

Fire protection in residential buildings

Product solutions for structural fire protection

With application examples for new and existing buildings



A photograph of a modern, multi-story residential building with a light beige facade. The building features numerous windows with white frames and several balconies with metal railings. Some balconies have potted plants. The building is set against a clear blue sky.

Fire protection in residential buildings

Building residential or commercial high-rise buildings results in specialised requirements for fire protection concepts.

Because of this, the following guidelines/regulations apply to the planning, construction, and operation of high-rise buildings:

- Model building ordinance / State building ordinance MBO/LBO
- Model administrative specification technical building regulations MVV TB
- Model high rise directive MHHR
- Model line installation directive MLAR

In addition, there are a wide range of other specifications and regulations, such as those for smoke detector systems, smoke protection pressure systems (RDA), fire department plans, lifts, etc.

In emergency corridors and stairwells in high-rise buildings, almost all components must be made of non-combustible materials. This is also the case for installation shafts and their closures.

In addition, two structurally independent escape and rescue routes must be constructed for all floors/fire compartments, meaning that two escape stairwells are required. So-called safety stairwells are also a special consideration. Pressure ventilation systems (RDA) can be used to prevent fire and smoke from entering these safety stairwells. Openings must be placed on each floor for this purpose to dissipate smoke. Since this kind of safety stairwell can be used safely even in case of a fire, the second emergency stairwell is not required.

Lines and installations that pass through multiple floors must be installed in installation ducts, which must conform to MLAR 3.5.1. The closures of these shafts should generally be made of non-flammable materials and should be fire-resistant.

Disclaimer: The information in this brochure provides indications of a possible solution, but cannot replace professional advice or planning.



2

Escape routes

→ 12

1

Entrance foyer

→ 8

2

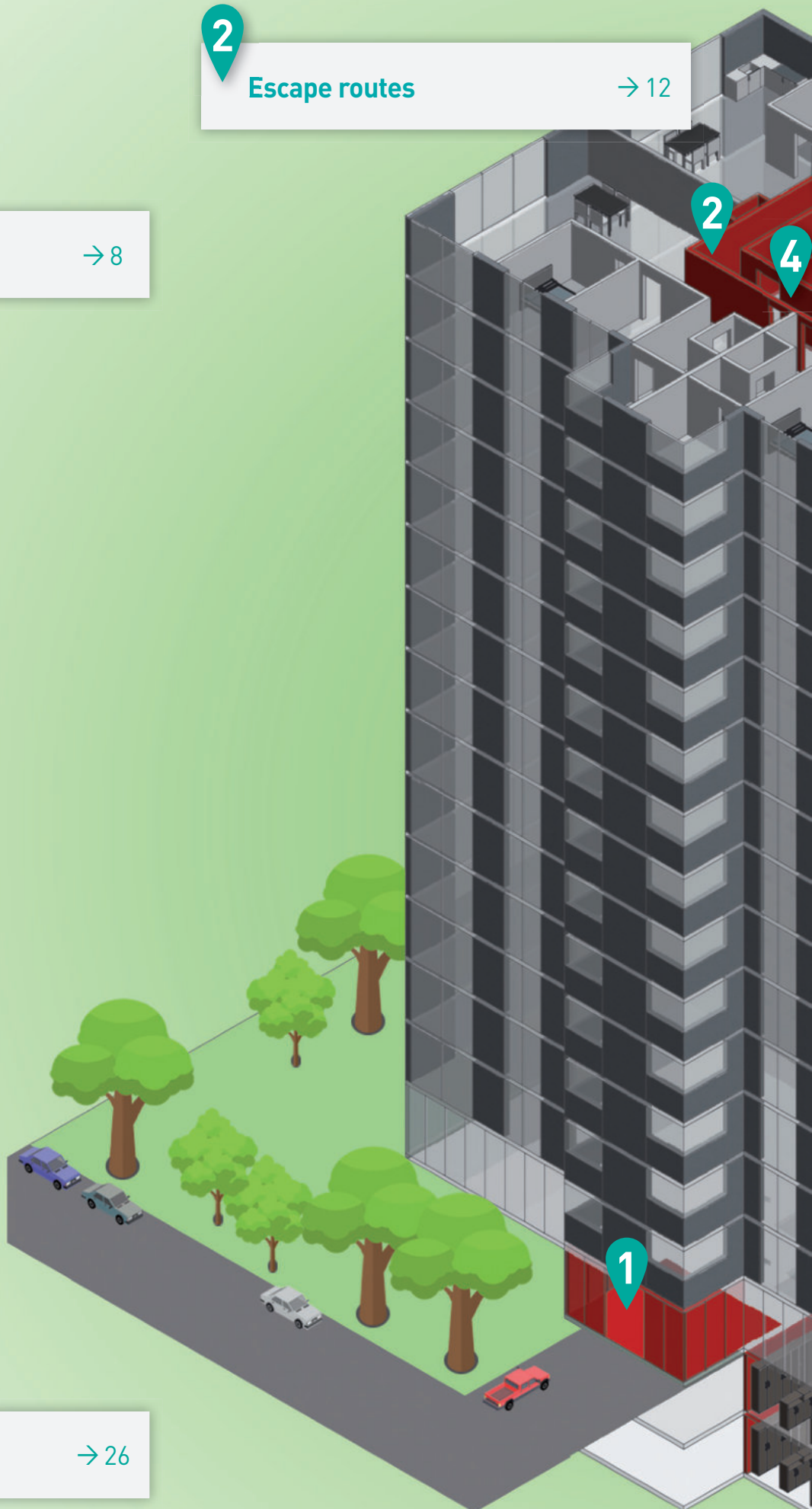
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1

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Installation shafts

→ 26



3

Smoke extraction

→ 18

5

2

3

4

Fire compartments/
Fire protection partitions

→ 22

6

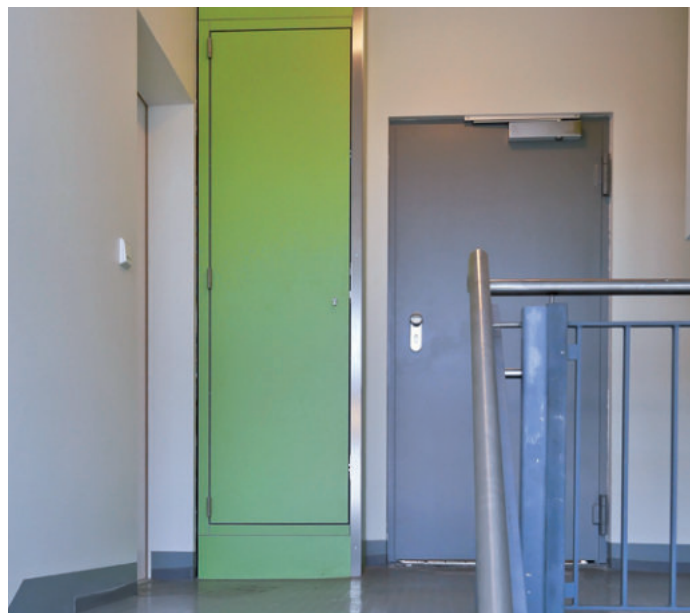
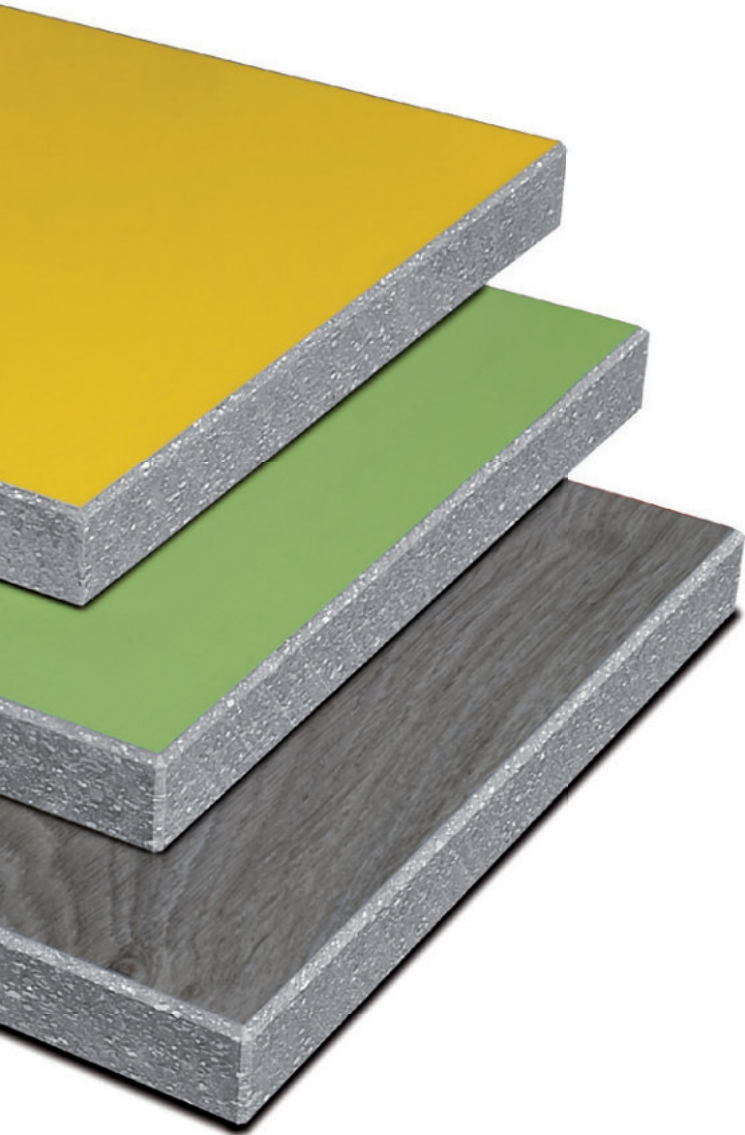
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Technical rooms

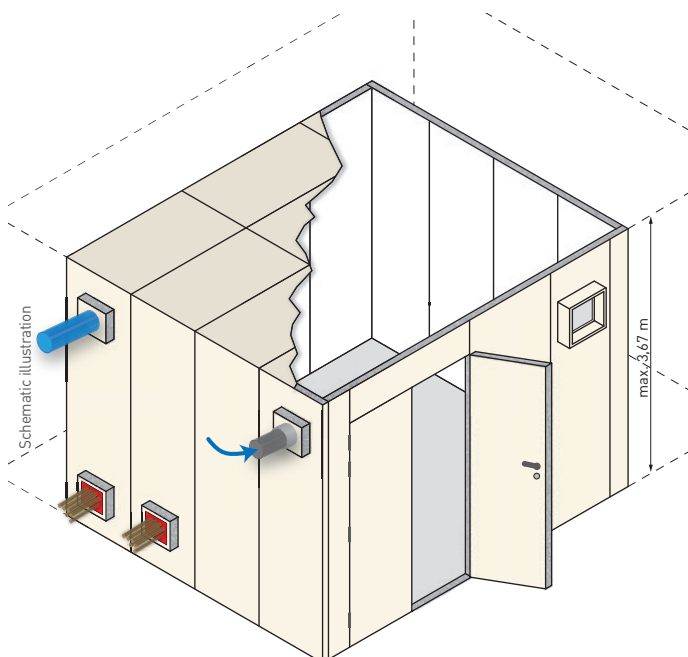
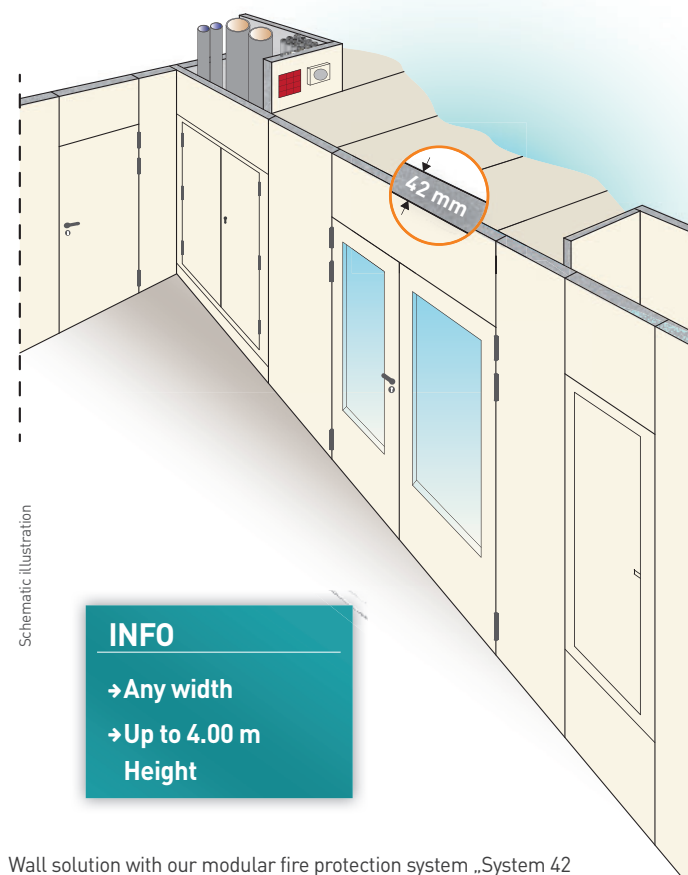
→ 32

Building products & components

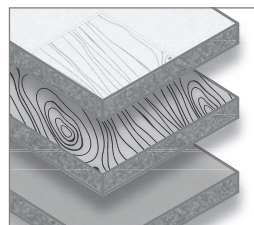
Based on building products classified as non-combustible, PRIORIT manufactures fire-resistant components with decorative surfaces, offering the capability to harmonize safety and design aspects.



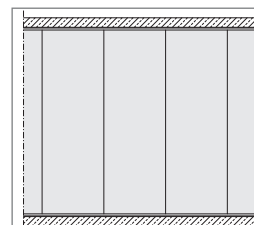
Modular fire protection system



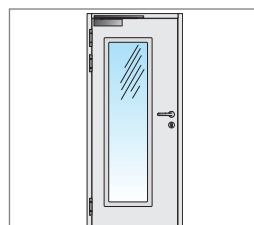
Basic components of System 42



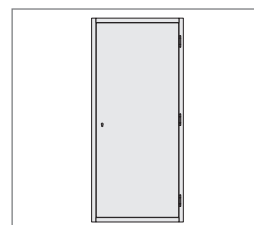
Non-combustible panel –
PRIODEK H



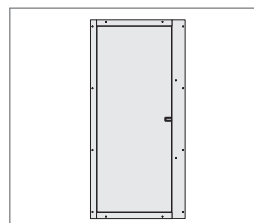
Wall – PRIOWALL



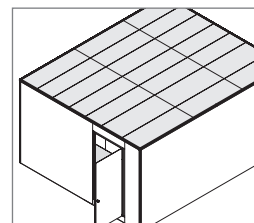
Doors – PRIODOOR FSA



Inspection opening closures –
PRIODOOR ETX/RTX/RTH

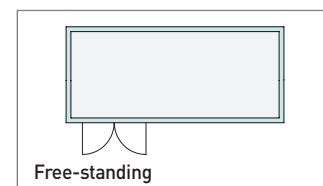
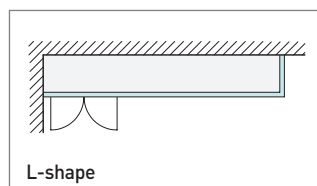
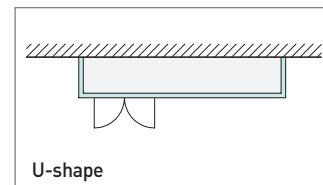
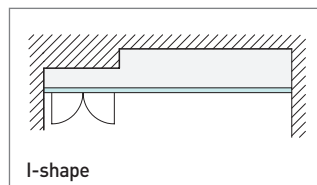


Smoke dampers –
PRIODOOR ETX RDA



Ceiling – PRIOCEIL

Construction forms of the System 42



1 Entrance foyer



In residential and commercial (high-rise) buildings, the entrance area/foyer usually plays a central role. This area of the building is regularly frequented by both residents and other people. The protection objectives and requirements resulting from this regular use are defined in the respective fire protection concept. For entrance areas, this usually includes minimising fire loads as well as fire-resistant partitioning of fire risks, e.g. through electrical distributors, installations or information displays.

Risks and protection goals

- Sealing off fire hazards such as electrical installations or distribution boards
- Fire-resistant partitioning of electrical appliances
- No additional fire loads due to combustible material/wall panelling or stored goods

Solutions

- Non-combustible panelling
- Safe enclosure of monitors
- Creation of fire protection separated areas
- Fire-resistant partitions
- Creation of fire-resistant partitioned storage areas



Non-combustible decorative wall coverings – design and safety

- No additional fire loads in entryway areas and rescue routes
- From single colour to decorative designs and veneered surfaces – a wide range of surfaces are available to choose from, depending on your individual colour concept

Fire-resistant partitions in the foyer



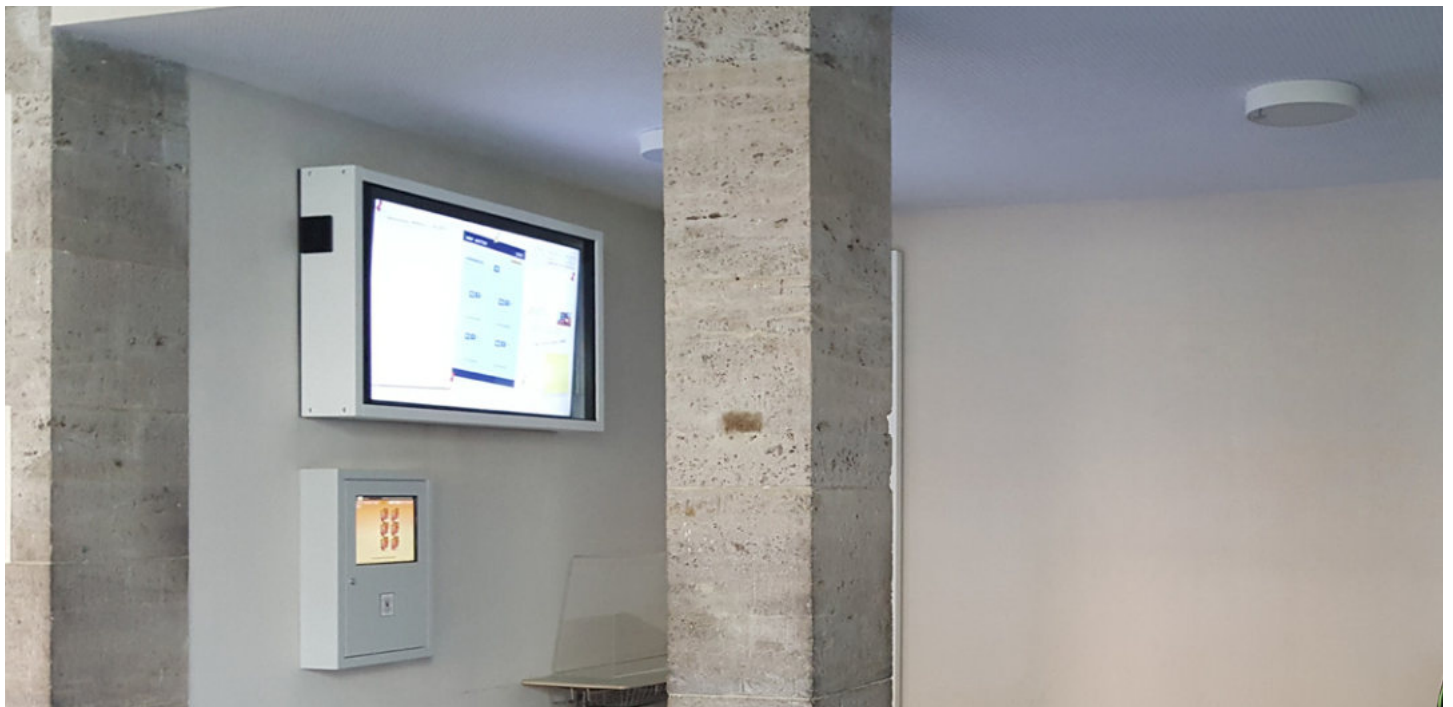
Fire-resistant partitioning of a storage room. The individually planned and industrially prefabricated elements enable quick and virtually dust-free installation. Large-format closures ensure excellent accessibility to the storage area under the staircase.

Fire protection closures in the foyer



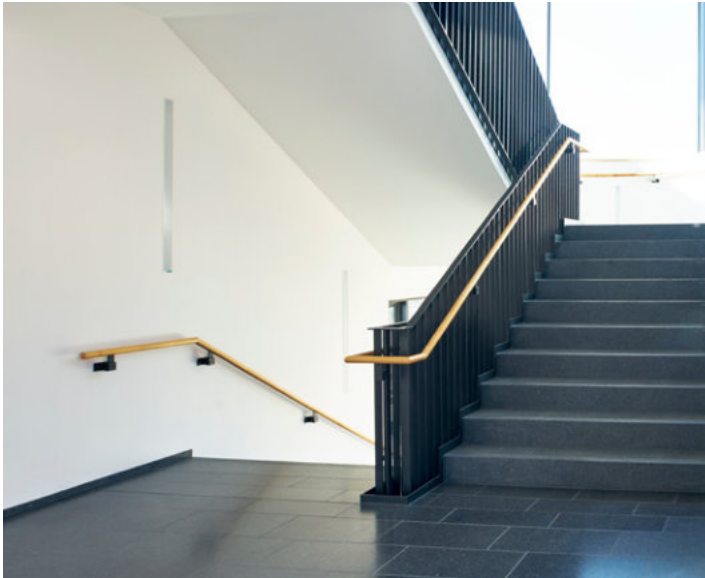
Fire protection closure clad on site for adaptation to an elegant ambience.

Secure monitor enclosures for screens in the entrance area



Tested fire protection: Smoke-tight monitor enclosures offer a simple solution for greater safety on escape routes. The enclosure is made of non-combustible material including a decorative surface. Easy to install both horizontally and vertically.

2 Escape routes



Structural escape routes are used for self-rescue of persons in the event of danger (fire) or for external rescue by rescue services and other persons providing assistance.

Escape routes are divided into vertical (stairwells) and horizontal escape routes (corridors, vestibules and airlocks).

According to legal requirements, escape routes must be designed in such a way that the development of a fire and the spread of fire and smoke (spread of fire) is prevented and that people and animals can be rescued and effective extinguishing work can be carried out in the event of a fire.

The effectiveness of structural fire protection measures is significantly influenced by

- the arrangement of the structural separation,
- the fire resistance of the building components
- the fire behaviour of the building materials and building products used.

Risks and protection goals

- Maintaining the function of safety equipment
- Separation of the risk of fire from electrical installations, distributors and devices
- Keeping escape routes and stairwells smoke-free
- No fire loads due to combustible material/wall panelling

Solutions

- Fire protection housing
- Access panels
- Smoke extraction damper
- Fire-resistant wall and room construction system
- Non-combustible panelling

Abtrennung von elektrischen Anlagen auf Rettungswegen



Fire-resistant partitioning of installation shafts and electrical distribution boards in the escape route. The large-format inspection opening closes allow free access for subsequent occupancy or for maintenance purposes.

Separation of electrical systems on escape routes



Fire-resistant separation of electrical installations. Customised planning and design with wall elements and inspection closures from the modular fire protection system 42.

Separation of electrical systems on escape routes



The fire loads of the electrical installations are fire-resistently sealed off from the stairwell. Positioning of the glass elements in line with the arrangement of the existing meters combines convenient reading with maximum safety.

Fire-resistant separation of electrical installations over several storeys of a residential building, individually adapted to the structural conditions. Construction heights of up to 4 m with an unlimited construction width can be realised.

Separation of electrical systems on escape routes



Retrofit fire-resistant panelling, in single or double-leaf design, over an existing, non-flush-mounted distribution system.

Separation of electrical systems on escape routes



Fire-resistant partitioning with large-format inspection closures. The wall construction system, which is precisely tailored to the structural conditions, scores points with a wall thickness of only 42 mm and thus a low restriction of the corridor width.



Inspection cover installed flush in GKF walls with panelling on one side (shaft walls)

3 Smoke extraction



Smoke extraction using excess pressure

How it works

In a smoke pressure system, if a fire occurs the ventilation system is started first in order to bring additional air into the stairwell. This results in a controlled level of excess pressure in the stairwell. At the same time, the smoke dampers on the affected floor open automatically.

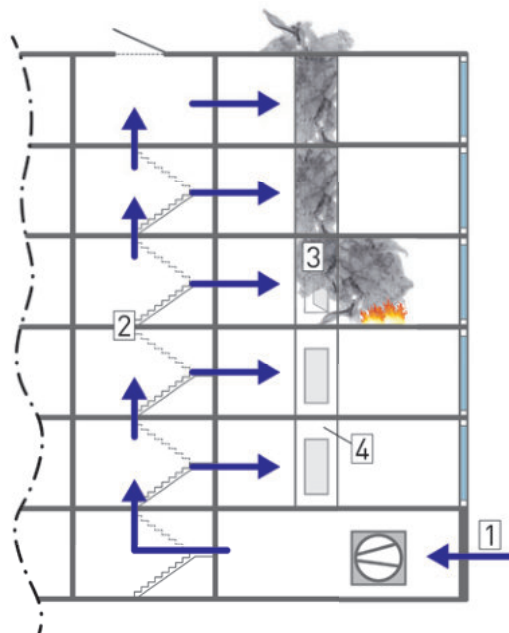
If personnel on the floor where the fire has occurred escape into the safety stairwell, the excess pressure provides protection. It pushes back the fumes and smoke, which dissipate through the smoke dampers and into the outflow shaft. This ensures that the safety stairwell remains smoke-free and can be used safely at all times.

In contrast, in a “regular” emergency stairwell, smoke from the fire flows out of the floor in which the fire occurred and into the stairwell. This makes the stairwell unusable for people who want to escape from higher floors. It also interferes with extinguishing the fire.

Advantage

A safety stairwell with a smoke pressure system eliminates the need for a second emergency stairwell. This makes more area in the building available for use, such as for office or living space.

Principle

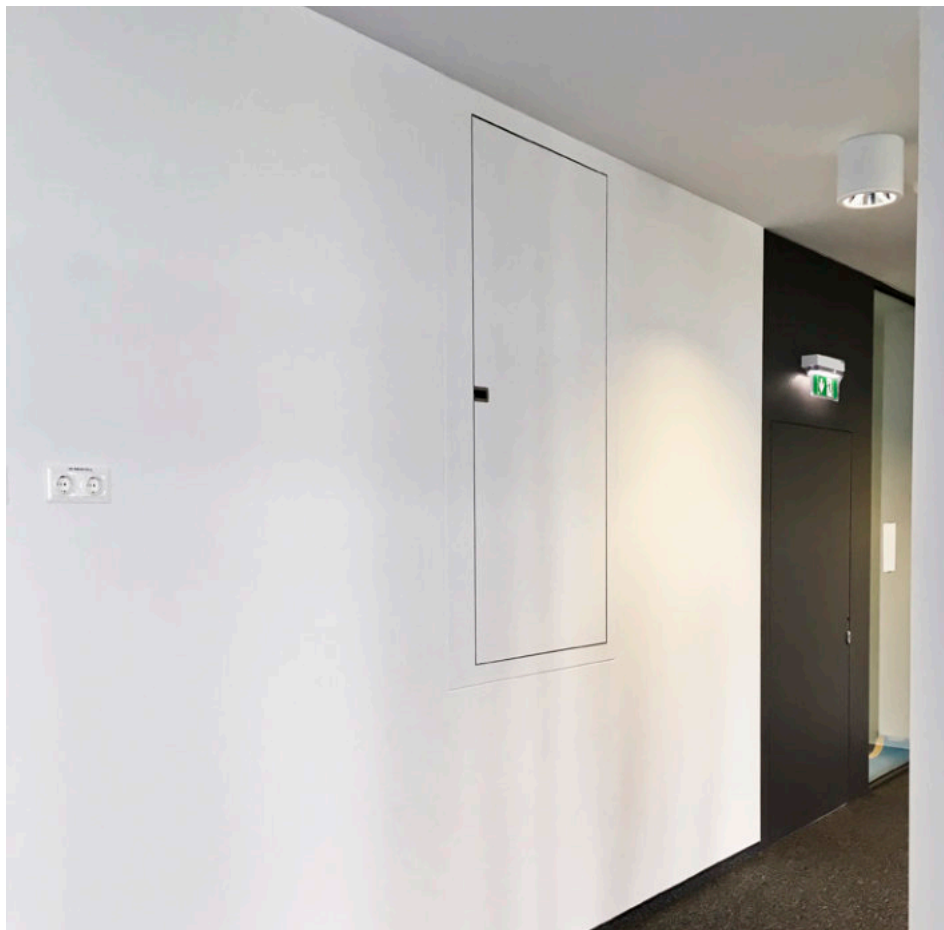


- 1 Air supply to be used in case of a fire
- 2 Excess pressure in the (safety) stairwell keeps smoke out
- 3 Fumes flow out through the PRIODOOR ETX RDA smoke dampers
- 4 Internal outflow shaft

Keeping escape routes smoke-free in the event of fire

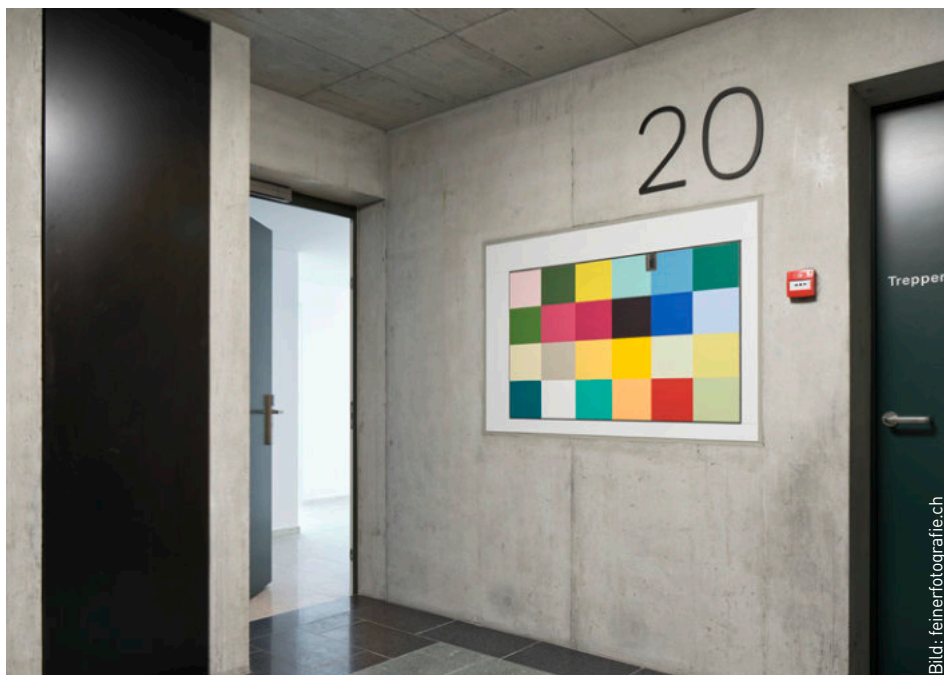


Keeping escape routes smoke-free in the event of fire



Large-format fire-resistant smoke control damper, specially designed for closing off discharge shafts as part of a pressurised smoke control system for keeping safety stairwells smoke-free.

- Free large-format discharge surface
- Flush installation, no protruding components
- Elegant appearance
- Available in a wide range of surface colours and finishes



Surface covered with PRIOpaint primer film and subsequently designed by an artist on site.

Keeping escape routes smoke-free in the event of fire



4 Fire compartments/ Fire protection partitions



To prevent the spread of fire and smoke within a building, individual fire compartments are created. This is done using walls and ceilings with a defined fire resistance

The wall and room construction system with a very thin wall thickness of just 42 mm is the ideal solution for creating fire compartments/fire protection separation in new or existing buildings.

The single-layer wall, ceiling, door and inspection elements can be flexibly combined with each other. This means that almost all designs and construction types can be realised. Separate fire protection areas can be created, as can complex escape tunnels.

The surface design options fulfil both functionality and high visual demands.

Risks and protection goals

- Subdivision of buildings to effectively prevent the spread of fire and smoke to neighbouring parts of the building.
- Fire-resistant and smoke-tight closure of operationally necessary openings to production and storage areas.
- Separation of hazardous areas.

Solutions

- Fire-resistant partition walls
- Fire protection closures
- Inspection opening closures

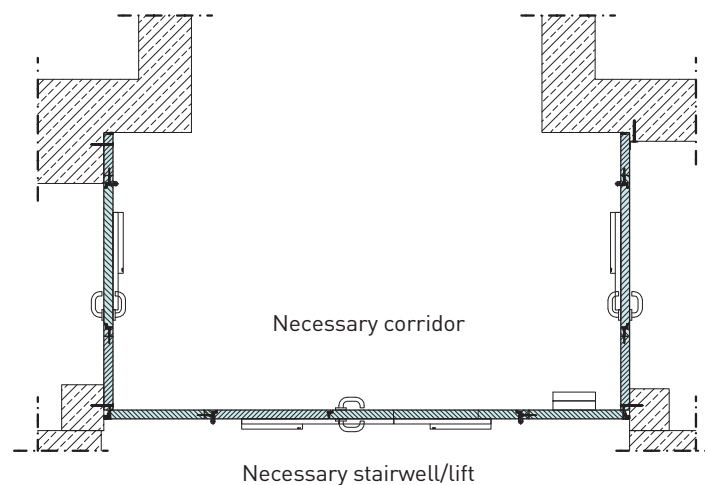
PRIOWALL wall system with large-format inspection closures



Customised corner solution in combination with single and double-leaf fire protection closures.

Fire compartmentation by means of a fire-resistant separation of the escape route with components from the modular fire protection system with a uniform appearance:

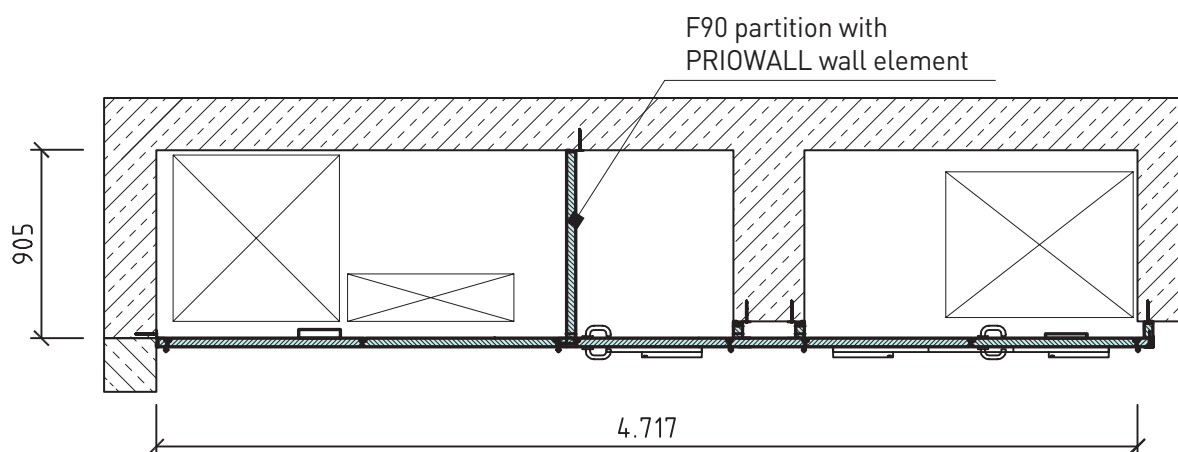
- Wall elements
- Fire door



PRIOWALL wall system with inspection and fire protection closures



Combination of single and double-leaf fire protection closures, fire-resistant wall elements and a double-leaf inspection closure.



Fire protection closures



Double-leaf fire protection closure, fire resistance over 90 minutes, active and passive leaves in different widths. Door leaves in white decorative finish.

5 Installation shafts



Inside the building, the supply lines for electricity, telecommunications, water, gas, etc. are guided to the individual floors through vertical shafts.

These rising shafts are used to pass flammable installations throughout all floors of the building, connecting different fire compartments. To prevent the spread of flames and smoke in case of a fire, installation ducts in accordance with MVV TB (model administrative specification on technical building regulations) / MLAR (regulation on fire security of conduit installations) - including the closures of openings - must be made of non-combustible building materials and meet the highest required fire-resistance standards for separating components that penetrate through them.

All openings in these fire-resistant components must be sealed off with appropriate closures.

Risks and protection goals

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

Solutions

- Fire-resistant wall construction system
- Inspection opening closures

Installation shafts with large-format inspection closures



Formation of installation shafts:

The fire-resistant PRIOWALL wall system offers customised solutions for almost any structural situation. The large-format inspection closures allow optimum accessibility to the installations behind them.

- Fire-resistant partitioning in a stairwell
- Space-saving solution
- Inspection opening closures allow convenient access for maintenance work and cable re-routing in the shafts
- Single-layer, highly stable prefabricated elements
- I-shaped, L-shaped and U-shaped design possible
- Project-related planning, production and installation
- Construction height up to 4 m, unlimited construction width
- Narrow and ceiling-high access panels offer optimum accessibility
- Available in a special green finish to match the colour scheme of the building

Installation shafts with large-format inspection closures



- Single or double-leaf inspection opening seals
- For the large-format, revisionable partitioning of installation shafts
- Fire resistance of 30 or 90 minutes
- Suitable for different wall types
- Different surface designs possible

Installation shafts with large-format inspection closures



Construction of installation shafts: The fire-resistant PRIOWALL wall construction system offers customised solutions for almost any structural situation. The large-format inspection closures allow optimum accessibility to the installations behind them.

Installation shafts with large-format inspection closures



Installation shafts with large-format inspection closures



- Fire-resistant partitioning
- Space-saving solution
- Inspection opening closures enable maintenance work and subsequent occupancy in the shafts
- Single-layer, highly stable prefabricated elements
- I-shaped, L-shaped and U-shaped design possible
- Project-related planning, production and installation
- Construction height up to 4 m, unlimited construction width
- Narrow and ceiling-high access panels offer optimum accessibility
- Pre-coated surface
- Different surfaces can be realised
- Fast, virtually dust-free assembly of the industrially prefabricated elements

6 Technical rooms



In addition to building regulations, it is recommended that areas with an increased fire risk are housed in fire-resistant partitioned rooms.

The spread of fire and smoke as well as the transfer of gases into neighbouring rooms and building areas should be prevented. Fire-resistant partitioning is recommended for areas such as

- Units for the generation of cold, refrigeration systems
- Firing and heating systems
- Building services installations such as ventilation centre
- Lift machine room
- Filter systems
- Battery charging station/lithium-ion battery charging

Risks and protection goals

- Areas that pose an increased fire risk must be partitioned off in a fire-resistant manner.
- Sealing off fire hazards.
- Safe storage of battery charging stations.
- Safe storage of Li-ion batteries (e.g. batteries for e-bikes, power tools, lawnmowers)

Solutions

- Fire-resistant, modular rooms
- Fire-resistant wall and room construction system
- Inspection opening closures
- Functional units

Customised technical rooms in various sizes



- Subsequent enclosure of a drinking water separation station
- U-shaped remodelling with the PRIOWALL wall and room construction system
- Door element with glass cut-out
- Industrially prefabricated components
- Short construction time
- Narrow construction method

References residential construction (extract)

Location	Object
Agsburg	Robert-Bosch-Straße
Basel (CH)	Rosenthalstraße
Berlin	Stadtquartier Allee der Kosmonauten
Berlin	Wohnhaus Adalbertstraße
Berlin	Heidestraß
Berlin	Langhoffstraße
Berlin	Pekrunstraße
Berlin	Pier 61-63
Berlin	Quartier Heidestraße
Berlin	Schulze-Boysen-Straße
Berlin	Tetris
Berlin	Upside
Berlin	Wohnquartier am Alex
Berlin	Wohnhochhäuser der HOWOGE
Böblingen	Wohnhochhaus
Braunschweig	Lahnstraße
Bremen	Aalto Hochhaus
Dortmund	Wohnturm Hafen 12
Dresden	mehrere Wohnhochhäuser
Erfurt	WIR-Quartier
Essen	Huyssen Quartier
Flensburg	Marrendamm 2
Frankfurt/Main	AXIS
Frankfurt/Main	Flare
Frankfurt/Main	Grand Tower
Frankfurt/Main	Guaitasstraße
Frankfurt/Main	Hafenpark Quartier
Frankfurt/Main	Henninger Turm
Frankfurt/Main	ONE FORTY WEST
Frankfurt/Main	Praedium
Frankfurt/Main	Schwedler Trio
Frankfurt/Main	Skywalk
Frankfurt/Main	Solid Home

Location	Object
Frankfurt/Main	Westside Tower
Frankfurt/Main	Wohnturm Blue Horizon
Freiburg	Krotzinger Straße
Hamburg	Baakenhöfe
Hamburg	Kaltenbergen
Hamburg	Kolbenhöfe
Hamburg	Leos Wohnpark
Hamburg	Luruper Höfe
Hamburg	Münzviertel
Hamburg	Pergolenviertel
Hamburg	Stadthöfe
Hamburg	Stellinger Weg
Hamburg	Strandkai
Karlsruhe	Goerdeler Straße
Karlsruhe	Parktower
Köln	Hochhaus Bayenthal
Köln	Sedanstraße
Leverkusen	Wohnhochhaus
München	Schönfeldstraße
Nürnberg	Seetor Tower
Oldenburg	Stadthafen Turm
Regensburg	Humboldtstraße
Sindelfingen	Pfarrwiesenallee
Stuttgart	Cloud No.7
Stuttgart	Marienstraße
Stuttgart	Wohnturm Mönchfeldstraße
Stuttgart	Paul-Lincke-Straße
Stuttgart	Uhlandstraße
Tübingen	Weidenweg
Wien (AT)	Triiiple
Wien (AT)	Viertel2Plus
Zürich (CH)	Wohnhochhaus

Stand: 09.2022



Production and safety

The ISO 9001 certification gives security. All PRIORIT fire protection product development and manufacturing processes comply with internationally recognised rules. You can count on that! That's for sure!

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