



Effective fire protection solutions up to EI 240

PYRO-SAFE[®] Flammotect Penetration Sealing Systems

Penetration seals made from mineral fibre wool or mineral fibre boards with fire-resistant ablative coating for a wide variety of different media lines



Penetration Seals – for Safe Separation of fire Compartments

Penetration seals fulfil an important function in almost all modern buildings: They prevent fire jumping from one fire compartment to the next. As a result of the multitude of electrical conduits and pipes that pass through a building, open penetrations are created that also cross through fire-protection walls and floors and pose a high risk for the spread of fire and smoke. In order to guarantee long-term safety, these openings must be professionally sealed with high-quality fire protection products.

Please contact us for further information:

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PYRO-SAFE[®] Flammotect Penetration Seals

Passive structural fire protection as well as the requirements for the construction of penetration seals are diverse and complex. With PYRO-SAFE[®] Flammotect penetration sealing systems you have a wide range of applications with just a few products and you always have the right fire protection solution. The different designs, from an easy sealing system for single installations to 4-layer system, allow you the best fire protection solution every time.

Overview of the Penetration Sealing Systems

- **PYRO-SAFE[®] ES**
Fire resistance class: **Up to max. EI 120** according to EN-13501-2
- **PYRO-SAFE[®] Flammotect OSI**
Fire resistance class: **Up to max. EI 120** according to EN-13501-2
- **PYRO-SAFE[®] Flammotect 1-layer**
Fire resistance class: **Up to max. EI 90** according to EN-13501-2
- **PYRO-SAFE[®] Flammotect 2-layer**
Fire resistance class: **Up to max. EI 120** according to EN-13501-2
- **PYRO-SAFE[®] Flammotect 4-layer**
Fire resistance class: **Up to max. EI 240** according to EN-13501-2

PYRO-SAFE® ES

Single penetrations in small openings can be sealed with the PYRO-SAFE® ES penetration sealing system, the opening is simply closed with loose mineral wool and sealed with PYRO-SAFE® FLAMMOTECT-A.

Penetration of Electrical Installations

Fire Resistance Class:
Up to max. EI 120 acc. to EN-13501-2








System Data

Certificate of usability	ETA-14/0418	
	Wall	Floor
Component thickness	≥ 100	≥ 125
Penetration seal thickness	≥ 100	≥ 125
Penetration seal size	500 x 200 (rectangular) or ∅ 350 (round)	350 x 150 (rectangular) or ∅ 160 (round)

All measurements in mm

Penetration of Electrical Installations

Media lines		Diameter (max.)	Measure	Fire resistance class (max.)	
				Wall	Floor
	Cables Cable bundles Cable support structures	≤ 21 (cable)	–	EI 90	EI 90
		≤ 100 / 21 (cable bundles)	–	EI 60	EI 90
	EIC Single	≤ 32 / 21	PYRO-SAFE® DG-CR 1.5 fire protection wrap	EI 120 U/U	EI 90 U/U
		≤ 50 / 21	PYRO-SAFE® DG-CR 1.5 fire protection wrap	EI 120 U/U	–
	EIC Bundle	≤ 100 / 32 / 21	PYRO-SAFE® DG-CR 1.5 fire protection wrap	EI 120 U/U	EI 90 U/U
	EIC Steel	≤ 16 / 14	–	EI 120	–
		≤ 50 / 21	PYRO-SAFE® DG-CR 1.5 fire protection wrap	EI 120	–
	HVAC split line combinations	✓	PYRO-SAFE® DG-CR 1.5 fire protection wrap	EI 90	EI 90

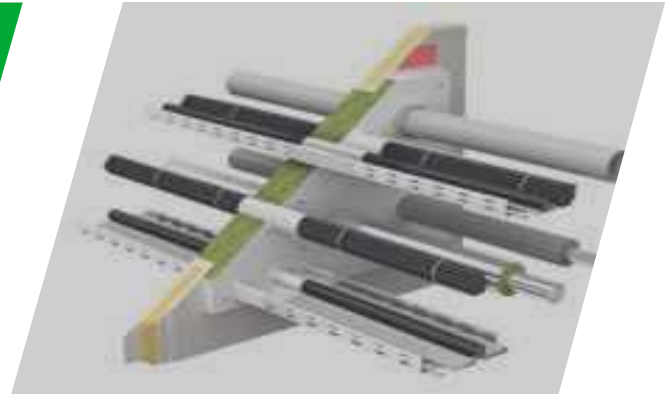
All measurements in mm

PYRO-SAFE[®] Flammotect OSI

If the structural situation requires a single-sided installation (e. g. in shaft walls), the PYRO-SAFE[®] Flammotect OSI is ideal it has been specially developed for this purpose.

**Installation in Shaft Walls,
floors, Solid Walls and
Light Partition Walls**

**Fire Resistance Class:
Up to max. EI 120 acc. to EN-13501-2**



System Data

Certificate of usability	ETA-14/0418	
	Wall	Floor
Component thickness	≥ 40 (shaft wall) / ≥ 100 (light partition wall)	≥ 150
Penetration seal thickness	≥ 100	≥ 100
Penetration seal size	450 x 370 (shaft wall) / 1175 x 800 (light partition wall)	1300 x 1100

All measurements in mm

Example Penetrations

Media lines		Diameter (max.)	Measure	fire resistance class (max.)		
				Wall	floor	
	Cables Cable bundles Cable support structures	≤ 21 (cable)	PYRO-SAFE [®] FLAMMOTECT-A coating or PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120	EI 120	
		≤ 80 (cable)		EI 90	EI 90	
		≤ 100 / 21 (cable bundles)		EI 120	EI 120	
	Wave guide	≤ 90 / 14	PYRO-SAFE [®] FLAMMOTECT-A coating	EI 120 U/U	EI 120 U/U	
	EIC	Single	≤ 32 / 21	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120 U/U	EI 120 U/U
	EIC	Bundle	≤ 100 / 32 / 21	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120 U/U	EI 120 U/U
	PE lines, "speed pipes"	max. 24 pcs., pipe outer ≤ 7 max. 7 pcs., pipe outer ≤ 10 max. 5 pcs., pipe outer ≤ 12	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120 U/U	EI 120 U/U	
	Combustible pipes	≤ 160	PYRO-SAFE [®] DG-CR BS fire protection wrap	EI 120 U/U	EI 120 U/U	
	Multilayer composite pipes	≤ 63	"Armaflex Protect" protective insulation	EI 120 U/C	EI 120 U/C	
	Non-combustible pipes with mineral fibre insulation	≤ 42 (copper)	Lamella mat protective insulation	EI 120 C/U	EI 120 C/U	
		≤ 114.3 (steel)		EI 120 C/U	EI 120 C/U	
		≤ 88.9 (copper)	–	–	EI 120 C/U	
		≤ 170 (steel)	–	–	EI 120 C/U	
	Non-combustible pipes with FEF insulation	≤ 88.9	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 120 C/U	EI 120 C/U	
	HVAC split line combinations	✓	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	–	EI 120 U/U	

All measurements in mm

For further information on the PYRO-SAFE[®] Flammotect OSI please request our separate brochure.

PYRO-SAFE[®] Flammotect 1-layer

With a fire resistance class up to max. EI 90, our PYRO-SAFE[®] Flammotect 1-layer penetration seal is suitable for large openings and complex penetrations. It consists of only one coated mineral-fibre board with a thickness of ≥ 60 mm. All media lines can be combined and fed through the same opening.

Penetration of Electrical Installations and Combustible/
Non-Combustible Pipes

Fire Resistance Class:
Up to max. EI 90 acc. to EN-13501-2



System Data






Certificate of usability	ETA-14/0418	
	Wall	Floor
Component thickness	≥ 100	≥ 125
Penetration seal thickness	≥ 60	≥ 60
Penetration seal size	1175 x 1200	1200 x 2400 or 800 x ∞

All measurements in mm











PYRO-SAFE[®] Flammotect 1-layer

Penetration of Electrical Installations

Media lines		Diameter (max.)	Measure	fire resistance class (max.)		
				Wall	floor	
	Cables Cable bundles Cable support structures	≤ 80 (cable)	PYRO-SAFE [®] FLAMMOTECT-A coating	EI 60	EI 60	
		≤ 100 (cable bundles)		EI 90	EI 60	
		≤ 80 (cable)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 60	EI 60	
		≤ 100 (cable bundles)				
	EIC	Single	≤ 32	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 60 U/U	
	EIC	Bundle	≤ 100			
	PE lines, "speed pipes"		max. 24 pcs., pipe outer ≤ 7 max. 7 pcs., pipe outer ≤ 10 max. 5 pcs., pipe outer ≤ 12	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 60 U/U	EI 60 U/U
	Wave guide / coaxial cable		≤ 51.1	Protective insulation made from lamella mat	EI 60 U/C	EI 60 U/C

All measurements in mm

Penetration of Combustible/Non-Combustible Pipes

Media lines		Diameter (max.)	Measure	fire resistance class (max.)	
				Wall	floor
	Combustible pipes	≤ 50	PYRO-SAFE [®] DG-CR BS fire protection wrap	EI 90 U/U	EI 90 U/U
		≤ 110		EI 60 U/U	EI 60 U/U
	"HENCO" multilayer composite pipes	≤ 63	Protective insulation made from lamella mat or "Armaflex Protect"	–	EI 90 U/C
	"Uponor MLC pipe white S" multilayer composite pipes	≤ 110	Protective insulation made from lamella mat or "Armaflex Protect"	–	EI 60 U/C
	Non-combustible pipes (copper, steel, stainless steel, cast iron) with mineral fibre insulation	≤ 88.9 (copper)	–	EI 60 C/U	EI 60 C/U
		≤ 219.1 (steel, stainless steel, cast iron)	Lamella mat protective insulation	EI 60 C/U	EI 60 C/U
	Non-combustible pipes (copper, steel, stainless steel, cast iron) with FEF "NH/Armaflex" insulation	≤ 42 (copper)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 90 C/U	EI 90 C/U
		≤ 108 (copper)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 90 C/U	EI 90 C/U
		≤ 170 (steel, stainless steel, cast iron)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 60 C/U	EI 90 C/U
	Non-combustible pipes (copper, steel, stainless steel, cast iron) with FEF "Armaflex Protect"	≤ 88.9 (copper)	–	EI 60 C/U	EI 60 C/U
		≤ 170 (steel, stainless steel, cast iron)	–	EI 90 C/U	EI 60 C/U
	HVAC split line combinations	✓	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation in floors	EI 60	EI 90
	"NanoSUN ² " double solar pipes	DN 16	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 90 U/U	EI 60 U/U
		DN 40	–	–	EI 60 U/U

All measurements in mm

PYRO-SAFE[®] Flammotect 2-layer

With a fire resistance class up to max. EI 120, our PYRO-SAFE[®] Flammotect 2-layer penetration seal is suitable for large openings and complex penetrations. It consists of two coated mineral-fibre boards with a thickness of ≥ 60 mm. All media lines can be combined and fed through the same opening.

Penetration of Electrical Installations and Combustible/ Non-Combustible Pipes

**Fire Resistance Class:
Up to max. EI 120 acc. to EN-13501-2**



System Data






Certificate of usability	ETA-14/0418	
	Wall	Floor
Component thickness	≥ 100	≥ 150
Penetration seal thickness	≥ 120	≥ 150
Penetration seal size	1400 x 2000	1400 x 2000

All measurements in mm










PYRO-SAFE[®] Flammotect 2-layer

Penetration of Electrical Installations

Media lines		Diameter (max.)	Measure	fire resistance class (max.)	
				Wall	floor
	Cables Cable bundles Cable support structures	≤ 80 (cable)	PYRO-SAFE [®] FLAMMOTECT-A coating	EI 120	EI 120
		≤ 100 (cable bundles)			
		≤ 80 (cable)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120	EI 120
		≤ 100 (cable bundles)			
	EIC	Single	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120 U/U	EI 90 U/U
	EIC	Bundle			
	PE lines, "speed pipes"	max. 24 pcs., pipe outer ≤ 7 max. 7 pcs., pipe outer ≤ 10 max. 5 pcs., pipe outer ≤ 12	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120 U/C	–
	Wave guide /coaxial cable	≤ 51.1	PYRO-SAFE [®] FLAMMOTECT-A coating	EI 120 U/C	EI 120 U/C

All measurements in mm

Penetration of Combustible/Non-Combustible Pipes

Media lines		Diameter (max.)	Measure	fire resistance class (max.)	
				Wall	floor
	Combustible pipes	≤ 110	PYRO-SAFE [®] DG-CR BS fire protection wrap	EI 120 U/U	EI 120 U/U
		≤ 160			
	"HENCO" multilayer composite pipes	≤ 63	Protective insulation made from lamella mat or "Armaflex Protect"	EI 120 U/C	EI 120 U/C
	Non-combustible pipes (copper, steel, stainless steel, cast iron) with mineral fibre insulation	≤ 42 (copper)	–	EI 120 C/U	EI 120 C/U
		≤ 108 (copper)	Lamella mat protective insulation	EI 120 C/U	EI 120 C/U
		≤ 323.9 (steel, stainless steel, cast iron)	Lamella mat protective insulation	–	EI 120 C/U
	Non-combustible pipes (copper, steel, stainless steel, cast iron) with FEF "NH/Armaflex" insulation	≤ 54 (copper)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 120 C/U	EI 120 C/U
		≤ 88.9 (copper)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 120 C/U	EI 90 C/U
		≤ 108 (copper)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 90 C/U	EI 90 C/U
		≤ 170 (steel, stainless steel, cast iron)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 120 C/U	EI 90 C/U
	Non-combustible pipes (copper, steel, stainless steel, cast iron) with FEF "Kaiflex ST" insulation	≤ 88.9 (copper)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 120 C/U	EI 120 C/U
		≤ 170 (steel, stainless steel, cast iron)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 90 C/U	EI 90 C/U
	HVAC split line combinations	✓	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap + lamella mat protective insulation	EI 120 U/U	EI 90 C/U
	"NanoSUN2" double solar pipes	DN 25	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120 C/U	–
		DN 25	–	–	EI 120 C/U
		DN 40	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 120 C/U	–
		DN 40	–	–	EI 120 C/U

All measurements in mm

PYRO-SAFE[®] Flammotect 4-layer

Particularly high fire protection requirements can be fulfilled with the 4-layer PYRO-SAFE[®] Flammotect 4-layer, which prevents flame penetration and temperature rise at electrical installations for a period of four hours.

Penetration of Electrical Installations

Fire Resistance Class:
EI 240 acc. to EN-13501-2




System Data

Certificate of usability	ETA-14/0418	
	Wall	Floor
Component thickness	≥ 240	≥ 200
Penetration seal thickness	≥ 240	≥ 240
Penetration seal size	600 x 600	600 x ∞

All measurements in mm

Penetration of Electrical Installations

Media lines	Diameter (max.)	Measure	fire resistance class (max.)	
			Wall	floor
 Cables Cable bundles Cable support structures	≤ 80 (cable)	PYRO-SAFE [®] DG-CR 1.5 fire protection wrap	EI 240	EI 240
	≤ 100 (cable bundles)			

All measurements in mm

Further Requirements

In addition to the high requirements for passive structural fire protection, our products and systems also fulfil a large number of other requirements, e. g. resistance to weathering (moisture, UV radiation, freeze-thaw cycles, salt-water exposure), short-term and long-term contact with various chemicals or sound insulation.

Your Benefits



Comprehensive application Solutions

- ✓ Classified fire penetration seals according to EN 13501-2 to EI 240
- ✓ Multi-combination configurations and use in floors, shaft walls, solid walls and light partition walls
- ✓ Numerous approved penetrations and design variants

Proven in Practice Throughout the World

- ✓ Use in building construction – residential/office buildings, hospitals, department stores, airports
- ✓ Proven in industrial buildings – production facilities, heavy industry, power stations and sub-stations nuclear facilities

High-Quality fire Protection Products

- ✓ Fire protection products Made in Germany – solvent and halogen free
- ✓ Resistant to external influences, e. g. permanent moisture, UV radiation, freeze-thaw cycles or salt water
- ✓ Resistant to a multitude of chemicals

Please contact us for further information:

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