposes.

In view of all of these reasons, a nitrogen-based FirExting® gas extinguishing system from WAGNER

was selected for the Darmstadt data centre. In combination with air sampling smoke detectors for highly sensitive fire detection and supplementary point-type detectors, fires can be detected and combated at the earliest possible stage.

WAGNER's protection concepts goes one step further

in order to effectively and reliably extinguish a fire within the shortest time possible, gas extinguishing systems have to flood the area to be protected with extinguishing gas under high pressure. As a result, conventional nitrogen extinguishing systems used to create sound pressure levels of over 130 db(A) when the gas rapidly rushed through the extinguishing nozzles, causing vibrations and



Air sampling smoke detector



G 310025

Special sound absorbers are attached to the extinguishing nozzles

therefore serious damage to hard disks. The indirect damage from this is often much worse than the fire damage itself – not only in the form of temporary server failures, but also due to data damage or even loss.

Silent extinguishing system protects sensitive IT equipment

WAGNER solved this problem in the server areas of the DARZ data centre by developing special sound absorbers (FirExting® *SILENT* with VdS device approval) which are attached to the extinguishing nozzles and reduce the sound pressure to approx. 98 dB(A). Soft

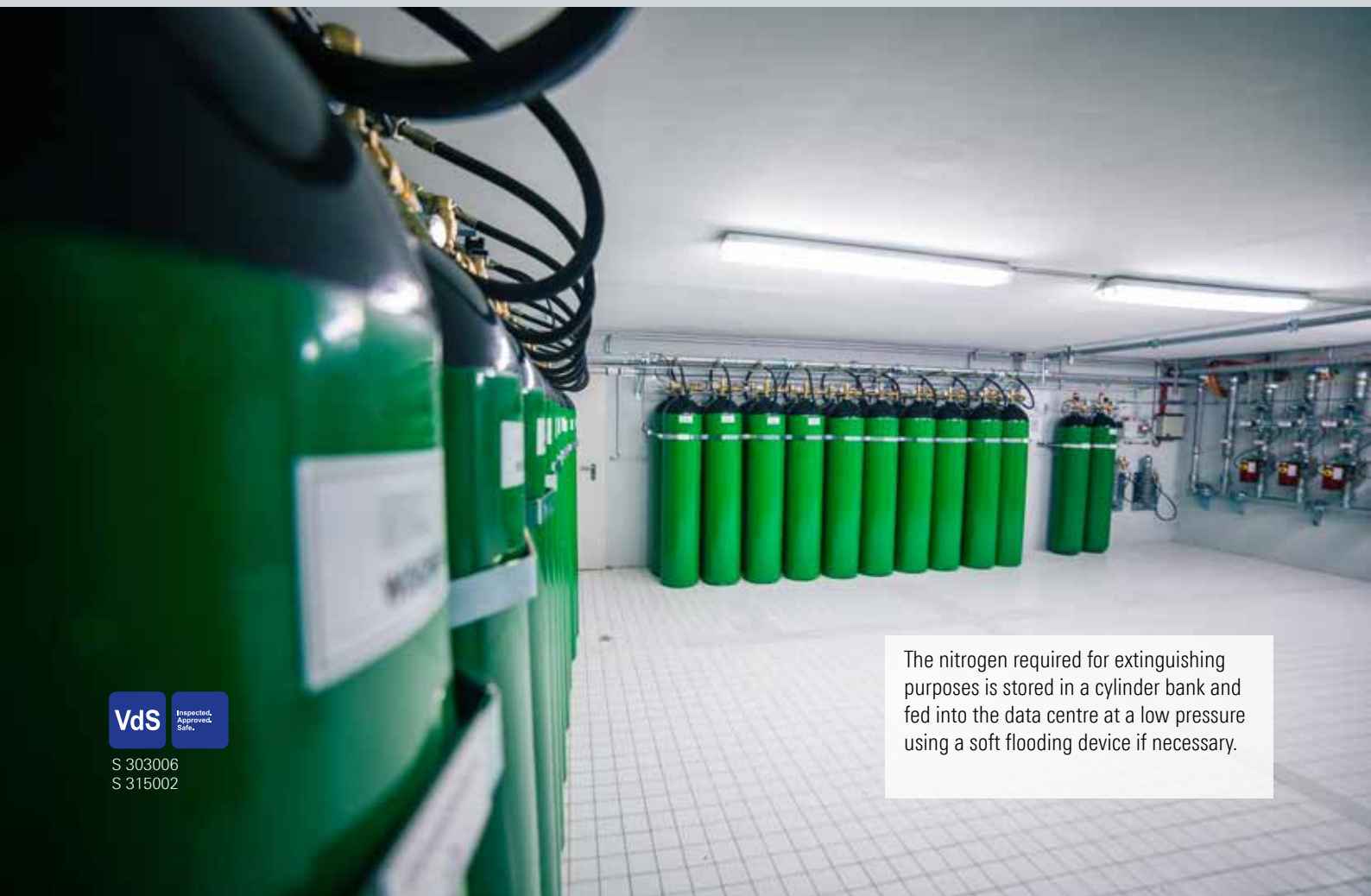
flooding is a further special feature. Flow regulators were attached to the extinguishing agent cylinders in order to minimise pressure spikes at the start of the extinguishing process.

The soft flooding device also considerably reduces the size of the pressure-release vents needed. This means that a single on-site F90 conduit system can provide pressure relief for all extinguishing zones on the first basement floor of the DARZ. Only one opening to the outdoors is therefore needed for all the pressure relief on the first basement floor. This meets

DARZ's high requirements in terms of IT security as the design enables the high-security building envelope to remain as intact as possible.

Special protection in the vault room

What distinguishes DARZ from all other data centre buildings in Germany is the vault room. In line with its original purpose, the room is hermetically sealed from the outside. The pressure relief holes required to use a gas extinguishing system would be associated with a huge amount



The nitrogen required for extinguishing purposes is stored in a cylinder bank and fed into the data centre at a low pressure using a soft flooding device if necessary.

of cost and effort. Instead, active fire prevention through oxygen reduction is used.

WAGNER's OxyReduct® system generates nitrogen from the air in the room and the ventilation system feeds it into the protected area, where it continuously reduces the amount of oxygen in the vault to create a heavily fire-retardant atmosphere. The O₂ level of 15.9% vol. is below the ignition threshold of typical IT materials, so a fire can no longer develop or spread.

“What is good for one is not permissible for another.”

Receiving the VdS certificate as quickly as possible was an important goal for DARZ GmbH, and one which was easily achieved thanks to WAGNER's solution. According to the client Mirochnik, WAGNER's expertise played a major part in this as: “The main challenge is meeting all the requirements of the different committees such as the VdS but also the fire brigade, construction authorities and TÜV.”



Flow regulators were attached to the extinguishing agent cylinders in order to minimise pressure spikes at the start of the extinguishing process.

EXAMPLE SYSTEM IN THE DATA CENTRE



- 1 Air sampling smoke detector
- 2 Point-type detector
- 3 Extinguishing nozzles with silent sound absorbers
- 4 Alarm indicator
- 5 Extinguishing cylinder bank (nitrogen) as a soft flooding option
- 6 Extinguishing control panel



To protect the former vault room, the OxyReduct® fire prevention system feeds in nitrogen via the ventilation system to reduce the oxygen level and create a fire-retardant atmosphere.

Summary

The unique construction material used for the data centre made DARZ special, even for WAGNER's project manager. Frankfurt branch manager Michael Leibner recalls: "We had never before worked with special bulletproof concrete. The holes we had to make in this extremely hard material were a real stress test for all the equipment we used. We also had to proceed with extreme caution. Remaining on schedule under these conditions was definitely a challenge."

Managing Director Sergey Mirochnik stressed the importance of the interaction between all the trades in the data centre: "We placed great value on the efficiency of all individual components throughout the data

centre infrastructure as well as the energy-efficient management of the facility as a whole. By working with strong partners, we were able to build one of Europe's most environmentally friendly data centres.

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

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