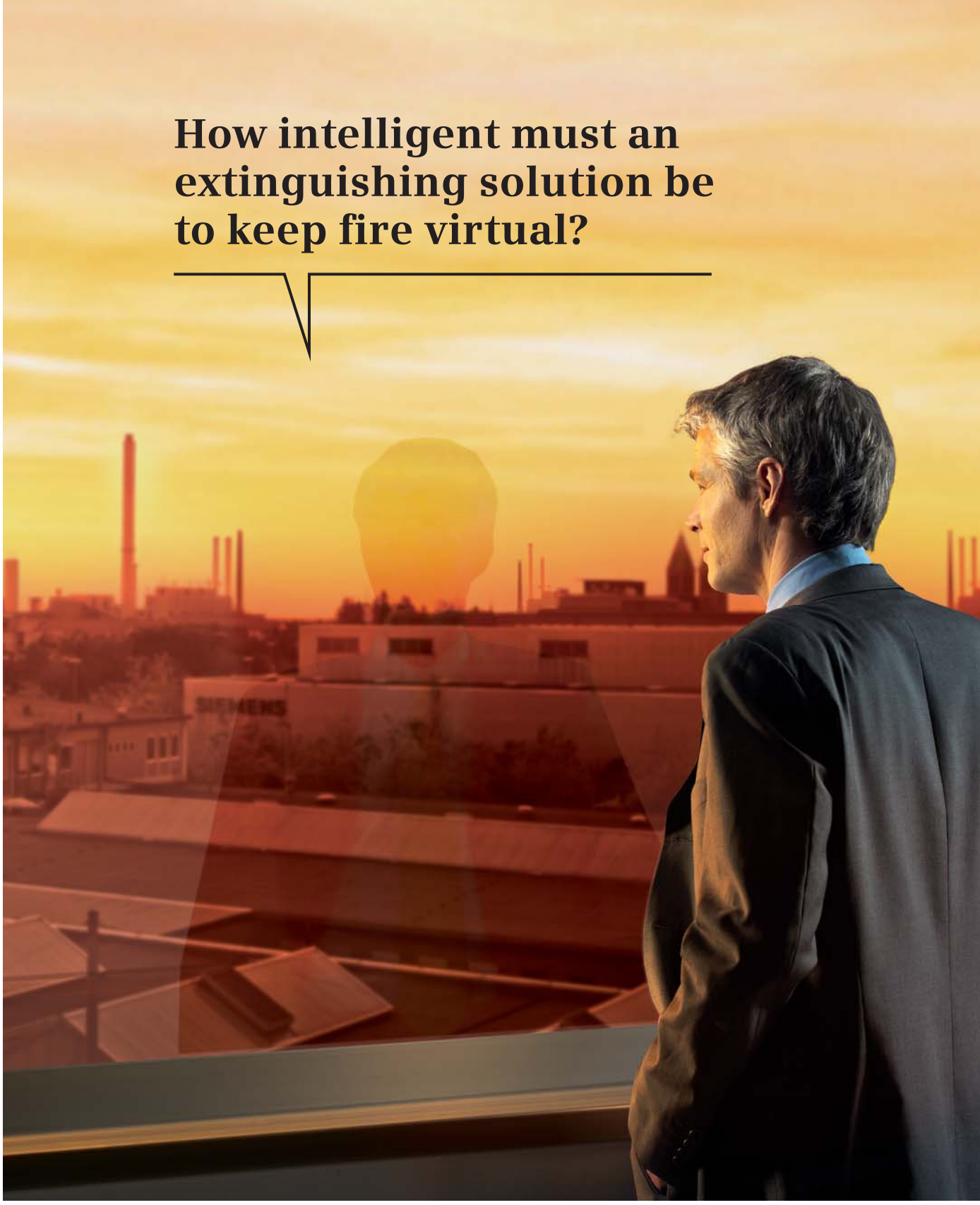
How intelligent must an extinguishing solution be to keep fire virtual?



Intelligent means: fire protection from Siemens.
Sinorix – intelligent extinguishing solutions.

Answers for infrastructure.

SIEMENS

Sinorix – intelligent extinguishing solutions to keep fire virtual

Our intelligent Sinorix™ solutions protect people, environment, and processes: They offer you advanced technologies, based on long-term know-how of a global partner in fire detection and extinguishing. The comprehensive portfolio for room and object protection comprises solutions with natural or chemical extinguishing agents, gas/water-combined as well as water mist solutions.

To optimally ensure the continuity of your business processes, the solutions are tailored to your specific applications, risks of fire as well as local requirements and regulations. In addition, they include a comprehensive service offering – from risk assessment, system design, installation, and commissioning to maintenance.

Solutions for optimal protection

Partnership – long-term experience of a global partner

With Sinorix extinguishing solutions, you benefit from a global partner with extensive experience in fire protection – for example, 100 years ago, Siemens was among the first to provide innovative extinguishing solutions in combination with reliable fire detection technology. Know-how, innovation strength, and solution competence from Siemens are available to you worldwide. In addition, we offer a comprehensive service portfolio: We support you from risk assessment, system design, installation, and commissioning to maintenance. This also includes, for example, the Sinorix Door-Fan-Test, which tests a flooding zone for leakages and thus proves the extinguishing efficiency of the system.

Innovative – most advanced technologies for highest effectiveness

The innovative Sinorix extinguishing technologies offer the best solutions for your individual requirements. Siemens continuously invests in research and development. The result: ongoing new findings and innovations – which lead to advanced technologies with highest effectiveness. Among the latest innovations are Sinorix CDT, the patented Constant Discharge Technology, as well as Sinorix H_2O Gas, the highly efficient combination of nitrogen and water mist technology.

Flexible – adaptable to any risk of fire

Sinorix provides solutions for all risks of fire and can be tailored flexibly to your specific object or room protection requirements.

Tailored – customized for your unique requirements

The Sinorix portfolio offers a broad spectrum of solutions that are precisely tailored to your individual applications. Whether you need to protect an object or room, a single sector or multi sectors – we support you in assessing the risk and in choosing the optimal solution for your application and processes.

Reliable – for optimized business continuity

Sinorix extinguishing solutions ensure reliable fire protection and secure the continuity of your business processes – with advanced technologies as well as thorough system planning and installation. It's a matter of course that they comply with international standards and regulations. Combining the extinguishing solutions with sophisticated fire detection systems and integrating them into a comprehensive fire safety concept from Siemens additionally provides unique protection. At the first signs of danger, the systems react reliably and appropriately, triggering a coordinated alarm which leads people out of the danger area and activates extinguishing systems automatically.

Sustainable – protecting the environment, people, and processes

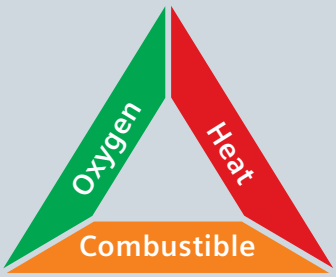
To sustainably protect the environment, people, and processes, you require a solution that is tailored to your application. With Sinorix, Siemens provides suitable solutions and supports you today and in the future. So your investment is a long-term win. Moreover, our solutions are environmentally friendly. Sinorix 1230, for example, ensures quick and reliable extinguishing without having any negative effect on the environment, especially on global warming.

Basic principle of automated extinguishing systems

Every fire needs three elements – oxygen, heat, and a combustible (see graphic below). If only one of these elements is removed, a fire cannot spread and will inevitably go out. Automated extinguishing systems are designed on the basis of this principle.

Highlights

- Worldwide partner for know-how, innovation strength, and solution competence
- Tailored solutions from one source, from risk assessment to maintenance
- Innovative, highly effective technologies for optimal protection
- Reliable fire safety ensures continuity of your business processes
- Sustainable protection of environment, people, and processes



Sinorix N_2 • Ar • CO_2 – reliable extinguishing with pure natural agents

Sinorix N_2 • Ar • CO_2 extinguishes efficiently using pure nitrogen, argon or carbon dioxide and can be flexibly tailored to the respective application. Fire is extinguished effectively by reducing the oxygen within the flooding zone.

Sinorix N_2 • Ar • CO_2 – for reliable extinguishing

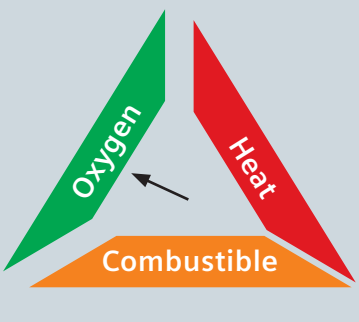
Sinorix extinguishing solutions with natural agents offer maximum flexibility in planning and engineering. The systems can be designed for either nitrogen or argon with 200- and 300-bar technology or for carbon dioxide with 56-bar technology. In addition, systems from small single-sector to large multi-sector solutions with the respective cylinder batteries and selector valves can be realized for all three inert gases.

The cylinders can be positioned either centrally or decentrally. Thus, extinguishing systems with inert gases can be optimally tailored to existing building structures, requirements, and risks of fire and therefore provide optimum protection.

Extinguishing with pure natural gases

Sinorix N_2 • Ar • CO_2 extinguishing solutions use pure natural gases for especially reliable extinguishing. They present no environmental hazards.

Moreover, the extinguishing agents have poor electric conductive properties and are chemically inert, which means that there will be no harmful reaction products when they come into contact with fire. This prevents damages to the equipment. Whether nitrogen, argon or carbon dioxide – natural gases offer excellent extinguishing properties for the fire classes A (solids), B (flammable liquids), and C (flammable gases). Argon is additionally suited for fire class D (metal fires).



Solutions with inert gases work principally by displacing oxygen, inerting the protected area.

Legend

1 Fire detection and extinguishing control panel
2 Fire detector
3 Aspirating smoke detector
4 Alarm sounder
5 Combined sounder beacon
6 Manual release for extinguishing system
7 Warning display
8 Extinguishing agent cylinders
9 Piping network with nozzles
10 Overpressure flap

Application example for electrical switching room

Using pure natural gases instead of a mixture of different gases facilitates refilling because pure natural gases are widely available. Our service offering thereby ensures an especially fast and comfortable refilling.

- **Sinorix N_2 – typical applications**
  - Telecommunication systems
  - Data centers
  - Cable ducts
  - Electrical switching rooms
  - Closed transformers, turbines, engines, and generators
  - Technical and machine rooms
  - Control rooms
  - Military depots
  - Museums

- **Sinorix Ar – additional applications** (additionally to the applications mentioned for N_2)
  - Areas with risk of a metal fire
  - Storage rooms for chemicals

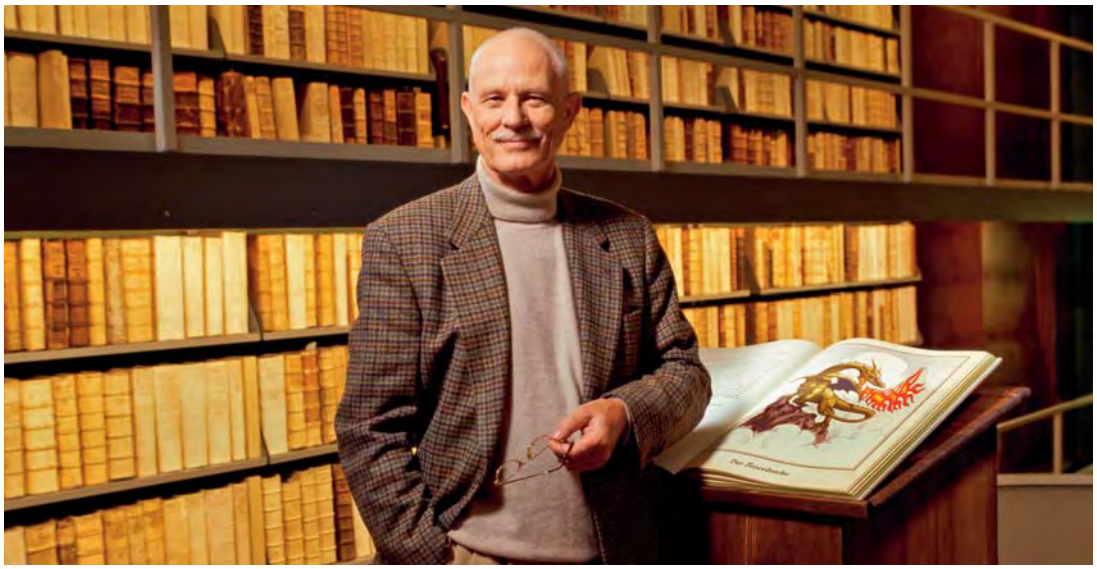
- **Sinorix CO_2 – typical applications**
  - Storage for flammable liquids
  - Unmanned generator and transformer stations
  - Local applications such as oil baths, turbines or machines

Highlights

- High flexibility in system planning and engineering
- Pure natural gases and state-of-the-art technology for fast and reliable extinguishing
- Environmentally friendly through usage of natural gases
- Simple, cost-efficient refilling

Internet PoP Hannover GmbH, Germany

Large and complex Sinorix Ar multi-sector system to optimally and comprehensively protect highly sensitive server rooms.



Sinorix CDT – innovative extinguishing technology without pressure peaks

Sinorix CDT (Constant Discharge Technology) is an innovation based on the extinguishing with nitrogen to provide constant gas discharge. Thus, overpressure flaps can be reduced by up to 70 percent.

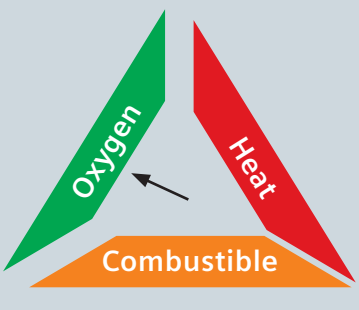
Sinorix CDT – innovative extinguishing technology

Sinorix CDT (Constant Discharge Technology) enables efficient extinguishing without pressure peaks. Thanks to the unique, by Siemens patented and VdS-approved valve technology, nitrogen is discharged with constant pressure during flooding.

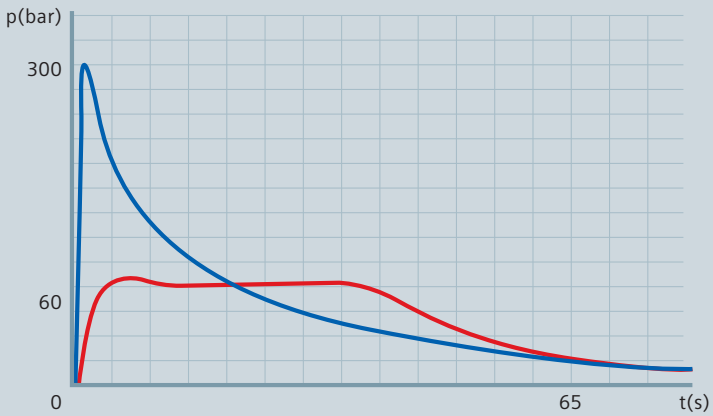
Thanks to the constant flooding, the piping network can be dimensioned smaller compared to conventional extinguishing systems and the overpressure flaps can be reduced by up to 70 percent. Thus, Sinorix CDT is especially suited for interior rooms where large overpressure flaps are hard to realize due to structural circumstances.

Extinguishing with pure nitrogen

Sinorix CDT uses pure nitrogen, a pure, color- and odorless natural gas. As a natural gas, nitrogen is environmentally friendly and does not leave any residues or decomposition products. In addition, nitrogen is available everywhere, which makes refilling easier, more cost-efficient, and faster compared to technologies that use mixed gases.



Solutions with inert gases work principally by displacing oxygen, inerting the protected area.



Comparison of the pressure release in regulated and non-regulated systems

- Traditional technology
- CDT (Constant Discharge Technology)

With the patented valve technology CDT (Constant Discharge Technology), the extinguishing agent is introduced to the flooding zone at constant pressure during the entire flooding.

- **Typical applications**
  - Telecommunication systems
  - Computer rooms
  - Cable ducts
  - Electrical switching rooms
  - Art galleries and museums
  - Archives
  - Military depots

Highlights

- Valve technology patented by Siemens and approved by VdS
- Reduction of overpressure flaps by up to 70 percent
- Less hardware costs
- Environmentally friendly and safe for people – due to usage of nitrogen
- First and as of today only VdS-approved system with constant gas discharge

Sinorix 1230 and Sinorix 227– fast extinguishing using chemical agents

Sinorix 1230 and Sinorix 227 are especially suited for electrical and electronic risks. They use chemical gases that are neither conductive nor leave any residues. Thus, when reaching the extinguishing concentration, they absorb sufficient heat to extinguish the fire.

Sinorix 1230 – quick and sustainable

Sinorix 1230 belongs to our latest generation of chemical extinguishing solutions. The 42-bar technology from Siemens is especially space-saving and assures maximum design flexibility. The high efficiency of the Sinorix 1230 solution allows using a low extinguishing concentration. Room flooding happens within 10 seconds and its highly effective extinguishing agent ensures quick extinguishing of the fire.

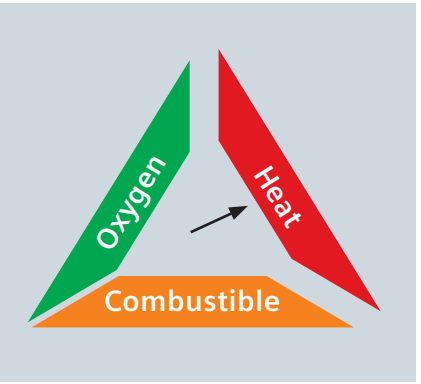
Extinguishing with 3M™ Novec™ 1230 Fire Protection Fluid

The innovative extinguishing agent of Sinorix 1230 provides reliable protection of assets, people, and the environment. It has an ozone depletion potential (ODP) of 0, a short atmospheric life time (ALT) of 3 to 5 days, and a global warming potential (GWP) of 1. As it is neither corrosive nor conductive, it does not damage sensitive equipment.

Thanks to its high safety margin*, it is harmless to people's health. Since the agent is non-toxic, non-flammable, and non-explosive, there are no transport restrictions at all.

Sinorix 227 – reliably protects business processes

Sinorix 227 is a solution based on the worldwide known HFC 227ea with 25- and 42-bar technology. Thanks to the high-pressure technology, the cylinders can be installed away from the protected room – thus allowing central positioning of the cylinder battery.



Solutions with chemical gases absorb heat (energy) from a fire to extinguish it.

Application example IT room

Legend

1 Fire detection and extinguishing control panel
2 Fire detector
3 Aspirating smoke detector
4 Combined sounder beacon
5 Alarm sounder
6 Electrical manual actuator for extinguishing system
7 Emergency stop button for extinguishing system
8 Warning display
9 Extinguishing agent cylinders with Novec 1230 fluid
10 Piping network with nozzles
11 Overpressure flap

Extinguishing with HFC 227ea

HFC 227ea is an extinguishing agent that is highly effective at low extinguishing concentrations and that protects assets and people. It is chemically inert, has no electric conductivity, and is thus safe for electric and electronic equipment. The extinguishing concentration is also harmless for people. With an ozone depletion potential of 0, it has no influence on the ozone layer. HFC 227ea is thermically and chemically stable when stored and can thus be used over a long time period.

Sinorix 1230 and Sinorix 227 – typical applications

– IT and server rooms
– Telecommunication systems
– Electrical switching rooms
– Cable ducts
– Store rooms
– Military depots
– Clean rooms

Highlights

- Highest extinguishing efficiency and flexibility in engineering
- Optimal protection of electrical and electronic equipment
- Fast and safe solutions
- Cylinder bank requires only little space as only a low extinguishing concentration is needed

* Safety margin: Distance between extinguishing concentration and NOAEL (No Observable Adverse Effect Level)

Pappas Group Headquarters, Austria

Sinorix 1230 protects server rooms at the corporate headquarters effectively and sustainably – harmless for people and sensitive assets.

Sinorix H_2O Gas – reliable extinguishing plus cooling

Sinorix H_2O Gas combines highly efficient nitrogen extinguishing with a cooling water mist. Thus, it fights fire in two ways: through oxygen displacement and an additional cooling effect.

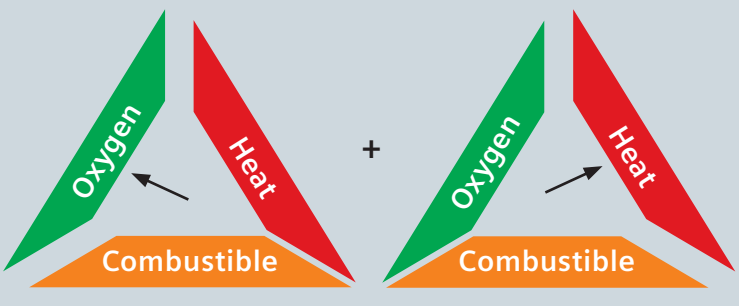
Sinorix H_2O Gas – tailored to your needs for double protection

With a perfect mixture of gas and water, Sinorix H_2O Gas provides double protection. Fires are reliably extinguished and reignitions effectively prevented. Both extinguishing agents are carried by the same piping network and are distributed by the same nozzles to the flooding zone. Nitrogen is used as the extinguishing agent and as the propellant for the water.

The extinguishing system is laid out using a specifically developed calculation program. The program was tested and approved by VdS as part of its system approval.

Sinorix H_2O Gas minimizes secondary damage with its fine spraying technology, which requires only 30 – 80 liters of water for each 100 cubic meters of space.

In addition, the water mist reduces toxic fumes in the air. This additionally protects the health of people and prevents smoke damage to property.



Gas/water-combined solutions extinguish a fire by displacing oxygen combined with an additional cooling effect.

Application example archive

Legend

1 Fire detection and extinguishing control panel
2 Fire detector
3 Aspirating smoke detector
4 Combined sounder beacon
5 Electrical manual actuator for extinguishing system
6 Warning display
7 Extinguishing agent cylinders with nitrogen and water
8 Piping network with nozzles
9 Overpressure flap

Extinguishing with nitrogen and water mist

The nitrogen provides excellent extinguishing properties for the three major types of fires A, B, and C. At the same time, the sprayed water quickly cools the materials below their combustion temperatures and displaces the oxygen as it evaporates.

Neither nitrogen nor water present any environmental or health hazards. They do not harm the ozone layer or contribute to global warming, nor do they create any harmful reaction products during the extinguishing process. Thus, you can easily air out the flooding zone using ventilation systems or opening windows.

Typical applications

– Archives
– Libraries
– Museums
– Uninterruptible power supply (UPS)
– Storerooms for flammable liquids
– Turbines
– Closed transformers and generators
– Vaults

Highlights

- Reliable extinguishing, effective prevention of reignition
- Highly flexible during planning phase, tailored in engineering
- Excellent property protection through minimal water use
- Additional safety for people through the reduction of toxic fumes
- First and as of today only VdS-approved gas/water-combined extinguishing solution for room protection
- Winner of the Security Innovation Award 2008

The Royal Archive, Denmark

The extinguishing solution Sinorix H_2O Gas offers optimal protection for the irreplaceable, historic documents.

Sinorix H_2O Jet – efficient water mist technology

Sinorix H_2O Jet controls or even extinguishes open, fast-growing fires in a highly efficient way. The unique two-phase flow technology uses a mixture of water and gas in order to generate fine water droplets at low hydraulic pressure – creating a cooling effect.

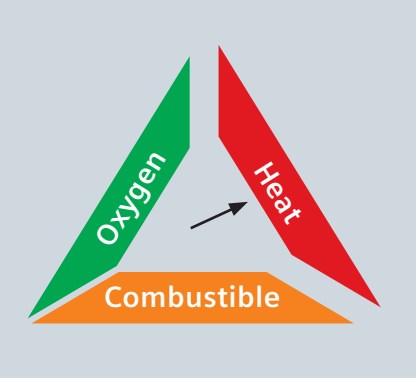
Sinorix H_2O Jet – flexible and tailored

Sinorix H_2O Jet mirrors our extensive expertise and profound know-how: with the Siemens patented nozzle technology and the use of the innovative Sinorix CDT (Constant Discharge Technology) that provides constant flooding. Sinorix H_2O Jet is highly flexible and can be used for object and volumetric protection to control or even extinguish open fires. Thus, a single object can be protected in a targeted way, or an object and its surrounding area within a defined radius.

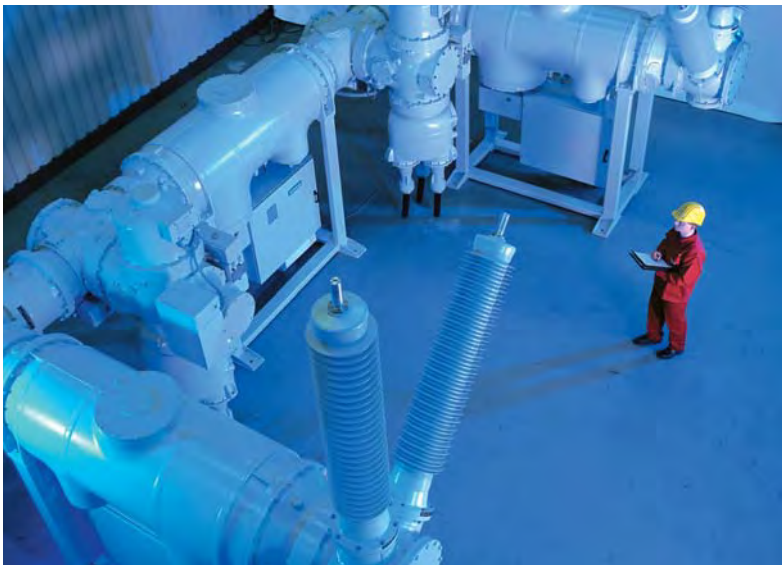
Sinorix H_2O Jet is a low-pressure system with less than 16 bar – reaching the same effectiveness as a high-pressure system because it mixes nitrogen with water. The nitrogen therefore acts as propellant for the water and is carried by the same piping network.

The combination of the nozzles with the two-phase flow technology results in fine water droplets at low hydraulic pressure. This offers advantages such as the use of simple galvanized pipes as well as autonomous systems with steel tanks. In addition, the moderate water quality requirements ensure efficient operation.

Only droplets of the right size can provide maximum cooling. This is why Siemens carefully considers the risks of fire for a particular application to decide how Sinorix H_2O Jet droplets should best be formed. Choosing the appropriate nozzle ensures droplets of the most effective size.



Water mist solutions absorb heat from a fire. Leaving it without energy, they thus control or extinguish the fire.



Concept example of a Sinorix H_2O Jet solution

Extinguishing with water mist

The smaller the water droplets, the larger the surface area available to absorb heat from and to smother a fire. This way, a small amount of water is already highly effective. The low water consumption is beneficial for the environment. In addition, water is easy to obtain, transport, and store. And Sinorix H_2O Jet doesn't require a special water quality: good filtration is sufficient to ensure cost-effective, efficient, and environmentally friendly extinguishing.

Typical applications

- Turbines and generators
- Engine test stands
- Production facilities
- Storage for flammable liquids
- Coating or painting lines

Highlights

- Efficient object and volumetric protection
- Innovative and by Siemens patented nozzle for object protection
- Low-pressure system with maximum effect
- Low water consumption
- Enormous cooling effect
- Highly economical
- Environmentally friendly and safe

Sinorix al-deco STD – protecting machine tools without compromise

Sinorix al-deco STD is an intelligent object protection system that can be used flexibly in machine tools. It distinguishes itself with fire detection and extinguishing without requiring an electrical source, online monitoring, and automatic recording of all security-relevant functions.

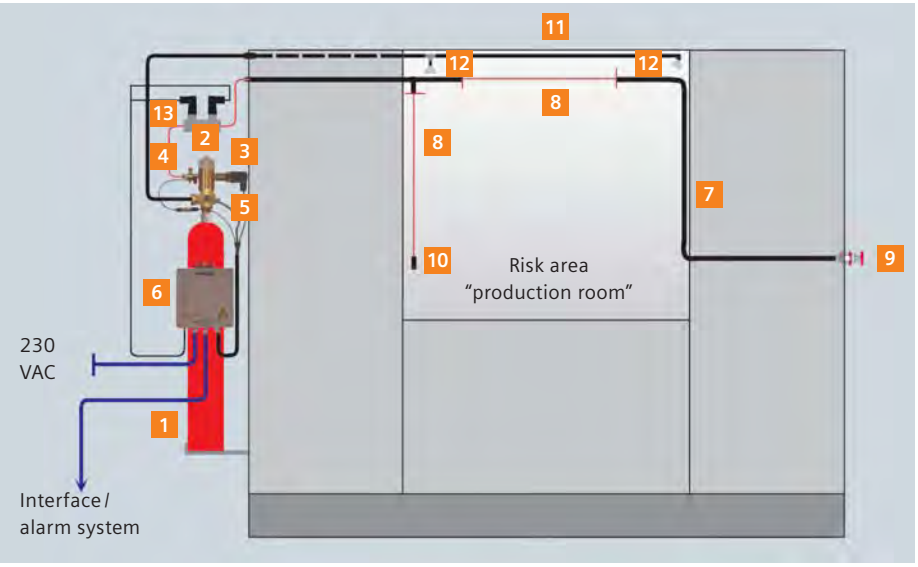
Sinorix al-deco STD – reliable and effective all-around protection

The object protection system Sinorix al-deco STD detects fire and activates the extinguishing process based on pneumatic functions. Therefore, the system is insensitive to all kinds of technical interferences and it is able to detect and extinguish a fire without needing an electrical source.

For this, a detection line is laid out within a machine tool. The so-called fire sensor Lifdes™ (**Li**near **f**ire **de**tection **s**ource) acts like a linear sensor, is permanently under pressure, and bursts as soon as its ambient temperature rises above 110 °C. The cylinder valve is activated by a drop of pressure.

To ensure comprehensive monitoring, all security-relevant functions are monitored online and incidents are indicated acoustically and optically. These functions as well as the operating data are automatically recorded in a long-term memory and can be read out via a USB interface. Thus, events can be easily reconstructed after an incident and liability issues clarified without doubt.

The need for maintenance is electronically displayed and can be carried out according to your operating schedule.



Concept example for machine tools

Legend for the key components

1 CO_2 extinguishing agent cylinder
2 CO_2 valve (IHP)
3 Pressure switch, potential-free
4 Ball valve for the activation/deactivation of the extinguishing system (with status monitoring)
5 Activation and measuring unit (integrated into the valve) for checking the CO_2 quantity
6 Alarm interface
7 Detection line, steel, D=6x4 mm
8 Detection line, fire sensor Lifdes (flexible)
9 Manual release with pressure gauge
10 End stops for detection line
11 Extinguishing line for CO_2
12 Extinguishing nozzles
13 Distribution unit with pressure switch 2 and 3

Cost efficiency that really counts

The Sinorix al-deco STD object protection system distinguishes itself with an unparalleled price-performance package that offers uncompromising protection. It requires only an investment of about 1.5 to 2.5 percent of the total value of a machine tool – a worthwhile investment compared to possible damages.

Highlights

- Highest operating safety
- Effective fire detection with patented fire sensor Lifdes
- Online monitoring as well as alarming in case of an incident
- Comprehensive monitoring through recording of security-relevant data
- Availability of the data via USB interface
- Maintenance appropriate to operation

Laubscher Präzision AG, Switzerland

At Laubscher, Sinorix al-deco STD already detected and extinguished several fires within machine tools that use non-hydrous coolants, thus ensuring the business processes.

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.

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