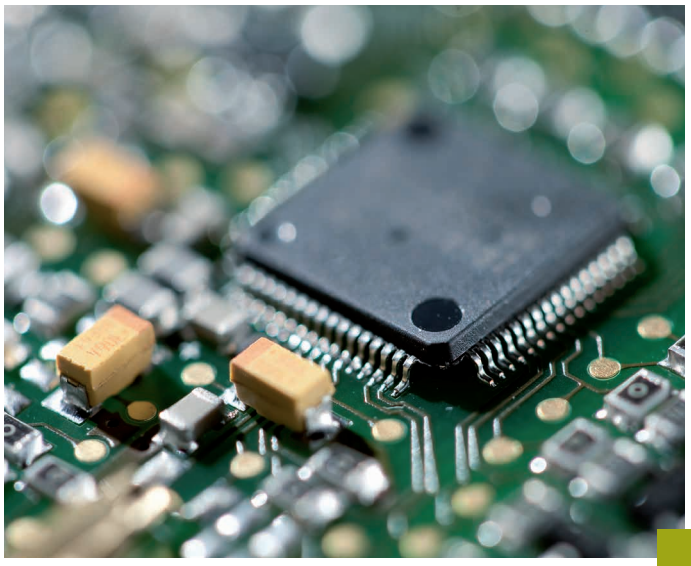
Trusted above all.

Oxeo Extinguishing Systems

Fighting Fire with Nitrogen and Argon

Effective fire extinguishing without residues



Oxeo fire extinguishing systems by Viking use nitrogen and argon to extinguish fires. These natural inert gases are particularly effective as extinguishing agents – especially in high risk areas. These systems are electrically non-conductive and leave no residues, hence they are especially suitable for the protection of areas containing valuable and sensitive equipment.

Oxeo extinguishing systems have a three-dimensional effect in the entire extinguishing zone: The released inert gases disperse homogeneously in the event of a fire and displace the oxygen at the source of the fire. Even hidden fire sources are usually extinguished instantaneously, not even spray obstructions present a problem. Oxeo extinguishing systems are therefore perfectly suited to provide fire protection for specific hazard areas with flammable liquids and other hazardous substances, as well as high risk fire areas.

Rapid fire extinguishing with inert gases reduces the potential damage resulting from the fire. In addition, secondary damage caused by the extinguishing agent itself is practically excluded.

Unlike water, foam or powder, inert gases do not affect sensitive electronic equipment. After successfully extinguishing a fire, the gas can be extracted from the room concerned by simple ventilation. Oxeo extinguishing systems are always an excellent choice for protecting valuable goods or irreplaceable cultural assets against fire or to avoid long, costly operational downtimes of electrical or electronic equipment.

Nitrogen and argon are not toxic in the concentrations required to extinguish fires – however, when released, the oxygen concentration is always significantly lower compared to the ambient atmosphere. For this reason, Oxeo extinguishing systems provide warnings to anyone present in the extinguishing zone through acoustic and optical alarms, in order to evacuate the zone before the extinguishing process starts. Thus, these systems can also be used in areas that are accessed by people.

In addition to walk-in rooms (“room protection”), Oxeo also offers dependable protection for enclosed facilities, such as control or server cabinets or machine tools (“equipment protection”). The special prefabricated Oxeo compact assembling groups are particularly effective for this type of protection.

Know-how: Oxeo extinguishing systems offer all features of modern inert gas extinguishing systems – from 300 bar technology to the ConstantFlow option. In addition, the Viking DesignManager ensures that the system dimensioning is always performed in an optimal way.

Natural extinguishing with inert gases

Inert gases are excellent for extinguishing fires of fire classes A (solid matter), B (flammable liquid) and C (combustible gases). Furthermore, argon is the only extinguishing gas that is also suitable for class D fire (metal fires). In most cases, fires can be already effectively extinguished at an oxygen reduction to 13.8% by volume.

Nitrogen and argon are natural components of the ambient air and have no harmful impact on the atmosphere. No other gaseous extinguishing agent has a comparable environmental track record. Both gases are readily available nearly everywhere, since they are used for many other purposes besides extinguishing fire. This means that Oxeo extinguishing systems that use pure nitrogen or pure argon can be readily refilled at minimal expense after activation and are quickly operational again.

Regardless of the inert gas that is being used – argon or nitrogen or as mixed gases – with Oxeo extinguishing systems, the system technology is always the same.

The right inert gas for each type of risk

Nitrogen

The natural atmosphere contains nitrogen at 78.1% by volume, with a density of 0.967 : 1 compared to air. Nitrogen thus has a similar density to air, which permits nitrogen to disperse optimally throughout the extinguishing zone and to maintain an extinguishable inert gas concentration over a particularly long period. This qualifies nitrogen as a universal extinguishing agent for a broad range of applications.

Argon

Argon is a noble gas obtained from the ambient air and present in the natural atmosphere at 0.93% by volume. Its density compared to air is 1.38 : 1. As argon is considerably heavier than air, it is particularly suitable for spaces such as false floors that are less well insulated in their upper part. Due to its high degree of inertia (“true” inert gas), argon is also especially suitable for metal fires.

Mixed gases

Mixed gases – containing both nitrogen and argon, and optionally small amounts of carbon dioxide – may also be used in Oxeo extinguishing systems. Typical mixed gases for the use in inert gas extinguishing systems are IG 55, consisting of 50% nitrogen and 50% argon, as well as IG 541, consisting of 52% nitrogen, 40% argon and 8% carbon dioxide.

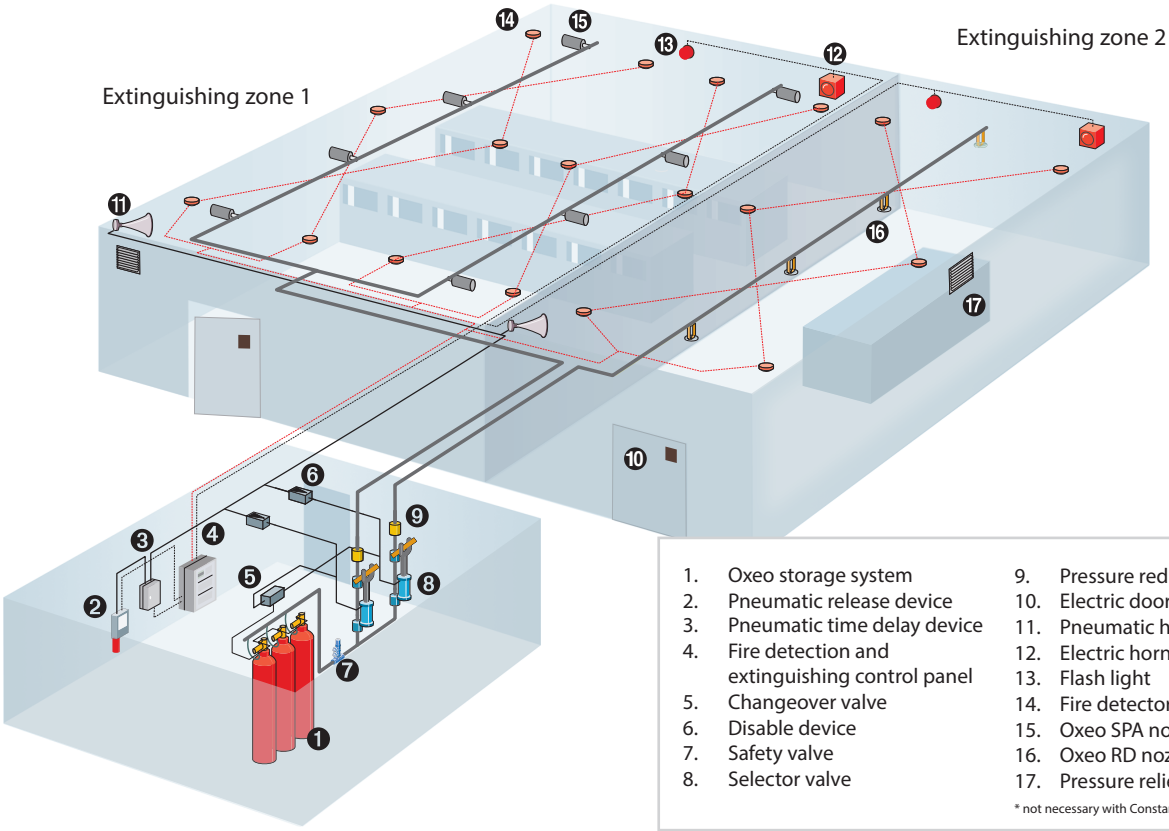
Structure and function

Oxeo extinguishing systems are subdivided into one or more extinguishing zones with corresponding zone partitioning, the extinguishing gas storage, along with the fire detection and extinguishing system control panel.

Zone distributor for 5 extinguishing zones

Extinguishing zones and zone subdivisions

A pipe network with Oxeo extinguishing nozzles runs through the protected areas. The dimension of the pipe network and the arrangement of the extinguishing nozzles are determined by the protected risk. In spaces with very high ceilings, the nozzles are installed at two or more levels. To protect enclosed equipment, the pipe network is generally located outside the protected equipment. The Oxeo extinguishing system offers a series of special extinguishing nozzles for a range of different applications. Oxeo extinguishing systems can be designed as a single-zone system for the protection of a single extinguishing zone, or as a multi-zone system for the protection of two or more extinguishing zones. Multi-zone extinguishing systems are equipped with selector valves that can be activated in the event of a fire via the fire detection and extinguishing control panel, ensuring that the extinguishing gas is only released in the extinguishing zone that is affected by the fire. When multiple rooms with a similar size within one protected facility are to be protected with an inert gas extinguishing system, a multi-zone system is particularly effective at providing cost benefits as not every individual extinguishing zone requires its own extinguishing gas storage.



1. Oxeo storage system
2. Pneumatic release device
3. Pneumatic time delay device
4. Fire detection and extinguishing control panel
5. Changeover valve
6. Disable device
7. Safety valve
8. Selector valve
9. Pressure reducer *
10. Electric door release unit
11. Pneumatic horn
12. Electric horn
13. Flash light
14. Fire detector
15. Oxeo SPA nozzle
16. Oxeo RD nozzle
17. Pressure relief flap

* not necessary with ConstantFlow

Extinguishing gas storage

The extinguishing agent is stored in high-pressure gas cylinders, which are then used in combination, enabling both the optimization of available space and extendibility of the Oxeo storage system. The filling pressure of every single cylinder is constantly monitored for leakage with pressure gauges and the results are displayed. Any error messages are transmitted to the fire detection and extinguishing control panel. This means that the quantity of available gas is constantly under control.

The required quantity of extinguishing gas to be stocked depends on the fire hazard and the size and nature of the protected facility. The modular structure of the Oxeo storage system permits perfect adaptation to the customer's individual needs and local conditions and offers maximum flexibility, especially for system modification or extension.

FMZ 5000 fire detection and extinguishing control panel

Fire detection and extinguishing system control

Oxeo extinguishing systems are controlled and monitored by the tried and tested Viking fire detection and extinguishing control technology. This ensures perfect compatibility, backed up by the appropriate approvals, of electrical and mechanical system components. Unnecessary coordination costs and efforts or interface problems between different parts of the system are thus avoided.

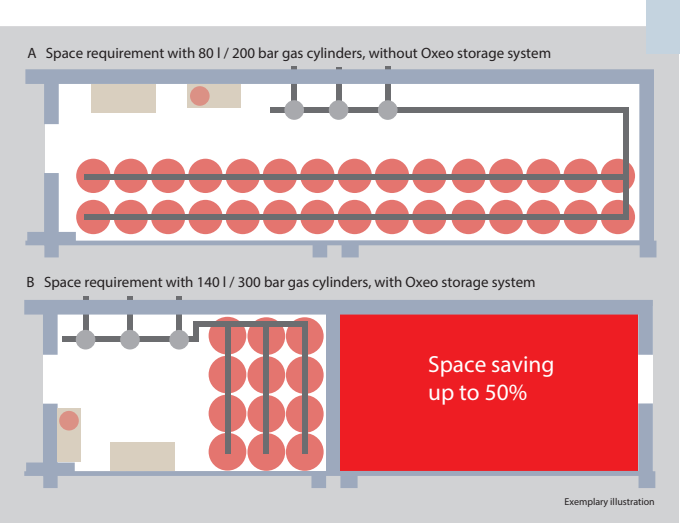
The extinguishing zones are continuously monitored by smoke, heat and/or flame detectors. In the event of a fire, these detectors transmit a signal to the FMZ 5000 fire detection and extinguishing control panel. The panel then activates the Oxeo extinguishing system and, in the case of multi-zone systems, the relevant selector valve. At the same time, it triggers an acoustic and optical alarm, which urges anyone present in the zone to leave the room concerned, and simultaneously sends a signal to a permanently manned station. Once the individually defined pre-warning time expires, the actual extinguishing process starts. This means that the extinguishing gas is delivered to the extinguishing zone by means of the pipe network and emitted from the extinguishing nozzles thus displacing the oxygen from the source of the fire.

The Oxeo storage system

Compact and space saving extinguishing agent storage

Oxeo extinguishing systems enable a remarkably compact and space-saving supply of extinguishing gas.

In Oxeo extinguishing systems, the inert gas is stored in gas cylinders with a volume of 140 litres, at a charging pressure of 300 bar. A large volume and high charging pressure enable the storage of large quantities of inert gas per cylinder, so only a few gas cylinders are required for the supply. In addition, the cylinders can be set up very compact.



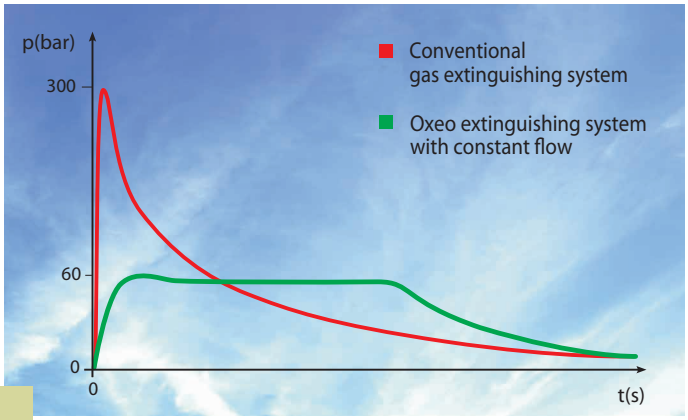
The possibility to arrange the gas cylinders in multiple rows and to adapt the cylinder setup to the premises creates additional flexibility for the inert gas storage. As a result, Oxeo extinguishing systems require up to 50% less space for the extinguishing gas supply than inert gas systems with 80 l / 200 bar gas cylinders and a conventional supply system.

Through the use of Oxeo extinguishing systems, a smaller space for the extinguishing agent supply can be planned in new buildings, which will lower construction costs. In existing buildings, on the other hand, the use of an inert gas extinguishing system often only becomes possible at all thanks to the space-optimized inert gas storage.

ConstantFlow

For a constant stream of extinguishing agent without pressure spikes

Oxeo ConstantFlow Technology operates with high-performance pressure regulators mounted directly on the gas cylinder valves. At the start of the extinguishing procedure, the operating pressure is thus already reduced to a maximum of 60 bar at the output of the gas cylinders. In addition, a constant stream of extinguishing agent is created without a pressure spike. In conventional inert gas extinguishing systems, on the other hand, the gas escapes from the cylinders into the pipe network at the beginning of the extinguishing process with a charging pressure of up to 300 bar. This creates a pressure spike at the beginning of an extinguishing process as well as a heavy stream of extinguishing agent that rapidly decreases with the duration of the flooding.



A constant extinguishing agent flow without pressure peak – thanks to the Oxeo ConstantFlow technology

When using Oxeo ConstantFlow technology the connected pipeworks and system components need only to be designed for the low pressure level of 60 bar maximum, which can provide considerable cost savings in many cases.

Together with the special nozzles with SPA sound absorbers, the constant stream of extinguishing agent without a pressure spike enables a "soft flood" in the event of fire. The softer flooding process reduces vibrations within the protected equipment and is notably gentle on particularly sensitive equipment, such as rotating hard drives in server rooms and data centers.

Cylinder valve with high-capacity pressure regulators used for the Oxeo ConstantFlow technology

A further, often crucial benefit: Thanks to the constant stream of extinguishing agent in Oxeo extinguishing systems with ConstantFlow, pressure relief flaps can turn out to be 60% smaller than in conventional inert gas extinguishing systems.

Pressure relief

Flooding a room with gas always creates over pressurization of the room. This may cause damage to doors, ceilings and walls, unless suitable counter-measures are taken. To negate this effect, a pressure relief flap corresponding to the expected flow of extinguishing agent is usually installed in the protected room when the gas extinguishing system is installed. This flap opens when a pre-determined room pressure is reached, allowing the air displaced by the gas to escape directly to the exterior.

Nozzles

For all applications

Different requirements and installation situations, for both room and equipment protection, demand individual nozzle designs: RD, SPA, ARGE and DD nozzles of the Oxeo extinguishing system supply the inert gas, at the right time and in the required volume, to the extinguishing zone, with even gas dispersion in the zone to achieve the desired oxygen displacement.

RD nozzles – Robust and flexible

RD nozzles are the ones most frequently used in Oxeo systems for room protection. They are also suitable for harsh ambient conditions. In addition to the conventional 1/2" nozzle, the Oxeo extinguishing system also offers RD nozzles in 3/4". 3/4" RD nozzles enable the delivery of extinguishing agent that is twice as high as that of the 1/2" nozzles. This means that up to 50% fewer extinguishing nozzles are required and the pipe network can be designed more flexibly.

SPA nozzles – Soft flooding

In combination with the ConstantFlow technology, the special SPA nozzles with sound absorbers enable a "soft flooding" in the event of a fire: During the emission of the inert gas, the sound pressure level is significantly reduced and the flooding process with the Oxeo extinguishing system is generally far gentler. In this way the equipment is protected against strong vibrations and particularly sensitive facilities, such as rotating hard drives in server rooms and data centers, are less subject to harmful impacts.

DD nozzle - Flush mounting

DD nozzles of the Oxeo extinguishing system are designed for flush mounting, for example in the housings or panels of protected facilities. The nozzles are equipped with threading on the input and output side, so that they can be mounted quickly and easily to the enclosure from the outside.

ARGE nozzles – finely dosed

When fighting fires in control cabinets and other small enclosed equipment or in very small rooms, it is necessary to emit the inert gas in small accurately metered doses. For this, the Oxeo extinguishing system offers ARGE nozzles made of stainless steel, in which particularly small nozzle holes enable an extremely fine emission of extinguishing agent.

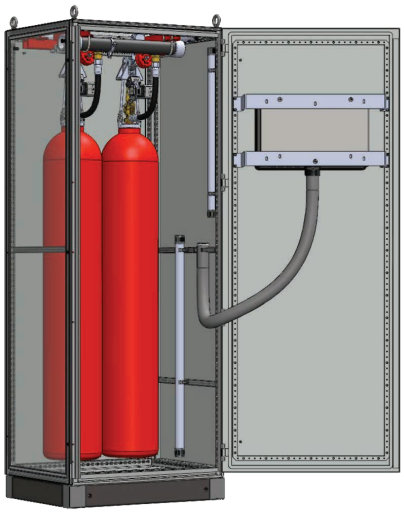
Oxeo compact assembling groups

Prefabricated for equipment protection

The Oxeo extinguishing system offers prefabricated compact assembling groups for the protection of smaller enclosed equipment, such as control or server cabinets or machine tools.

In compact assembling groups, all key components are combined in a cabinet to form a single unit that offers protection against dust and moisture or mechanical stress. The cabinet contains a rack with one or two extinguishing gas cylinders, an electronically monitored leakage indicator and an electromagnetic extinguishing agent activation device.

A fire detection and extinguishing control panel integrated in the front door activates the extinguishing unit in the event of a fire. To connect the pipe network including Oxeo extinguishing nozzles as well as the cable lines to the fire detectors, standardized connections on the compact assembling group are available.



Compact assembling groups can be placed in the immediate vicinity of the protected equipment and thus enable short distances for pipe networks and cables. Their prefabrication also ensures a very quick and easy installation of the Oxeo extinguishing system.

Optimum design

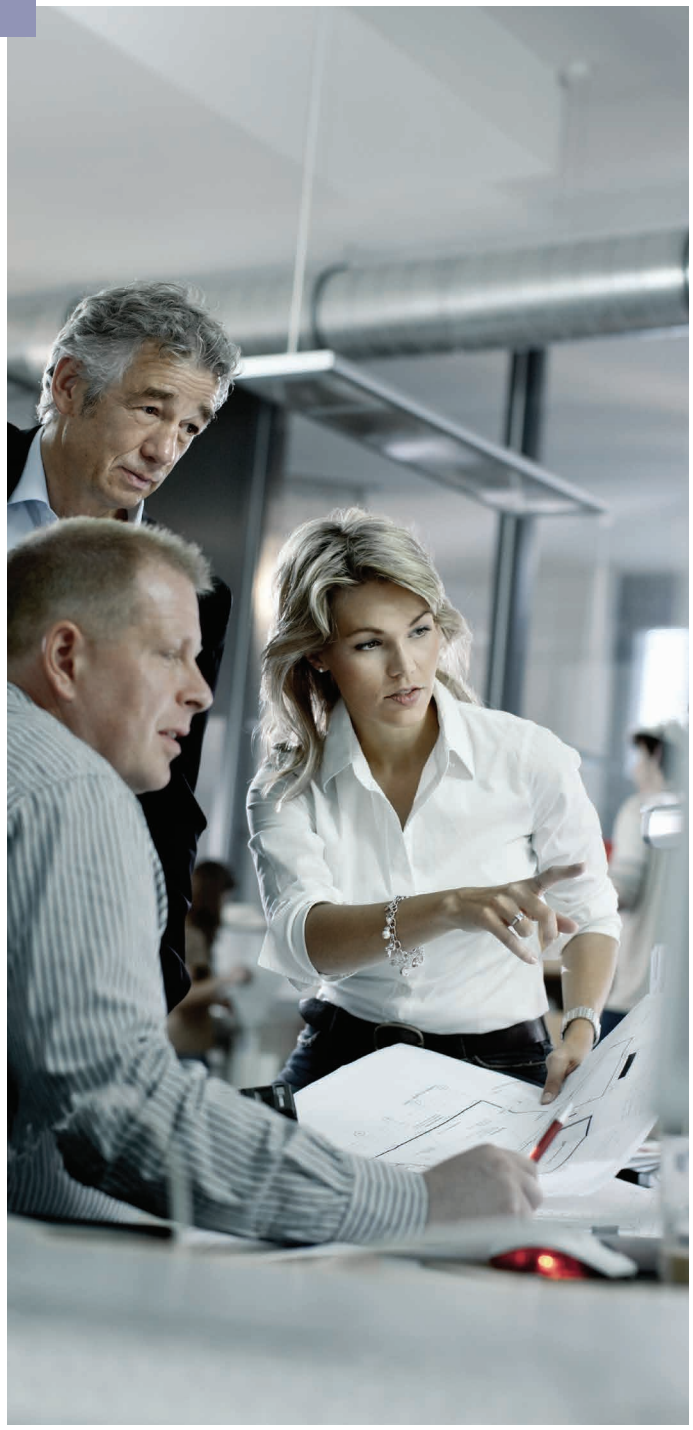
Viking DesignManager

Oxeo extinguishing systems are designed for specific projects with the Viking DesignManager. This calculation programme has been developed on the basis of theoretic research work, which has been verified in numerous flow tests on extinguishing system models.

Thanks to the calculation accuracy of the Viking DesignManager, extinguishing systems can be optimally designed - both as regards safety systems and from an economic perspective: the designed extinguishing systems have been proven to be dependable and effective.

The designed extinguishing systems are proven to be dependable and effective. 1/2" or 3/4" nozzles, 200 bar or 300 bar technology, single or multi-zone systems, with or without ConstantFlow - the Viking DesignManager will always find the ideal system version and solution for each project.

An interface to the AutoCAD software integrated into the Viking DesignManager makes it possible to conveniently carry out the calculations and to import the corresponding results into the project documents and system records afterwards.



Applications

A class on its own

Oxeo extinguishing systems are ideally suited for the protection of specific hazard areas with flammable liquids and other hazardous materials, such as painting systems, and for zones with spraying obstructions such as paternoster storage. The argon extinguishing gas can even be used to extinguish metal fires.

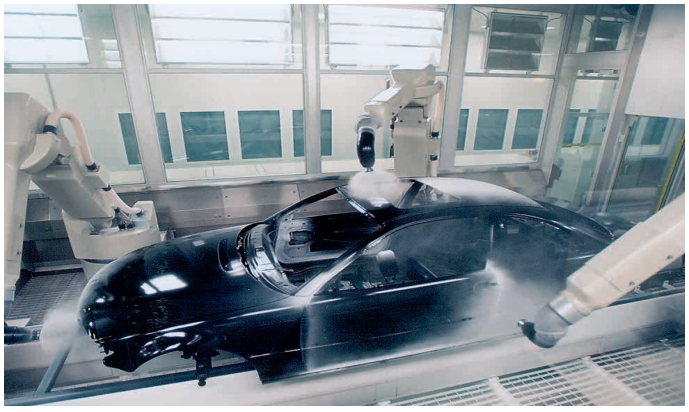
Since inert gases are non-conductive and do not leave any residues, Oxeo extinguishing systems are always an excellent choice for protecting valuable goods or irreplaceable cultural assets against fire or to avoid long, costly operational downtimes of electrical or electronic equipment.

All system variants and options of the Oxeo extinguishing systems are tested and approved by VdS Schadenverhütung. The system has also been listed by UL and approved by other international certification bodies.

Examples of use:

- Control systems, control rooms and control cabinets
- Control stations, operation and control rooms
- Data center, server rooms and server racks
- Building services rooms
- Painting and powder coating systems
- Storage facilities for hazardous substances and flammable liquids
- Paternoster storage
- Machine tools
- Museums, archives

In addition to room protection for areas that are accessed by people, Oxeo extinguishing systems are also suitable for protection of enclosed equipment.



Benefits

At a glance

There are numerous reasons to choose an Oxeo inert gas extinguishing system from Viking:

- Excellent extinguishing effect even in special hazard zones and in areas with high or concealed fire hazards
- The inert gases used are non-conductive and leave no residues – this makes them ideal for the protection of highly valuable and sensitive equipment
- In the concentration required for the extinguishing, the inert gases used are non-toxic and therefore suitable for zones that are frequented by people
- Nitrogen and argon are natural components of the ambient air – no harmful impact on the atmosphere
- Nitrogen and argon are available almost everywhere – quick and cost effective reactivation after operation
- Cost-effective multi-zone systems with common extinguishing gas storage can be implemented for several extinguishing zones
- High degree of flexibility for modification or extension measures, thanks to the Oxeo storage system
- The Oxeo technology enables a more compact storage of the extinguishing agent, requiring up to 50% less space
- ConstantFlow technology ensures a constant flow of the extinguishing agent in the event of a fire – this permits the use of pressure relief flaps that are up to 60% smaller
- The Viking DesignManager will always find the ideal system version and solution for each project

For further information, please contact your local Viking sales office or refer to the technical documentation.
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