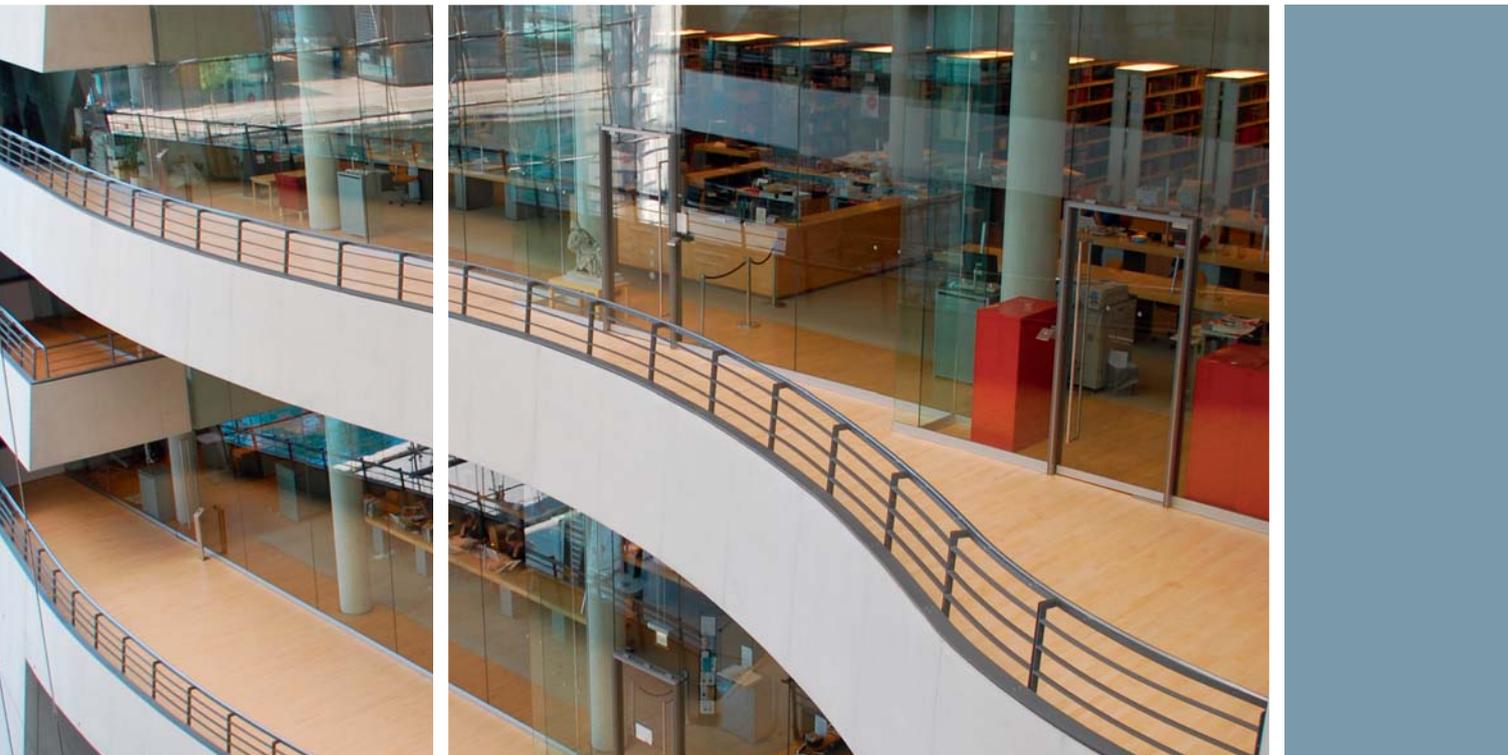# What ensures optimal protection for my archive and library?

Our fire safety solutions provide optimum safety for people and maximum protection for precious contents.

Answers for infrastructure.

**SIEMENS**

# Complete solutions for safe archives and libraries – from an experienced partner

**Archives and libraries contain valuable and unique records for permanent preservation. No matter where archives are being used – in museums, libraries, public buildings, hospitals, and industries – damage by fire and smoke can destroy irreplaceable items. That's why it's important to provide your archive and library with a high level of fire safety.**

**Siemens' fire safety solutions are tailored exactly to your archive's and library's requirements, offering maximum protection against all risks of fire. Based on the concept of a professional and innovative partner, they provide everything from consulting to commissioning and after-sales service for fire detection and extinguishing.**

# Integrating innovative fire safety solutions into your archive and library

■ **Protecting people and assets**

Fires and their consequential damage through water pose a great risk for archives and libraries as well as for people and valuable documents. Proof are incidents such as the fire at the university library of Lyon, France in 1999, the disastrous fire at the Herzogin Anna Amalia library in Weimar, Germany in 2004 or the major fire at the famous Universal Studios in Hollywood, USA in 2008 which also destroyed the video archive.

Fires can be caused by natural phenomena such as lightning strikes, technical defects such as short circuits or human errors. Very often, fires are detected too late. This might be due to a smoldering phase that can stay undetected for hours. However, once the temperature is high enough or oxygen is fed, a smoldering fire can turn into a blazing fire in next to no time. Within a short time, a building can completely burn down to the ground. Even seemingly extinguished fires or fires "under control" might lead to another outburst of fire if a deep seated fire stays undetected.

One of the most dangerous side effects of a fire is smoke. It not only threatens lives, but also the archived valuables. If smoke gas is not aspirated in a controlled manner and in time, it can lead to an explosion-like expansion of a fire as soon as a critical heat level is reached. In addition, smoke gases also leave an oily, greasy film and a long-lasting smell of burning.

Besides loosing usually irreplaceable cultural goods and information, consequences also include high costs for the rescue, drying, and restoration of the damaged material. Often, the items are not insured, and when they are, only restoration costs are covered. Once culturally (legal, medical, and other documents) and historic values are lost, they cannot be replaced in most cases.

It is therefore recommended that archives and libraries have a high level of fire safety. Preventive and active fire safety is particularly important here. High investments are often made for conservational preservation – but what about protection from fire?

Are you sure, the fire safety concept for your archive and library is still up-to-date?

■ **More fire safety and security through an integral concept**

For fire safety in archives and libraries, early and reliable detection of an event and the initiation of appropriate extinguishing measures are critical factors in an effective protection concept. The goal is to detect and extinguish fire as early as possible. If no extinguishing system is installed, the early detection gains time for the intervention forces.

Analyses show that the no. 1 cause for fire safety system failure is the interface between detection, alarming, control, and extinguishing. The different systems must therefore be compatible with each other. That's why we offer comprehensive, one-stop fire safety solutions that cover everything from fire detection to evacuation and extinguishing.

■ **All-inclusive portfolio**

We offer more than fire safety and help enhance the overall security of your archive or library, e.g. with access control, intrusion detection or video surveillance systems. Moreover, we take care of your systems throughout their entire life cycle – from consulting and commissioning to choosing a service concept that fits your needs.

■ **Unique fire safety technology for your archive and library**

Our fire safety solutions provide earliest possible warning – thanks to unique technologies like our state-of-the-art Sinteso™ fire detectors that even offer a Genuine Alarm Guarantee or our aspiration smoke detection. Combine these with our highly reliable and effective Sinorix™ extinguishing systems that are based on innovative technologies such as the combined gas-water technology Sinorix $H_2O$ Gas and you will benefit from comprehensive fire safety that meets your requirements.
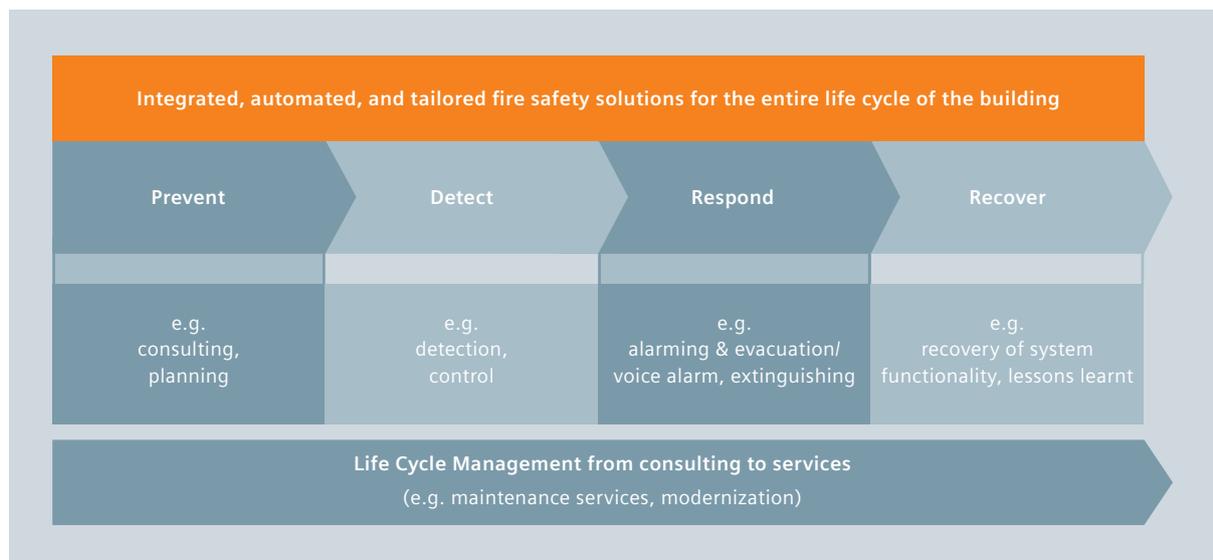
■ **Highest standard of safety**

Backed by more than 150 years of experience in fire safety, our solutions excel through highest possible quality. Incorporating only products that meet industry-specific standards and regulations certified by VdS, LPCB, FM or UL, they comply with the highest safety standards.

## Highlights

■ Safety for people and assets – due to application-specific know-how

■ One integrated solution – from fire safety and security to building automation

■ One project responsible – receive everything from planning and implementation to maintenance from one source

■ Highest possible product quality – solutions comply with industry-specific standards and regulations

| Integrated, automated, and tailored fire safety solutions for the entire life cycle of the building | | | |
|---|---|---|---|
| Prevent | Detect | Respond | Recover |
| e.g. consulting, planning | e.g. detection, control | e.g. alarming & evacuation/ voice alarm, extinguishing | e.g. recovery of system functionality, lessons learnt |
| Life Cycle Management from consulting to services (e.g. maintenance services, modernization) | | | |

Fire safety process for integrated and tailored fire safety solutions

# Earliest fire detection and reliable extinguishing – for maximum fire safety

**Our competence is backed by many years of application know-how, innovative systems, and integration of fire detection, alarm signaling, and extinguishing systems into a comprehensive fire safety solution.**

■ **Prevent**
We provide our comprehensive know-how and support during every project phase. From the very beginning, we partner with everybody involved – architects, planners, contractors, and building operators.

■ **Detect**
A fire can start due to malfunctions of electrical equipment, human failure or incidents in the surrounding building area. A typical fire in archives and libraries starts slowly, with a long period of smoldering before erupting into flames. To detect it and avoid an onset of flames, early smoke detection is required. For this reason, our fire safety solutions are based on fast and reliable fire detection.

Sinteso S-LINE optical detectors (FDO241) offer unmatched detection accuracy and quick notification thanks to our unique ASA*technology*™. ASA*technology* stands for "Advanced Signal Analysis". Behind it there is a complex and unrivalled signal evaluation concept. Even under the most difficult conditions, Sinteso S-LINE detectors distinguish between genuine danger and deceptive phenomena,

and signal alarm when threat is imminent. This works so well that we even offer a Genuine Alarm Guarantee for our Sinteso S-LINE fire detectors.

If very early smoke detection is required due to the high value of assets and fire load, aspirating smoke detection (ASD) will provide the earliest possible warning and minimize potential damage. Air samples are continuously taken at the danger spots and carried to the ASD device. As soon as smoke particles are detected in the air sampler, a pre-alarm or an alarm is triggered – depending on the smoke concentration. The response characteristic is determined according to the application. It ranges from normal to high sensitivity which allows even a minimal smoke concentration to be identified unequivocally at an early stage of fire.

Our detection concept can integrate both technologies, smoke detection with Sinteso S-LINE and ASD, on one loop. As soon as an alarm is triggered, the ventilation systems are shut down to allow alarm verification. Only if the alarm is reconfirmed, the extinguishing process is activated.

■ **Respond: alarming and evacuation**
Integrating the fire detection system of your archive or library into a danger management station increases security. It allows you to centrally control and monitor your fire safety system as well as other integrated security-related subsystems, such as extinguishing, access control or video surveillance. This means for you that you can monitor everything from the control room – and benefit from simple, uniform operation of all integrated systems.

What happens in case of a fire? Alarm sounders and sounder beacons alert people that there is an incident. The voice alarm system E100 is automatically activated by the fire safety system. The evacuation system gives clear and precise information and instructions with voice messages. This ensures that your archive or library as well as neighboring areas are evacuated in a safe and orderly manner.
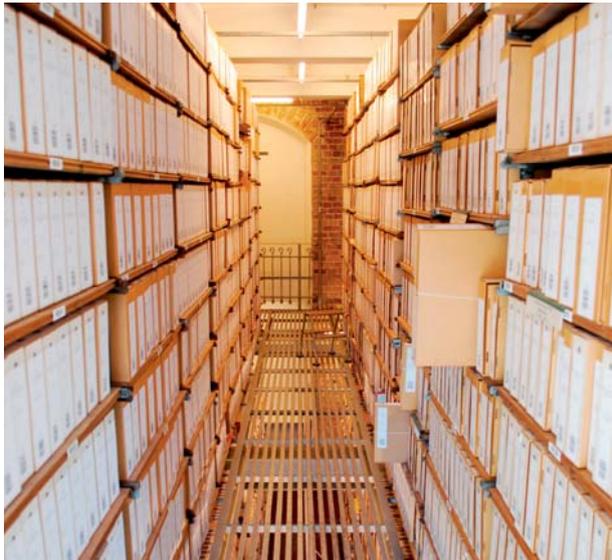
### ■ Respond: extinguishing

After the evacuation has been initiated, the next task is to close all openings so that the room remains air-tight for the gas discharge. Now the automatic extinguishing system can be triggered. Our extinguishing control panels XC10 are designed for dry extinguishing application areas such as archives. The control panels can function as a stand-alone solution or be efficiently integrated into larger fire safety systems.

Our water-combined technology Sinorix $H_2O$ Gas offers the most reliable extinguishing for archives available today that doesn't damage the contents. It combines the excellent extinguishing behavior of nitrogen with additional water mist to cool down hot surfaces. This dual protection is especially suitable for deep-seated fires, providing faster extinguishing and long-lasting reignition prevention. It requires so little water (about 0.5 liter per m³) that it is even suitable for protecting areas containing sensitive assets in archives, avoiding any type of damage to the irreplaceable goods. In an emergency, the system will release a precisely calculated and carefully balanced mixture of nitrogen and water mist over the required extinguishing source. Sinorix $H_2O$ Gas is a unique technology and was awarded the Security Innovation Award "Fire Protection 2008" at the security fair in Essen, Germany.

In areas where water isn't acceptable at all, we offer a valid alternative solution: Sinorix $N_2$. Based on pure nitrogen and available in 200 and 300 bar technology, it offers flexibility in engineering and reliable extinguishing. When there are additional overpressure restrictions in the room to be protected, we recommend our innovative Sinorix CDT $N_2$ – a unique Constant Discharge Technology that provides additional advantages as it considerable reduces pressure peaks.
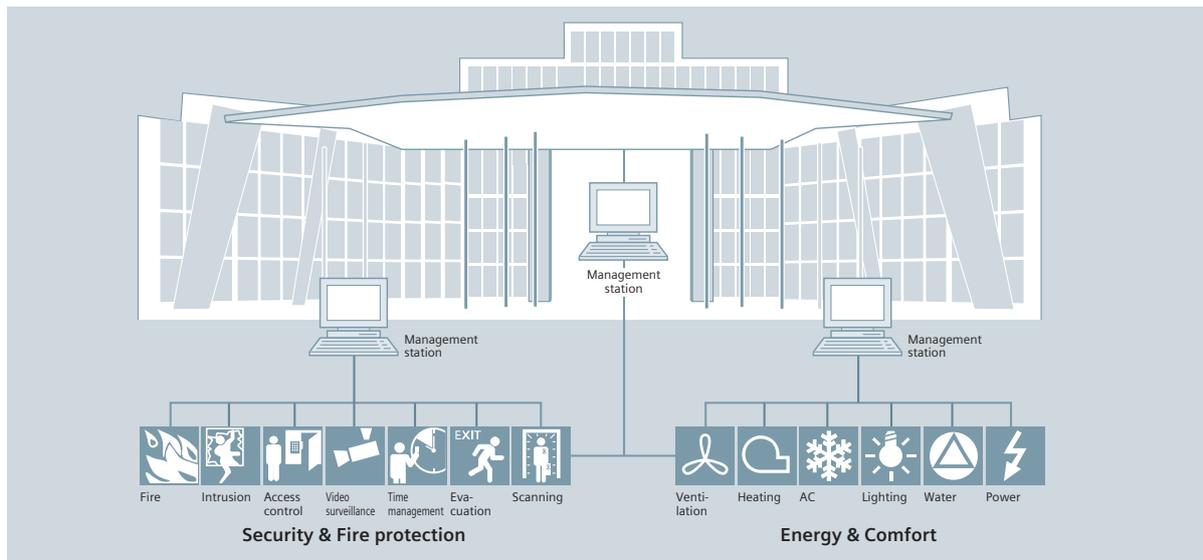
Needless to say, all our solutions comply with all applicable international standards and guidelines. Sinorix $H_2O$ Gas, Sinorix $N_2$, and Sinorix CDT $N_2$ have been tested and approved by the most stringent European certification authority: VdS.

### ■ Recover

After a fire occurred, there are many questions. Where did the fire start? And, most importantly: Why did it start? Answers have to be found and evaluated. We support you in drawing conclusions regarding prevention, detection, and response to the event. To recognize specific hazards in your environment, general principles of fire propagation – and to reduce or mitigate damage in the future.

## Highlights

■ Early and reliable fire detection – thanks to Sinteso S-LINE detectors with Genuine Alarm Guarantee and aspirating smoke detection

■ Safe evacuation – supported by safety messages and clear instructions

■ Fast and reliable extinguishing – Sinorix ensures valuable assets preservation with no damage to people and environment

■ Increased safety – by integrating systems into a danger management station

| | |
|---|---|
| Fire | Ventilation |
| Intrusion | Heating |
| Access control | AC |
| Video surveillance | Lighting |
| Time management | Water |
| Evacuation | Power |
| Scanning | |

**Security & Fire protection** — **Energy & Comfort**

Management station

# Simplified control of your systems – with a danger management station

**With our danger management station, you can monitor and control all integrated security-relevant subsystems and building automation from one central point. We are also your partner throughout the entire life cycle.**

## ■ Overall monitoring

Whether fire safety, security or building automation systems – you can integrate multiple disciplines into our MM8000 danger management station. This not only facilitates supervision and alarm handling for your security personnel, but also supports communication between the connected subsystems. An integrated access control system allows only authorized people to gain access to your archive or library – increasing security for your employees and assets. In addition Radio Frequency Identification (RFID) systems protect valuable assets activating an alarm if the object is removed from the archive without authorization. Moreover, our building automation system monitors and controls heating, ventilation, and air conditioning – supporting you to save energy and thus costs.

## ■ Innovative service solutions

From alarm management, system maintenance, and extension to modernization – our comprehensive service portfolio covers the entire life cycle of your systems. Our "Advantage Plus" service provides dedicated service options tailored for archives and libraries. It includes a balanced mix of proactive and reactive service components that ensure the reliability and availability of your systems. Our proactive remote service SafeGuard, for example, helps identify critical system deviations before they become problems. And our "Guaranteed repair time" assures that your fire safety systems are up and running at all times, protecting people, and process continuity – allowing you to focus on your core business.

## Highlights

■ Centralized supervision and event handling – due to integration of multiple disciplines into MM8000

■ Increased security – thanks to innovative technologies e.g. RFID

■ Lower energy consumption – through building automation system

■ Highest system availability and reliability – thanks to SafeGuard, our proactive remote service solution, and "Guaranteed repair time"

## Fire control panel

The Sinteso FC20 fire control panel is the heart of every fire safety solution. It converts a fire alarm into actions for alarm notification, evacuation, and extinguishing. The extremely simple user interface with prompting texts lets users quickly check the system status, either locally or by remote access.

## Voice alarm system

**1**

In case of fire, the voice alarm system E100 is automatically activated by the fire detection system. With voice announcements, it communicates clear alarm alerts and evacuation messages in the archive or library and neighboring areas to assure the evacuation before the discharge of an extinguishing agent.

## Extinguishing control panels

**2**

XC10 control panels combine fire detection and extinguishing – by acting as an interface between the two: After receiving a fire alarm from the connected detectors, the combined XC10 panels trigger the extinguishing system. They can be used for single- or multi-sector applications. Additional repeater terminals allow remote control of the XC10.

## Aspirating smoke detection

**3**

Is a highly sensitive system for the earliest possible fire detection in ventilated archives or libraries, minimizing the risk of fire damage. In an archive or library, it is typically applied in air in- and outputs as well as in the detection system in the room.

## Point type fire detectors

**4**

Sinteso S-LINE detectors are used in the archive or library area. The ASA parameter sets provide unsurpassed detection security to ensure early recognition. This is particularly critical in archives and libraries where the likelihood of a smoldering fire is high. This works so well that Siemens offers a Genuine Alarm Guarantee for Sinteso S-LINE fire detectors.

## Electrical manual actuator

**5**

For immediate manual actuation of the extinguishing system, electrical manual actuators are placed along the exit routes.

## Sounder and sounder beacon

**6**

In the archive area, the sounder FDS221 and sounder beacon FDS229 are recommended to alert the occupants acoustically and optically.

## Alarm indicators

**7**

If a fire detector that is not easily visible triggers an alarm, the alarm indicator will quickly identify the area in danger.

## Extinguishing with Sinorix $H_2O$ Gas

**8**

In the protection of archives and libraries, Sinorix $H_2O$ Gas offers the highest extinguishing efficiency known today on the market. Based on nitrogen and water, it combines the excellent extinguishing behavior of nitrogen with water mist that cools down burning or heated surfaces. The limited amount of water needed makes it suitable even for very sensitive assets.

**4**

**12**

**10**

**6**

**7**

**9**

**5** **2**

**11**

## Intrusion detection
**10**

Detection of unauthorized access. Siemens offers a complete range of devices for each kind of risk and application.

## Video surveillance
**9**

The video surveillance system monitors critical zones such as the archive or library entrance area or public areas – to record incidents before and after an event.

## Access control
**11**

The access control system provides safe and flexible access authorization, time recording, and badge issuing. In an archive or library with high value concentration, pin code or a finger print reader are recommended.

## Extinguishing with Sinorix N₂

Sinorix $N_2$ is based on pure nitrogen and offers a very valid alternative for archives containing assets that cannot take any water. When there are additional overpressure restrictions in the protected room, Siemens offers Sinorix CDT $N_2$, a unique Constant Discharge Technology that assures minimum pressure peaks.

## RFID
**12**

Radio Frequency Identification (RFID) asset tracing is a real-time location system that protects valuable assets in archives and libraries by the use of active RFID wireless tags. Scenarios based on location and motion of the monitored assets allow for flexible security needs. The battery-powered RFID tags are protected against tampering. They feature infrared and RFID transmission as well as a motion detector.

# Best references and experience

■ **The Royal Archive, Copenhagen, Denmark**

The Royal Archive, located in a 400-year-old building, collects and stores historical sources – the earliest ones origin from the early Middle Ages.

To protect these values, the archive needed an integral fire safety solution that could be tailored to the existing building structure, respecting its historic value. Siemens conducted an in-depth risk assessment first, followed by extensive evaluation and a testing phase. In the end, all participants decided that a solution based on ASD and Sinorix $H_2O$ Gas would provide very early detection and best protection for this application and risk of fire.

Sinorix $H_2O$ Gas is optimally suited to protect historic documents and can be tailored to the specific requirements. In case of an emergency, a precisely calculated mixture of nitrogen and water mist is released over the required extinguishing zone. This ensures quick and reliable fire extinguishing, preventing reignition. And thanks to its fine spray technology, Sinorix $H_2O$ Gas also minimizes secondary damage.

■ **The Abbey and the Abbey Library of St. Gall, Switzerland**

The Abbey of St. Gall, founded in 612, houses the Abbey Library of St. Gall, the oldest library of Switzerland. In 1983, the library and the entire abbey precinct were included in the UNESCO list of global cultural heritage sites.

Siemens provided a state-of-the-art fire safety solution for the whole abbey, including the library and the archive. A requirement was that no detectors were to be installed on the historical ceilings. The system includes 5 fire detection panels and more than 800 smoke detectors, in addition to linear smoke detectors that protect historical rooms. The system detects the fire and directs the fire brigade to the strategically best entrance location of the abbey. A big challenge, as not all buildings in the abbey precinct are accessible from the same geographical point. The archive room with its original medieval manuscripts is protected with an extinguishing system and an intrusion detection system.

The Royal Archive, Copenhagen, Denmark



The Abbey Library of St. Gall, Switzerland

# Answers for infrastructure.

■ **Megatrends driving the future**

The megatrends – demographic change, urbanization, climate change, and globalization – are shaping the world today. These have an unprecedented impact on our lives and on vital sectors of our economy.

■ **Innovative technologies to answer the associated toughest questions**

Throughout a 160-year history of proven research and engineering talent, with more than 50,000 active patents, Siemens has continuously provided its customers with innovations in the areas of healthcare, energy, industry, and infrastructure – globally and locally.

■ **Increase productivity and efficiency through complete building life cycle management**

Building Technologies offers intelligent integrated solutions for industry, commercial and residential buildings, and public infrastructure. Over the entire facility's life cycle, our comprehensive and environmentally conscious portfolio of products, systems, solutions, and services for low-voltage power distribution and electrical installation technology, building automation, fire safety and security ensures the:
– optimum comfort and highest energy efficiency in buildings,
– safety and security for people, processes, and assets,
– increased business productivity.

**www.siemens.com/firesafety**