Oxeo Prevent
Oxygen Reduction System

Active Fire Prevention using natural Nitrogen

Cool down. Fire Protection by

MINIMAX

FIRE PREVENTION

Active prevention instead of firefighting

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

In order for a fire to occur 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. Generally it is simply impossible to remove all combustible materials or eliminate all potential ignition sources.

The oxygen level can, however, be targeted and specifically reduced, making an open combustion process impossible: that is active fire prevention.

Reducing the oxygen level
The air around us has an oxygen content of nearly 21% by volume. By targeting 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 Oxeo Prevent fire prevention system maintains the volume of oxygen in the protected area at a lower level. The nitrogen suppresses the proportion of oxygen, and a fireproof atmosphere is created.

Wherever the protected area is well sealed, the Oxeo Prevent fire prevention system can simply remove the risk of fire occurring.

The following are generally applicable to the Oxeo Prevent 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 the extinguishant itself.
- Oxeo Prevent can be adapted to modified conditions of use and fire load.

OXYGEN REDUCTION

Taking a relaxed deep breath

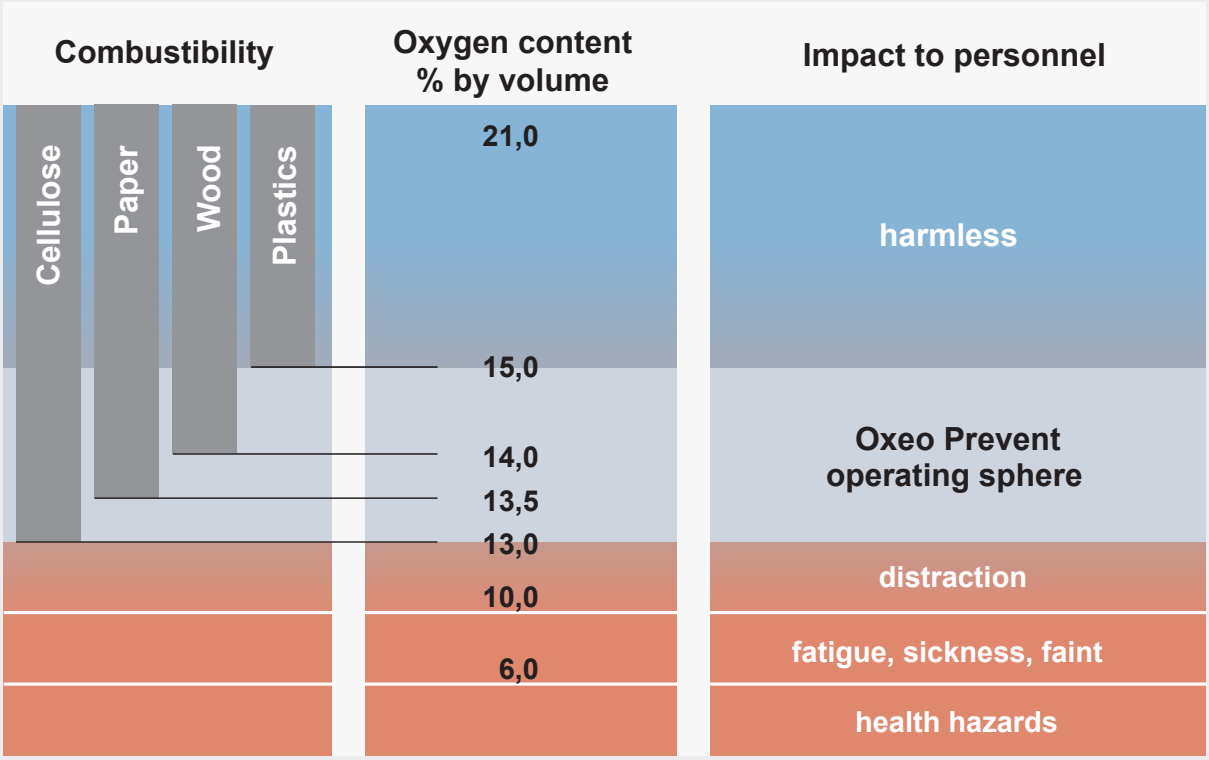
The nitrogen required for the oxygen reduction process is produced cheaply and directly onsite by the Oxeo Prevent fire prevention system using a nitrogen generator. The monitoring and control unit of the Oxeo Prevent fire prevention system continuously regulates the proportion of oxygen in the air.

Oxeo Prevent atmosphere is still breathable
Areas protected by Oxeo Prevent remain accessible to your workforce and can be used almost without restriction. The inert gas nitrogen (inert = dull, passive, 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 Oxeo Prevent fire prevention system corresponds to the level of oxygen at an altitude of around

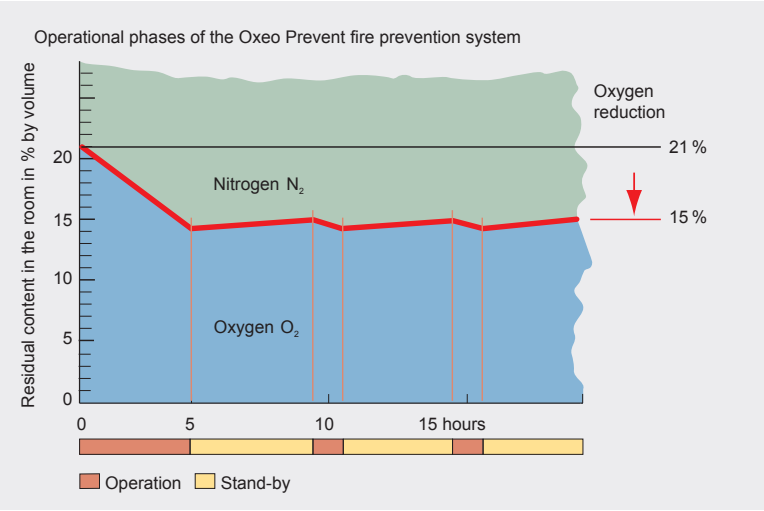
3,000 m. The fireproof Oxeo Prevent atmosphere is comparable to that found in high mountain regions. With due regard for certain safety measures, therefore, there is no danger at all in reducing the oxygen level.

Ignition limits of combustible materials and physiological effects



DESIGN AND

The components
The main components of the Oxeo Prevent fire prevention system are an air compressor, a compressed air conditioner, a nitrogen generator and the oxygen sensors with the monitoring and control panel. To achieve effective fire prevention through the reduction of oxygen, the individual components must interact as follows:



The air compressor sucks in normal air and compresses the air up to 13 bar, depending on the application. In the compressed air conditioning unit, the compressed air is cleaned of dirt particles, moisture and residual oil to ensure a long life of the nitrogen generator.

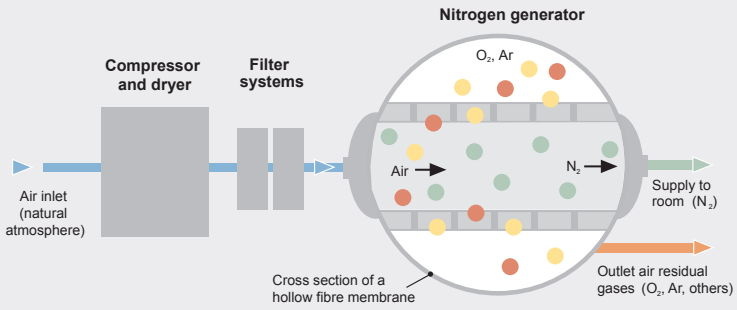
FUNCTION

simply safe

In the nitrogen generator (membrane or PSA technology), the compressed air is separated into its main constituents, nitrogen (78.0%) and residual gases (22.0%). 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, that is regulated by the monitoring and control unit. Once the required level of nitrogen is reached, the Oxeo Prevent fire prevention system automatically switches to stand-by operation. It then only recommences mode if the oxygen level begins to rise, e.g. through unsealed points in the building or open doors and gates.

Schematic diagram of nitrogen production installation (membrane technology)



ADDED SYFETY

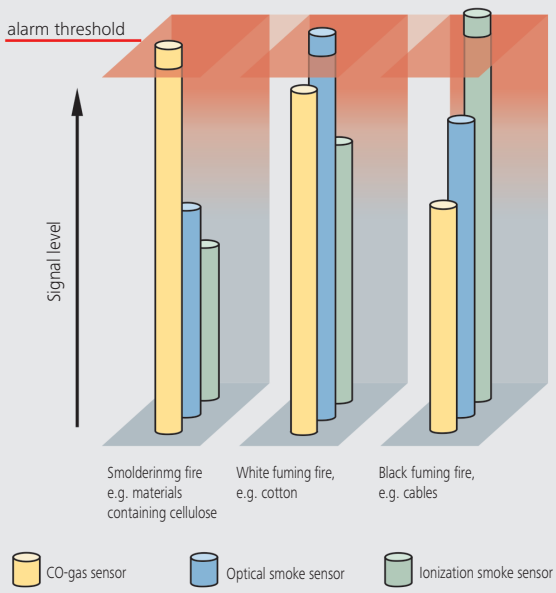
by use of early fire detection

Early fire detection and fire prevention are an optimal combination for guaranteed fire protection
The Oxeo Prevent fire prevention system creates an oxygen-reduced atmosphere thus providing protection against the occurrence or propagation of fires. Smoldering fires, however, may occur even- at a low oxygen content, e.g. due to a thermal overload of electric components. Systems for the early detection of fires detect the smoldering fire and will automatically disconnect the power supply if necessary. Moreover, they report the smoldering fire to a superordinate point. The oxygen-reduced atmosphere does the rest and prevents further burning.

Detecting a fire even before the first signs of smoke.
A particular feature of the Minimax early fire detection systems is the detection of an increase in the carbon monoxide concentration. Smoldering in a reduced oxygen atmosphere constitutes an incomplete combustion process, and carbon monoxide occurs even before smoke emerges. For this reason, the detection of carbon monoxide concentrations is a fundamental addition to the other fire detection criteria applied.

Detecting a fire before it starts burning
HELIOS AMX5000 smoke aspirating systems are able to detect even minute glowing and smoldering fires both safely and securely.
The HELIOS system has a detection sensitivity of 0.002 %/m and is thus 400 times as sensitive as a conventional optical smoke detector.
The HELIOS AMX5000 can be equipped additionally with a sensor for monitoring carbon monoxide for the earliest detection of fires.

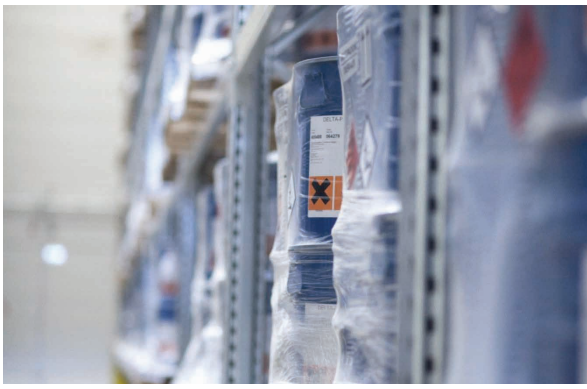
One detector ± multiple criteria
The HELIOS AMX5000



APPLICATIONS

a class on its own

Wherever the protected area is well sealed, the Oxeo Prevent fire prevention system can simply remove the risk of fire occurring. The Oxeo Prevent 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.

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.

ADVANTAGES

Overview

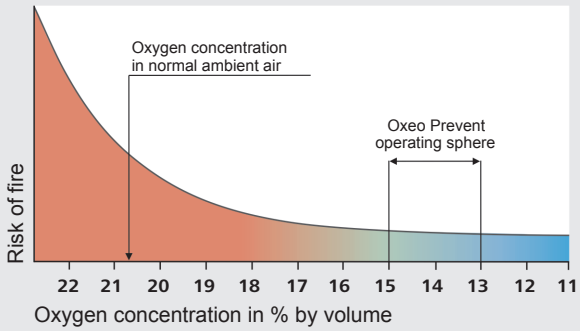
Clearly superiour

The Oxeo Prevent 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 Oxeo Prevent system offers the best possible kind of fire protection: active fire prevention. Whereas extinguishing systems are designed to put out existing fires, the Oxeo Prevent fire prevention system actually stops them breaking out in the first place.

The benefits at a glance:

- Prevents fire from occurring.
- Damage is limited to the defective component.
- Ensures availability of technical equipment and processes.
- No smoke-related damage.
- The Oxeo Prevent system avoids the possible side-effects of normal fire extinguishing methods:
  rapid temperature changes in specific points,
  electric short-circuits,
  extinguishing agent residue.

Decreasing oxygen content reduces the risk of fire (Example: solids)



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