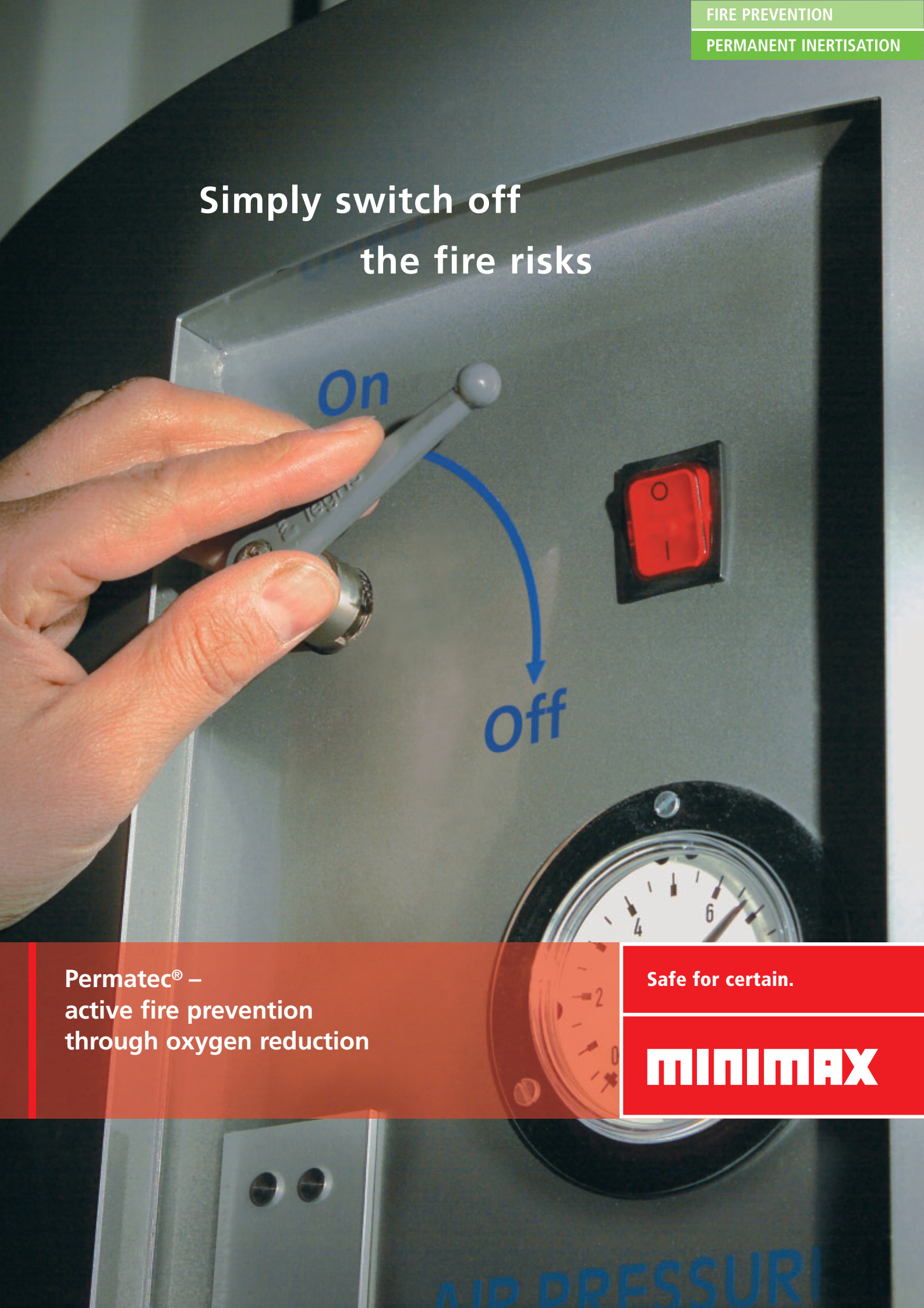



# Simply switch off the fire risks

**Permatec® –**
**active fire prevention**
**through oxygen reduction**

**Safe for certain.**

MINIMAX

# FIRE PREVENTION

**Active fire prevention beats fire extinguishing: the Permatec® fire prevention system simply prevents fires from occurring! Unlike "reactive fire fighting" using extinguishing systems or by fire brigades, methods that aim to deal with initial fires, Permatec® actively rules out the possibility of fire in the first place by oxygen reduction.**

In order for a fire to happen certain conditions have to be fulfilled:
If the three key factors

- **combustible material,**
- **ignition energy and**
- **oxygen**

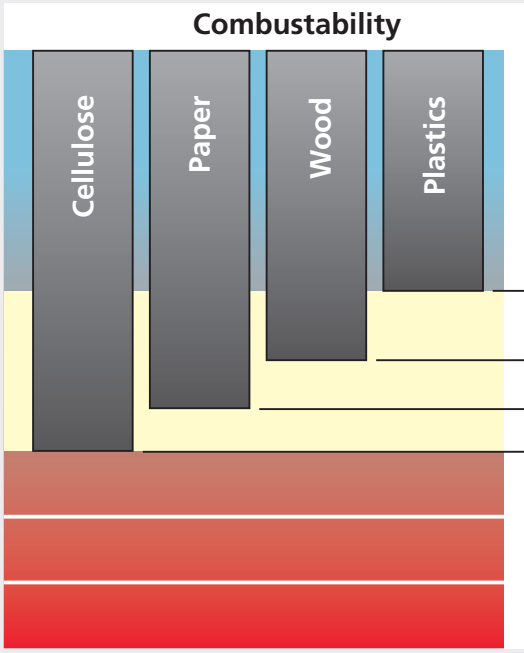
are present in the right quantities and proportions, a fire can break out at any time.

Usually it is just not possible to remove all combustible materials or eliminate all potential ignition sources. The oxygen level can, however, be targetted and specifically reduced, making combustion impossible: that is active fire prevention!

**Reducing the oxygen level**
The air around us has an oxygen content of nearly 21% by volume. By targetting and reducing this level according to nature of the goods you wish to protect, it´s impossible for a fire to occur.

Through the controlled supply of nitrogen, the Permatec® fire prevention system keeps the content of oxygen in the protected area at a lower level. The nitrogen suppresses the proportion of oxygen, and you create a fireproof atmosphere.

**Ignition limits of combustible materials and physiological effects.**





Nitrogen generator

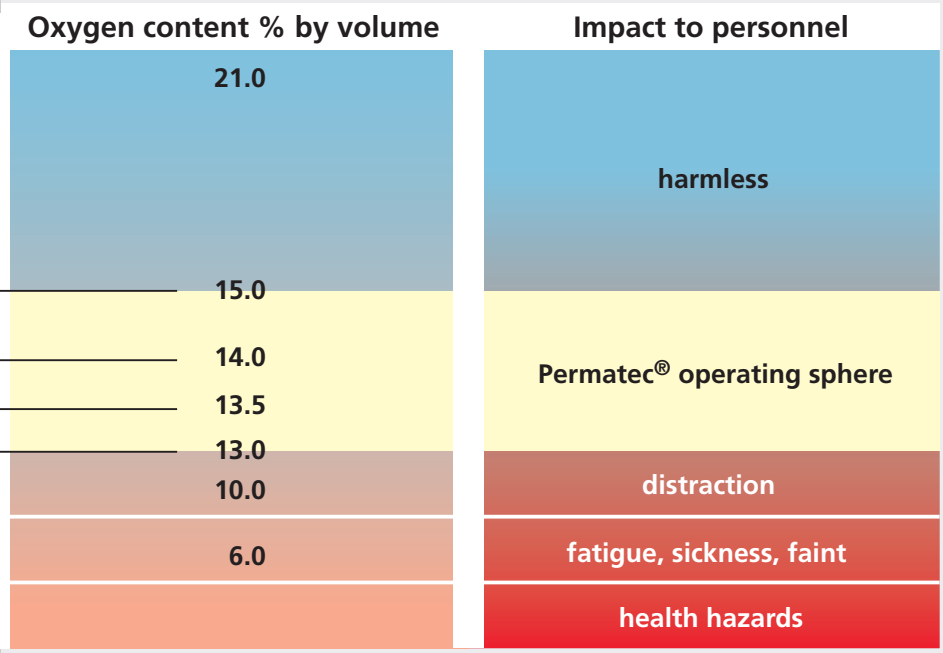

Compressed air generator

# PERMATEC®

The nitrogen required for the oxygen reduction process is produced cheaply and directly on-site by the Permatec® fire prevention system using a nitrogen generator. The monitoring and control unit of the Permatec® fire prevention system continuously regulates the proportion of oxygen in the air.

**Permatec® atmosphere is still breathable**
Areas protected by Permatec® remain accessible to your workforce and can be used almost without restriction. The inert gas nitrogen (inert = dull, uninvolved, inactive) is completely safe at normal atmospheric pressure. As it makes up 78 % by volume of the natural atmosphere, the human body is perfectly well adapted to it.

The reduction in oxygen content of the air to around 15% by volume using nitrogen under the Permatec® fire prevention system corresponds to the level of oxygen at an altitude of around 3,000 m. The fireproof Permatec® atmosphere is comparable to that found in high mountain regions. With due regard for certain safety measures, therefore, there is no danger at all in reducing the oxygen level.



# THE FUNCTION

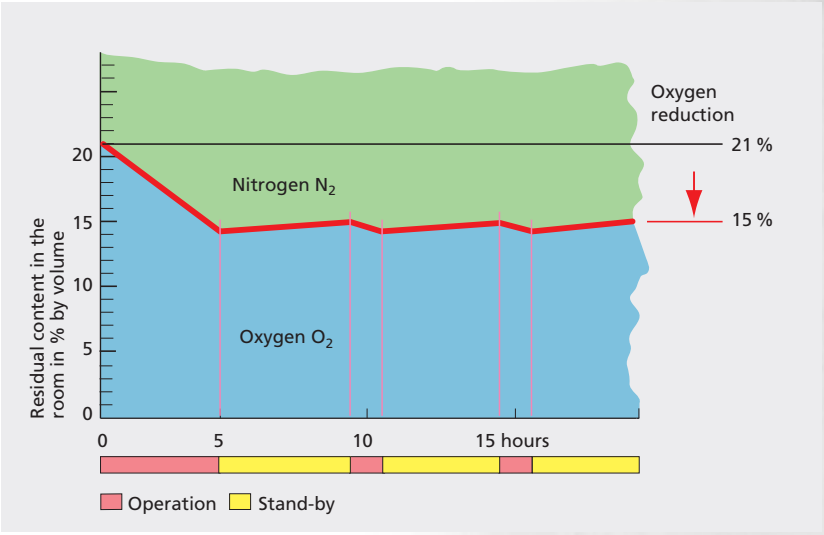
## SIMPLE, PRECISE, EFFICIENT

**The 3 components**
The basic components of the Minimax Permatec® fire prevention system are the compressed air and nitrogen generator, and oxygen sensors with the monitoring and control unit. This is how the 3 components work together:

Normal air from outside is compressed and dried in a compressor, cleaned of particles and oil residue in the filter unit, then separated into the components nitrogen and oxygen in hollow fibre membranes. While the remaining gases are released, the nitrogen replaces part of the room atmosphere in the protected area, thus reducing the proportion of oxygen to below that required for independent combustion. In most cases a reduction from 21% to 15% by volume is sufficient to prevent the occurrence of fire. Sensors continuously measure the oxygen level of the air in the protected area.

The supply of nitrogen is adjusted by a solenoid valve regulated by the monitoring and control unit. Once the required level of nitrogen is reached, the Permatec® fire prevention system automatically switches to stand-by operation.
It then only recommences operation if the oxygen level begins to rise, e.g. through unsealed points in the building or open doors and gates.

**Operational phases of the Permatec® fire prevention system**



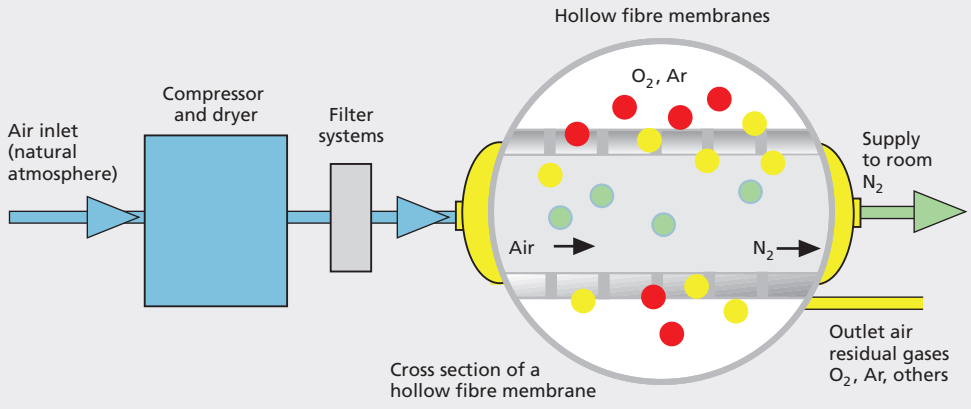

Minimax is Europe's only provider of mobile and stationary fire prevention solutions. With 100 years of experience Minimax can offer a complete service from planning and installation through to maintenance and training.



Compressed air regulation

Hollow fibre membranes

**Schematic diagram of nitrogen production installation**



# INDIVIDUAL APPLICATION WITH GREAT BENEFITS

Wherever relatively few people use the protected area and a room itself is well sealed, the Permatec® fire prevention system can simply remove the risk of fire occurring.

**Basic advantages of the Permatec® system:**

- It offers permanent protection against fire by reducing the oxygen in the air.
- It avoids environmental damage from the fire or its effects.
- It prevents fire damage from smoke or the extinguishant itself.
- Permatec® can be adapted to modified conditions of use and fire load.

The Permatec® system also offers the following specific benefits in individual application areas:

## Automated frozen and cold warehouses

- Lasting prevention even at very low temperatures.
- Economic fire prevention by making use of existing sealed conditions.
- System easily adapts to building alterations.
- Highly accessible as system components are outside cold area.

## Hazardous goods storage and automated high bay warehouses

- Optimal suitability for high fire loads and mixed storage.
- Minimal outlay on pipe and sensor installation.
- Problem-free integration into existing buildings.
- Spacious dimensioning of fire sections.
- No toxic reactive products from extinguishant and burnt goods.

## Automatic parking systems

- Minimal outlay on pipe installation.
- Optimal fire protection for high fire load areas that are difficult to access.

D

## Telecommunications and Information processing

- Guaranteed system availability through fire prevention.
- Can easily be adapted to modified conditions of use.
- Minimal outlay on installation and maintenance in sensitive security and technical areas.

## Archives, Libraries, Museums, Storerooms

- Prevention against fire and consequential damage to irreplaceable objects of artistic and cultural value.
- Staff and visitors can still use the protected areas.
- Additional benefit: the reduction in oxygen can also help conserve valuable items.

## Silos and mixers, ship freight storage and safety deposit vaults

- Takes maximum advantage of existing sealed storage conditions, the ideal system for an economic inertisation plan.
- Effective fire prevention.
- Areas remain accessible.
- Can be easily adapted to modified fire loads and conditions of use.

**We are happy to offer advice.**
Our aim is to put together the safest and most economic fire prevention solution for your fire risk. Ask us!


Nitrogen generator


Compact system

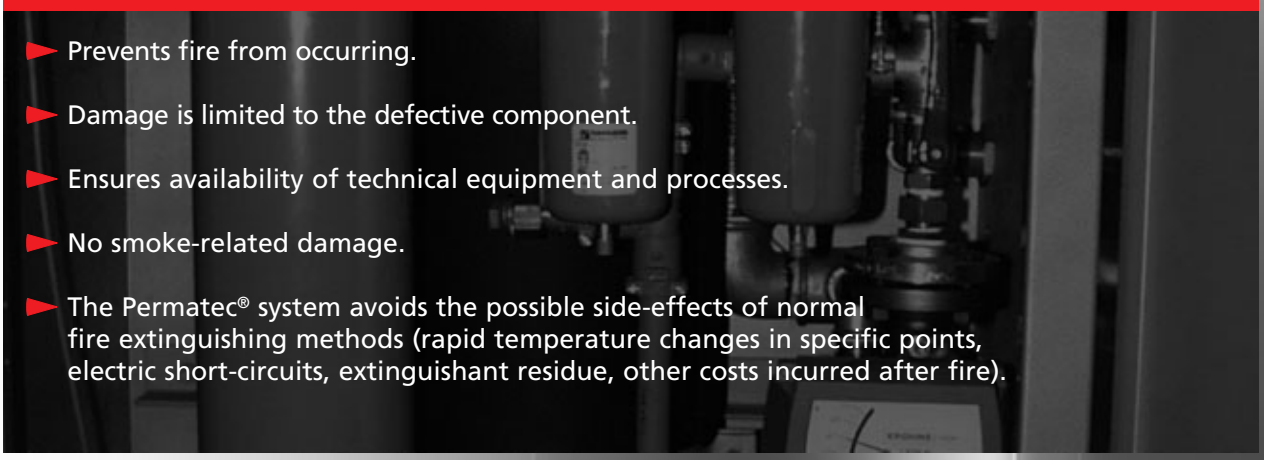
# THE BENEFITS

## PERMATEC® FIRE PREVENTION SYSTEM

**Think it over.**
The Permatec® fire prevention system offers a better solution than extinguishing systems if relatively few people use the protected area and the room itself is well sealed.

Under such conditions the Permatec® system offers the best possible kind of fire protection: active fire prevention.

Whereas extinguishing systems are designed to put out existing fires, the Permatec® fire prevention system actually stops them breaking out in the first place.



**Overview of benefits:**

- Prevents fire from occurring.
- Damage is limited to the defective component.
- Ensures availability of technical equipment and processes.
- No smoke-related damage.
- The Permatec® system avoids the possible side-effects of normal fire extinguishing methods (rapid temperature changes in specific points, electric short-circuits, extinguishant residue, other costs incurred after fire).

Minimax GmbH & Co. KG
Industriestrasse 10/12
D-23840 Bad Oldesloe
Phone: +49 (0) 45 31 8 03-0
Fax: +49 (0) 45 31 8 03-2 48
E-mail: info@minimax.de
www.minimax.de

VdS
Nr. S 89201
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