

Fire protection in industrial construction

Product solutions for structural fire protection. With application examples





Fire protection in industrial companies

Fires frequently lead to serious personal injuries and damage to property. According to the insurance industry, in Germany, the damage caused by fire runs into billions.

Apart from the material damage caused by a fire, in industrial companies, lengthy downtimes frequently cause consequential damage that is not to be underestimated, such as loss of market shares or the departure of qualified employees.

The economic success of companies depends, among other things, on ensuring damage-free operation. The risk of fire in the company can be countered effectively through preventive fire protection measures.

The causes of fires range from technical defects in electrical installations, to human error, overheating through to arson. Statistics show that roughly one in three fires are caused by "electricity". With approx. 33%, this accounts for the largest share in the statistics.

For industrial companies, apart from the most important objective of protecting persons, topics such as securing production, protection of material assets, environmental protection and protection against unauthorised access are high priority protection objectives. Apart from building regulations, other requirements take effect, for example, from the industrial construction guidelines or the VdS guidelines on loss prevention in industrial and commercial undertakings.

It is therefore advisable for industrial companies to take structural measures extending beyond the building code legal provisions, in order to provide fire resistant separation of areas with increased fire risk or with particular importance for maintaining protection.



Production



Administration building



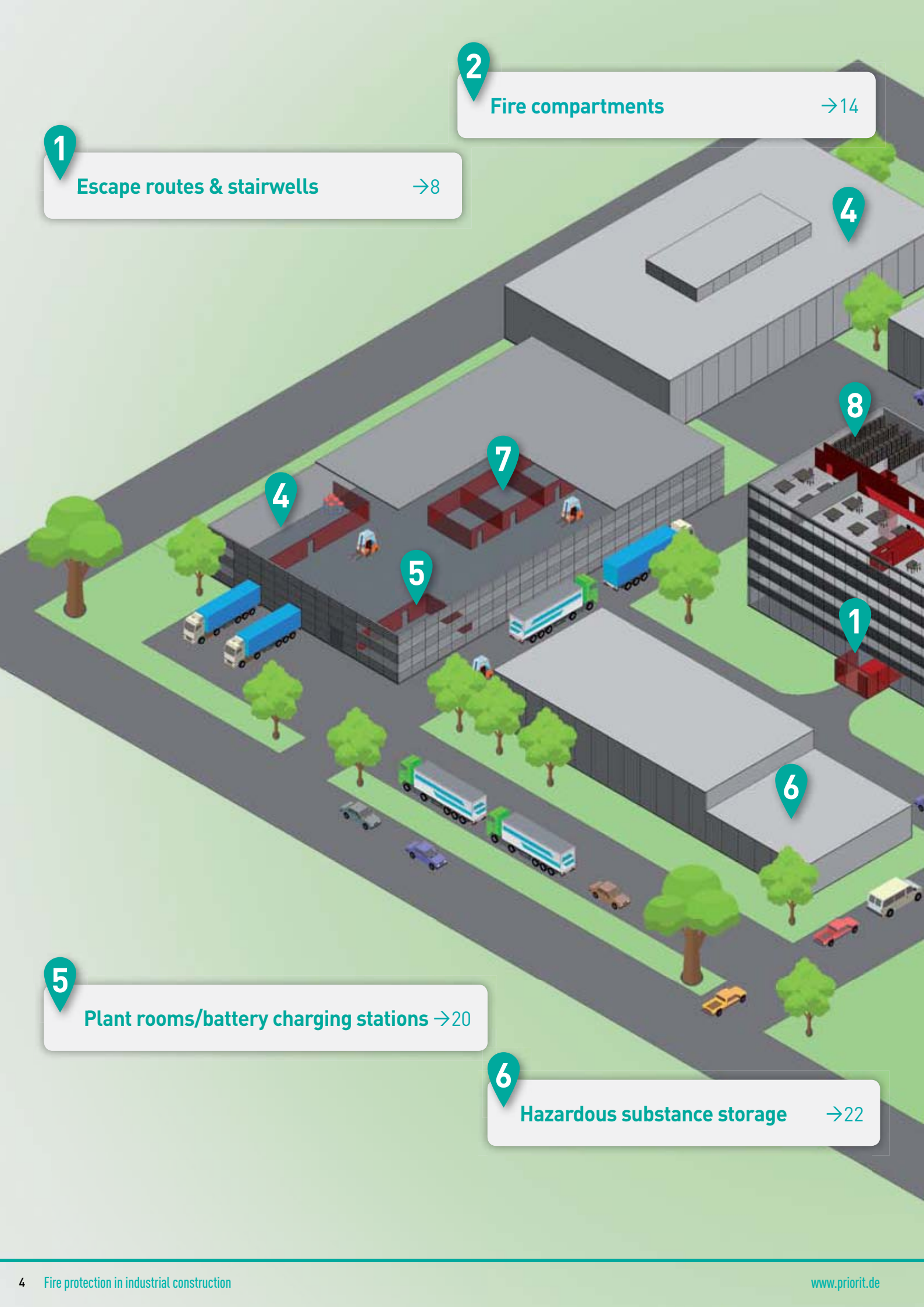
Warehouse

2

Fire compartments →14

1

Escape routes & stairwells →8



4

8

7

5

4

1

6

5

Plant rooms/battery charging stations →20

6

Hazardous substance storage →22

→22

3

Inter-storey shafts

→16

4

Warehouse/storage areas

→18

2

3

6

5

8

8

8

7

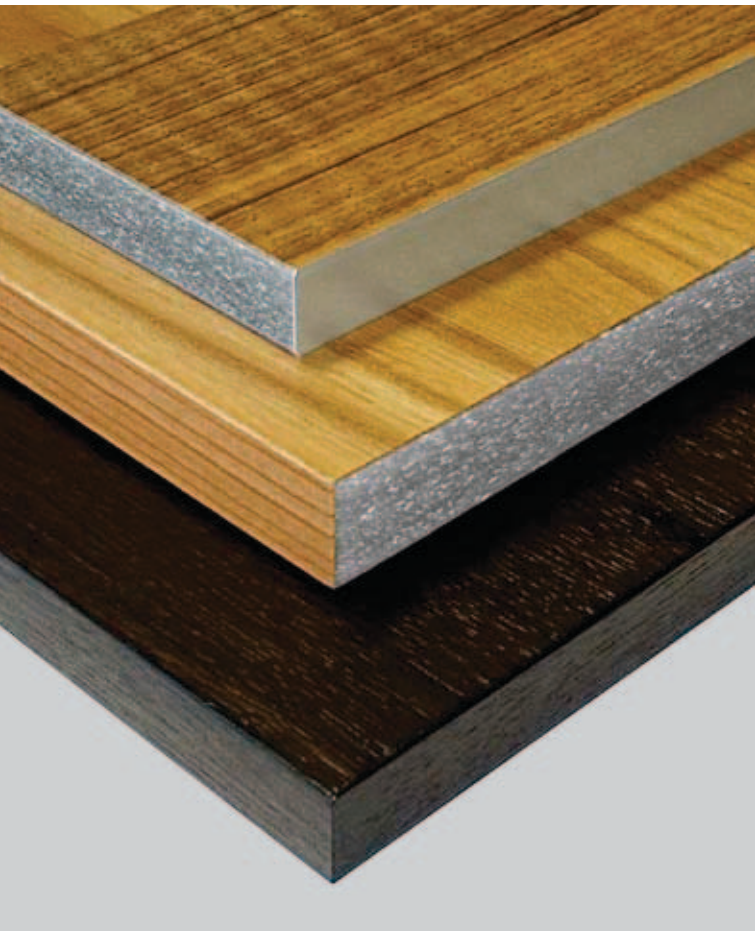
Process control systems

→24

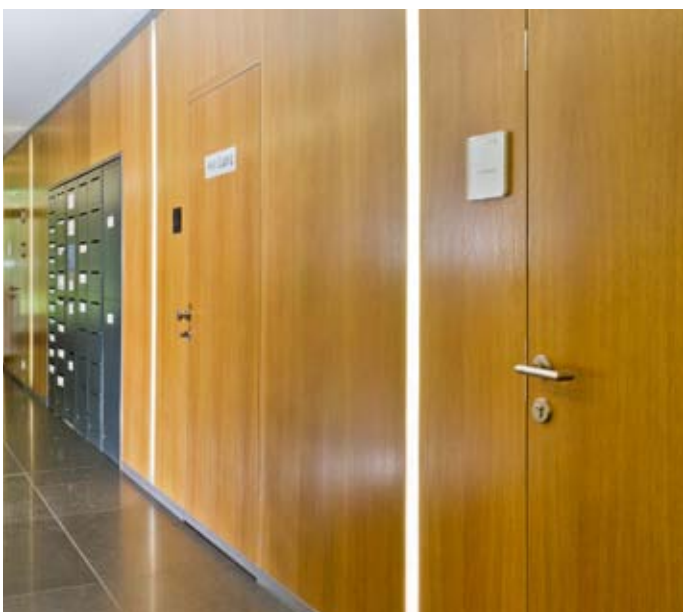
Physical IT and document protection

→28

Construction materials, construction products & elements

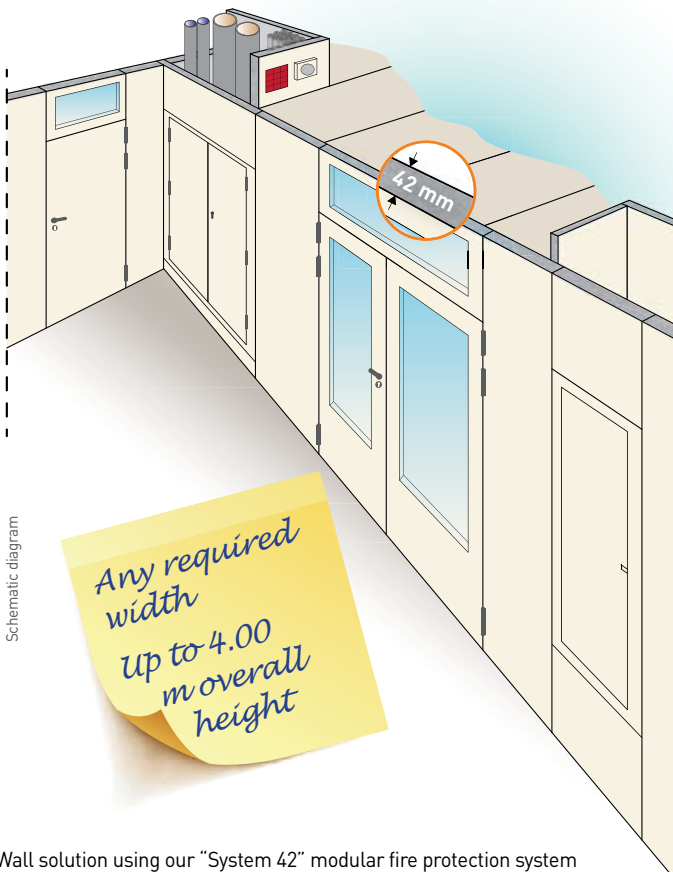


Based on construction materials classified as noncombustible, PRI-ORIT produces fire resistant elements with decorative surfaces and thus makes it possible to harmonise safety and design aspects.

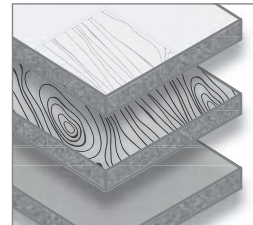


Modular fire protection system

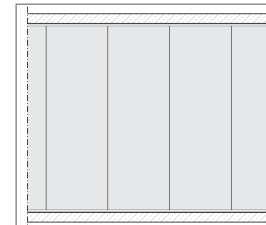
Basic components of System 42



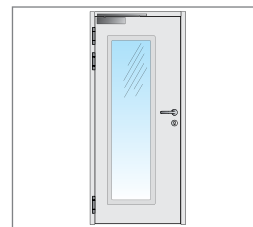
Wall solution using our "System 42" modular fire protection system



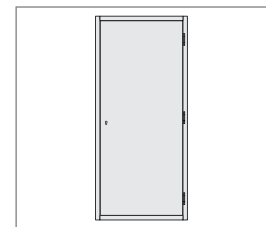
Construction material - PRIODEK H



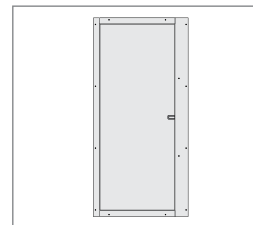
Wall - PRIOWALL



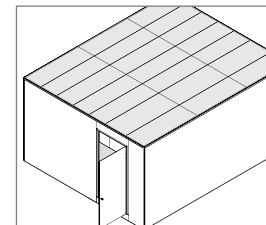
Doors - PRIODOOR FSA



Inspection opening closure - PRIODOOR ETX

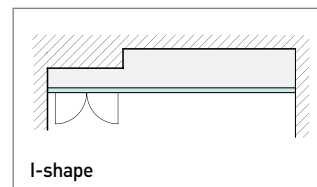


Smoke control damper - PRIODOOR ETX RDA

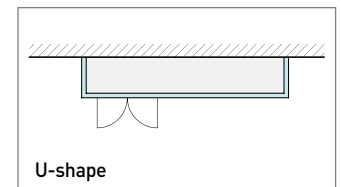


Ceiling - PRIOCEIL

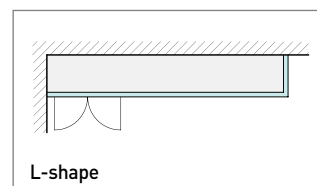
System 42 types



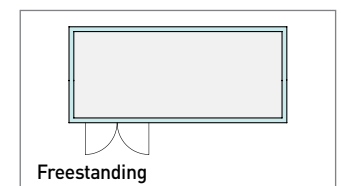
L-shape



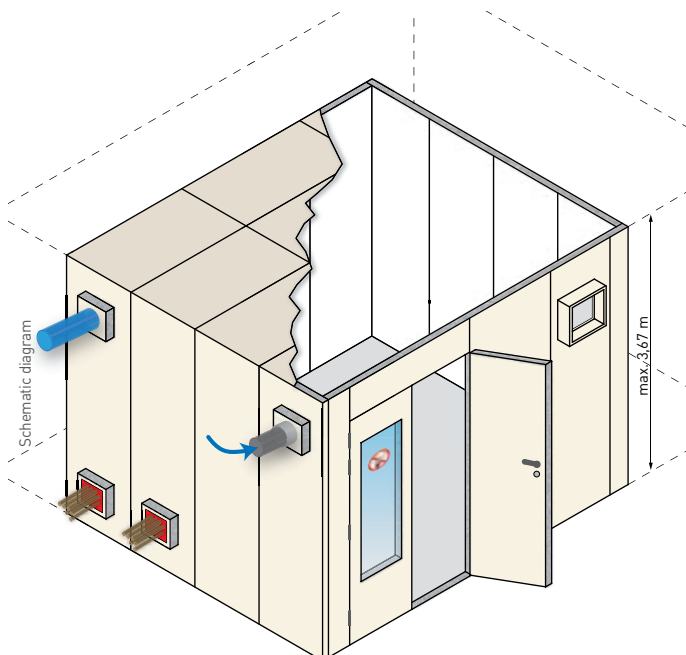
U-shape



L-shape



Freestanding



Room solution using our "System 42" modular fire protection system

1 Escape routes



Building escape routes are used by persons to rescue themselves in case of danger (fire) or to be rescued by the emergency services and other persons providing assistance.

A differentiation is made between vertical (stairwells) and horizontal escape routes (corridors, lobbies and personnel locks).

According to the legal requirements, escape routes must be designed and implemented to prevent the occurrence of a fire and the spread of fire and smoke (fire propagation) and, in the event of a fire, the rescue of people and animals and effective firefighting work are possible.

The effectiveness of structural fire protection measures is significantly influenced by


- the layout of the structural separation,
- the fire resistance of the structural members or elements
- the reaction to fire of the construction materials and products used.

Risks and fire safety objectives

- Functional integrity of safety devices
- Separation of the origin of the fire risk due to electrical installations, distributors and equipment
- Smoke control: keeping escape routes and stairs free from smoke
- No fire loads due to combustible material/wall coverings

Solutions

- Fire protection enclosure
- Inspection opening closures
- Smoke control damper
- Fire resistant wall and space construction system
- Noncombustible claddings
- Photocopier enclosures



Nonflammable decorative wall coverings – design and safety

- No additional fire loads in entrance areas and escape routes.
- From plain colours to decors through to veneer surfaces – an extensive choice of surfaces is available to match the respective colour concept.

PRIOWALL wall system with large access opening shutters



Before the alterations

Penetration seals for installations in escape routes using the PRIOWALL and PRIODOOR components from the modular fire protection system 42. The pipes, shafts and distributors are safely separated by wall elements and inspection closures. The noncombustible A2 construction material ensures escape routes free from fire loads.

In this case, the space between the riser shafts and laboratory entrances was fitted out with the same material as is used for storage areas.



After the alterations



Before the alterations

Fire resistant penetration sealing of electrical distributors and installations.

Large inspection closures ensure convenient accessibility. Edge protection with stainless steel profiles. Special features in this case is the execution with real beech wood surface.



After the alterations

Safe monitor enclosures for screens along escape routes



Tested fire protection: Smoke-proof monitor enclosures provide a simple solution for increased safety along escape routes. The enclosure is made of noncombustible material incl. decorative surface. Easy installation possible, both horizontally and vertically.

Smoke Protection
min leakage

Material + Decor
A2 Class

Fire load insulation of electrical equipment along escape routes

Printer and photocopier room – fire resistant room for accommodating printers and photocopiers along escape routes. Lockable side cabinets are used to store consumables.



Smoke Protection
min leakage

Fire Resistance
90 Min.

Material + Decor
A2 Class

Separation of electrical installations along escape routes



Fire resistant separation of service shafts, electrical distribution boards and ventilation systems in the escape route. Large inspection opening closures ensure free access to the electrical distribution boards for subsequent installation or for maintenance purposes.



Smoke control to keep escape routes free from smoke in case of fire



Large fire resistant smoke control damper, especially designed to close off air discharge shafts as part of a smoke control pressurisation system to keep emergency stairs free from smoke.

- Large, clear discharge area
- Installation flush with the surface, no protruding elements
- Elegant look
- Available in all kinds of different surface colours and decors



2 Fire compartments



Individual fire compartments are formed to prevent the spread of fire and smoke within a building. This is done using walls and ceilings with a defined fire resistance.

The wall and space construction system with very small wall thickness of only 42 mm is an ideal solution for creating fire compartments in a new building or in an existing building.

The single layer wall, ceiling, door and inspection elements can be flexibly combined with each other. This enables virtually all shapes and types to be implemented. Areas separated for fire protection can be built as well as complex escape tunnels.

The surface design options not only satisfy the functionality requirements but also high visual standards.

Risks and fire safety objectives

- Subdivision of buildings, to effectively prevent the transfer of smoke and fire to adjacent parts of the building.
- Fire resistant and smoke-tight shutter to close off operationally necessary openings to production and storage areas.
- Separation of dangerous areas.

Solutions

- Fire resistant partition walls
- Fire doors
- Door hold-open systems
- Inspection opening closures

PRIOWALL wall system with large access opening shutters



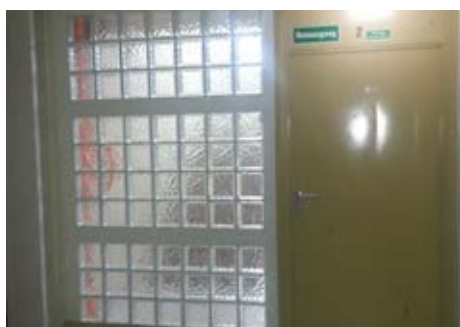
Before the alterations

Fire resistant wall system with two-leaf fire doors for separating fire compartments.



After the alterations

SYSTEM 42 **Smoke Protection min leakage** **Fire Resistance 30 Min.** **Material + Decor A2 Class**



Before the alterations

Formation of a fire compartment by installing fire resistant separation of the escape route using components from the modular fire protection system with a uniform look:

- Wall system
- Integrated smoke control damper
- Fire door



After the alterations

SYSTEM 42 **Smoke Protection min leakage** **Fire Resistance 90 Min.** **Material + Decor A2 Class**

3 Service shafts



Within a building, the utility pipes and cables for electricity, telecommunications, water, gas, etc. are routed to the individual storeys in vertical shafts.

These riser shafts route combustible installations across storeys throughout the whole building and connect different fire compartments to each other. To prevent the spread of fire and smoke in case of fire, according to MVV TB / MLAR, service shafts including shutters of openings, must be made of noncombustible materials and have a fire resistance corresponding to the highest necessary fire resistance of the separating elements they penetrate.

All openings in these fire resistant elements must be closed off by appropriate shutters.

Risks and fire safety objectives

- No spread of fire and smoke across storeys
- Separation of origin of fire risk, e.g. due to electrical installations and distributors
- No fire loads due to flammable pipes/cables

Solutions

- Fire resistant wall construction system
- Inspection opening closures
- Fire resistant partition walls

Service shafts with large access opening shutters



Formation of service shafts: The PRIOWALL fire resistant wall system offers individual solutions for virtually any initial structural situation. The large access opening shutters enable optimum accessibility to the installations behind them.

- Fire resistant separation in the escape route
 - Space-saving solution
 - Inspection opening closures enable maintenance work and cable laying and assignment in the shafts
 - Single layer, highly stable prefabricated elements
 - Can be configured in I-shape, L-shape and U-shape
 - Project-based design, production and installation
 - Overall height up to 4 m, unlimited width
- Fire resistant separation of the cable shafts and electrical distribution boards in the escape route
 - Narrow and ceiling-high inspection closures offer optimum accessibility

4 Warehouse/stores



Storage areas for packaging material - Goods are frequently packed in the warehouse or are temporarily stored in the packaging areas. The fire risk is increased additionally due to an accumulation of packaging materials and possibly by the packaging process itself – welding and shrinking of wrapping films.

Therefore, it is recommended that:

- Separate off storage areas of packaging or other areas, e.g. by means of fire resistant walls.
- To store packaging material in fire resistant separated rooms.
- And to remove packaging waste regularly and collect it in safe places, e.g. in fire resistant separate rooms or outdoors with sufficient distance from buildings.

Risks and fire safety objectives

- To build ancillary rooms, which are particularly sensitive to fire, in conformity with the law.
- Separation of storage areas for packaging material.
- Safe storage of lithium batteries.

Solutions

- Fire resistant wall construction system with appropriate fire barriers/access opening shutters
- Modular storage rooms
- Compact functional units
- Safety cabinets

Modular storage rooms in different sizes



- “Room-in-room” solution
- Individually designable due to modular construction
- For accommodated stocks or safety systems
- Short construction period

With fire resistant ceiling elements

Fire resistant wall elements

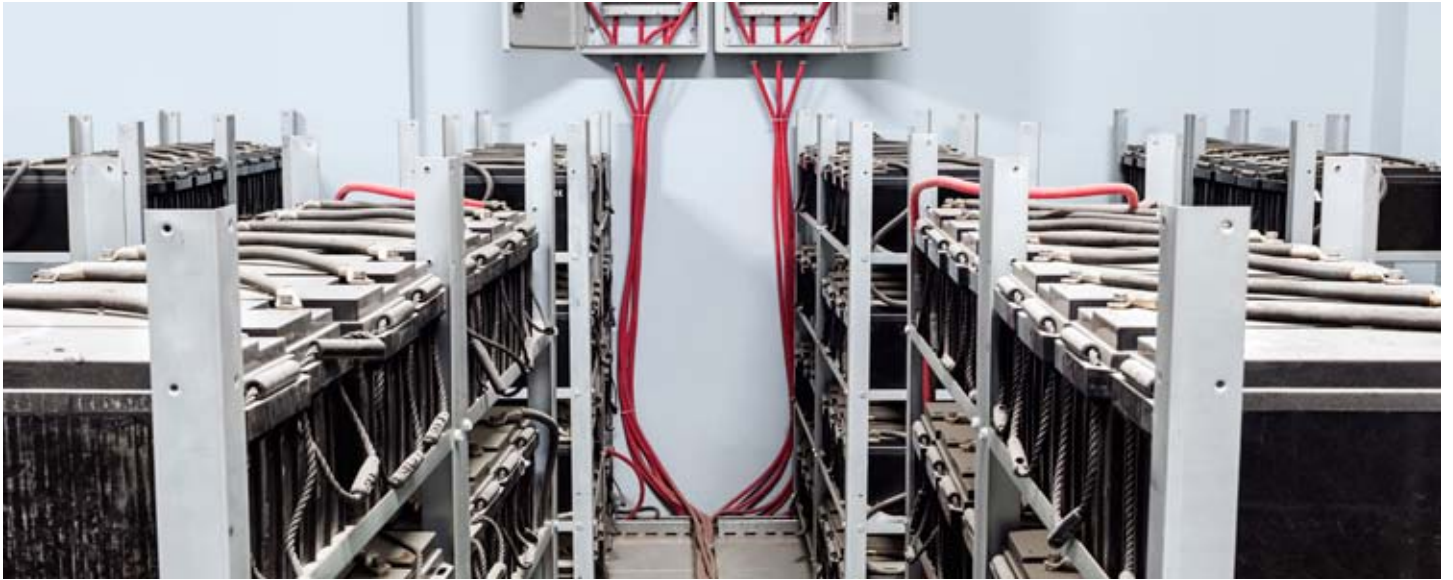
Large, two-leaf door elements

Profile cylinder, for integration in the building locking system

High-quality, adjustable 3D hinges



5 Plant rooms



In addition to the building code legal provisions, it is advisable to accommodate areas with increased risk of fire in fire resistant separated rooms.

The aim is to prevent the spread of fire and smoke and the transfer of gas into adjacent rooms and areas of buildings, e.g. including escape routes. It is recommended that fire resistant separation including fire resistant and smoke tight protection be provided for operationally necessary openings to areas such as:

- Units for generating cold, refrigeration systems
- Plant room for hydraulics and recirculating lubrication
- Firing and heating systems
- Building services systems such as ventilation plant room
- Lift machinery room
- Central compressed air supply
- Filter systems and
- with particular weighting: Battery charging station

Risks and fire safety objectives

- To separate off ancillary rooms, which constitute an increased fire risk, with fire resistant elements.
- Separation of fire origin hazards.
- Safe accommodation of battery charging stations.

Solutions

- Fire resistant, modular rooms
- Fire resistant wall and space construction system
- Inspection opening closures
- Modular electrical operations rooms

Individual plant rooms in various sizes



Modular fire protection system suitable for the construction of fire resistant plant and technical rooms. Project-based design, production and installation enable individual sizes.

- Fire resistant storage of batteries / rechargeable batteries
- Installation of penetration seals for ventilation and cables
- Large inspection opening closures
- Short construction period due to prefabricated elements



6 Hazardous substance storage



Fire-protected storage plays an important role in the storage of hazardous substances. The legislation requires that certain substances be accommodated in fire resistant, separated areas.

Boxes, containers and storage rooms provide diverse options for the storage of hazardous substances. Depending on the requirement and needs, these can be equipped for different types and sizes of containers.

The wall and space construction system is suitable for the storage of large quantities of hazardous substances and the construction of fire resistant rooms. The 42 mm module system of prefabricated panels can be used to create a separate fire compartment with fast and clean construction. The advantages: highly chemically resistant surfaces on the inside and outside, easy installation, alteration and extension. The room always has an access with flush threshold and can be equipped with standard commercial containment trays according to the regulations of the German Water Management Act (Wasserhaushaltsgesetz - WHG). The room provides fire resistance for 90 minutes.

Risks and fire safety objectives

- Legally compliant storage of hazardous substances
- Environmental protection

Solutions

- Safety cabinets
- Boxes and containers
- Fire resistant storage rooms

Legally compliant storage of hazardous substances



- Storage of several 200 litre drums
- Safe storage of hazardous substances
- Access through large shutters
- Fire resistant “room-in-room” solution
- Optional installation of explosion-proof lighting

*Also suitable for the storage of lithium-ion batteries
Individual colour design*

- Fire resistant and GS certified safety cabinets
- For the storage of flammable liquids or solids
- With adjustable or pull-out shelves



7 Plant control



One factor that should not be underestimated is the protection of economic viability by ensuring process reliability. For industrial companies, it is advisable to accommodate areas that are particularly important for maintaining production in fire resistant separate rooms.

The modular fire protection system 42 represents a virtually ideal option for a fire resistant “room-in-room” solution or the enclosure of production plants during operation.

The individually designable room is made of 42 mm thick pre-fabricated noncombustible individual wall, ceiling, fire barrier components as well as separations and penetration seals, and ventilation elements.

The room is smoke tight, provides a fire resistance of 90 minutes and can be built with a fast and clean construction method.

Risks and fire safety objectives

- Areas with increased risk of fire or particular importance for maintaining production are to be accommodated in fire resistant separated rooms.
- Protection of economic viability by ensuring process reliability.

Solutions

- Modular fire resistant rooms
- Individually built enclosures

Wall and space construction system for fire-resistant enclosure



After the alterations



Before the alterations

- Fire resistant enclosure of an emergency power system (NEA, emergency power supply)
- Side fire dampers with overhead, surface mounted door closer, hold-open and integrated smoke detectors serve as cold smoke-tight ventilation openings
- Installation of large access opening shutters
- Installation of cable penetration seals

Wall and space construction system for fire-resistant enclosure

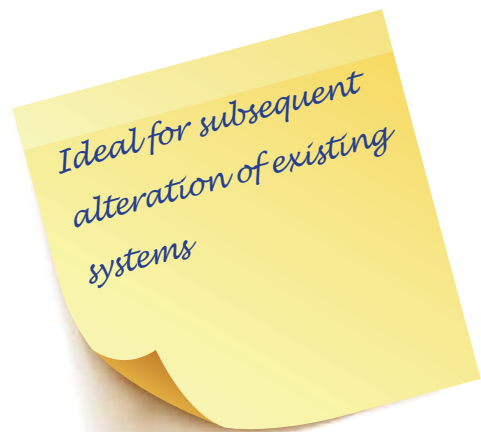


Before the alterations



After the alterations

- Fire resistant enclosure of a fire alarm system and production control system in the escape route
- Execution with F90 glass elements
- Short construction period due to prefabricated elements
- Elements positioned according to the displays



SYSTEM 42
Smoke Protection
min leakage
Fire Resistance
90 Min.
Material + Decor
A2 Class



Before the alterations

- Subsequent enclosure of a drinking water separating station
- Alteration in U-shape using the PRIOWALL wall and space construction system
- Door element with glass cutout
- Industrially prefabricated elements
- Short construction period
- Narrow design



After the alterations

SYSTEM 42
Smoke Protection min leakage
Fire Resistance 90 Min.
Material + Decor A2 Class

8 Physical IT and data protection



IT systems for data processing, internet and communication are now an essential part of the business and production processes in companies. They therefore need particular protection, including and above all, in case of fire. PRIORIT solutions ensure the functional integrity of IT systems in case of fire and thus the reliable functioning of IT-based business processes with products from small to large size.

Risks and fire safety objectives

- Physical protection of IT components and data
- Comprehensive protection of files and documents
- Separation of the fire origin risks due to IT components
- Protection against unauthorised access

Solutions

- Safety racks
- Fire resistant separations/barriers
- Modular fire resistant rooms
- High-security rooms
- Fireproof cabinets for safe storage of files and documents

Industry References (Excerpt)

Town/City	Property
Berlin	Bayer AG
Braunschweig	Volkswagen AG
Burghausen	Wacker Chemie AG
Buxtehude	Synthopol Chemie GmbH & Co. KG
Frankfurt	Bayer AG
Frankfurt	Industriepark Höchst
Göppingen	Schuler Pressen GmbH
Hamburg	F. Reyer Nchfg. GmbH & Co. KG
Hamburg	Baiersdorf AG
Heilbronn	Läpple AG
Jena	Jenoptik AG
Landshut	BMW AG
Lienz (AT)	Liebherr GmbH
Ludwigshafen	BASF SE
Lulea (SE)	RISE SICS North AB
Lucerne (CH)	Roche Diagnostics International AG
Marl	Sasol Germany GmbH
Munich	BMW AG
Munich	Siemens Headquarters
Osnabrück	OSMA Aufzüge GmbH & Co. KG
Penzberg	Roche Diagnostics GmbH
Pforzheim	Laboratoire Biosthetique Kosmetik GmbH & Co. KG
Rüsselsheim	Adam Opel AG
Sindelfingen	Daimler AG
Unterschleißheim	Linde AG
Untertürkheim	Daimler AG
Vorarlberg	Doppelmayr Seilbahnen GmbH
Vienna (AT)	Boehringer Ingelheim RCV GmbH & Co KG
Winterthur (CH)	Data centre
Wolfsburg	Volkswagen AG
Zusmarshausen	Sortimo International GmbH



Dated: 02.2019

Tailor-made fire protection solution for Sortimo International GmbH



Research, fire protection and design – Wacker Chemie in Burghausen



Production and safety

ISO 9001 certification provides certainty. All development and production processes of PRIORIT fire protection products comply with internationally recognised rules. You can rely on this! That is certain!

PRIORIT AG
Technologiepark Hanau
Margarete-von-Wrangell-Straße 23
D-63457 Hanau-Wolfgang

Tel: +49 6181 3640-0
Fax: +49 6181 3640-210

info@priorit.de
www.priorit.de

