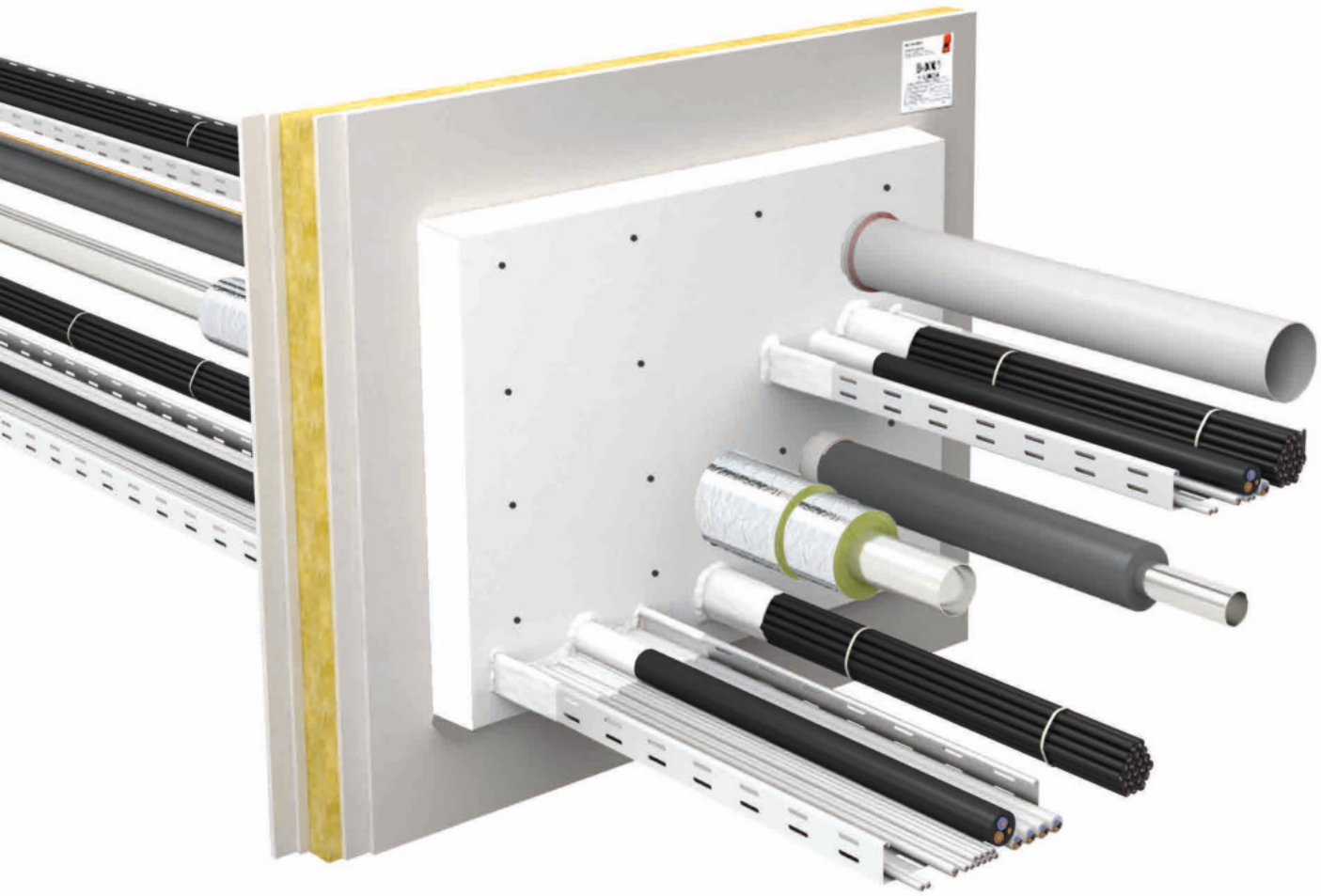
PYRO-SAFE® Flammotect OSI

One-sided installation

Installation instructions

Mixed penetration sealing system made of mineral fibre boards and an ablative coating for one-sided installation in shaft walls, plasterboard walls, solid walls and floors for electrical cables and lines of all types, electrical installation conduits, combustible/non-combustible pipes and other services.
Fire resistance class maxiumum EI 120 in accordance with EN 13501-2 and ETA-14/0418.



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1. Preliminary remarks / overview

1.1 Target group

- The installation instructions are intended solely for personnel trained in fire protection.

1.2 Use of the instructions

- Before starting work, read through these instructions completely once. Pay particular attention to the following safety instructions.
- The authorisation holder assumes no liability for damage caused by failure to comply with these instructions.
- Figures appear as examples only. Installation results may differ in appearance.
- Unless stated otherwise, all lengths are specified in mm.
- All information in this document corresponds to the current state of the art or the valid standard version at the time of preparation. Upon request, svt will gladly provide the relevant statutory and technical framework conditions or manufacturer's specifications for each individual case.
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1.3 Safety instructions

- The safety data sheets must be used for advice when processing the fire protection compounds.
- Personal protective equipment:

	Wear protective clothing and non-slip shoes.
	Use protective goggles.
	In case of short-term or low-level exposure: P2 particle filter. In case of intensive or long-term exposure: use self-contained breathing apparatus. Only use respirators that comply with international/national standards.
	Use chemically resistant gloves. Recommended materials: Butyl rubber, nitrile rubber, fluorinated rubber, PVC.

Safety instructions for the installation of floor penetration seals

	The area below the floor penetration seal must be cordoned off while work on the penetration seal is underway (warning tape, or sign: danger - falling objects; keep off this area; sealing work underway in the floor above!
	The company that is commissioned to install the floor penetration seals shall provide the client with written information (to be passed on to the owner or his authorised representative), pointing out that fire-resistant penetration seals in floors must be provided on site with adequate protection (e.g. barriers), or covered with grating to prevent them from being walked on after installation.

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1.4 Field of application

The PYRO-SAFE® Flammotect OSI mixed penetration sealing system in wall and floor openings is assessed and evaluated in accordance with ETAG 026-2 regarding the features „Reaction to fire“, „Fire resistance“, „Release of dangerous substances“ and „Durability and serviceability“

Reaction to fire

The ablative component „PYRO-SAFE® FLAMMOTECT-A“ is classified as E in accordance with EN 13501-1; the intumescent material „PYRO-SAFE® DG-CR“ is classified as C-s1, d0 in accordance with EN 13501-1; the mineral fibre boards „Hardrock 040“ and the mineral fibre mats „Klimarock“ are classified as A1 in accordance with EN 13501-1.

Fire resistance

"PYRO-SAFE® Flammotect OSI" complies with requirements of max class EI 120 in accordance with EN 13501-2. The pipe end configuration -U/U covers also all other possible endings (C/U, U/C and C/C) in accordance with EN 13501-2. The pipe end configuration -U/C also covers the configuration -C/C in accordance with EN 13501-2. The -U/C configuration is also valid for -C/U and -C/C in accordance with EN 13501-2.
When installed in walls or floors with a lower fire resistance duration, the fire resistance duration of the penetration seal is also reduced to that of the fire resistance class of the wall or floor.

Release of dangerous substances

None

Durability and suitability for use

The ablative „PYRO-SAFE® FLAMMOTECT-A“ component and the intumescent material „PYRO-SAFE® DG-CR“ fulfill the type X in accordance with EOTA TR 024. The PYRO-SAFE® Flammotect OSI system can be subjected to the conditions of inside rooms with and without exposure to moisture or atmospheric conditions, without substanial changes to the fire protection characteristics being expected.

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1.5 Components

Plasterboard walls with steel frame

In studworks and double-sided lining with at least 2 layers of 12.5 mm thick cement or gypsum-based building slabs with a fire performance of Class A1 or A2 in accordance with EN 13501-1.

The wall structure shall be complemented by additional wall struts and bars to form the edge of the opening.

The walls must be classified with the required fire resistance rating in accordance with EN 13501-2.

Plasterboard walls with wood frame

In studworks and double-sided lining with at least 2 layers of 12.5 mm thick cement or gypsum-based building slabs with a fire performance of Class A1 or A2 in accordance with EN 13501-1.

The distance from the opening to the struts and bars shall be ≥ 100 mm and the hollow spaces between the linings of the wall, the struts and bars as well as the opening edge shall be stuffed down to a depth of ≥ 100 mm with mineral-wool, fire resistance Class A1 or A2 in accordance with EN 13501 -1.

The walls shall be classified with the required fire resistance rating in accordance with EN 13501-2.

Lining of opening edge for plasterboard walls

Alongside the opening edge, there shall be at least one layer of 12.5 mm thick concrete or gypsum based slabs with a fire reaction class A1 or A2 according to EN 13501-1.

Shaft walls with steel substructure

In stud design with metal substructure and single-sided cladding with at least 2 layers of 20 mm thick building boards (Glasroc F 20, type GM-FH2 according to DIN EN 15283-1).

Solid walls

Made of masonry, concrete, reinforced concrete, cellular concrete, ceramic bricks, hollow bricks or lattice bricks with a density of ≥ 450 kg/m³.

The walls must be classified for the required fire resistance rating according to EN 13501-2.

Solid floors

Made of concrete, reinforced concrete or cellular concrete with a density of ≥ 550 kg/m³. The floors must be classified for the required fire resistance rating according to EN 13501-2.

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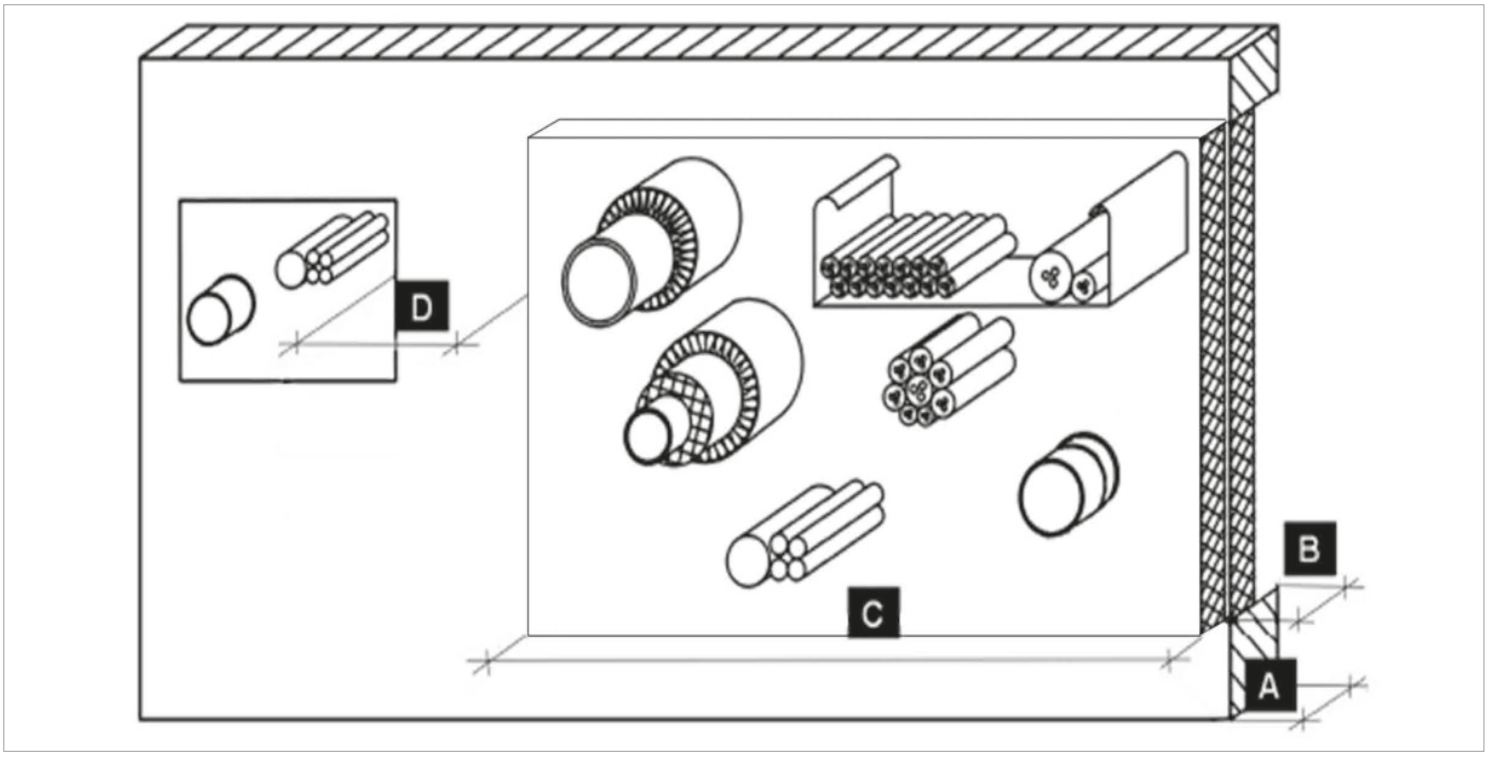
1.6 Component and sealing thickness, distances between openings

Dimensions					
Item	Name		Shaft wall [mm]	Plasterboard wall / solid wall [mm]	Floor [mm]
A	Thickness of structural element		≥ 40	≥ 100	≥ 150
B	Thickness of penetration seal	2-layer	≥ 100	≥ 100	≥ 100
		3-layer	≥ 150	≥ 150	≥ 150
C	Maximum dimensions of the opening (width x height)	2-layer	450 x 370	1,175 x 800	1,200 x 1,100
		3-layer			600 x 1,100
D	Distance from other openings or installations		≥ 200	≥ 200	≥ 200



The total permissible cross-section of the installations (external dimensions) is ≤ 60% of the rough opening!

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1.7 Used products

PYRO-SAFE® FLAMMOTECT-A Coating

in accordance with ETA-14/0418

12.5 kg pail – product no. 01155101
15.0 kg pail – product no. 01155105

PYRO-SAFE® FLAMMOTECT-A Solid emulsion

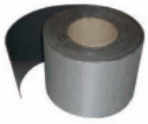
in accordance with ETA-14/0418

12.5 kg pail – product no. 01155106
15.0 kg pail – product no. 01155107

PYRO-SAFE® FLAMMOTECT-A Filler

in accordance with ETA-14/0418

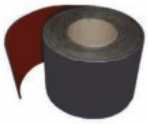
12.5 kg pail – product no. 01155104
15.0 kg pail – product no. 01155109



PYRO-SAFE® DG-CR 1.5 Fire protection wrap

in accordance with ETA-16/0268

Roll of 10 m x 125 mm – product no. 01261125



PYRO-SAFE® DG-CR BS Fire protection wrap

in accordance with ETA-16/0268

Roll of 10 m x 100 mm – product no. 01264100

Mineral fibre board acc. to EN 13162

Criteria: volume weight ≥ 150 kg/m³
Reaction to fire Class A1 acc. to EN 13501:1
Melting point ≥ 1,000°C.
(TR10) Tensile strength perpendicular to board plane
≥ 10 kPa according to EN1607
Thickness ≥ 60 mm

Mineral fibre boards

One-side pre-coated with PYRO-SAFE® FLAMMOTECT-A

Format 1,000 x 600 x 60 mm
Carton à 4 pcs – product no. 01181160

Mineral wool A1

Class of reaction to fire in accordance with EN 13501-1: A1
Melting point ≥ 1,000 °C

10 kg bag – product no. 01183000

Lamella mat "ROCKWOOL"

according to DIN EN 14303 and DoP DE0628071802 dated 2018-07-13

Reaction to fire class according to EN 13501-1: Class A1
Dimensions 610 x 50 cm
Thickness 30 mm
Roll à 3.05 m² – product no. 01187100

It is allowed to apply any lamella mats/ mineral fibre mats/ mineral-fibre pipe shells if they match the following requirements: EN 14303
density ≥ 40 kg/g³
Reaction to fire class according to EN 13501-1: Class A1 in accordance with EN 13501-1
Thickness = minimum 30 mm

Sectional and protective insulation

made of flexible elastomeric foam (FEF) according to DIN EN 14304

Name	DIN/ abZ/abP
NH/Armaflex	DIN EN 14304

Label

1 piece – product no. 01229000

Coarse thread drywall screws

Screw-Ø:	8.0 mm
Screw length:	100 mm
Thread length:	≥ 60 mm

Recommended tools

spatula, brush, masking tape
Mineral wool knife and saw

If required: plastic film, folding ladder, lock wire pliers, galvanised steel wire

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1.8 Fire resistance classes

1.8.1 Installation in shaft walls

1.8.1.1 2-layer penetration sealing system

Fire resistance classes

	Measure	Wall	
		Fire resistance class	Source*
Cables, cable bundles and cable trays with coating "PYRO-SAFE® FLAMMOTECT-A"			
Cable Ø ≤ 21 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 90 / E 120**	**1**
Cable bundle Ø ≤ 100 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120**	**1**
Cables, cable bundles and cable trays with fire protection wrap "PYRO-SAFE® DG-CR 1.5" – Wrap width 125 mm			
Cable Ø ≤ 21 mm	1x 1-layer, 40-60 mm overlap	**EI 120**	**1**
Cable bundle Ø ≤ 100 mm	1x 1-layer, 40-60 mm overlap	**EI 90 / E 120**	**1**
Electrical installation conduits (EIC) with fire protection wrap "PYRO-SAFE® DG-CR 1.5" – Wrap width 125 mm			
EIC single Ø ≤ 32 mm	2x 2-layer	**EI 120 U/U**	**1**
EIC bundled Ø ≤ 100 mm	2x 2-layer	**EI 120 U/U**	**1**
"Speed pipes" bundled or single, with/without glass fibre cable, with fire protection wrap "PYRO-SAFE® DG-CR 1.5" – Wrap width 125 mm			
Max. 24 pcs outside pipe Ø ≤ 7 Max. 7 pcs outside pipe Ø ≤ 10 Max. 5 pcs outside pipe Ø ≤ 12	2x 2-layer	**EI 120 U/U**	**1**
Special-duo-coax bundles with coating "PYRO-SAFE® FLAMMOTECT-A"			
Bundle Ø ≤ 90 mm / cable Ø ≤ 14 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120**	**1**

* 1 → KB 02423.2/15/Z00NZP, 2 → KB 02423.3/15/Z00NZP, 3 → KB 02423.4/15/Z00NZP, 4 → KB 02423.5/15/Z00NZP, 5 → KB 02423.6/15/Z00NZP,
6 → Techn. Opinion No. 02423.7/15/Z00NZP, 7 → Techn. Opinion No. 02423.8/15/Z00NZP, 8 → Techn. Opinion No. 02423.9/15/Z00NZP, 9 → Techn. Opinion No. 01012/19/Z00NZP

1.8.1.2 3-layer penetration sealing system

Fire resistance classes

	Measure	Wall	
		Fire resistance class	Source*
Cables, cable bundles and cable trays with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
Cable Ø ≤ 21 mm	1x 1-layer, 40-60 mm overlap	**EI 120**	**2**
Cable Ø ≤ 50 mm	1x 1-layer, 45-60 mm overlap	**EI 90 / E 120**	**2**
Cable Ø ≤ 80 mm	1x 1-layer, 45-60 mm overlap	**EI 90 / E 120**	**2**
Cable bundle Ø ≤ 100 mm	1x 1-layer, 45-60 mm overlap	**EI 120**	**2**

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1.8.2 Installation in plasterboard walls and solid walls

1.8.2.1 2-layer penetration sealing system

Fire resistance classes			
	Measure	Wall	
		Fire resistance class	Source*
Cables, cable bundles and cable trays with coating „PYRO-SAFE® FLAMMOTECT-A“			
Cable Ø ≤ 21 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 90 / E 120**	**9**
Cable bundle Ø ≤ 100 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120**	**9**
Cables, cable bundles and cable trays with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
Cable Ø ≤ 21 mm	1x 1-layer, 40-60 mm overlap	**EI 120**	**9**
Cable bundle Ø ≤ 100 mm	1x 1-layer, 40-60 mm overlap	**EI 90 / E 120**	**9**
Electrical installation conduits (EIC) with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
EIC single Ø ≤ 32 mm	2x 2-layer	**EI 120 U/U**	**9**
EIC bundled Ø ≤ 100 mm	2x 2-layer	**EI 120 U/U**	**9**
„Speed pipes“ bundled or single, with/without glass fibre cable, with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
Max. 24 pcs outside pipe Ø ≤ 7 Max. 7 pcs outside pipe Ø ≤ 10 Max. 5 pcs outside pipe Ø ≤ 12	2x 2-layer	**EI 120 U/U**	**9**
Special-duo-coax bundle with coating "PYRO-SAFE® FLAMMOTECT-A"			
Bundle Ø ≤ 90 mm / cable Ø ≤ 14 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120 U/U**	**9**

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1.8.2.2 3-layer penetration sealing system

Fire resistance classes			
	Measure	Wall	
		Fire resistance class	Source*
Cables, cable bundles and cable trays with coating „PYRO-SAFE® FLAMMOTECT-A“			
Cable Ø ≤ 21 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120**	**3**
Cable Ø ≤ 50 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 90 / E 120**	**3**
Cable Ø ≤ 80 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 90 / E 120**	**3**
Cable bundle Ø ≤ 100 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120**	**3**
Cables, cable bundles and cable trays with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
Cable Ø ≤ 21 mm	1x 1-layer, 45-60 mm overlap	**EI 120**	**3**
Cable Ø ≤ 50 mm	1x 1-layer, 40-60 mm overlap	**EI 90 / E 120**	**3**
Cable Ø ≤ 80 mm	1x 1-layer, 40-60 mm overlap	**EI 90 / E 120**	**3**
Cable bundle Ø ≤ 100 mm	1x 1-layer, 40-60 mm overlap	**EI 120**	**3**
Electrical installation conduits (EIC) with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
EIC single Ø ≤ 32 mm	2x 2-layer	**EI 120 U/U**	**8**
EIC bundled Ø ≤ 100 mm	2x 2-layer	**EI 120 U/U**	**8**
„Speed pipes“ bundled or single, with/without glass fibre cable, with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
Max. 24 pcs outside pipe Ø ≤ 7 Max. 7 pcs outside pipe Ø ≤ 10 Max. 5 pcs outside pipe Ø ≤ 12	2x 2-layer	**EI 120 U/U**	**8**

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Fire resistance classes

	Measure	Wall	
		Fire resistance class	Source*
Special-duo-coax bundle with coating "PYRO-SAFE® FLAMMOTECT-A"			
Bundle Ø ≤ 90 mm / cable Ø ≤ 14 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120 U/U**	**8**
Combustible pipes made of PVC-U, PVC-C with intumescent wrap "PYRO-SAFE® DG-CR BS" – Wrap width 100 mm			
Outside pipe-Ø ≤ 50 mm	2x 1-layer	**EI 120 U/U**	**3**
Outside pipe-Ø ≤ 70 mm	2x 2-layer	**EI 120 U/U**	**3**
Outside pipe-Ø ≤ 110 mm	2x 3-layer	**EI 120 U/U**	**3**
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation "NH/Armaflex", with fire protection wrap "PYRO-SAFE® DG-CR 1.5" – Wrap width 125 mm			
Outside pipe-Ø ≤ 15.0 mm	≥ 550 / 800 mm per side x 13 - 25 mm + wrap 2x 1-layer	**EI 120 C/U**	**3**
Outside pipe-Ø ≤ 28.0 mm	≥ 550 / 800 mm per side x 19 - 25 mm + wrap 2x 1-layer	**EI 120 C/U**	**3**
Outside pipe-Ø ≤ 42.0 mm	≥ 550 / 800 mm per side x 19 - 25 mm + wrap 2x 2-layer	**EI 120 C/U**	**3**
Non-combustible pipes made of copper, steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre "lamella mat"			
Outside pipe-Ø ≤ 15.0 mm	≥ 250 mm x ≥ 20 mm	**EI 90 / E 120 C/U**	**3**
	∞ x ≥ 20 mm	**EI 120 C/U**	**7**
Outside pipe-Ø ≤ 28.0 mm	≥ 750 mm x ≥ 30 mm + lamella mat ≥ 250 mm x ≥ 30 mm	**EI 90 / E 120 C/U**	**3**
	∞ x ≥ 30 mm + lamella mat ≥ 250 mm x ≥ 30 mm	**EI 120 C/U**	**7**
Outside pipe-Ø ≤ 42.0 mm	≥ 750 mm x ≥ 30 mm + lamella mat ≥ 250 mm x ≥ 30 mm	**EI 90 / E 120 C/U**	**3**
	∞ x ≥ 30 mm + lamella mat ≥ 250 mm x ≥ 30 mm	**EI 120 C/U**	**7**
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre "lamella mat"			
Outside pipe-Ø ≤ 63.5 mm	≥ 750 mm x ≥ 30 mm + lamella mat ≥ 250 mm x ≥ 30 mm	**EI 60 / E 120 C/U**	**3**
	∞ x ≥ 30 mm + lamella mat ≥ 500 mm x ≥ 30 mm	**EI 120 C/U**	**7**
Outside pipe-Ø ≤ 114.3 mm	≥ 1,000 mm x ≥ 30 mm + lamella mat ≥ 500 mm x ≥ 30 mm	**EI 60 / E 120 C/U**	**3**
	∞ x ≥ 30 mm + lamella mat ≥ 500 mm x ≥ 30 mm	**EI 120 C/U**	**7**

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1.8.3 Installation in floors, from below

1.8.3.1 2-layer penetration sealing system

Fire resistance classes			
	Measure	Floor	
		Fire resistance class	Source*
Cables, cable bundles and cable trays with coating „PYRO-SAFE® FLAMMOTECT-A“			
Cable Ø ≤ 21 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120**	**4**
Cable Ø ≤ 50 mm	≥ 150 mm, DFT ≥ 2 mm	**EI 120**	**4**
Cable Ø ≤ 80 mm	≥ 150 mm, DFT ≥ 2 mm	**EI 90**	**4**
Cable bundle Ø ≤ 100 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120**	**4**
Cables, cable bundles and cable trays with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
Cable Ø ≤ 21 mm	1x 1-layer, 40-60 mm overlap	**EI 120**	**4**
Cable bundle Ø ≤ 100 mm	1x 1-layer, 40-60 mm overlap	**EI 120**	**4**
Electrical installation conduits (EIC) with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
EIC single Ø ≤ 32 mm	2x 2-layer	**EI 120 U/U**	**4**
EIC bundled Ø ≤ 100 mm	2x 2-layer	**EI 120 U/U**	**4**
„Speed pipes“ bundled or single, with/without glass fibre cable, with fire protection wrap „PYRO-SAFE® DG-CR 1.5“ – Wrap width 125 mm			
Max. 24 pcs outside pipe Ø ≤ 7 Max. 7 pcs outside pipe Ø ≤ 10 Max. 5 pcs outside pipe Ø ≤ 12	2x 2-layer	**EI 120 U/U**	**4**
Special-duo-coax bundle with coating "PYRO-SAFE® FLAMMOTECT-A"			
Bundle Ø ≤ 90 mm / cable Ø ≤ 14 mm	≥ 150 mm, DFT ≥ 1 mm	**EI 120 U/U**	**4**
Combustible pipes made of PVC-U, PVC-C with intumescent wrap "PYRO-SAFE® DG-CR BS" – Wrap width 100 mm			
Outside pipe-Ø ≤ 50 mm	1x 1-layer	**EI 120 U/U**	**4**
Outside pipe-Ø ≤ 70 mm	1x 2-layer	**EI 120 U/U**	**4**
Outside pipe-Ø ≤ 110 mm	1x 3-layer	**EI 120 U/U**	**4**
Outside pipe-Ø ≤ 125 mm	1x 4-layer	**EI 120 U/U**	**4**
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation "NH/Armaflex", with fire protection wrap "PYRO-SAFE® DG-CR 1.5" – Wrap width 125 mm			
Outside pipe-Ø ≤ 15.0 mm	≥ 400 / 750 mm (bottom/top) x 13 - 24 mm + wrap 2x 1-layer	**EI 90 / E 120 C/U**	**4**
	≥ 400 / 750 mm (bottom/top) x 25 mm + wrap 2x 1-layer	**EI 120 C/U**	**4**
Outside pipe-Ø ≤ 28.0 mm	≥ 400 / 750 mm (bottom/top) x 19 - 25 mm + wrap 2x 1-layer	**EI 120 C/U**	**4**
Outside pipe-Ø ≤ 42.0 mm	≥ 400 / 750 mm (bottom/top) x 19 - 24 mm + wrap 2x 1-layer	**EI 90 / E 120 C/U**	**4**
	≥ 400 / 750 mm (bottom/top) x 25 mm + wrap 2x 1-layer	**EI 120 C/U**	**4**
Multilayer pipes "HENCO pipes" with non-combustible insulation made of mineral fibre "lamella mat"			
Outside pipe-Ø ≤ 12.0 mm	≥ 500 mm x ≥ 20 mm	**EI 120 U/C**	**4**
Outside pipe-Ø ≤ 63.0 mm	≥ 500 mm x ≥ 30 mm	**EI 120 U/C**	**4**
Multilayer pipes "HENCO pipes" with PE foam insulation with intumescent wrap "PYRO-SAFE® DG-CR BS" – Wrap width 100 mm			
Outside pipe-Ø ≤ 32.0 mm	2x 1-layer + lamella mat ≥ 500 mm x ≥ 20 mm	**EI 120 U/C**	**4**
Non-combustible pipes made of copper, steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre "lamella mat"			
Outside pipe-Ø ≤ 28.0 mm	≥ 500 / 500 mm (top/bottom) x ≥ 30 mm	**EI 120 C/U**	**4**

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Fire resistance classes			
	Measure	Floor	
		Fire resistance class	Source*
Outside pipe-Ø ≤ 42.0 mm	≥ 500 / 500 mm (top/bottom) x ≥ 40 mm	EI 120 C/U	4
Outside pipe-Ø ≤ 54.0 mm	∞ / ≥ 950 mm (top/bottom) x ≥ 40 mm	EI 120 C/U	6
	≥ 500 / 1,000 mm (top/bottom) x ≥ 30 mm + lamella mat ≥ 950 mm x ≥ 30 mm + lamella mat ≥ 500 mm x ≥ 30 mm	EI 120 C/U	4
Outside pipe-Ø ≤ 88.9 mm	∞ / ≥ 950 mm (top/bottom) x ≥ 40 mm	EI 120 C/U	6
	≥ 500 / 1,000 mm (top/bottom) x ≥ 40 mm + lamella mat ≥ 950 mm x ≥ 30 mm	EI 120 C/U	4
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre "lamella mat"			
Outside pipe-Ø ≤ 63.5 mm	∞ / ≥ 950 mm (top/bottom) x ≥ 30 mm	EI 120 C/U	6
	≥ 500 / 1,000 mm (top/bottom) x ≥ 30 mm + lamella mat ≥ 500 mm x ≥ 30 mm	EI 120 C/U	4
Outside pipe-Ø ≤ 114.3 mm	∞ / ≥ 950 mm (top/bottom) x ≥ 50 mm	EI 120 C/U	6
	≥ 500 / 1,000 mm (top/bottom) x ≥ 50 mm + lamella mat ≥ 950 mm x ≥ 30 mm	EI 120 C/U	4

* 1 → KB 02423.2/15/Z00NZP, 2 → KB 02423.3/15/Z00NZP, 3 → KB 02423.4/15/Z00NZP, 4 → KB 02423.5/15/Z00NZP, 5 → KB 02423.6/15/Z00NZP, 6 → Techn. Opinion No. 02423.7/15/Z00NZP, 7 → Techn. Opinion No. 02423.8/15/Z00NZP, 8 → Techn. Opinion No. 02423.9/15/Z00NZP, 9 → Techn. Opinion No. 01012/19/Z00NZP

1.8.3.2 3-layer penetration sealing system

Fire resistance classes			
	Measure	Floor	
		Fire resistance class	Source*
Cables, cable bundles and cable trays with coating „PYRO-SAFE® FLAMMOTECT-A“			
Cable Ø ≤ 21 mm	≥ 150 mm, DFT ≥ 1 mm	EI 120	5
Cable Ø ≤ 50 mm	≥ 150 mm, DFT ≥ 1 mm	EI 90	5
Cable Ø ≤ 80 mm	≥ 150 mm, DFT ≥ 1 mm	EI 90	5
Cable bundle Ø ≤ 100 mm	≥ 150 mm, DFT ≥ 1 mm	EI 120	5
Cables, cable bundles and cable trays with fire protection wrap "PYRO-SAFE® DG-CR 1.5" – Wrap width 125 mm			
Cable Ø ≤ 21 mm	1x 1-layer, 40-60 mm overlap	EI 120	5
Cable Ø ≤ 50 mm	1x 1-layer, 40-60 mm overlap	EI 90	5
Cable Ø ≤ 80 mm	1x 1-layer, 40-60 mm overlap	EI 90	5
Cable bundle Ø ≤ 100 mm	1x 1-layer, 40-60 mm overlap	EI 120	5
Multilayer pipes "HENCO pipes" with combustible insulation "Armaflex Protect"			
Outside pipe-Ø ≤ 12.0 mm	≥ 480 mm x 19 mm	EI 120 U/C	5
Outside pipe-Ø ≤ 63.0 mm	≥ 480 mm x 25 mm	EI 120 U/C	5
HVAC split line combinations with fire protection wrap "PYRO-SAFE® DG-CR 1.5" – Wrap width 125 mm			
Double (6-22/8-22 mm) or single copper pipe (6-22 mm) with PEF-Iso 9 mm + PE-HD pipe Ø ≤ 25 mm + max. 4 sheathed cables Ø ≤ 21 mm	2x 1-layer + lamella mat ≥ 250/500 mm (top/bottom) x ≥ 30 mm	EI 120 U/U	5

* 1 → KB 02423.2/15/Z00NZP, 2 → KB 02423.3/15/Z00NZP, 3 → KB 02423.4/15/Z00NZP, 4 → KB 02423.5/15/Z00NZP, 5 → KB 02423.6/15/Z00NZP, 6 → Techn. Opinion No. 02423.7/15/Z00NZP, 7 → Techn. Opinion No. 02423.8/15/Z00NZP, 8 → Techn. Opinion No. 02423.9/15/Z00NZP, 9 → Techn. Opinion No. 01012/19/Z00NZP

PYRO-SAFE® Flammotect OSI

2. Installation in shaft walls

PYRO-SAFE® Flammotect OSI

2.1 Allowed services

2.1.1 Cables / cable bundles / cable trays / electrical installation conduits / PE lines

Electrical cables and lines of all types (including optical fibre cables)

Overall cross-section of individual cable up to Ø ≤ 80 mm

Cable bundles

Up to Ø ≤ 100 mm with cables Ø ≤ 21 mm.

No filling necessary for tightly packed and tied cable bundles.

Special-duo-coax bundles (for TV upgrade)

Up to Ø ≤ 90 mm with cables Ø ≤ 14 mm.

acc. to DIN EN 50117-1 "TELASS CDF 101 (A+) with PE pipes Ø 3.5/5.0 FRNC" from Bedea Berkenhoff & Drebas GmbH or "oren Hydra-DD 113 (1.1/4.8) FRNC (A+) with PE pipes Ø 3.5/5.0" from Oren Kable.

+ A1-PVC cable (NYM-J 5x 1.5 mm², Ø 14 mm)

+ PVC cable (NYM-J 3x 1.5 mm², Ø 8 mm)

+ Grounding cable (H07V-U, 1x 4 mm², Ø 4 mm)

No gusset filling necessary for tightly packed, tied cable bundles.

Cable support structures

Cable trays and cable ladders made of steel.

Poss. with organic coatings if the overall reaction to fire corresponds to at least A2, acc. to EN 13501-1.

Electrical installation conduits, single made of plastic

Outside-Ø ≤ 32 mm, with/without cable configuration Ø ≤ 21 mm.

Electrical installation conduits, bundled made of plastic

Outside-Ø ≤ 100 mm with individual conduits Ø ≤ 32 mm, with/without cable configuration, individual cable Ø ≤ 21 mm.

PE lines "speed pipes" (for glass fibre cables and micro cables)

From Gabocom Systemtechnik GmbH, bundled or single, with/without glass fibre cable.

Outside pipe-Ø [mm]	Max. qty. [pcs.]	Pipe wall thickness [mm]
≤ 7	24	≤ 1.5
≤ 10	7	≤ 2.0
≤ 12	5	≤ 2.0

PYRO-SAFE® Flammotect OSI

2.2 Distances

Distances – shaft wall, 2-layer penetration seal design

		 Cables	 Cable bundles	 Cable trays	 Special-duo-coax bundles	 Electrical installation conduits single or bundled	 PE lines "speed pipes"	Seal edge		
								Upper	Under	Side
	Cables	≥ 0	≥ 0	≥ 0	≥ 0	≥ 25	≥ 10	≥ 0		
	Cable bundles	≥ 0	≥ 0	≥ 0	≥ 0	≥ 25	≥ 10			
	Cable trays	≥ 0	≥ 0	≥ 0 (≥ 40 above each other)	≥ 0	≥ 25	≥ 10			
	Special-duo-coax bundles	≥ 0	≥ 0	≥ 0	≥ 0	≥ 100	≥ 100	≥ 0		
	Electrical installation conduits single or bundled	≥ 25	≥ 25	≥ 25	≥ 100	≥ 0	≥ 100	≥ 10		
	PE lines "speed pipes"	≥ 10	≥ 10	≥ 10	≥ 100	≥ 100	≥ 0	≥ 0		

Distances – shaft wall, 3-layer penetration seal design

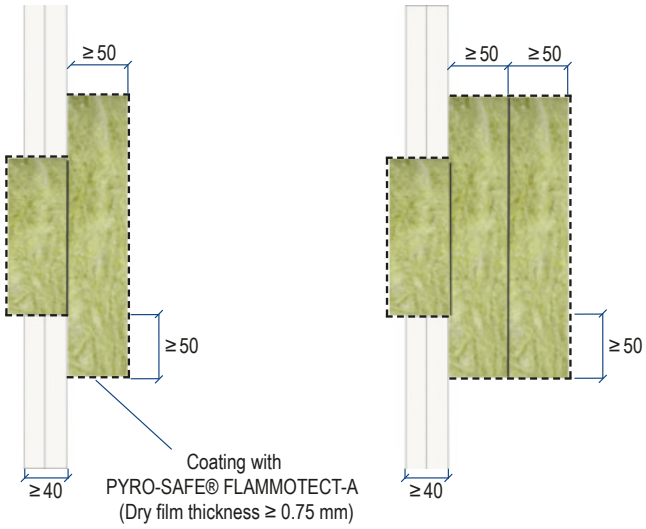
		 Cables	 Cable bundles	 Cable trays	Seal edge		
					Upper	Under	Side
	Cables	≥ 0	≥ 0	≥ 0	≥ 0		
	Cable bundles	≥ 0	≥ 0	≥ 0			
	Cable trays	≥ 0	≥ 0	≥ 0 (≥ 50 above each other)			

PYRO-SAFE® Flammotect OSI

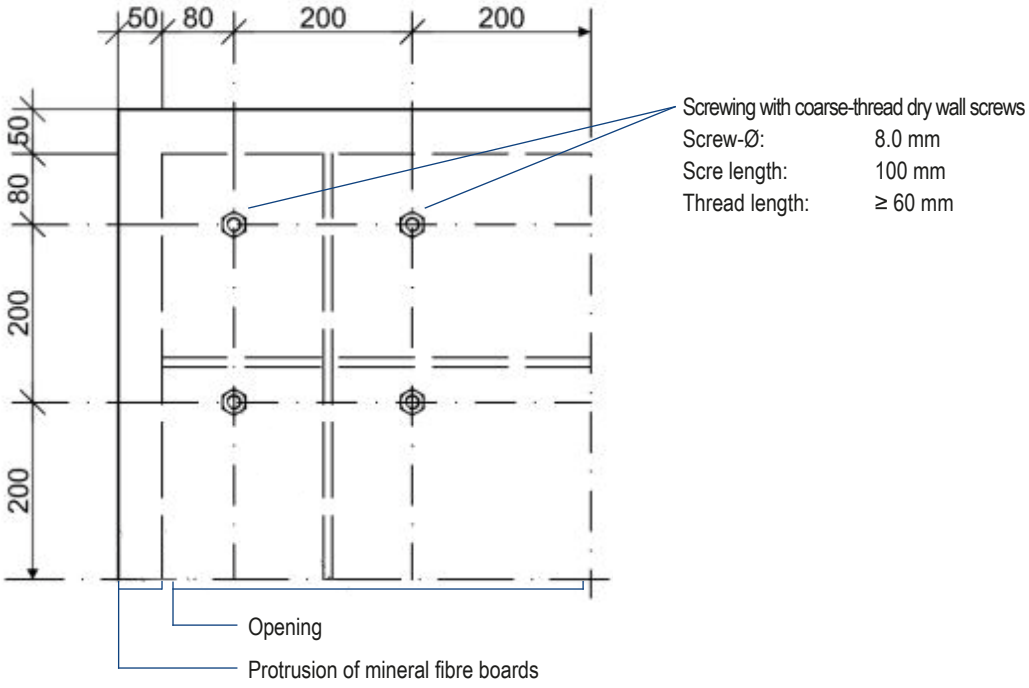
2.3 Regulations and variants / initial brackets (supports)

- The mixed penetration sealing system may be used to close openings without installations (so-called reserve penetration sealing system).
- The penetration seal surface of mineral fibre boards and their edges must be coated with PYRO-SAFE® FLAMMOTECT-A, dry film thickness ≥ 0.75 mm.
- The first layer of boards is carefully glued into the component with PYRO-SAFE® FLAMMOTECT-A, the other layers are then positioned on all sides of the component opening with a protrusion of 50 mm and fastened to the each of the preceding boards with coarse thread screws, see screw pattern below.
- In order to facilitate assembly, the mineral fibre boards can be glued using PYRO-SAFE® FLAMMOTECT-A to the component and/or to each other.
- The fire protection measures described on the following pages also apply to retrofitting.

Variants in shaft walls



Dimensions in mm

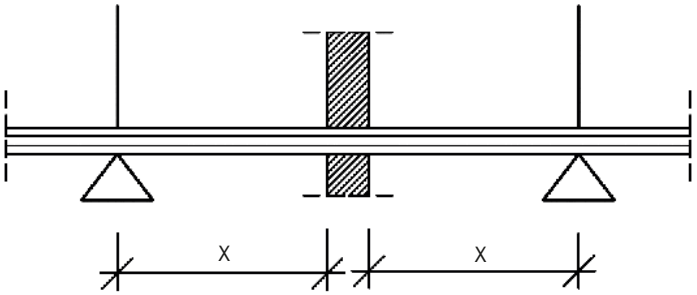


Screwing with coarse-thread dry wall screws

Screw-Ø:	8.0 mm
Scre length:	100 mm
Thread length:	≥ 60 mm

PYRO-SAFE® Flammotect OSI

Essential parts of the brackets/supports for the installations in front of the wall penetration sealing system must be non-combustible (construction material class DIN 4102-A) and must be configured with a spacing as per the overview on both sides.



Initial bracket (support) of the installations in front of the wall penetration sealing system made of steel or equivalent.

Initial brackets	
Cables, cable bundles, cable trays	≤ 300 mm
Special-duo-coax bundles	≤ 350 mm
Electrical installation conduits	≤ 300 mm
PE lines "speed pipes" for glass fibre cables and micro cables	according to manufacturer's specifications

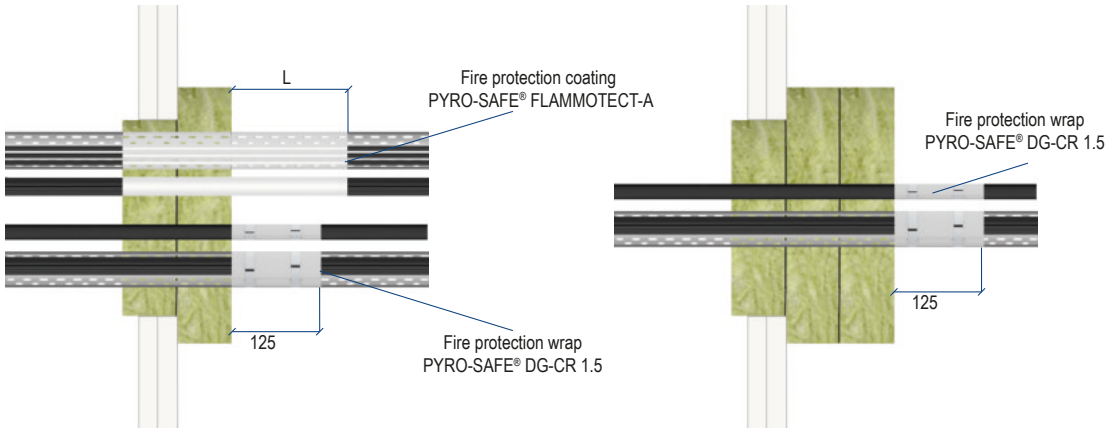
PYRO-SAFE® Flammotect OSI

2.4 Fire protection measures

2.4.1 Cables / cable bundles / cable trays

- The passage of cables or cable bundles is allowed without and with cable trays.
- Cable bundles can be installed unopened through the penetration sealing system. If they consist of parallel-running cables that are densely packed and permanently bound, stitched or welded together they don´t have to be filled inside with filler material.
- The support constructions of the cable trays must be designed in such a way that in the event of fire no additional mechanical stress can occur on the penetration sealing system.
- As an alternative to the coating, the passages can be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5.
- The fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers or 3-layers in shaft walls



Component, penetration seal thicknesses and implementation variants page 7 and page 17

Dimensions in mm

2-layer system

	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside L [mm]	Wall
Cables	Ø ≤ 21	≥ 1.0	100	≥ 150	EI 90 / E 120
Cable bundles	Ø ≤ 100	≥ 1.0		≥ 150	EI 120

	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
Cables	Ø ≤ 21	125	1	1	≥ 45	0	125	EI 120
Cable bundles	Ø ≤ 100							EI 90 / E 120

3-layer system

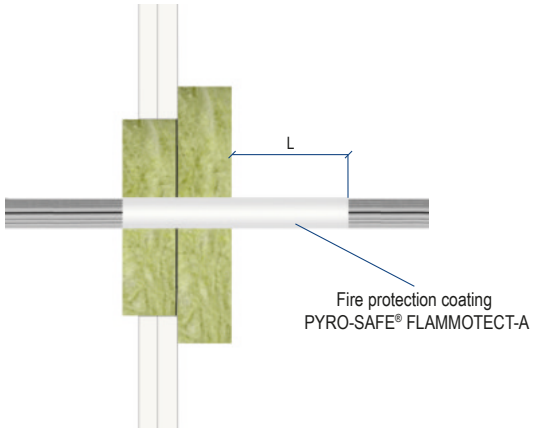
	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
Cables	Ø ≤ 21	125	1	1	≥ 45	0	125	EI 120
	Ø ≤ 50							EI 90 / E 120
	Ø ≤ 80							EI 90 / E 120
Cable bundles	Ø ≤ 100							EI 120

PYRO-SAFE® Flammotect OSI

2.4.2 Special-duo-coax bundles

- Special-duo-coax bundles may be routed unopened through the penetration seal and do not have to be filled internally (gusset) with construction materials if they consist of tightly packed cables which are tightly tied, sewn or welded together and run in parallel.
- The special-duo-coax bundles must be coated with PYRO-SAFE® FLAMMOTECT-A on a length of ≥ 150 mm on the installation side (dry film thickness ≥ 1.0 mm).

2-layers in shaft walls



Component, penetration seal thicknesses and implementation variants page 7 and page 17

Dimensions in mm

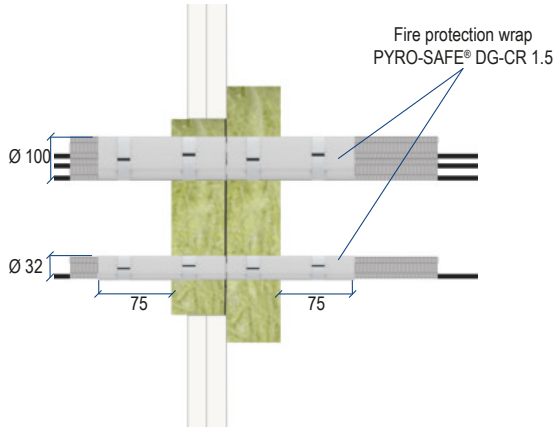
	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Wall
Bundle / cable	Ø ≤ 90 / Ø ≤ 14	≥ 1.0	100	≥ 150	EI 120 U/U

PYRO-SAFE® Flammotect OSI

2.4.3 Electrical installation conduits, single or bundled

- Electrical installation conduits can be passed through both individually and in bundled form with/without cable configuration.
- The electrical installation conduits must be wrapped on both sides with the fire protection wrap PYRO-SAFE® DG-CR 1.5.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in shaft walls



Component, penetration seal thicknesses and implementation variants page 7 and page 17

Dimensions in mm

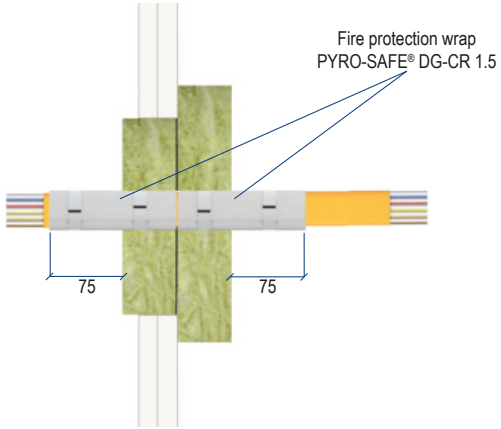
	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
EIC made of plastic, single	Ø ≤ 32 (with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 120 U/U
EIC made of plastic, bundled	Ø ≤ 100 (single conduits up to Ø ≤ 32, with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 120 U/U

PYRO-SAFE® Flammotect OSI

2.4.4 PE lines "speed pipes"

- PE lines "speed pipes" must be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5 on both sides.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in shaft walls



Component, penetration seal thicknesses and implementation variants page 7 and page 17

Dimensions in mm

Speed pipe configuration	Wall thickness [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
24 pcs. x Ø 7 mm	≥ 1.5	125	2	2	0	50	75	EI 120 U/U
7 pcs. x Ø 10 mm	≥ 2.0							
5 pcs. x Ø 12 mm	≥ 2.0							

PYRO-SAFE® Flammotect OSI

3. Installation in plasterboard walls and solid walls

PYRO-SAFE® Flammotect OSI

3.1 Allowed services

3.1.1 Cables / cable bundles / cable trays / electrical installation conduits / PE lines

Electrical cables and lines of all types (including optical fibre cables)

Overall cross-section of individual cable up to Ø ≤ 80 mm

Cable bundles

Up to Ø ≤ 100 mm with cables Ø ≤ 21 mm.

No filling necessary for tightly packed and tied cable bundles.

Special-duo-coax bundles (for TV upgrade)

Up to Ø ≤ 90 mm with cables Ø ≤ 14 mm.

acc. to DIN EN 50117-1 "TELASS CDF 101 (A+) with PE pipes Ø 3.5/5.0 FRNC" from Bedea Berkenhoff & Drebas GmbH or "oren Hydra-DD 113 (1.1/4.8) FRNC (A+) with PE pipes Ø 3.5/5.0" from Oren Kable.

+ A1-PVC cable (NYM-J 5x 1.5 mm², Ø 14 mm)

+ PVC cable (NYM-J 3x 1.5 mm², Ø 8 mm)

+ Grounding cable (H07V-U, 1x 4 mm², Ø 4 mm)

No gusset filling necessary for tightly packed, tied cable bundles.

Cable support structures

Cable trays and cable ladders made of steel.

Poss. with organic coatings if the overall reaction to fire corresponds to at least A2, acc. to EN 13501-1.

Electrical installation conduits, single made of plastic

Outside-Ø ≤ 32 mm, with/without cable configuration Ø ≤ 21 mm.

Electrical installation conduits, bundled made of plastic

Outside-Ø ≤ 100 mm with individual conduits Ø ≤ 32 mm, with/without cable configuration, individual cable Ø ≤ 21 mm.

PE lines "speed pipes" (for glass fibre cables and micro cables)

From Gabocom Systemtechnik GmbH, bundled or single, with/without glass fibre cable.

Outside pipe-Ø [mm]	Max. qty. [pcs.]	Pipe wall thickness [mm]
≤ 7	24	≤ 1.5
≤ 10	7	≤ 2.0
≤ 12	5	≤ 2.0

PYRO-SAFE® Flammotect OSI

3.1.2 Combustible pipes

Combustible pipes

With fire protection wrap PYRO-SAFE® DG-CR BS up to an outside Ø ≤ 125 mm for ventilated sewer pipes and closed piping systems. Circulation of non-combustible liquids and gases (except ventilation pipes).

PVC-U, PVC-C

Standards:
EN 1329-1, EN 1453-1, EN 1542-1, EN 15493, DIN 8061/8062, EN 1566-1

Outside pipe-Ø [mm]	Wall thickness [mm]
≤ 50	1.8 - 3.7
≤ 70	1.9 - 6.0
≤ 80	2.0 - 6.0
≤ 100	2.1 - 8.2
≤ 110	2.2 - 8.2

3.1.3 Non-combustible pipes

Non-combustible pipes

Pipes made of copper, steel, stainless steel or cast iron*

Pipe material / insulation	Outside Ø [mm]	Wall thickness [mm]
Copper with non-combustible insulation made of mineral fibre, e.g. "Klimarock"	≤ 15.0	≥ 0.8
	≤ 28.0	≥ 1.0
	≤ 42.0	≥ 1.2
Steel, stainless steel, cast iron with non-combustible insulation made of mineral fibre, e.g. "Klimarock"	≤ 63.5	≥ 2.3
	≤ 114.3	≥ 2.9
Copper with combustible insulation made of FEF "NH/Armaflex"	≤ 15.0	≥ 0.8
	≤ 28.0	≥ 0.9
	≤ 42.0	≥ 1.1

* The penetration seal may also be used for pipes from other materials, whose heat transfer rate is lower than that of steel or copper with a melting point ≥ 1049°C

PYRO-SAFE® Flammotect OSI

3.2 Distances

Distances

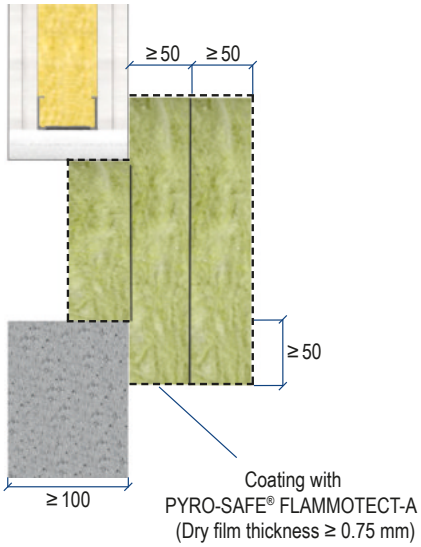
		 Cables	 Cable bundles	 Cable trays	 Special-duo-coax bundles	 Electrical installaion conduits single or bundled	 Combustible pipes	 Non-combustible pipes; Insulation made of mineral fibre	 Non-combustible pipes, insulation made of FEF "NH/Armaflex"	 PE lines "speed pipes"	Seal edge		
		Cables	Cable bundles	Cable trays	Special-duo-coax bundles	Electrical installaion conduits single or bundled	Combustible pipes	Non-combustible pipes; Insulation made of mineral fibre	Non-combustible pipes, insulation made of FEF "NH/Armaflex"	PE lines "speed pipes"	Upper	Under	Side
	Cables	≥ 0	≥ 0	≥ 0	≥ 0	≥ 25	≥ 50	≥ 20	≥ 25	≥ 10	≥ 0		
	Cable bundles	≥ 0	≥ 0	≥ 0	≥ 0	≥ 25	≥ 50	≥ 20	≥ 25	≥ 10			
	Cable trays	≥ 0	≥ 0	≥ 0 (≥ 40 above each other)	≥ 0	≥ 25	≥ 50	≥ 20	≥ 25	≥ 10			
	Special-duo-coax bundles	≥ 0	≥ 0	≥ 0	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥100	≥ 0		
	Electrical installaion conduits single or bundled	≥ 25	≥ 25	≥ 25	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 10		
	Combustible pipes	≥ 50	≥ 50	≥ 50	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 100	≥ 0		
	Non-combustible pipes; Insulation made of mineral fibre	≥ 20	≥ 20	≥ 20	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0	≥ 100	≥ 0		
	Non-combustible pipes; insulation made of FEF „NH/Armaflex“	≥ 25	≥ 25	≥ 25	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0	≥ 100	≥ 0		
	PE lines "speed pipes"	≥ 10	≥ 10	≥ 10	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0		

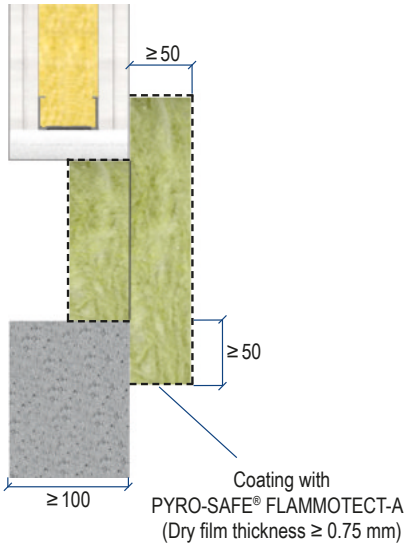
PYRO-SAFE® Flammotect OSI

3.3 Regulations and variants / initial brackets (supports)

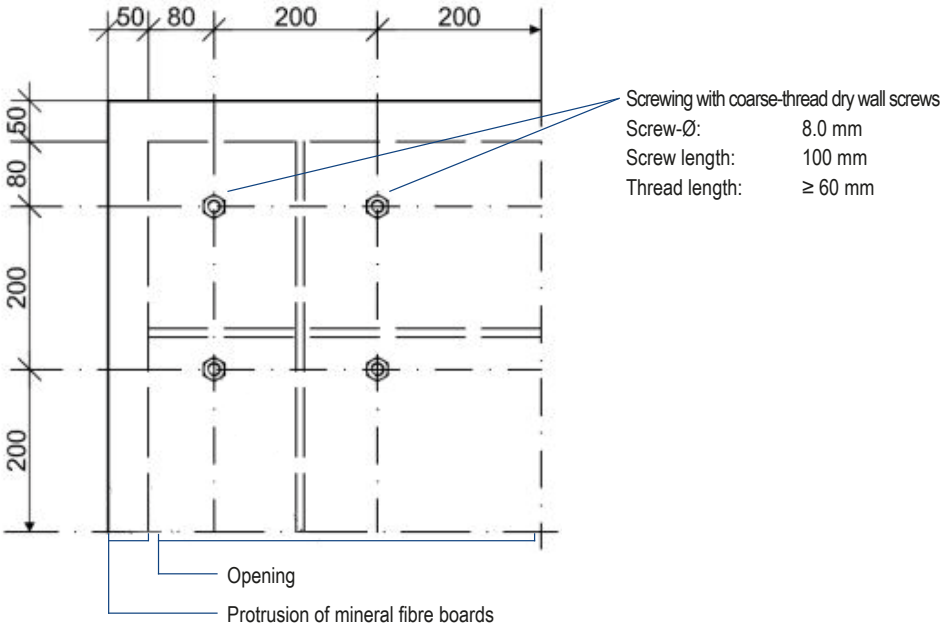
- The mixed penetration sealing system may be used to close openings without installations (so-called reserve penetration sealing system).
- Depending on the installed media, a 2-layer or 3-layer system is required. Media which require a 2-layer penetration sealing can also be sealed with 3 layers.
- For installation in plasterboard walls, a circumferential reveal lining is required.
- The penetration seal surface of mineral fibre boards and their edges must be coated with PYRO-SAFE® FLAMMOTECT-A, dry film thickness ≥ 0.75 mm.
- The first layer of boards is carefully glued into the component with PYRO-SAFE® FLAMMOTECT-A, the other layers are then positioned on all sides of the component opening with a protrusion of 50 mm and fastened to the each of the preceding boards with coarse thread screws, see screw pattern below.
- In order to facilitate assembly, the mineral fibre boards can be glued using PYRO-SAFE® FLAMMOTECT-A to the component and/or to each other.
- The fire protection measures described on the following pages also apply to retrofitting.

Variants in plasterboard walls or solid walls



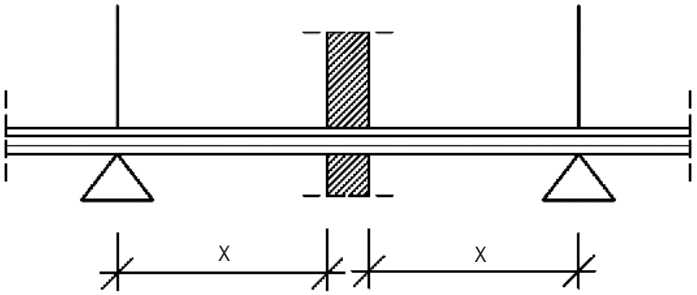


Dimensions in mm



PYRO-SAFE® Flammotect OSI

Essential parts of the brackets/supports for the installations in front of the wall penetration sealing system must be non-combustible (construction material class DIN 4102-A) and must be configured with a spacing as per the overview on both sides.



Initial bracket (support) of the installations in front of the wall penetration sealing system made of steel or equivalent.

Initial brackets	
Cables, cable bundles, cable trays	≤ 300 mm
Special-duo-coax bundles	≤ 350 mm
Electrical installation conduits	≤ 300 mm
Combustible pipes	≤ 500 mm
Non-combustible pipes – insulation made of mineral fibre	≤ 600 mm
Non-combustible pipes – installation made of FEF	≤ 600 mm
PE lines "speed pipes" for glass fibre cables and micro cables	according to manufacturer's specifications

PYRO-SAFE® Flammotect OSI

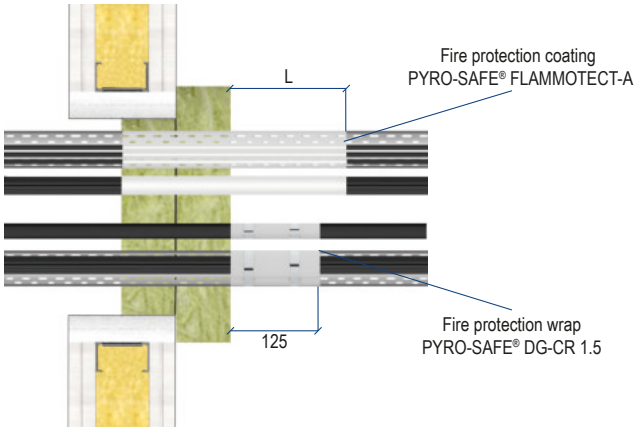
3.4 Fire protection measures

3.4.1 Cables / cable bundles / cable trays

3.4.1.1 2-layer system

- The passage of cables or cable bundles is permitted without and with cable trays.
- Cable bundles may be routed unopened through the penetration seal and do not have to be filled internally (gusset) with construction materials if they consist of tightly packed cables which are tightly tied, sewn or welded together and run in parallel.
- The support structures of the cable trays must be designed in such a way that in the event of fire no additional mechanical stress can occur on the penetration sealing system.
- As an alternative to the coating, cables can be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Wall
Cables	Ø ≤ 21	≥ 1.0	100	≥ 150	EI 90 / E 120
Cable bundles	Ø ≤ 100	≥ 1.0		≥ 150	EI 120

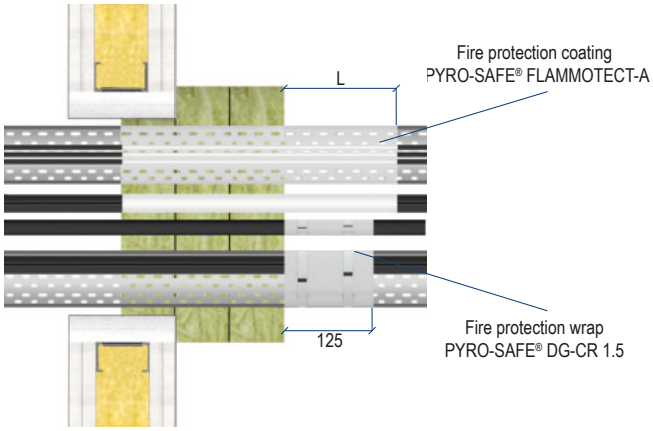
	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
Cables	Ø ≤ 21	125	1	1	≥ 45	0	125	EI 120
Cable bundles	Ø ≤ 100							EI 90 / E 120

PYRO-SAFE® Flammotect OSI

3.4.1.2 3-layer system

- The passage of cables or cable bundles is permitted without and with cable trays.
- Cable bundles may be routed unopened through the penetration seal and do not have to be filled internally (gusset) with construction materials if they consist of tightly packed cables which are tightly tied, sewn or welded together and run in parallel.
- The support structures of the cable trays must be designed in such a way that in the event of fire no additional mechanical stress can occur on the penetration sealing system.
- As an alternative to the coating, cables can be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

3-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Wall
Cables	Ø ≤ 21	≥ 1.0	150	≥ 150	EI 120
	Ø ≤ 50	≥ 1.0		≥ 150	EI 90 / E 120
	Ø ≤ 80	≥ 1.0		≥ 150	EI 90 / E 120
Cable bundles	Ø ≤ 100	≥ 1.0		≥ 150	EI 120

	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
Cables	Ø ≤ 21	125	1	1	≥ 45	0	125	EI 120
	Ø ≤ 50							EI 90 / E 120
	Ø ≤ 80							EI 90 / E 120
Cable bundles	Ø ≤ 100							EI 120

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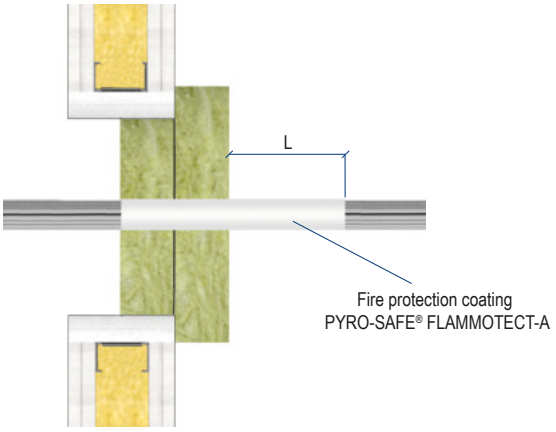
3.4.2 Special-duo-coax bundles

- Special-duo-coax bundles may be routed unopened through the penetration seal and do not have to be filled internally (gusset) with construction materials if they consist of tightly packed cables which are tightly tied, sewn or welded together and run in parallel.
- The special-duo-coax bundles must be coated using PYRO-SAFE® FLAMMOTECT-A over a length of ≥ 150 mm on the installation side (dry film thickness ≥ 1.0 mm).

2-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Wall
Bundle / cable	Ø ≤ 90 / Ø ≤ 14	≥ 1.0	100 / 150	≥ 150	EI 120

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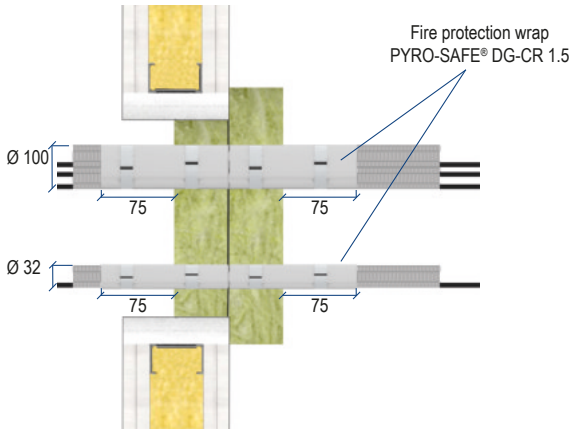
3.4.3 Electrical installation conduits, single or bundled

- Electrical installation conduits can be passed through both single and in bundled form with/without cable configuration up to Ø ≤ 21 mm.
- Electrical installation conduits must be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5 on both sides.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

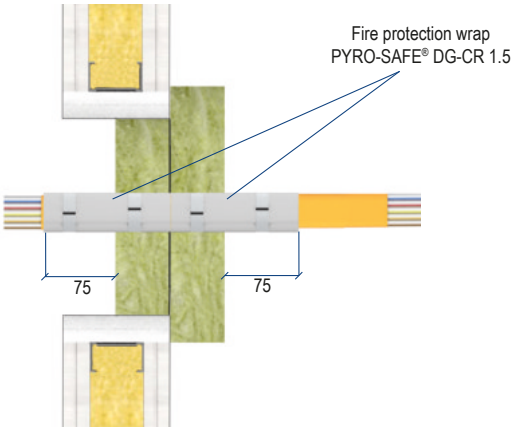
	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
EIC made of plastic, single	Ø ≤ 32 (With/without cables Ø≤ 21)	125	2	2	0	50	75	EI 120 U/U
EIC made of plastic, bundled	Ø ≤ 100 (Single conduits Ø ≤ 32 with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 120 U/U

PYRO-SAFE® Flammotect OSI

3.4.4 PE lines "speed pipes"

- PE lines “speed pipes” must be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5 on both sides.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

Speed pipe configuration	Wall thickness [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
24 pcs. x Ø 7 mm	≥ 1.5	125	2	2	0	50	75	EI 120 U/U
7 pcs. x Ø 10 mm	≥ 2.0							
5 pcs. x Ø 12 mm	≥ 2.0							

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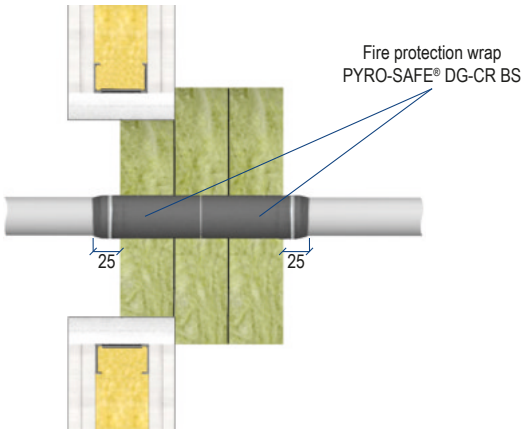
3.4.5 Combustible pipes

- The penetration sealing system must only be used on pneumatic conveyor systems, compressed air lines, etc. if the pipe system is shut off in the event of a fire.
- Fire protection wrap PYRO-SAFE® DG-CR BS is coated on both sides and is equipped with a protective film. This must be removed before the wrap is positioned and fixed with steel wires.

2-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

Combustible pipes made of PVC-U, PVC-C							
Dimensions [mm]	Intumescent wrap PYRO-SAFE® DG-CR BS						Fire resistance class
	Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall
Ø ≤ 50	100	2	1	0	75	25	EI 120 U/U
Ø ≤ 70			2				EI 120 U/U
Ø ≤ 110			3				EI 120 U/U

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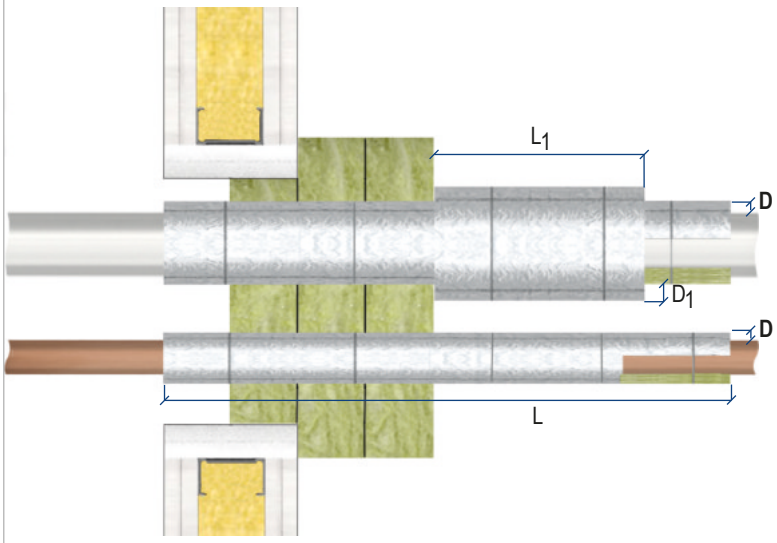
3.4.6 Non-combustible pipes – insulation made of lamella mat "KLIMAROCK"

- Depending on the outside pipe-Ø, an additional protective insulation made of mineral fibre mats may be necessary.
- The section insulation must be positioned so that it protrudes 50 mm on the opposite side.
- The insulation must be fixed with tension straps or wire.

2-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

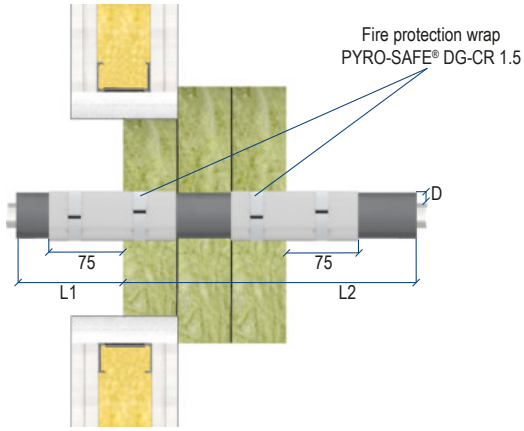
Pipe material	Outside pipe-Ø [mm]	Section insulation		Protective insulation		Fire resistance class
		Insulation length L [mm]	Insulation thickness D [mm]	Insulation length L [mm]	Insulation thickness D1 [mm]	Wall
Copper, steel, stainless steel, cast iron	Ø ≤ 15.0	≥ 250	≥ 20	-	-	EI 90 / E 120 C/U
		∞	≥ 20	-	-	EI 120 C/U
	Ø ≤ 42.0	≥ 750	≥ 30	≥ 250	≥ 30	EI 90 / E 120 C/U
		∞	≥ 30	≥ 250	≥ 30	EI 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 63.5	≥ 750	≥ 30	≥ 250	≥ 30	EI 60 / E 120 C/U
		∞	≥ 30	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 114.3	≥ 1,000	≥ 30	≥ 500	≥ 30	EI 60 / E 120 C/U
		∞	≥ 30	≥ 500	≥ 30	EI 120 C/U

PYRO-SAFE® Flammotect OSI

3.4.7 Non-combustible pipes – insulation made of FEF "NH/Armaflex"

- Section insulation made of FEF must be routed through the component opening to be sealed.
- The pipes must be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in plasterboard walls or solid walls



Component, penetration seal thicknesses and design variants page 7 and page 27

Dimensions in mm

Pipe material	Outer pipe-Ø [mm]	Insulation length (L1) / (L2) x Insulation thickness D [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5					Fire resistance class
			Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Inside seal [mm]	Outside seal [mm]	Wall
Copper, steel, stainless steel, cast iron	Ø ≤ 15,0	≥ 550 / ≥ 800 x 13 - 25	125	2	1	50	75	EI 120 C/U
	Ø ≤ 28.0	≥ 550 / ≥ 800 x 19 - 25						EI 120 C/U
	Ø ≤ 42.0	≥ 550 / ≥ 800 x 19 - 25			2			EI 120 C/U

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4. Installation in solid floors – installation from below

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4.1 Allowed services

4.1.1 Cables / cable bundles / cable trays / electrical installation conduits / PE lines

Electrical cables and lines of all types (including optical fibre cables)

Overall cross-section of individual cable up to Ø ≤ 80 mm

Cable bundles

Up to Ø ≤ 100 mm with cables Ø ≤ 21 mm.

No filling necessary for tightly packed and tied cable bundles.

Special-duo-coax bundles (for TV upgrade)

Up to Ø ≤ 90 mm with cables Ø ≤ 14 mm.

acc. to DIN EN 50117-1 "TELASS CDF 101 (A+) with PE pipes Ø 3.5/5.0 FRNC" from Bedea Berkenhoff & Drebas GmbH or "oren Hydra-DD 113 (1.1/4.8) FRNC (A+) with PE pipes Ø 3.5/5.0" from Oren Kable.

+ A1-PVC cable (NYM-J 5x 1.5 mm², Ø 14 mm)

+ PVC cable (NYM-J 3x 1.5 mm², Ø 8 mm)

+ Grounding cable (H07V-U, 1x 4 mm², Ø 4 mm)

No gusset filling necessary for tightly packed, tied cable bundles.

Cable support structures

Cable trays and cable ladders made of steel.

Poss. with organic coatings if the overall reaction to fire corresponds to at least A2, acc. to EN 13501-1.

Electrical installation conduits, single made of plastic

Outside-Ø ≤ 32 mm, with/without cable configuration Ø ≤ 21 mm.

Electrical installation conduits, bundled made of plastic

Outside-Ø ≤ 100 mm with individual conduits Ø ≤ 32 mm, with/without cable configuration, individual cable Ø ≤ 21 mm.

PE lines "speed pipes" (for glass fibre cables and micro cables)

From Gabocom Systemtechnik GmbH, bundled or single, with/without glass fibre cable.

Outside pipe-Ø [mm]	Max. qty. [pcs.]	Pipe wall thickness [mm]
≤ 7	24	≤ 1.5
≤ 10	7	≤ 2.0
≤ 12	5	≤ 2.0

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4.1.2 Combustible pipes

Combustible pipes	
Design with fire protection wrap PYRO-SAFE® DG-CR BS up to an outer Ø of ≤ 125 mm for ventilated waste water pipes and closed pipe systems. Non-combustible fluids or non-combustible gases (with the exception of ventilation pipes) may be carried in the pipes.	
PVC-U, PVC-C	
Standards: EN 1329-1, EN 1453-1, EN 1542-1, EN 15493, DIN 8061/8062, EN 1566-1	
Outside pipe-Ø [mm]	**Pipe wall thickness [mm]**
≤ 50	1.8 - 3.7
≤ 70	1.9 - 6.0
≤ 80	2.0 - 6.0
≤ 100	2.1 - 8.2
≤ 110	2.2 - 8.2
≤ 125	2.5 - 6.0

4.1.3 Multilayer pipes

Multilayer pipes "HENCO pipes"	
Pipes in a multilayer composite of aluminium and cross-linked PE from HENCO with an outer diameter of ≤ 63.0 mm	
Without PE foam insulation	
Pipe outer-Ø [mm]	**Pipe wall thickness [mm]**
≤ 12	1.6
≤ 32	3.0
≤ 63	4.5
With PE foam insulation	
Pipe outer-Ø [mm]	**Pipe wall thickness [mm]**
≤ 14	2.0
≤ 32	3.0

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4.1.4 Non-combustible pipes

Non-combustible pipes Pipes made of copper, steel, stainless steel or cast iron*		
Pipe material / insulation	**Outside Ø [mm]**	**Wall thickness [mm]**
Copper with non-combustible insulation made of mineral fibre, e.g. "Klimarock"	≤ 15.0	≥ 0.8
	≤ 21.8	≥ 0.9
	≤ 28.0	≥ 1.0
	≤ 35.0	≥ 1.1
	≤ 42.0	≥ 1.2
	≤ 46.0	≥ 1.3
	≤ 50.0	≥ 1.4
	≤ 54.0	≥ 1.5
	≤ 61.0	≥ 1.6
	≤ 74.9	≥ 1.8
	≤ 88.9	≥ 2.0
Steel, stainless steel, cast iron with non-combustible insulation made of mineral fibre, e.g. "Klimarock"	≤ 63.5	≥ 2.3
	≤ 72.0	≥ 2.4
	≤ 80.4	≥ 2.5
	≤ 88.9	≥ 2.6
	≤ 97.4	≥ 2.7
	≤ 105.8	≥ 2.8
	≤ 114.3	≥ 2.9
Copper with combustible insulation made of FEF "NH/Armaflex"	≤ 15.0	≥ 0.8
	≤ 21.5	≥ 0.9
	≤ 28.0	≥ 1.0
	≤ 35.0	≥ 1.1
	≤ 42.0	≥ 1.2

* Pipes made of other metals whose heat transfer is lower than steel or copper with a melting point of ≥ 1,049°C may also be sealed.

4.1.5 HVAC split line combinations

HVAC split line combinations

E.g. "Tubolit DuoSplit" or "Tubolit Split" from Armacell or types with the same parameters.

Double (6-22/8-22 mm) or single copper pipe (6-22 mm) and 9 mm thick PE foam pipe insulation according to EN14313 with optional accompanying pipes (one plastic pipe (U/U) made of PE-HD, outer Ø 25 mm and pipe wall thickness 1.8-3.5 mm, according to EN 1519-1, DIN 8074:2011, DIN 8075:2011 and 4 sheathed lines Ø ≤ 21 mm at zero distance).

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4.2 Distances

Distances

		Cables	Cable bundles	Cable trays	Special-duo-coax-bundles	Electrical installation conduits, single or bundled	Combustible pipes	Multilayer pipes	Non-combustible pipes; insulation made of "lamellamat"	Non-combustible pipes, insulation made of FEF "NH/ Armaflex"	HVAC split line combinations	PE lines "speed pipes"	Seal edge		
													Upper	Under	Side
	Cables	0	0	0	100	50	50	100	0	25	100	0	0		
	Cable bundles	0	0	0	100	50	50	100	0	25	100	0	0		
	Cable trays	0	0	0	100	50	50	100	0	25	100	0	0		
	Special-duo-coax bundles	100	100	100	25	100	100	100	100	100	100	100	0		
	Electrical installation conduits, single or bundled	50	50	50	100	25	100	100	100	100	100	100	100		
	Combustible pipes	50	50	50	100	100	100	45	0	0	100	100	0		
	Multilayer pipes	100	100	100	100	100	45	100	0	100	100	100	0		
	Non-combustible pipes; insulation made of "lamellamat"	0	0	0	100	100	0	0	100	0	100	100	0		
	Non-combustible pipes; insulation made of FEF "NH/ Armaflex"	25	25	25	100	100	0	100	0	0	100	100	100		
	HVAC split line combinations	100	100	100	100	100	100	100	100	100	100	100	100		
	PE lines "speed pipes"	0	0	0	100	100	100	100	100	100	100	0	0		

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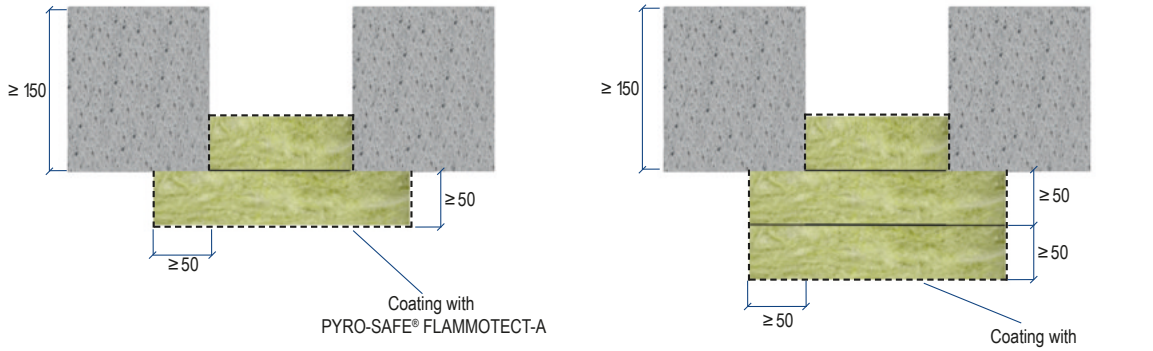
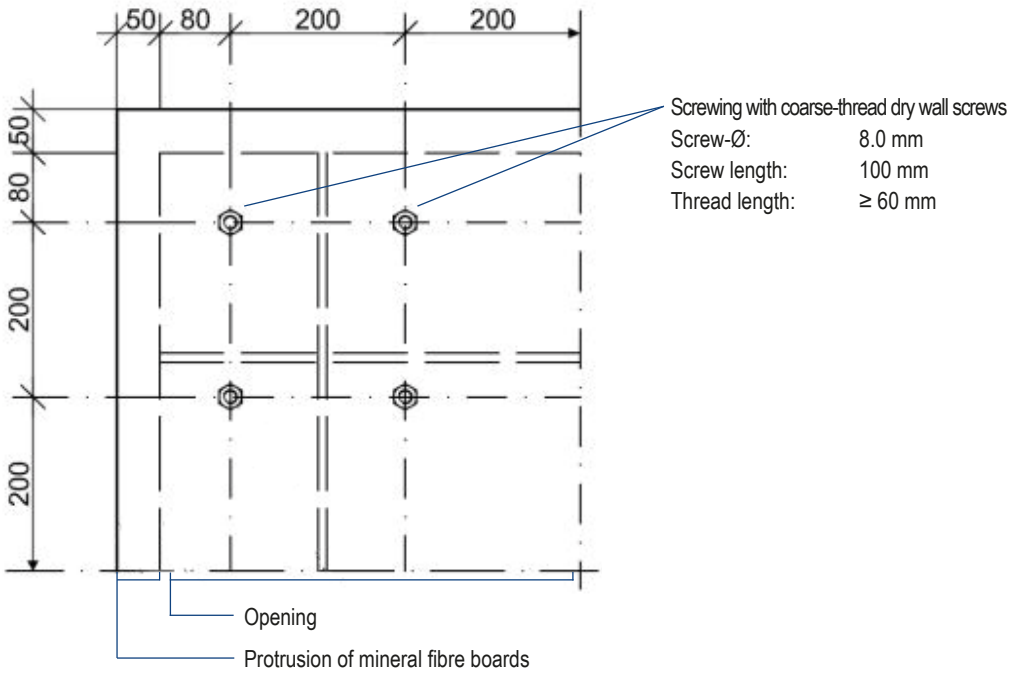
4.3 Regulations and variants / initial brackets (supports)

- The mixed penetration sealing system may be used to close openings without installations (so-called reserve penetration sealing system).
- Depending on the installed media, a 2-layer or 3-layer system is required. Media which require a 2-layer penetration sealing can also be sealed with 3 layers.
- For installation in plasterboard walls, a circumferential reveal lining is required.
- The penetration seal surface of mineral fibre boards and their edges must be coated with PYRO-SAFE® FLAMMOTECT-A, dry film thickness ≥ 0.75 mm.
- The first layer of boards is carefully glued into the component with PYRO-SAFE® FLAMMOTECT-A, the other layers are then positioned on all sides of the component opening with a protrusion of 50 mm and fastened to the each of the preceding boards with coarse thread screws, see screw pattern below.
- In order to facilitate assembly, the mineral fibre boards can be glued using PYRO-SAFE® FLAMMOTECT-A to the component and/or to each other.
- The fire protection measures described on the following pages also apply to retrofitting.

Variants in solid floors



Dimensions in mm



Screwing with coarse-thread dry wall screws

Screw-Ø:	8.0 mm
Screw length:	100 mm
Thread length:	≥ 60 mm

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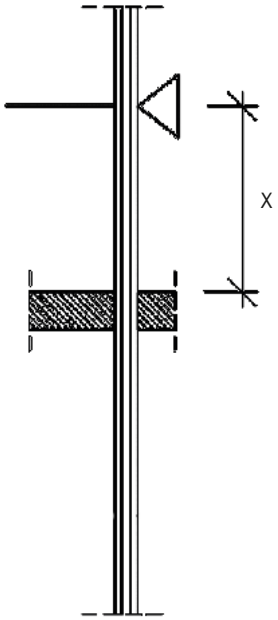
Essential parts of the brackets/supports for the installations in front of the wall penetration sealing system must be non-combustible (construction material class DIN 4102-A) and must be configured with a spacing as per the overview on both sides.



Initial bracket (support) of the installations in front of the wall penetration sealing system made of steel or equivalent.

Initial brackets	
Cables, cable bundles, cable trays	≤ 500
Special-duo-coax bundles	≤ 500
Electrical installation conduits	≤ 500
Combustible pipes	≤ 750
Multilayer pipes	≤ 750
Non-combustible pipes – insulation made of mineral fibre	≤ 800
Non-combustible pipes – insulation made of FEF	≤ 700
PE lines "speed pipes" for glass fibre cables and micro cables	according to manufacturer's specifications
HVAC split line combinations	≤ 500

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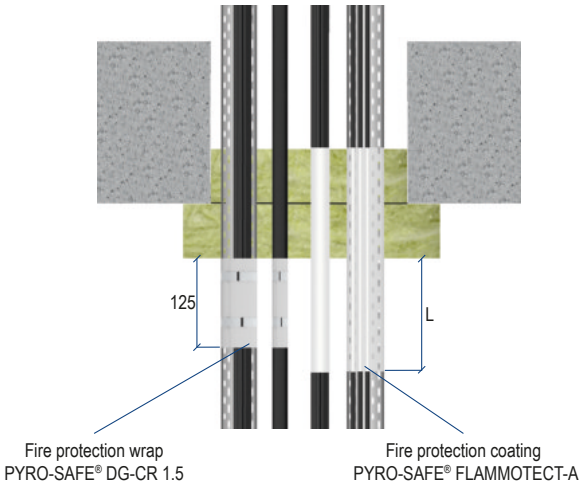
4.4 Fire protection measures

4.4.1 Cables / cable bundles / cable trays

4.4.1.1 2-layer system

- The passage of cables or cable bundles is permitted without and with cable trays.
- Cable bundles may be routed unopened through the penetration sealing system and do not have to be filled internally (gusset) with construction materials if they consist of tightly packed cables which are tightly tied, sewn or welded together and run in parallel.
- The support structures of the cable trays must be designed in such a way that in the event of fire no additional mechanical stress can occur on the penetration sealing system.
- As an alternative to the coating, cables can be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Floor
Cables	Ø ≤ 21	≥ 1.0	100	≥ 150	EI 120
	Ø ≤ 50	≥ 2.0		≥ 150	EI 90
	Ø ≤ 80	≥ 2.0		≥ 150	EI 90
Cable bundles	Ø ≤ 100	≥ 1.0		≥ 150	EI 120

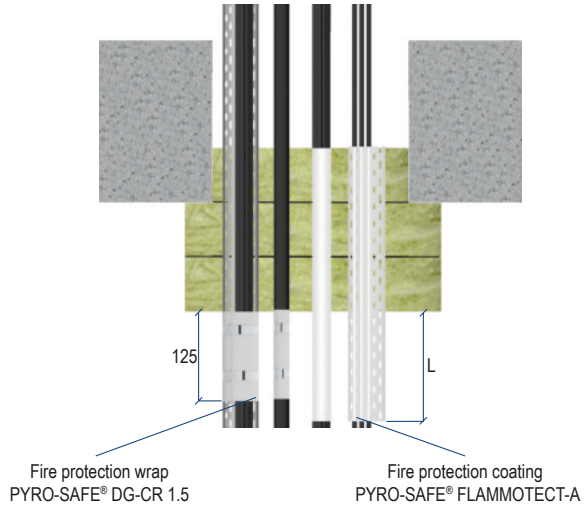
	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Floor
Cables	Ø ≤ 21	125	1	1	≥ 45	0	125	EI 120
Cable bundles	Ø ≤ 100							EI 120

PYRO-SAFE® Flammotect OSI

4.4.1.2 3-layer system

- The passage of cables or cable bundles is permitted without and with cable trays.
- Cable bundles may be routed unopened through the penetration sealing system and do not have to be filled internally (gusset) with construction materials if they consist of tightly packed cables which are tightly tied, sewn or welded together and run in parallel.
- The support structures of the cable trays must be designed in such a way that in the event of fire no additional mechanical stress can occur on the penetration sealing system.
- As an alternative to the coating, cables can be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

3-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Floor
Cables	Ø ≤ 21	≥ 1.0	100	≥ 150	EI 120
	Ø ≤ 50	≥ 1.0		≥ 150	EI 90
	Ø ≤ 80	≥ 1.0		≥ 150	EI 90
Cable bundles	Ø ≤ 100	≥ 1.0		≥ 150	EI 120

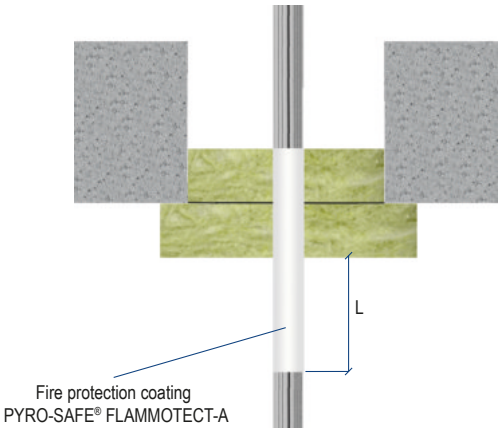
	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Floor
Cables	Ø ≤ 21	125	1	1	≥ 45	0	125	EI 120
	Ø ≤ 50							EI 90
	Ø ≤ 80							EI 90
Cable bundles	Ø ≤ 100							EI 120

PYRO-SAFE® Flammotect OSI

4.4.2 Special-duo-coax bundles

- Special-duo-coax bundles may be routed unopened through the penetration seal and do not have to be filled internally (gusset) with construction materials if they consist of tightly packed cables which are tightly tied, sewn or welded together and run in parallel.
- The special-duo-coax bundles must be coated with PYRO-SAFE® FLAMMOTECT-A over a length of ≥ 150 mm on the installation side (dry layer thickness ≥ 1.0 mm).

2-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

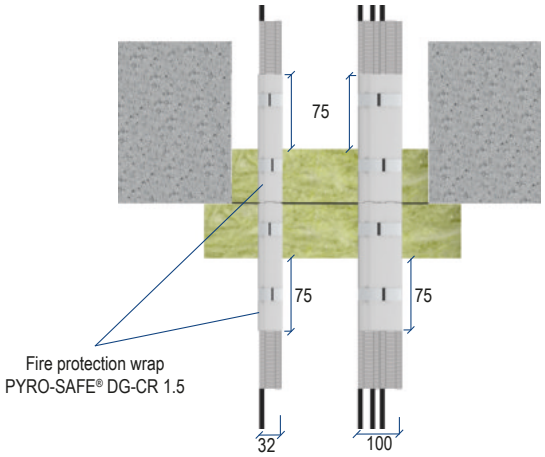
	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Floor
Bundle / cable	Ø ≤ 90 / Ø ≤ 14	≥ 1.0	100	≥ 150	EI 120 U/U

PYRO-SAFE® Flammotect OSI

4.4.3 Electrical installation conduits, single or bundled

- Electrical installation conduits can be passed through both individually and in bundled form with/without cable configuration.
- Electrical installation conduits must be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5 on both sides.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

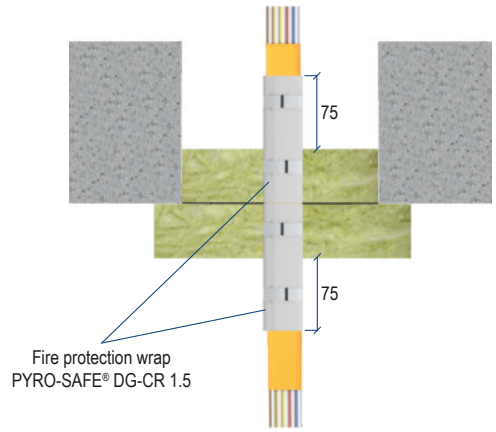
Design variant	Dimensions [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Floor
EIC made of plastic, single	Ø ≤ 32 (with/without cables Ø ≤21)	125	2	2	0	50	75	EI 120 U/U
EIC made of plastic, bundled	Ø ≤ 100 (Single conduits Ø ≤ 32 with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 120 U/U

PYRO-SAFE® Flammotect OSI

4.4.4 PE lines "speed pipes"

- The PE pipes "speed pipes" must be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5 on both sides.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

Speed pipe configuration	Wall thickness [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
		Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Floor
24 pcs. x Ø 7 mm	≥ 1.5	125	2	2	0	50	75	EI 120 U/U
7 pcs. x Ø 10 mm	≥ 2.0							
5 pcs. x Ø 12 mm	≥ 2.0							

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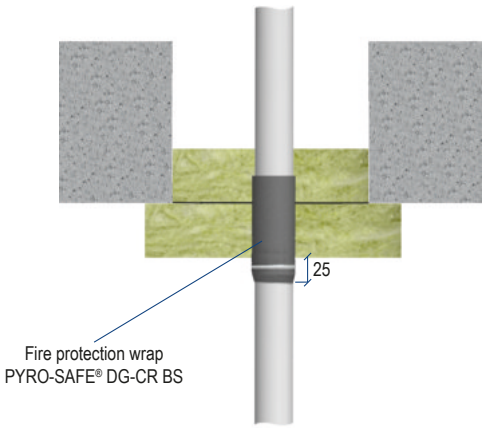
4.4.5 Combustible pipes

- The penetration sealing system must only be used on pneumatic conveyor systems, compressed air lines, etc. if the pipe system is shut off in the event of a fire.
- Fire protection wrap PYRO-SAFE® DG-CR BS is coated on both sides and coated with a protective film. This must be removed before the wrap is positioned and fixed with steel wires.

2-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

Combustible pipes made of PVC-U, PVC-C							
Dimensions [mm]	Intumescent wrap PYRO-SAFE® DG-CR BS						Fire resistance class
	Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Floor
Ø ≤ 50	100	1	1	0	75	25	EI 120 U/U
Ø ≤ 70			2				EI 120 U/U
Ø ≤ 110			3				EI 120 U/U
Ø ≤ 125			4				EI 120 U/U

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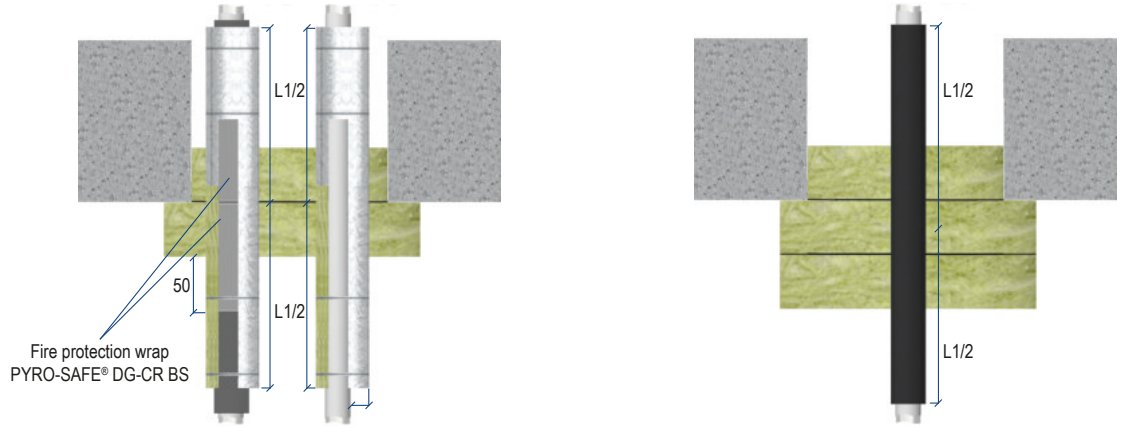
4.4.6 Multilayer pipes "HENCO pipes"

- Multi-layer composite pipes with PE foam insulation must be wrapped with fire protection wrap PYRO-SAFE® DG-CR BS and provided with protective insulation consisting of mineral fibre (lamella mat "Klimarock").
- Multi-layer composite pipes with protective insulation made of FEF "Armaflex Protect" may only be installed in 3 layers.

2-layer sand 3-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

2-layer			
Multilayer pipes "HENCO STANDARD"			
Outer Ø [mm]	**Protective insulation "lamella mat"**		**Fire resistance class**
	Length L [mm]	**Thickness D [mm]**	**Floor**
Ø ≤ 12.0	≥ 500	≥ 20	EI 120 U/C
Ø ≤ 63.0	≥ 500	≥ 30	EI 120 U/C

Multilayer pipes "HENCO STANDARD" with PE foam insulation									
Outer Ø [mm]	**Intumescent wrap PYRO-SAFE® DG-CR BS**						**Protective insulation "lamella mat"**		**Fire resistance class**
	Wrap Width [mm]	**Qty. wraps [n]**	**Qty. layer [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal [mm]**	**Length L [mm]**	**Thickness D [mm]**	**Floor**
Ø ≤ 32.0	100	2	1	0	50	50	≥ 500	≥ 20	EI 120 U/C

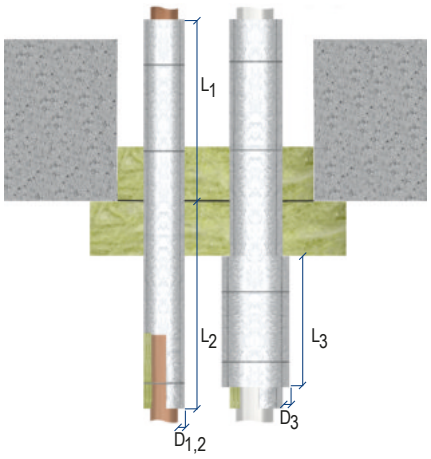
3-layer			
Multilayer pipes "HENCO STANDARD"			
Outer Ø [mm]	**Protective insulation „Armaflex Protect“**		**Fire resistance class**
	Length L [mm]	**Thickness D [mm]**	**Floor**
Ø ≤ 12.0	≥ 480	19	EI 120 U/C
Ø ≤ 63.0		25	EI 120 U/C

PYRO-SAFE® Flammotect OSI

4.4.7 Non-combustible pipes – insulation made of lamella mat "KLIMAROCK"

- Depending on pipe outer diameter, additional protective insulation consisting of mineral fibre mats may be necessary.
- The insulation must be fixed with tension straps or wire.

2-layers in solid floors



Component, penetration sealing system thicknesses and design variants page 7 and page 42.

Dimensions in mm

Pipe		Section insulation			Protective insulation		Fire resistance class
Material	Outer Ø [mm]	Length L_1 [mm]	Length L_2 [mm]	Thickness $D_{1.2}$ [mm]	Length L_3 [mm]	Thickness D_3 [mm]	Floor
Copper, steel, stainless steel, cast iron	Ø ≤ 28.0	500	500	30	-	-	EI 120 C/U
	Ø ≤ 42.0	500	500	40	-	-	EI 120 C/U
	Ø ≤ 54.0	∞	950	40	-	-	EI 120 C/U
		500	1,000	30	950*	30*	EI 120 C/U
	Ø ≤ 88,9	∞	950	40	-	-	EI 120 C/U
		500	1,000	30	950	30	EI 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 63.5	∞	950	30	-	-	EI 120 C/U
		500	1,000	30	500	30	EI 120 C/U
	Ø ≤ 114.3	∞	950	50	-	-	EI 120 C/U
		500	1,000	50	950	30	EI 120 C/U

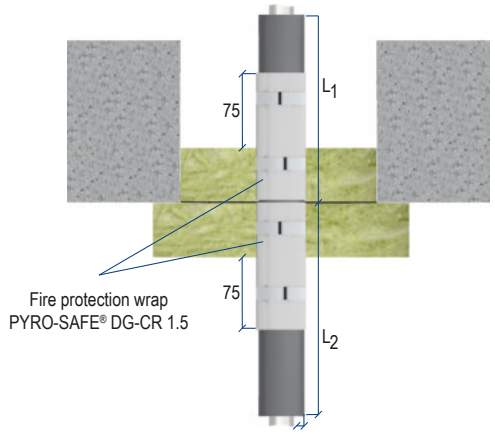
* A second layer of protective insulation is required L ≥ 500 mm x D ≥ 30 mm

PYRO-SAFE® Flammotect OSI

4.4.8 Non-combustible pipes – insulation made of FEF "NH/Armaflex"

- Section insulation consisting of FEF must be routed through the component opening to be sealed.
- The pipes must be wrapped with fire protection wrap PYRO-SAFE® DG-CR 1.5.
- Fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. This must be removed before the wrap is fixed in position with the coated side pointing inwards and with steel wires.

2-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

Dimensions in mm

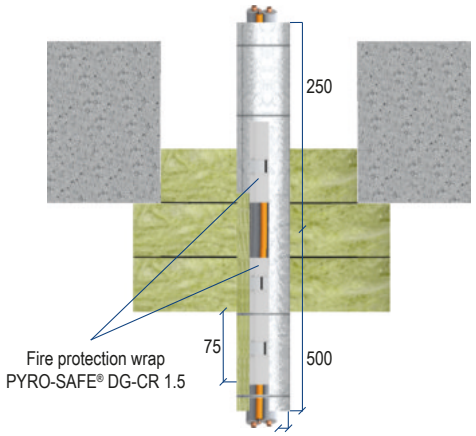
Pipe material	Outer pipe-Ø [mm]	Insulation length (L_1) / (L_2) x Insulation thickness D [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
			Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Floor
Copper, steel, stainless steel, cast iron	Ø ≤ 15,0	≥ 750 / ≥ 400 x 13 - 24	125	2	1	0	50	75	EI 90 / E 120 C/U
		≥ 750 / ≥ 400 x 25							EI 120 C/U
	Ø ≤ 28.0	≥ 750 / ≥ 400 x 19 - 25							EI 120 C/U
	Ø ≤ 42.0	≥ 750 / ≥ 400 x 19 - 24							EI 90 / E 120 C/U
		≥ 750 / ≥ 400 x 25							EI 120 C/U

PYRO-SAFE® Flammotect OSI

4.4.9 HVAC split line combinations

- Depending on pipe outer diameter, additional protective insulation consisting of mineral fibre mats may be necessary.
- The insulation must be fixed with tension straps or wire.
- HVAC split line combinations must be sealed in 3 layers.

3-layers in solid floors



Component, penetration seal thicknesses and design variants page 7 and page 42

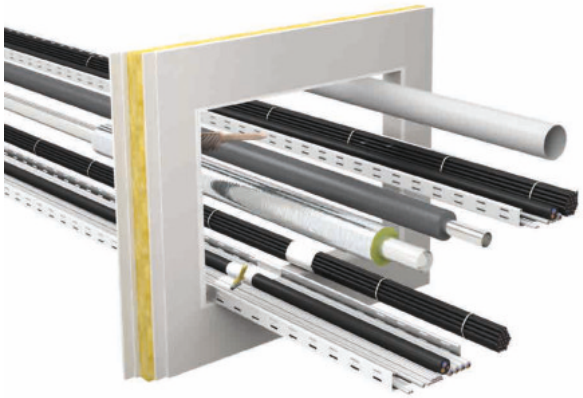
Dimensions in mm

Pipe					Qty. add. cables [n]	Add. PE-pipe [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
Material	Outer Ø [mm]	Wall thickness [mm]	Insulation [Type]	Insu-lation thickn. [mm]			Wrap width [mm]	Qty. wraps [n]	Qty. layer [n]	Overlap [mm]	Inside seal [mm]	Outside [mm]	Floor
Copper	6 - 22 6 - 22 and 8 - 22	1.0	PEF	9	4 (Ø ≤ 21 mm)	Ø ≤ 25 (wall thickn. 1.8 - 3.5)	125	2	1	-	50	75	EI 120 U/U

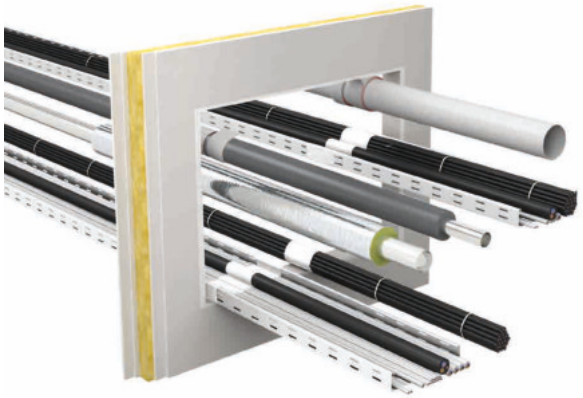
PYRO-SAFE® Flammotect OSI

5. Installation steps

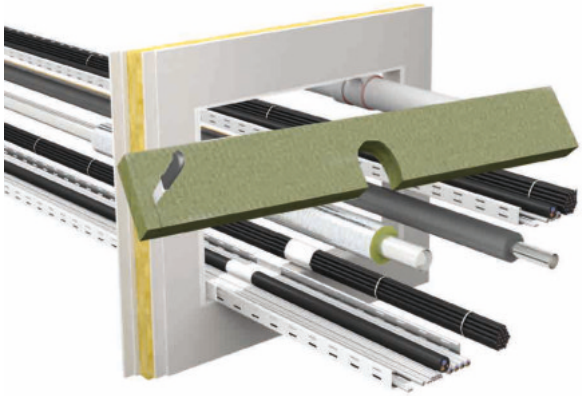
1. Clean the reveal. Coat the cables, -bundles, -trays in the area of penetration sealing with PYRO-SAFE® FLAMMOTECT-A



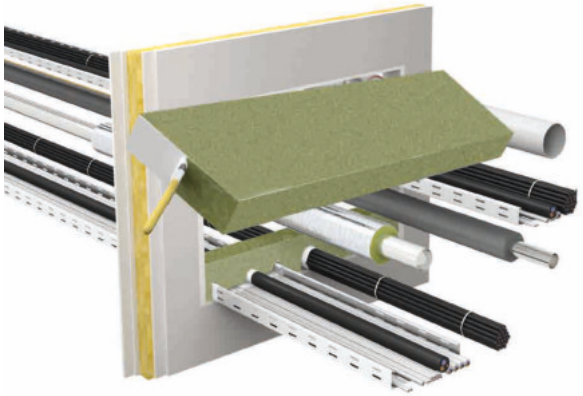
2. Use PYRO-SAFE® DG-CR 1.5 for "speed pipes", electrical installation conduits and non-combustible pipes with FEF. Wrap PYRO-SAFE® DG-CR BS around combustible pipes.



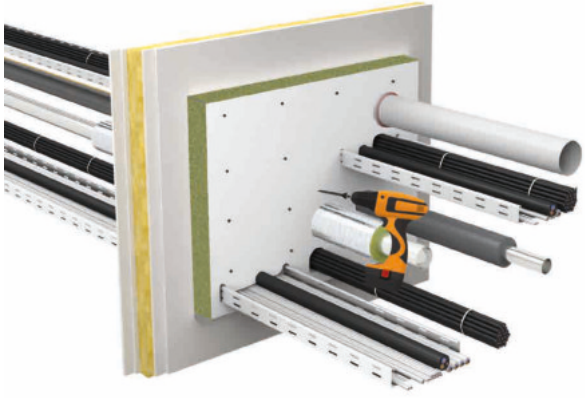
3. Cut mineral fibre boards to size for the first layer and produce cut-outs fpr the installations.



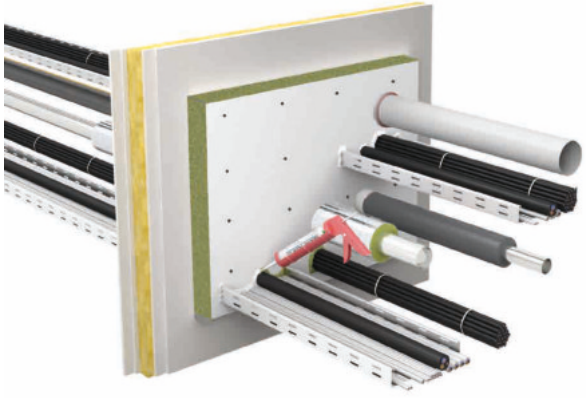
Coat the edges and, if necessary, the reverse side with PYRO-SAFE® FLAMMOTECT-A (DFT ≥ 0.75 mm) and insert the boards (flush to the surface of the installation side) into the component.



4. Place the second/third layer with a protrusion of ≥ 50 mm on all sides of the component opening and screw to the first/second layer (see screw pattern).*



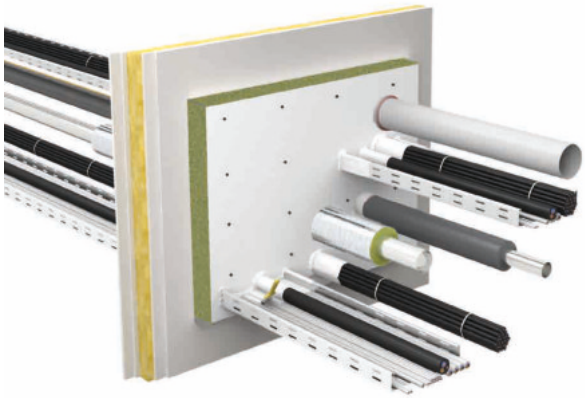
5. Seal remaining openings tightly with mineral wool and/ or close with PYRO-SAFE® FLAMMOTECT-A.



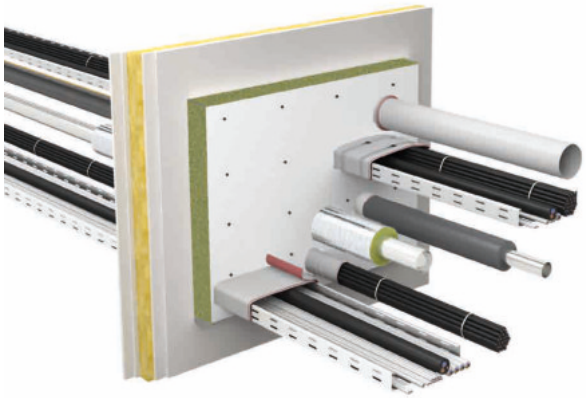
*For easier assembly, the mineral fibre boards can be bonded to the component or to each other with PYRO-SAFE® FLAMMOTECT-A.

PYRO-SAFE® Flammotect OSI

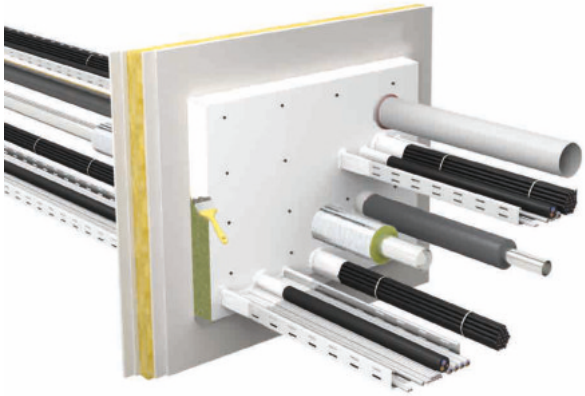
6. Coat cables, cable bundles, cable trays and special-duo-coax bundles with PYRO-SAFE® FLAMMOTECT-A.



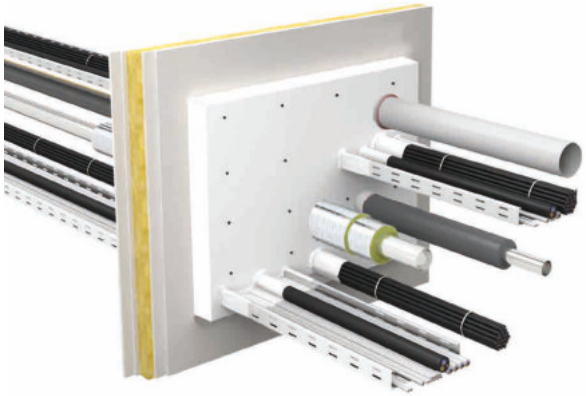
7a. Alternative to coating: wrap cables, cable bundles and cable support structures with PYRO-SAFE® DG-CR 1.5.



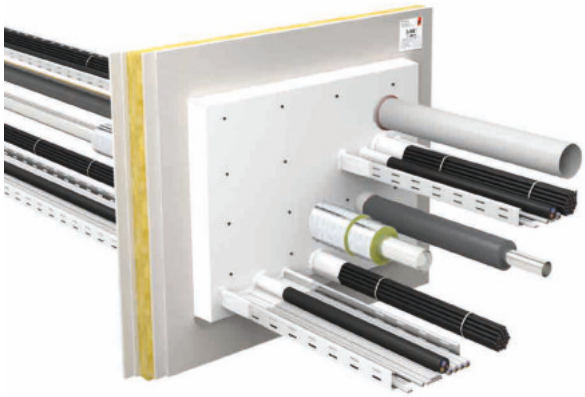
7. Coat the edges of the mineral fibre boards circumferentially with PYRO-SAFE® FLAMMOTECT-A (DFT ≥ 0.75 mm).



8. If necessary, apply protective insulation to non-combustible pipes with lamella mat.



9. Label the penetration sealing system. Legibly complete the label and permanently affix it next to or above the penetration seal (not on it!).



Installation in floor is the same prodecure as installation in walls.

Declaration of Performance
N° 01155-PYRO-SAFE-FLAMMOTECT-A
PYRO-SAFE FLAMMOTECT-A

Date: 26.10.2018
Rev. 04

Unique identification code of the product type
PYRO-SAFE FLAMMOTECT-A

Intended use:
A) Ablative fire stopping product used in penetration seals
B) Fire stopping product used for linear joint and gap sealing

Producer
svt Brandschutz Vertriebsgesellschaft mbH International
Gluesinger Strasse 86 ● D - 21217 Seevetal ● Germany

System for assessing and verifying constancy of performance
A) + B) System 1

European Assessment Document
A) ETAG 026-2:2011
B) EAD 350141-00-1106

European Technical Assessment
A) ETA-14/0418 vom 04.12.2014
B) ETA-18/0237 vom 16.05.2018

cerificate of constancy of performance
A) 0761-CPR-0426
B) 0761-CPR-0726

Technical Assessment Body
A) Deutsches Institut für Bautechnik (DIBt), Berlin
B) ETA-Danmark A/S

The notified body
A) + B) Materialprüfanstalt für das Bauwesen Braunschweig, Kennnummer 0761

Declared performance

	Essential characteristics	Performance	Harmonised technical specification
A) + B)	Reaction to fire	**Class E**	EN 13501-1
A)	Fire resistance	Class EI 30 - Class EI 240 for details check ETA-14/0418	EN 13501-2
B)		Maximum Class EI 120-H-X-B-W-00 up to 200 Class EI 120-V-X-B-W-00 up to 200 for details check ETA-18/0237	
A)	Emission of dangerous substances	no dangerous substances	ETAG 026-2
A) + B)	Durability and serviceability	Use category type X	EOTA TR 024/ EAD 350141-00-1106

The performance of the product identified above is in conformity with the set of declared performances. This declaration of performance is issued, in accordance with Regulation (EU) No. 305/2011, under the sole responsibility of the manufacturer identified above. DoP online available at www.svt.de.
Signed for and on behalf of the manufacturer by:

i.V. Christian Meyer-Korte
Head of Product Management

i.V. Andree Schober
Head of chemical department

protect your values

Fire preotection worldwide

svt Brandschutz Vetriebsgesellschaft mbH International

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