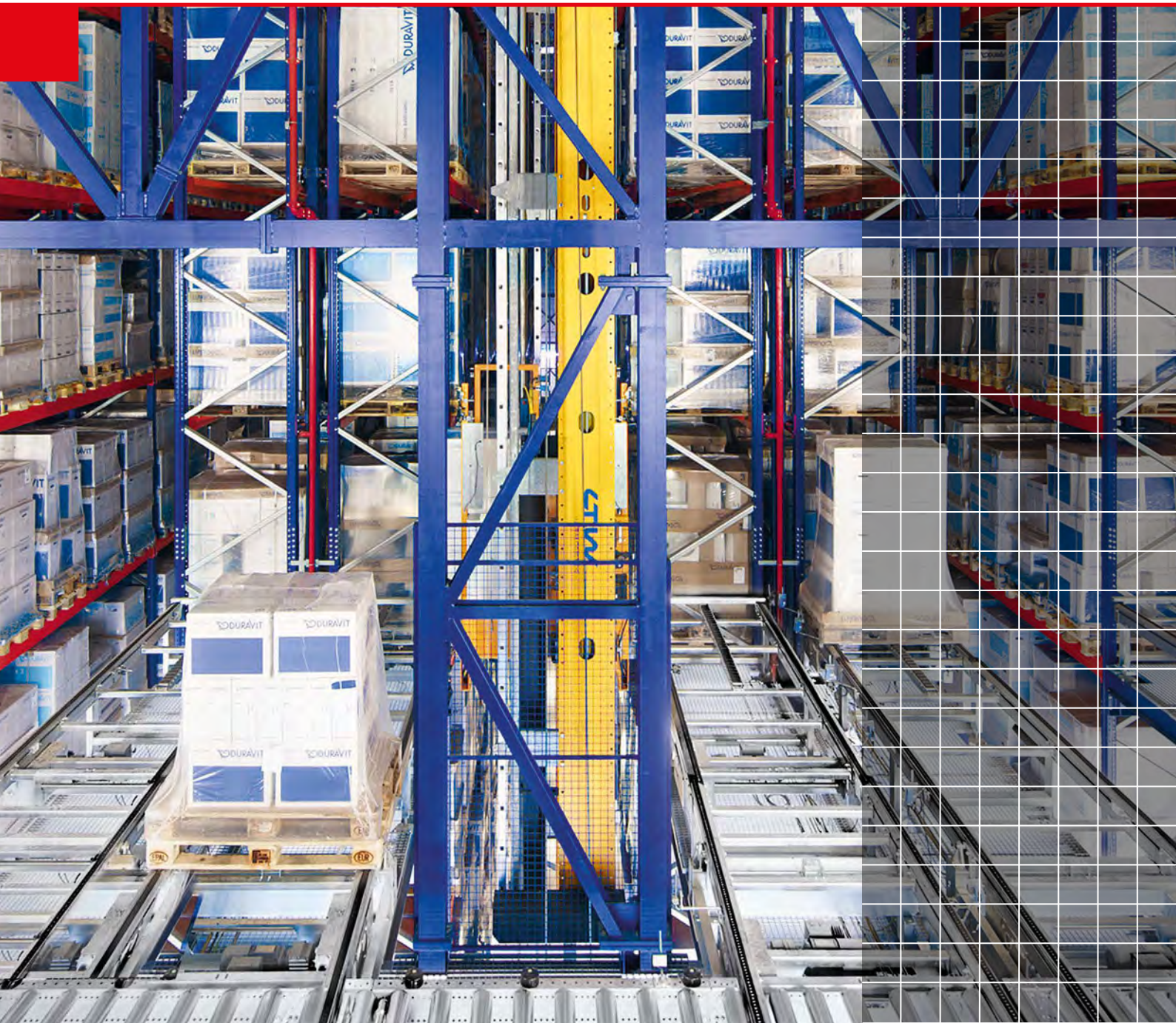
Experts in fire protection

MINIMAX

Fire protection solutions for warehouses and logistics centers



BRANCH SOLUTIONS

LOGISTICS

Goods and assets - just in time

In recent years, logistics services have continuously grown in importance for the success of businesses. This is due to the globalization of the markets and supply chains, the evolution from a production-oriented to a service-oriented society, the decrease of product life cycles and the integration of information and communication technology into the process chain. Only when the latter works without disruption from start to finish can "just in time" also function.

More than one third of all large-scale fire damage in commercial operations and industry occur in storage and logistics areas. Logistics businesses characteristically store large amounts of goods - and thus a high volume of assets - in a comparatively small area. The total sum of fire risks and the quick spreading of fire combine to form extreme hazard potentials. As a result, a fire can quickly threaten the survival of an entire business. Especially in the field of storage and logistics there are numerous crucial criteria for the selection of the best type of fire protection. In a first step, the various storage types - from high rack storage to vertical rotary racks - must be distinguished. The type of moved and stored goods also plays a significant role, since these may differ greatly in their composition and characteristics. Special risks, such as the storage of paper rolls or tires, often require specific fire protection solutions. And finally, the commissioning area, the server room and other peripheral areas have to be taken into consideration.

Flames, smoke, fire gases, heat – a fire has many faces. Minimax has the right fire detectors for the different areas within logistics centers. Their signals converge in the fire detection and extinguishing control panel, which alerts persons in danger and the fire service. In addition to this the Minimax control panel monitors the installed fire protection systems for function and electrically activates those extinguishing systems, such as *sprinkler systems**, that do not possess their own release elements.

A sprinkler system provides comprehensive building protection in a logistics centre. Minimax has a wide range of sprinkler types and special sprinklers which allow an ideal adjustment of the sprinkler system to the particular conditions of use in the individual protection zones.

All alarm- and status messages from the fire protection systems installed by Minimax and from other components can be visualized on screen via the Inveron risk management system.

* *Technologies are explained on pages 16 to 18.*

Structural fire protection and technologies from Minimax Mobile Services, such as fire extinguishers, *hydrant systems** and *smoke- and heat venting systems* round off fire protection in logistics centers.

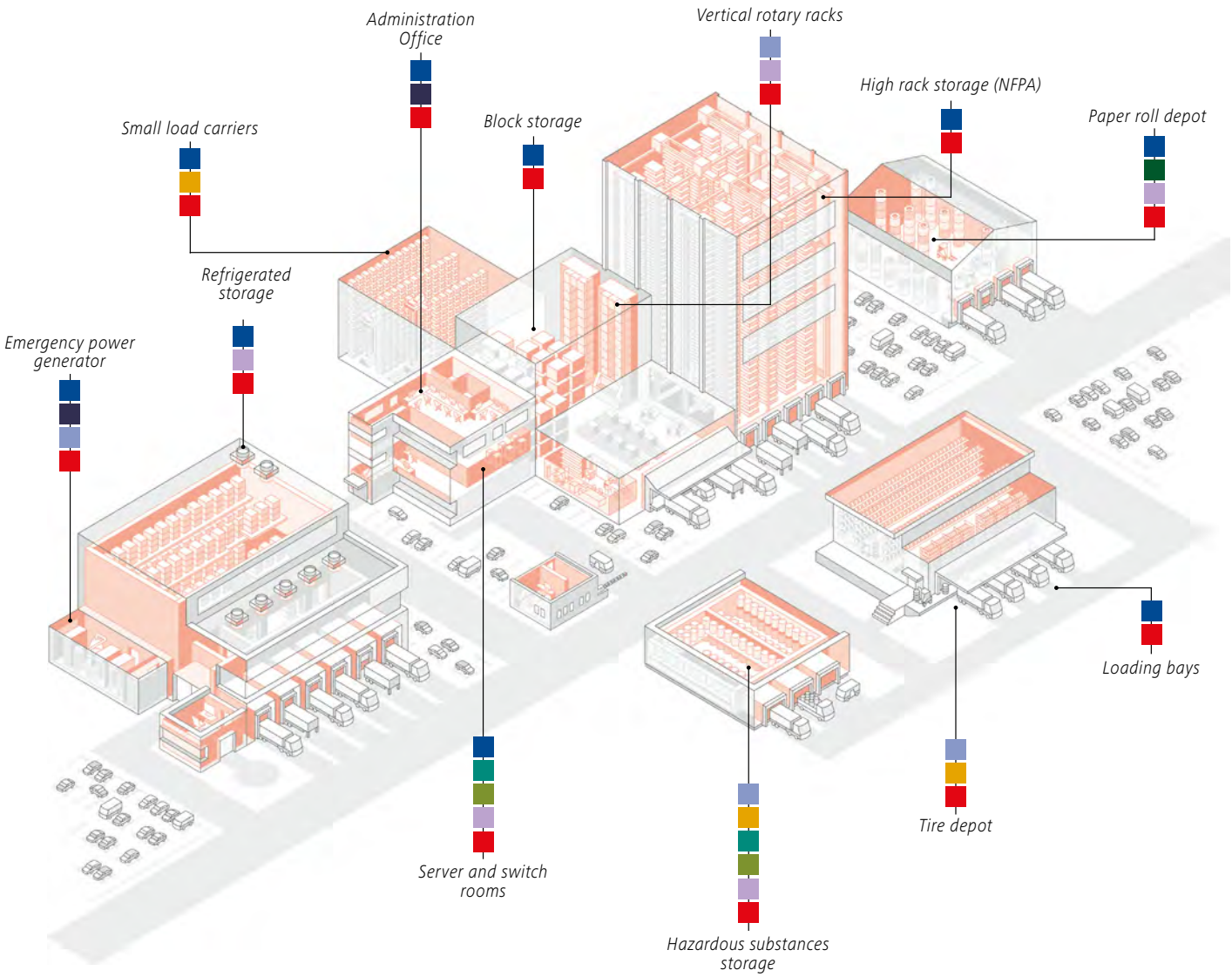
Areas with special fire risks or conditions of use require - as a supplement to or instead of the sprinkler system - a customized area- or local application system.

Therefore other fire protection systems also come into operation in logistics centers:

- *water spray systems**
- *foam-based suppression systems**
- *Minifog water mist suppression systems**
- *Oxeo inert gas extinguishing systems**
- *MX 1230 fire extinguishing systems**
- *Oxeo EcoPrevent oxygen reduction systems**

Protection zones

Optimal fire protection in warehouse buildings and for logistics centers requires specialist solutions for each area to prevent the loss of valuable assets or operational interruptions that can threaten the existence of the business. Minimax can fall back on a unique range of proven and innovative fire protection systems and components. These meet the multifaceted requirements and fit extremely efficiently and economically into the basic configuration of the building protection for a total solution.



Sprinkler systems	MX 1230 fire extinguishing systems (NovecTM 1230)	Foam extinguishing systems
Water spray systems	Oxeo inert gas extinguishing systems (Ar/N_2)	Fire detection systems
Minifog water mist suppression systems	Carbon dioxide extinguishing systems	Oxeo EcoPrevent

High rack storage – safety for every slot

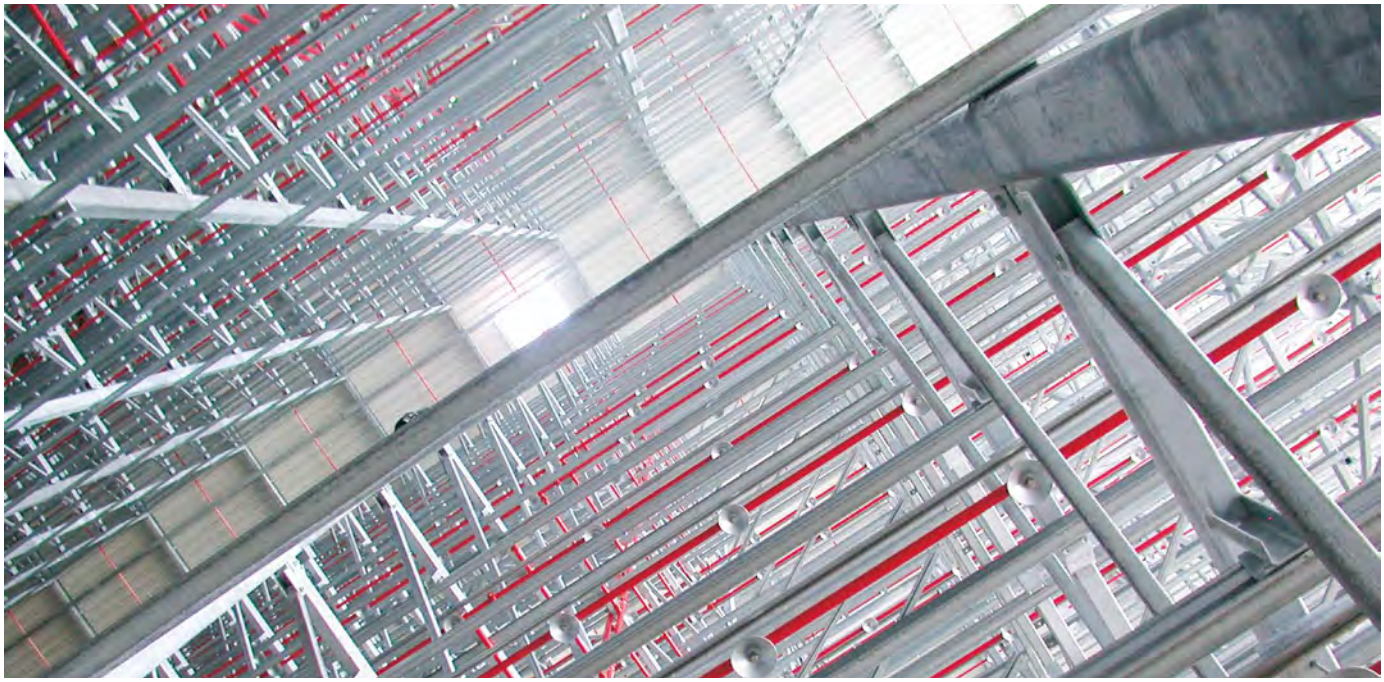
High rack storage shelves are up to 50 m high and are mostly designed for the intake of EURO-pallets. Their capacity ranges from a few thousand to several hundred thousand pallet storage positions. On a very small surface area, they offer space for an extremely large quantity of goods and products. Between every two rows of storage shelves there is an alley in which rack feeders move up and down.

Risks

- Rapid spread of fire in a vertical direction due to pallets stacked on top of one another
- Chimney effect, i.e. flames and hot fire gases are drawn upwards through the shafts

Fire protection

Sprinkler systems have proven to work well in high rack storage facilities. In the classical version, sprinklers are installed both under the ceiling and in the shelves. However, the installation of sprinklers in the shelves can be avoided by using ESFR (Early Suppression Fast Response) sprinklers. *Fire detection systems* for the early detection of fires are also used to supplement sprinkler systems in high rack storage facilities. In these cases, Minimax recommends the use of HELIOS AMX5000 aspirating smoke detectors with a vertical installation of the suction lines in the shelves and mounting the evaluation units in easily accessible locations. The advantage of such a solution over punctiform smoke detectors is, for example, that they can be serviced very easily without having to interrupt business operations.



Refrigerated storage – optimally protected

Refrigerated storage is widespread especially in the food industry and in the related, downstream commercial operations. The goods and products are stored for these purposes at temperatures of up to -40 °C. The necessary heat insulation often consists of non-flammable or flammable insulation materials with varying fire performance, in many cases also in the form of sandwich elements. Rack storage prevails in refrigerated storage facilities.

Risks

- Dry area encourages fire to spread rapidly
- Additional fire loading when flammable insulation materials are used
- Water deployed without antifreeze additives can freeze over very quickly.

Fire protection

*Oxeo EcoPrevent oxygen reduction systems** are the ideal solution for refrigerated storage facilities, since the conditions for their use – no permanent presence of people in the storage facility, a well-sealed building shell and very low infiltration of fresh air caused by bringing in and removing goods – are also required to maintain the desired temperature level. Moreover, they offer perfect protection for the storage of foodstuff that is sensitive to smoke and temperatures. Oxeo EcoPrevent oxygen reduction systems are mostly used in combination with HELIOS AMX5000 aspirating smoke detectors with a highly sensitive setting to ensure earliest fire detection. Heated aspirating outlets ensure their proper operation in refrigerated areas. Though Oxeo EcoPrevent can only prevent a smoldering fire from turning into an open fire, the fire and the cause of fire would remain permanently undetected in the absence of an earliest fire detection system. Alternatively, *sprinkler systems* can be installed in such conditions – ideally fitted with ESFR sprinklers. If there is a sufficiently spaced, non-frost intermediate area above the ceiling available, we recommend pendent Viking ESFR dry sprinklers. Combined with a Minimax PipeGuard Antifreeze system, sprinkler systems can be used in refrigerated storage facilities at a temperature of up to -40 °C.

Block storage facilities – goods tightly together without shelves

In block storage facilities, goods and products are stored in crates, boxes or pallets on top of each other and next to each other, piled up in blocks without using shelves. The individual blocks of a storage facility are often subdivided into smaller units - so-called cells. This in turn ensures a very dense arrangement of the storage units, and thus a very high rate of space and volume usage.

Risks

- Technical defects in the warehouse facilities
- Very high fire hazard, since goods and products are stored very densely.

Fire protection

As a rule, fire protection in block storage facilities can be ensured by using a *sprinkler system**.

In this case, the sprinklers – either conventional sprinklers or ESFR sprinklers, depending on the type of stored goods, packaging and the height of the building – are installed only in the ceiling. For block storage facilities, this system is supplemented by a HELIOS AMX5000 aspirating smoke detector for early fire detection. The suction lines of the aspirating smoke detector are installed under the ceiling, with sections descending down to evaluation units in easily accessible locations to facilitate maintenance works. A further advantage of the HELIOS AMX5000: Owing to very sensitive settings it is possible to compensate – at least in part – the fact that it is not possible to monitor the intermediate levels as in the case of high rack storage facilities.

Hazard substances storage – optimally protected

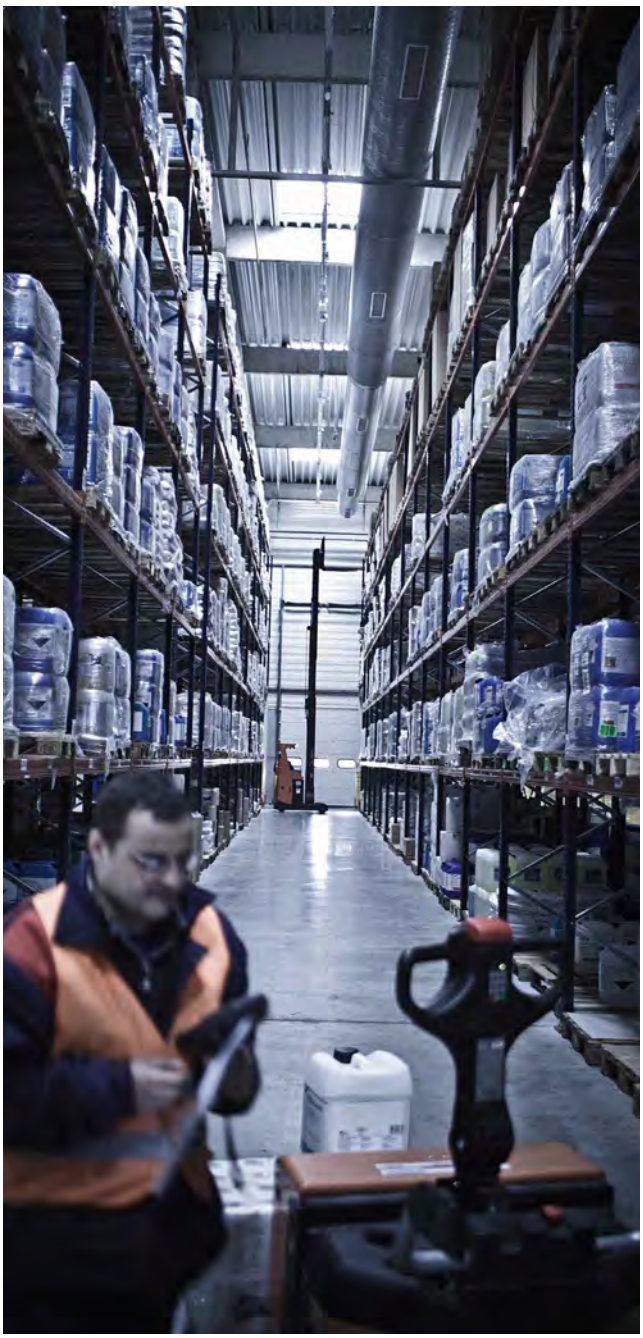
Hazardous substances are materials or mixtures that are explosive, combustible or damaging to human health or to the environment. Warehouses where such substances are stored have a great variety of typical designs; subject, however, to specific laws and regulations applicable to their construction. Such provisions require e.g., fall-safe storage, soil protection in the form of collecting reservoirs and extinguishing water retention systems as well as the prevention of operational sources of ignition.

Risks

- Rapid spread of fire
- Devastating consequences of a fire for people and environment

Fire protection

As a rule, the planned fire protection system for hazardous substance storage is determined in particular by the characteristics of the stored goods. Accordingly, nearly the full range of fire extinguishing systems is being used in such facilities. For this type of storage, *Oxeo inert gas extinguishing systems** is often the preferred solution: they extinguish fires quickly without leaving residues on the protected objects, and reactions between the burnt materials and extinguishants are precluded. Alternatively, *Oxeo EcoPrevent oxygen reduction systems** or *foam extinguishing systems** can be used. *UniVario flame* and *heat detectors* are often used in these cases.



Vertical rotary racks – rotating racks optimally protected

Vertical rotary racks are vertical, fully metal-plate encased rotating racks of up to 30 m in height, where all goods are typically moved over a single outlet for inserting or removing goods. Thus an ideal form of storage for small parts. They also offer the ergonomic advantage of moving the stored goods towards the operator, and not vice versa.

Risks

- Friction in the integrated drive equipment
- Ignition introduced into a narrow space
- Quick spread of the fire, since it is a closed system with a density of stored goods.

Fire protection

Minimax recommends the Viking protective system for automatically closed storage systems – a *deluge system** with special extinguishing nozzles that can be connected to a sprinkler system already in place. Alternatively, if the vertical rotary rack is particularly high, if particularly sensitive goods are stored in the racks or if the use of water may lead to extended business interruptions, an *Oxeo inert gas extinguishing system**, using nitrogen as an extinguishant, may be more appropriate. Using nitrogen, as opposed to other extinguishing gases, has the advantage that it is somewhat lighter than air and therefore escapes – in the event of a fire – gradually via the low-lying outlet for inserting or removing goods after the rack system has been flooded. For both fire protection systems, we recommend combining it with the *HELIOS AMX5000* aspirating smoke detector system.

Small and large load carriers – keeping plastic crates safe from fire

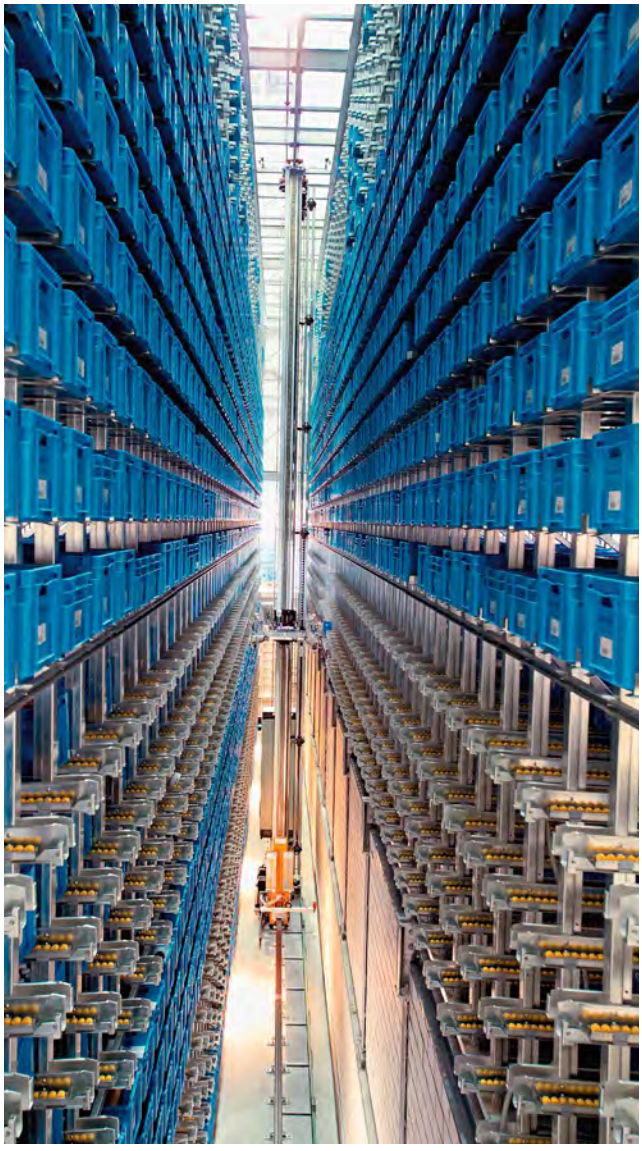
Very often the small and heavy load carriers used to store and transport goods for industrial purposes are made of plastic. While small load carriers (SLC) are very often used in automatic high rack storage facilities, heavy load carriers (HLC) are rather used in block storage facilities.

Risks

- Chimney effect, the air ducts formed by stacking the stored goods drawing the flames and gas emission upwards like in a chimney.
- Limited ability to wet the crates with water due to the blocking effect of storage and transport containers stacked on top of one another
- High fire loading due to large quantity of stored goods in a narrow space

Fire protection

In principle, the same fire protection systems described for high rack and block storage facilities can be used in these cases too. However, if a *sprinkler system** is used, we recommend using a film-forming foaming additive to enhance the dampening effect on SLCs and/or HLCs. When using SLCs in automated high rack storage facilities, *Oxeo EcoPrevent oxygen reduction systems** combined with earliest fire detection features of HELIOS AMX5000 aspirating smoke detectors often present an interesting alternative.



Paper roll storage – keeping pulp stored safely against fire

As a rule, paper rolls are stored in block storage facilities. Some warehouses are equipped with mechanical gripping systems - in other words, automatic paper roll depots.

Risks

- Chimney effect via shafts between the rolls of paper
- The use of water as an extinguishing agent is impeded in cases where absorbent sanitary paper is stored.

Fire protection

In principle, the same fire protection systems described for block storage facilities can be used in these cases too. Protection concepts based on ESFR sprinklers or, in the case of high-rise warehouses, a carbon dioxide extinguishing system are viable alternatives for situations where the storage of absorbent sanitary paper prevents the use of water-based fire extinguishing systems. In this case, too, carbon dioxide has the advantage – compared to other extinguishing gases – that it is also suitable for fighting deep seated fires. In large-dimension storage areas that require large quantities of carbon dioxide, we recommend using low-pressure containers to store the extinguishant for cost reasons. For automatic paper roll depots *Oxeo EcoPrevent oxygen reduction systems** are an alternative. Activation is via a *fire detection system**, HELIOS AMX5000 aspirating smoke detectors allowing early detection.

Tire storage – high-energy items

As a rule, tires are stored in block storage facilities. However, sometimes they are stored in transport pallets designed specifically for the storage of tires.

Risks

- Defects in warehouse facilities or small appliances
- High fire loading due to large density of many tires in a narrow space

Fire protection

In view of the limited ability to wet the tires and the risk of a very fast development and spreading of the resulting fire, this fire risk is best addressed with a *deluge system** with a film-forming foaming additive or a *foam extinguishing system**. In this regard, Minimax offers a variety of protection concepts designed for individual storage conditions, e.g. the use of open large drop sprinklers. The release of the extinguishing system is via a *fire detection system** using intelligent *UniVario flame- and heat detectors**.

Server rooms – preventing data loss

Server rooms take on an important function in logistics operations. This is where merchandise data is stored and processed. If this sensitive data is destroyed by fire, this can have serious economic consequences for a logistics operation.

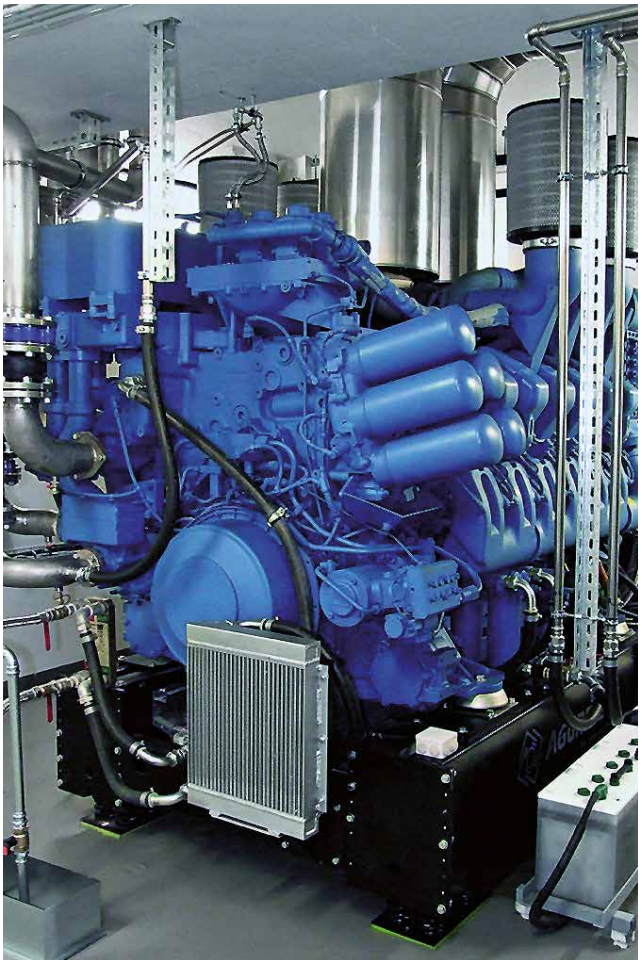
Risks

- Overheating of the equipment
- Faults such as short circuits
- Significant damage even with small fires

Fire protection

For small to medium server rooms the *MX 1230 fire extinguishing system** offers the ideal solution. It uses the innovative extinguishing agent Novec™ 1230 to extinguish without leaving a residue and requires little space. *Oxeo extinguishing systems** are ideally suited for larger server rooms. The extinguishing system is automatically activated by means of the earliest possible detection via the HELIOS AMX5000 smoke aspiration system.

Emergency power units – securing power supplies even in the event of fire



Emergency power units are often accommodated on separate premises. These ensure the power supply in the event of a power failure, keep the business running and prevent financial damage from operational downtime.

Risks

- Diesel fuel igniting on hot surfaces
- Lubricating oil escaping via leakages

Fire protection

Minifog ProCon water mist suppression systems are suitable for the local protection of the emergency power unit. These can be connected to the sprinkler systems installed for the protection of the building and quickly and efficiently fight the fire by means of open water mist nozzles. The Minifog ProCon water mist suppression system is activated by a *fire detection system**, which uses *UniVario flame- or heat detectors** for fire detection.

Recreational- and office spaces – dependably protected

Employees and visitors regularly visit offices, conference rooms and dining rooms. In addition break- and smoking areas and small kitchens allow staff to take a break. Corridors run through the entire building as the main thoroughfare.

Risks

- Defects in electrical equipment such as projectors or computers
- Overheating lighting equipment
- Short circuits in drinks machines

Fire protection

Minifog EconAqua water mist suppression systems offer space- and water-saving protection and can be connected to an existing *sprinkler system**. In higher premises building protection in the form of a sprinkler systems ensures reliable fire protection. *Fire detection systems** are a sensible complement to fire detection and activation of Minifog EconAqua water mist suppression systems. *Hydrant systems** and *smoke- and heat venting systems** complete the protection of the building.

Technologies used

Whether it's sprinkler systems, gas extinguishing systems, fire prevention systems or fire detection systems - Minimax can fall back on a unique range of tested and certified components and systems from its own development- and production facilities.

Fire detection systems –
detecting fire risks and reacting accordingly

Flames, smoke, fire gases, heat – a fire has many faces. Minimax has the right detectors and fire detectors for every kind of appearance. All signals run together into the fire detection control unit, which alerts persons at risk and the fire service as well as reliably providing the competent authorities with all relevant information. In addition to this, in many cases all fire protection systems on the property are controlled and monitored for functioning via the fire detection technology, in particular the electric release of the extinguishing systems.

Hydrant systems –
ready for action at all times

Wall- and external hydrants are only the visible end of a reliable extinguishing water supply for the fire services, operator personnel or building users to manually attack the fire. Behind them are reliable water supply components such as pump systems, underground pipeworks and filling and draining stations which are also adapted to the local conditions. These components ensure that the hydrants are reliably supplied.

Minifog water mist suppression systems:
Extinguishing with water mist

The innovative and efficient Minifog fine water spray systems provide a highly efficient fire protection for certain applications, while reducing water consumption at the same time. In warehouses and logistics centers, such water mist extinguishing system are used in certain peripheral areas, such as office and administrative areas or for emergency power units operated with diesel fuel.

MX 1230 fire extinguishing systems –
maximum security for server rooms

MX 1230 fire extinguishing systems using the innovative extinguishant Novec™ 1230 by 3M™ were specifically developed for rooms containing electrical and electronic equipment. These systems, too, extinguish fires without leaving residue on the protected objects, while ensuring a high level of personal and environmental protection at the same time. An additional benefit of MX 1230 fire protection systems is the very small space required for the storage of the extinguishant.

Oxeo inert gas extinguishing systems –
extinguishing without leaving residues

Oxeo extinguishing systems ensure a reduction of the oxygen content in the event of a fire, by introducing inert gases such as argon or nitrogen into the protected area. By displacing the oxygen, the fire is extinguished rapidly and without leaving any residue of extinguishant. Therefore, Oxeo inert gas extinguishing systems are especially suitable for the protection of high-quality systems, sensitive equipment or valuable assets that might be damaged by the use of non-gaseous extinguishants. Argon and nitrogen are natural components of the ambient air. Moreover, the gases are non-toxic and electrically non-conductive.

Oxeo EcoPrevent oxygen reduction systems –
“fireproof” atmosphere

Minimax fire prevention systems lower the air oxygen content in the protected area via the deliberate introduction of nitrogen to the extent that a "fire-safe" atmosphere occurs. This way a fire cannot occur at all. Depending on the fire prevention system used, the “fireproof” atmosphere is built up either permanently or as required. All versions of the Oxeo EcoPrevent product family use nitrogen for fire prevention and thus prevent fires without leaving any residue at all.

Smoke- and heat venting systems –
breathe deeply and have a clear view

Smoke- and heat venting systems keep escape- and rescue routes free in the event of fire. The system is manually or automatically activated by heat- or smoke detectors. Pneumatic or electric drives open skylights, windows or other smoke- and heat venting appliances. In the event of fire this guarantees clear views and direction as well as fresh air for breathing. Explosive flashovers are also prevented.

Foam extinguishing systems –
wide-area dampening

Minimax foam extinguishing systems are in many cases an interesting alternative for warehouses intended for the storage of hazardous substances, of flammable liquids and in certain special risk areas. The foam added via the automatic extinguishing system dampens the stored goods extensively, thus compounding the smothering effect.

Sprinkler systems –
universal protection

Sprinkler systems detect and report fires and automatically initiate the extinguishing process with water. In doing so they make the principle of selective extinguishing extremely efficient: In the event of a fire, only the sprinklers located in immediate proximity to the fire source will be activated. Immediate extinguishing action using water is taken, while the remaining sprinklers remain closed. Sprinkler systems offer reliable fire protection for buildings and industrial systems. For particular fire risks a film-forming foam compound can be added to the extinguishing water to increase extinguishing efficiency.

Water spray systems –
quick and comprehensive

Water spray systems are hydraulically, pneumatically or electrically released and distribute extinguishing water across the whole protection zone via open nozzles. This way they reliably fight fires in areas and on equipment, even when dealing with a particularly rapid spread of fire. A film-forming foam compound can be added to the extinguishing water as needed. Water spray systems are also installed to prevent the spread of fire to adjacent areas by use of water spray curtains or to use sprinkling to cool especially endangered equipment.

UniVario industrial fire detector –
adapted for every situation

UniVario industrial fire detectors are intelligent, platform-based, microprocessor-controlled fire detectors with robust housing- and installation technology for the most extreme conditions. Thanks to their modular concept and use of the latest signal processing technology these devices meet individual specifications in an unusually wide range of uses. Thus they function both indoors and outdoors, in immediate proximity to the equipment to be protected or from greater distances, in sterile clean room areas as well as under extremely contaminated processing conditions.

About Minimax

Minimax has been one of the leading brands worldwide in fire protection for more than 110 years. Qualified and certified staff plan and install modern fire protection systems - in Germany, Europe and the whole world. With its comprehensive service range, Minimax is also at your disposal after installation.

Technologies

Whether it's sprinkler systems, gas extinguishing systems, fire prevention systems or fire detection systems - Minimax can fall back on a unique range of tested and certified components and systems from its own development- and production facilities. Our claim: Minimax quality from the simple fire extinguisher to the complex extinguishing system. Intensive development work carried out in our fire protection research centers ensures that the company will continue to develop advanced technologies well into the future.

Solutions

Recycling businesses or power stations, sales outlets, ships or logistics centers - every industry, every property and every application requires different fire protection solutions. Our expert teams have many years of experience and support each project individually in order to meet the requirements of authorities, insurers and operators while taking into account applicable guidelines. From the engineering of the fire protection system, via project management right up to installation and commissioning, with Minimax you're on the safe side.

Service

Regular inspection- and maintenance work are the prerequisite for ensuring that a fire protection system remains functional in the long term. The Minimax service team offers the necessary security via its professional execution of all inspection-, maintenance and repair work. In addition to system servicing, we offer specific measures and programs exist to ensure that all your fire protection systems continue to function correctly and correspond to the latest technological developments even after years on standby.

Some of our references

Minimax can fall back on a unique range of proven and innovative fire protection systems for all areas. These meet the multifaceted requirements of a logistics operation and combine extremely efficiently and economically into a total solution.

Fire protection solutions for

- High rack storage (NFPA)
- Refrigerated storage
- Block storage
- Hazardous substances storage
- Vertical rotary storage
- Small and large load carriers
- Paper roll storage
- Recreational- and office spaces
- Emergency power generators

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