PYRO-SAFE® Flammotect Single Layer

Ablative Mineral Fibre Board Seal

Mixed penetration sealing system made of one mineral fibre board (60 mm) and an ablative coating for electrical cables of any type and for combustible and non-combustible pipes.
Maximum fire resistance class EI 90 as per EN 13501-2 in accordance with ETA-22/0052, KB 322042005-A, KB 321100703-A and KB 322081804-A

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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 installation 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.

Pictorial representations serve as examples only. Installation results may differ in appearance.

Unless stated otherwise, all lengths are specified in mm.

All information in this document represents the state of the art at the time of writing or the current version of the standard.

Upon request, svt will be pleased to provide the relevant legal and technical framework and manufacturer specifications for each individual case.

1.2.1 Safety instructions

Consult the respective safety information for the individual penetration seal components.

Personal protective equipment:

	Wear protective clothing and non-slip shoes.
	Use safety goggles, safety glasses.
	P2 particle filter in case of short-term or low level exposure. For intensive or prolonged exposure use a breathing apparatus with independent air supply. Use breathing protection in compliance 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 against entry during penetration seal work (barrier tape and warning sign: warning of possible falling objects, do not enter the area, penetration seal work in floor component openings).
	The contractor for the production of floor penetration seals must inform the client in writing (for forwarding to the client or appointed representative) that after the production of the fire penetration seals in floors, these must be secured on site against loads, in particular against walking, by suitable measures (e.g. by fencing or by covering with grating).

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1.3 Field of application

The PYRO-SAFE® Flammotect single layer mixed penetration sealing system in wall and floor openings has been assessed in accordance with ETAG 026-2 in terms of the „Reaction to fire“, „Resistance to fire“, „Release of dangerous substances“ and „Durability and serviceability“ product characteristics.

Reaction to fire

The ablative component PYRO-SAFE® FLAMMOTECT-A meets class E for reaction to fire in accordance with EN 13501-1; the intumescent material PYRO-SAFE® DG-CR meets class B-s1, d0 for reaction to fire in accordance with EN 13501-1; the mineral fibre boards meet class A1 and the mineral fibre mats meet class A2-s1,d0 for reaction to fire in accordance with EN 13501-1..

Resistance to fire

PYRO-SAFE® Flammotect single layer meets the maximum requirements of class EI 90 (configuration for plastic pipes -U/U or for metal pipes -C/U) in accordance with EN 13501-2. The fire resistance class for plastic pipes EI 90-U/U also covers all other possible endings in accordance with EN 13501-2. The fire resistance class EI 90-C/U also covers all classes of the same fire resistance duration with the configuration -C/C .

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

The ablative component PYRO-SAFE® FLAMMOTECT-A component and the intumescent material PYRO-SAFE® DG-CR do not contain any substances identified as dangerous in the list of the European Commission.

The mineral fibre board; the mineral fibre mat and the loose mineral fibre wool do not contain any dangerous substances listed in Directive 67/548/EC or Regulation (EC) No. 1272/2008 or the Indicative List on Dangerous Substances.

Durability and serviceability

The ablative component PYRO-SAFE® FLAMMOTECT-A and the intumescent material PYRO-SAFE® DG-CR meet the requirements of type X in accordance with EOTA TR 024. The PYRO-SAFE® Flammotect single layer system can be subjected to the conditions of interior rooms with and without exposure to moisture or atmospheric conditions, without substantial changes to the fire protection characteristics to be expected.

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1.4 Components

Plasterboard walls with steel substructure

In stud design and double-sided cladding with at least 2 layers of 12.5 mm cement or gypsum-bound building boards with a reaction to fire of class A1 or A2 according to EN 13501-1.

The stud construction must be complemented by additional wall struts and transoms to form the reveal.

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

Plasterboard walls with wood substructure

In stud design and double-sided cladding with at least 2 layers of 12.5 mm cement or gypsum-bound building boards with a reaction to fire of class A1 or A2 according to EN 13501-1.

The distance between the opening and the studs and transoms must be ≥ 100 mm and the hollow spaces between the cladding of the wall, studs and transoms and the opening reveal must be tightly sealed to a depth of ≥ 100 mm with mineral wool, reaction to fire class A1 or A2 according to EN 13501-1.

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

Cladding of reveal in plasterboard walls

Alongside the opening edge, corresponding to the wall panelling, with at least one layer of 12.5 mm cement or gypsum-bound building boards with a reaction to fire of class A1 or A2 according to EN 13501-1.

Solid walls

Made of concrete or reinforced concrete with a density of ≥ 2200 (± 500) kg/m³.

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

Solid floors

Made of concrete, reinforced concrete or aerated concrete with a density of ≥ 550 kg/m³.

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

Timber walls and floors

Made of cross laminated timber (CLT) by the manufacturer STORA ENSO.
Wall: thickness 100 mm / layers: 30/40/30
Floor: thickness 140 mm / layers: 40/20/20/20/40

A wall or floor of cross laminated timber can be regarded as equivalent to the tested wall and floor if the following requirements are met.

- The construction of the wall/floor is identical.
- The fire resistance class of the wall/floor is identical or higher.
- The construction is certified as per EN 13501-2.
- The construction is based on the same solid wood panels as tested.
- The solid wood panels are of the same building material category as tested or of a better category.
- The strength class of the solid wood panels as per EN 338 ist equivalent to the class of the tested panels or a higher class.
- The mass burning rate of the solid wood panels as per EN 1995-1-2 is equivalent to the class of the tested panels or a higher class.
- The thickness of the solid wood panel is at least equivalent to that of the tested panel.

Since particularly critical walls and floors were tested with this construction, we are also able to offer our sealing systems for timber components by other manufacturers, such as KLH, Mayr-Melnhof, Binderholz et al. Our technical service will be glad to assist you with any enquiry.

Sandwich panel walls

Sandwich panel walls PAROC AST-S/F with a thickness of ≥ 100 mm.

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2. Fire resistance classes

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

2.1 Walls

Service	Measure	Fire resistance class	Source*
Cables, cable bundles and cable trays with coating PYRO-SAFE® FLAMMOTECT-A			
Cables Ø ≤ 21 mm	≥ 100 mm, dry film thickness ≥ 0.75 mm	EI 60 / E 90	1, 2
Cables Ø > 21 mm to ≤ 50 mm	≥ 150 mm, dry film thickness ≥ 1.00 mm	EI 60 / E 90	1, 2
Cables Ø > 50 mm to ≤ 80 mm	≥ 150 mm, dry film thickness ≥ 1.00 mm	EI 60 / E 90	1, 2
Cable bundles Ø ≤ 100 mm	≥ 100 mm, dry film thickness ≥ 0.75 mm	EI 60 / E 90	1, 2
Cable bundles Ø ≤ 100 mm	≥ 150 mm, dry film thickness ≥ 1.00 mm	EI 90	1, 2
Cables, cable bundles and cable trays with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Cable Ø ≤ 21 mm without cable tray through drill holes	2× 1-layer, ≥ 45 mm overlap	EI 90	2
Cables Ø ≤ 21 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	1, 2
Cables Ø > 21 mm to ≤ 50 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	1, 2
Cables Ø > 50 mm to ≤ 80 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	1, 2
Cable bundles Ø ≤ 100 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	1, 2
Electrical installation conduits (EIC) with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
EIC made of plastic up to Ø ≤ 32 mm single or bundled up to Ø ≤ 100 mm, with/without cables (Ø ≤ 21 mm)	2× 2-layer	EI 60 / E 90 U/U	2
speedpipes, bundled or single, with/without glass fibre cables, with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
max. 24 pcs. pipe outer-Ø ≤ 7 max. 7 pcs. pipe outer-Ø ≤ 10 max. 5 pcs. pipe outer-Ø ≤ 12	2× 1-layer, 125 mm	EI 60 / E 90 U/U	1

* Classification report no. 1 → 1913.2/13/Z00NP 2 → KB 00924.1/15/Z00NP/e 3 → KB K-2401/311/20-MPA BS

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Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
Combustible pipes made of PVC-U, PVC-C according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062 with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50.0 mm	1× 1-layer	EI 90 U/U	2
Pipe outer Ø ≤ 70.0 mm	1× 2-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 90.0 mm	1× 3-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 110.0 mm	1× 4-layer	EI 60 / E 90 U/U	2
Combustible pipes made of PE-100 with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50.0 mm	1× 1-layer	EI 90 U/U	2
Pipe outer Ø ≤ 70.0 mm	1× 2-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 90.0 mm	1× 3-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 110.0 mm	1× 4-layer	EI 60 / E 90 U/U	2
Combustible pipes made of PP-H with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50.0 mm	1× 1-layer	EI 90 U/U	2
Pipe outer Ø ≤ 70.0 mm	1× 2-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 90.0 mm	1× 3-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 110.0 mm	1× 4-layer	EI 60 / E 90 U/U	2
Multilayer pipes Henco Pipes with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 12.0 mm, wall thickness ≥ 1.6 mm	≥ 250 mm × ≥ 20 mm	EI 30 U/C	2
Pipe outer Ø ≤ 32,0 mm, wall thickness ≥ 3.0 mm	≥ 250 mm × ≥ 20 mm	EI 30 U/C	2
Pipe outer Ø ≤ 63,0 mm, wall thickness ≥ 4.5 mm	≥ 250 mm × ≥ 30 mm	EI 30 U/C	2
Multilayer pipes Henco Pipes with combustible insulation made of FEF ArmaFlex Protect			
Pipe outer Ø ≤ 12.0 mm, wall thickness ≥ 1.6 mm	≥ 240 mm × 13 mm	EI 30 U/C	2
Pipe outer Ø ≤ 32.0 mm, wall thickness ≥ 3.0 mm	≥ 240 mm × 13 mm	EI 90 U/C	2
Pipe outer Ø ≤ 63.0 mm, wall thickness ≥ 4.5 mm	≥ 240 mm × 26 (2× 13) mm	EI 30 U/C	2
Multilayer pipes Henco Pipes with PEF insulation and intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 14.0 mm, 6 mm PE foam, wall thickness ≥ 2,0 mm	1× 1-layer, ≥ 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 30 U/C	2
Pipe outer Ø ≤ 26.0 mm, 6–13 mm PE foam, wall thickness ≥ 3.0 mm	1× 1-layer, ≥ 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 30 U/C	2
Pipe outer Ø ≤ 32.0 mm, 6–10 mm PE foam, wall thickness ≥ 3.0 mm	1× 1-layer, ≥ 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 30 U/C	2

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Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of copper, steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 15.0 mm, wall thickness ≥ 0.8	≥ 250 mm × ≥ 20 mm	EI 60 / E 90 C/U	1
Pipe outer Ø ≤ 22.0 mm, wall thickness ≥ 1.0	≥ 250 mm × ≥ 60 mm	EI 60 / E 90 C/U	1
Pipe outer Ø ≤ 22.0 mm, wall thickness ≥ 1.0	≥ 500 mm × ≥ 20 mm	EI 60 / E 90 C/U	1
Pipe outer Ø ≤ 54.0 mm, wall thickness ≥ 1.5	≥ 500 mm × ≥ 30 mm	EI 60 / E 90 C/U	1
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 2.0	≥ 800 mm × ≥ 40 mm	EI 60 / E 90 C/U	1
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 2.0	≥ 800 mm × ≥ 40 mm	EI 90 C/U	1
Pipe outer Ø ≤ 114.3 mm, wall thickness ≥ 3.6	≥ 500 mm × ≥ 40 mm	EI 60 / E 90 C/U	1
Pipe outer Ø ≤ 170.0 mm, wall thickness ≥ 3.0	≥ 800 mm × ≥ 60 mm + ≥ 500 mm × ≥ 30 mm	EI 60 C/U	1
Pipe outer Ø ≤ 219.1 mm, wall thickness ≥ 5.0	≥ 800 mm × ≥ 60 mm + ≥ 500 mm × ≥ 30 mm	EI 60 / E 90 C/U	1
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation made of NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 15.0 mm; wall thickness ≥ 0.8 mm			
Insulation thickness 13–24 mm	2× 2-layer	EI 60 / E 90 C/U	2
Insulation thickness 25 mm	2× 2-layer	EI 90 C/U	2
Pipe outer Ø ≤ 28.0 mm; wall thickness ≥ 1.0 mm			
Insulation thickness 19–24 mm	2× 2-layer	EI 60 / E 90 C/U	2
Insulation thickness 25 mm	2× 2-layer	EI 90 C/U	2
Insulation thickness 13–30 mm	2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 90 C/U	2
Pipe outer Ø ≤ 42.0 mm; wall thickness ≥ 1.2 mm			
Insulation thickness 25–43 mm	2× 2-layer	EI 60 / E 90 C/U	2
Insulation thickness 44 mm	2× 2-layer	EI 90 C/U	2
Pipe outer Ø ≤ 54.0 mm; wall thickness ≥ 1.5 mm			
Insulation thickness 29–57 mm	2× 1-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U	2

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Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
Pipe outer Ø ≤ 88.9 mm; wall thickness ≥ 2.0 mm			
Insulation thickness 25–89 mm	2× 2-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U	2
Pipe outer Ø ≤ 108.0 mm; wall thickness ≥ 2.5 mm			
Insulation thickness 57 mm	2× 2-layer + lamella mat ≥ 750 mm × ≥ 40 mm	EI 90 C/U	2
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation made of NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 170.0 mm, wall thickness ≥ 2.9 mm			
Insulation thickness 25 mm	2× 2-layer + lamella mat ≥ 750 mm × ≥ 40 mm	EI 60 / E 90 C/U	2
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation made of ArmaFlex Protect			
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 0.8 mm	–	EI 60 / E 90 C/U	1
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation made of ArmaFlex Protect			
Pipe outer Ø ≤ 170.0 mm, wall thickness ≥ 3.0 mm	–	EI 90 C/U	1

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Service	**Insulation thickness**	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of copper, steel, stainless steel or cast iron with PIR insulation and fire protection wrap PYRO-SAFE® DG-CR PRO				
Pipe outer Ø ≤ 28.0 mm, wall thickness ≥ 1.0 mm – ≤ 14.2 mm	30 mm	2× 62.5 mm 2-layer	EI 60 C/U	3
	50 mm	2× 62.5 mm 3-layer	EI 60 C/U	3
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 1.5 mm – ≤ 14.2 mm	80 mm	2× 62.5 mm 4-layer	EI 60 C/U	3
Non-combustible pipes made of steel, stainless steel or cast iron with PIR insulation and fire protection wrap PYRO-SAFE® DG-CR PRO				
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 2.9 mm – ≤ 14.2 mm	100 mm	2× 62.5 mm 4-layer	EI 60 C/U	3
Pipe outer Ø ≤ 133.0 mm, wall thickness ≥ 3.6 mm – ≤ 14.2 mm	100 mm	2× 62.5 mm 4-layer	EI 60 C/U	3
Pipe outer Ø ≤ 219.1 mm, wall thickness ≥ 4.5 mm – ≤ 14.2 mm	100 mm	2× 62.5 mm 4-layer	EI 60 C/U	3
	60 mm	2× 62.5 mm 3-layer	EI 60 C/U	3

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Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
HVAC split line combinations with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe Ø 6/10 mm or Ø 6–10, 9 mm PE foam, 1 pipe PVC-U Ø ≤ 25.0 mm, wall thickness 1.8–3.5 mm, 2 cables Ø ≤ 14.0 mm	2× 2-layer	EI 60 / E 90	1
Pipe Ø 22/22 mm or Ø 6-22, 9 mm PE foam, 1 pipe PVC-U Ø ≤ 25.0 mm, wall thickness 1.8 mm, 4 cables Ø ≤ 21.0 mm	1× 2-layer + lamella mat ≥ 250 mm × ≥ 30 mm	EI 30	2
Double solar pipes Nanosun² with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
DN 16	2× 1-layer, ≥ 25 mm overlap	EI 90 U/U	1
DN 40	2× 1-layer, ≥ 25 mm overlap	EI 30 / E 90 U/U	1

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2.2 Floors

Service	Measure	Fire resistance class	Source*
Cables, cable bundles and cable trays with coating PYRO-SAFE® FLAMMOTECT-A			
Cables Ø ≤ 21 mm without cable tray through drill holes	≥ 100 mm × ≥ 0.75 mm dry film thickness	EI 90	2
Cables Ø ≤ 21 mm	≥ 100 mm × ≥ 0.75 mm dry film thickness	EI 60 / E 90	2
Cables Ø > 21 mm up to ≤ 50 mm	≥ 150 mm × ≥ 1.00 mm dry film thickness	EI 60 / E 90	2
Cables Ø > 50 mm up to ≤ 80 mm	≥ 150 mm × ≥ 1.00 mm dry film thickness	EI 60 / E 90	2
Cable bundles Ø ≤ 100 mm	≥ 100 mm × ≥ 0.75 mm dry film thickness	EI 60 / E 90	2
Cable bundles Ø ≤ 100 mm	≥ 150 mm × ≥ 1.00 mm dry film thickness	EI 60	1
Cables, cable bundles and cable trays with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Cables Ø ≤ 21 mm without cable tray through drill holes	2× 1-layer, ≥ 45 mm overlap	EI 90	2
Cables Ø ≤ 21 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	2
Cables Ø > 21 mm up to ≤ 50 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	2
Cables Ø > 50 mm up to ≤ 80 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	2
Cable bundles Ø ≤ 100 mm	2× 1-layer, ≥ 45 mm overlap	EI 60 / E 90	2
Electrical installation conduits (EIC) with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
EIC made of plastic up to Ø ≤ 32 mm single or bundled up to Ø ≤ 100 mm, with/without cables (Ø ≤ 21 mm)	2× 2-layer	EI 90 U/U	2
speedpipes, bundled or individually, with/without glass fibre cables, with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
max. 24 pcs., pipe outer-Ø ≤ 7 max. 7 pcs., pipe outer-Ø ≤ 10 max. 5 pcs., pipe outer-Ø ≤ 12	2× 1-layer, 125 mm	EI 60 U/U	1

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Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Combustible pipes made of PVC-U, PVC-C according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062 with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50.0 mm	1× 1-layer	EI 90 U/U	2
Pipe outer Ø ≤ 70.0 mm	1× 2-layer	EI 45 / E 90 U/U	2
Pipe outer Ø ≤ 90.0 mm	1× 3-layer	EI 45 / E 90 U/U	2
Pipe outer Ø ≤ 110.0 mm	1× 4-layer	EI 45 / E 90 U/U	2
Combustible pipes made of PE-100 with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50.0 mm	1× 1-layer	EI 90 U/U	2
Pipe outer Ø ≤ 70.0 mm	1× 2-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 90.0 mm	1× 3-layer	EI 60 / E 90 U/U	2
Pipe outer Ø ≤ 110.0 mm	1× 4-layer	EI 60 / E 90 U/U	2
Combustible pipes made of PP-H with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50.0 mm	1× 1-layer	EI 90 U/U	2
Pipe outer Ø ≤ 70.0 mm	1× 2-layer	EI 90 U/U	2
Pipe outer Ø ≤ 90.0 mm	1× 3-layer	EI 90 U/U	2
Pipe outer Ø ≤ 110.0 mm	1× 4-layer	EI 90 U/U	2
Multilayer pipes Henco Pipes with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 12.0 mm, wall thickness ≥ 1.6 mm	≥ 250 mm × ≥ 20 mm	EI 90 U/C	2
Pipe outer Ø ≤ 32.0 mm, wall thickness ≥ 3.0 mm	≥ 250 mm × ≥ 20 mm	EI 90 U/C	2
Pipe outer Ø ≤ 63.0 mm, wall thickness ≥ 4.5 mm	≥ 250 mm × ≥ 30 mm	EI 90 U/C	2
Multilayer pipes Henco Pipes with combustible insulation made of FEF ArmaFlex Protect			
Pipe outer Ø ≤ 12.0 mm, wall thickness ≥ 1.6 mm	≥ 240 mm × 13 mm	EI 90 U/C	2
Pipe outer Ø ≤ 32.0 mm, wall thickness ≥ 3.0 mm	≥ 240 mm × 13 mm	EI 90 U/C	2
Pipe outer Ø ≤ 63.0 mm, wall thickness ≥ 4.5 mm	≥ 240 mm × 26 (2× 13) mm	EI 90 U/C	2
Multilayer pipes Henco Pipes with PEF insulation and intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 14.0 mm, 6 mm PE foam, wall thickness ≥ 2.0 mm	1× 1-layer, ≥ 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 90 U/C	2
Pipe outer Ø ≤ 26.0 mm, 6–13 mm PE foam, wall thickness ≥ 3.0 mm	1× 1-layer, ≥ 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 90 U/C	2
Pipe outer Ø ≤ 32.0 mm, 6–10 mm PE foam, wall thickness ≥ 3.0 mm	1× 1-layer, ≥ 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 90 U/C	2
Multilayer pipes Uponor MLC pipe white S			
Pipe outer Ø ≤ 110.0 mm, Wall thickness = 10.0 mm	Lamella mat ≥ 250 mm × ≥ 30 mm	EI 60 / E 90 U/C	2
	ArmaFlex Protect ≥ 240 mm × 26 mm	EI 60 U/C	2

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Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of copper, steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 15.0 mm, wall thickness ≥ 0.8	≥ 250 mm × ≥ 20 mm	EI 60 C/U	1
Pipe outer Ø ≤ 22.0 mm, wall thickness ≥ 1.0	≥ 250 mm × ≥ 60 mm	EI 60 C/U	1
Pipe outer Ø ≤ 22.0 mm, wall thickness ≥ 1.0	≥ 500 mm × ≥ 20 mm	EI 60 C/U	1
Pipe outer Ø ≤ 54.0 mm, wall thickness ≥ 1.5	≥ 500 mm × ≥ 30 mm	EI 60 C/U	1
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 2.0	≥ 800 mm × ≥ 40 mm	EI 60 C/U	1
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 2.0	≥ 800 mm × ≥ 40 mm	EI 60 C/U	1
Pipe outer Ø ≤ 114.3 mm, wall thickness ≥ 3.6	≥ 500 mm × ≥ 40 mm	EI 60 C/U	1
Pipe outer Ø ≤ 170.0 mm, wall thickness ≥ 3.0	≥ 800 mm × ≥ 60 mm + ≥ 500 mm × ≥ 30 mm	EI 60 C/U	
Pipe outer Ø ≤ 219.1 mm, wall thickness ≥ 5.0	≥ 800 mm × ≥ 60 mm + ≥ 500 mm × ≥ 30 mm	EI 60 C/U	1
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation made of NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 15.0 mm, wall thickness ≥ 0.8 mm			
Insulation thickness 13–19 mm	2× 2-layer	EI 90 C/U	2
Insulation thickness 19–25 mm	1× 2-layer	EI 60 / E 90 C/U	2
Pipe outer Ø ≤ 28.0 mm, wall thickness ≥ 1.0 mm			
Insulation thickness 19–25 mm	2× 2-layer	EI 90 C/U	2
Insulation thickness 25 mm	1× 2-layer	EI 60 / E 90 C/U	2
Pipe outer Ø ≤ 42.0 mm, wall thickness ≥ 1.2 mm			
Insulation thickness 25 mm	2× 2-layer	EI 90 C/U	2
Insulation thickness 25–44 mm	1× 2-layer	EI 60 / E 90 C/U	2
Pipe outer Ø ≤ 54.0 mm, wall thickness ≥ 1.5 mm			
Insulation thickness 28–57 mm	1× 1-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U	2

* Classification report no. 1 → 1913.2/13/Z00NP 2 → KB 00924.1/15/Z00NP/e 3 → KB K-2401/311/20-MPA BS

PYRO-SAFE® Flammotect Single Layer

Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 2.0 mm			
Insulation thickness 25–88 mm	1× 2-layer + lamella mat ≥ 500 mm × ≥ 40 mm	EI 90 C/U	2
Insulation thickness 89 mm	1× 2-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U	2
Pipe outer Ø ≤ 108.0 mm, wall thickness ≥ 2.5 mm			
Insulation thickness 57 mm	1× 2-layer + lamella mat ≥ 1000 mm × ≥ 40 mm	EI 90 C/U	2
Insulation thickness 58–89 mm	1× 2-layer + lamella mat ≥ 1000 mm × ≥ 40 mm	EI 60 C/U	2
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation made of NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 170.0 mm, wall thickness ≥ 2.9 mm			
Insulation thickness 25 mm	1× 2-layer + lamella mat ≥ 1000 mm × ≥ 40 mm	EI 90 C/U	2
Insulation thickness 26–85 mm	1× 2-layer + lamella mat ≥ 1000 mm × ≥ 40 mm	EI 60 C/U	2
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation made of ArmaFlex Protect			
Pipe outer Ø ≤ 88.9 mm, wall thickness ≥ 0.8 mm	–	EI 60 / E 90 C/U	1
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation made of ArmaFlex Protect			
Pipe outer Ø ≤ 170.0 mm, wall thickness ≥ 3.0 mm	–	EI 60 / E 90 C/U	1

* Classification report no. 1 → 1913.2/13/Z00NP 2 → KB 00924.1/15/Z00NP/e 3 → KB K-2401/311/20-MPA BS

PYRO-SAFE® Flammotect Single Layer

Installation in floors				
Service	**Insulation thickness**	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of copper, steel, stainless steel or cast iron with PIR insulation and fire protection wrap PYRO-SAFE® DG-CR PRO				
Pipe outer Ø ≤ 28.0 mm, Wall thickness ≥ 1.0 mm – ≤ 14.2 mm	20 mm	1× 125 mm 2-layer	EI 60 C/U	3
	50 mm	1× 125 mm 3-layer	EI 90 C/U	3
Pipe outer Ø ≤ 42.0 mm, Wall thickness ≥ 1.2 mm – ≤ 14.2 mm	30 mm	1× 125 mm 2-layer	EI 60 C/U	3
	60 mm	1× 125 mm 3-layer	EI 60 C/U	3
Pipe outer Ø ≤ 54.0 mm, Wall thickness ≥ 1.5 mm – ≤ 14.2 mm	30 mm	1× 125 mm 2-layer	EI 60 C/U	3
	80 mm	1× 125 mm 4-layer	EI 60 C/U	3
Pipe outer Ø ≤ 88.9 mm, Wall thickness ≥ 2.0 mm – ≤ 14.2 mm	40 mm	1× 125 mm 2-layer	EI 60 C/U	3
	50 mm	1× 125 mm 3-layer	EI 60 C/U	3
	100 mm	1× 125 mm 4-layer	EI 60 C/U	3
Non-combustible pipes made of steel, stainless steel or cast iron with PIR insulation and fire protection wrap PYRO-SAFE® DG-CR PRO				
Pipe outer Ø ≤ 88.9 mm, Wall thickness ≥ 2.9 mm – ≤ 14.2 mm	30 mm	1× 125 mm 2-layer	EI 60 C/U	3
	100 mm	1× 125 mm 4-layer	EI 60 C/U	3
Pipe outer Ø ≤ 133.0 mm, Wall thickness ≥ 3.6 mm – ≤ 14.2 mm	40 mm	1× 125 mm 2-layer	EI 60 C/U	3
	100 mm	1× 125 mm 4-layer	EI 60 C/U	3
Pipe outer Ø ≤ 219.1 mm, Wall thickness ≥ 4.5 mm – ≤ 14.2 mm	40 mm	1× 125 mm 2-layer	EI 60 C/U	3
	60 mm	1× 125 mm 3-layer	EI 60 C/U	3
	100 mm	1× 125 mm 4-layer	EI 60 C/U	3

* Classification report no 1 → 1913.2/13/Z00NP 2 → KB 00924.1/15/Z00NP/e 3 → KB K-2401/311/20-MPA BS

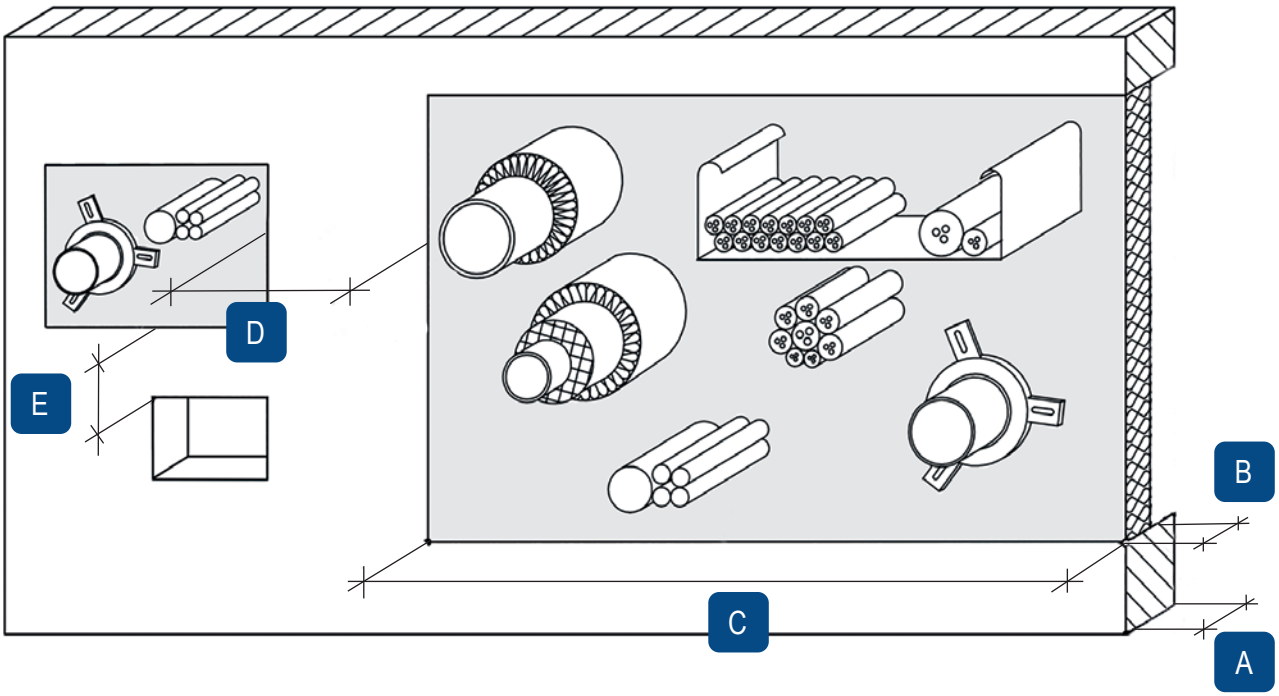
Service	Measure	Fire resistance class	Source*
HVAC split line combinations with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe Ø 6/10 mm or Ø 6–10, 9 mm PE foam, 1 pipe PVC-U Ø ≤ 25.0 mm, wall thickness 1.8–3.5 mm, 2 cables Ø ≤ 14.0 mm	2× 2-layer	EI 45 / E 60	1
Pipe Ø 22/22 mm or Ø 6-22, 9 mm PE foam, 1 pipe PVC-U Ø ≤ 25.0 mm, wall thickness 1.8 mm, 4 cables Ø ≤ 21.0 mm	1× 2-layer + lamella mat ≥ 250 mm × ≥ 30 mm	EI 90	2
Double solar pipes Nanosun² with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
DN 16	2× 1-layer, ≥ 25 mm overlap	EI 60 U/U	1
DN 40	2× 1-layer, ≥ 25 mm overlap	EI 60 U/U	1

* Classification report no. 1 → 1913.2/13/Z00NP 2 → KB 00924.1/15/Z00NP/e 3 → KB K-2401/311/20-MPA BS

PYRO-SAFE® Flammotect Single Layer

3. Thicknesses and spacing

Dimensions						
Item	**Name**	**Wall [mm]**	**Floor [mm]**	**Timber wall [mm]**	**Timber floor [mm]**	**Sandwich panel wall [mm]**
A	Component thickness	≥ 100	≥ 125	≥ 100	≥ 140 (blank seal)	≥ 100
B	Penetration seal thickness	≥ 60	≥ 60	≥ 60	≥ 60	≥ 60
C	Maximum dimensions of the component opening (width × height)	1175 × 1200	1200 × 2400 oder 800 × ∞	600 × 1000	600 × 1000	1000 × 1000
D	Distance to other openings or installations	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200
E	Reduced distance to adjacent seal openings, as long as both openings are ≤ 400 mm × 400 mm	≥ 100	≥ 100	≥ 200	≥ 200	≥ 200



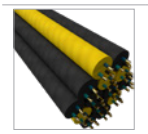
PYRO-SAFE® Flammotect Single Layer

4. Allowed services

4.1 Cables / cable bundles / cable trays / electrical installation conduits / PE pipes

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

Maximum outer diameter of the individual cables ≤ 80 mm.



Cable bundles

Ø ≤ 100 mm with single cable Ø ≤ 21 mm.

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

Cable trays

Cable trays and ladders made of steel (with organic coating if applicable) as long as the fire reaction class complies at least with class A2 according to EN 13501-1.

Electrical installation conduits (EIC)

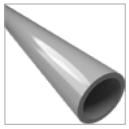
made of plastic Ø ≤ 32 mm single or bundled Ø ≤ 100 mm, with/without cable (Ø ≤ 21 mm)

speedpipes (for glass fibre cables and micro cables)

from Gabocom Systemtechnik GmbH, bundled or individual, with/without glass fibre cable.

pipe outer Ø [mm]	≤ 7	≤ 10	≤ 12
max. number [pcs.]	24	7	5
pipe wall thickness [mm]	≤ 1.5	≤ 2.0	≤ 2.0

4.2 Combustible pipes



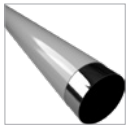
With fire protection wrap PYRO-SAFE® DG-CR BS up to an outer Ø ≤ 100 mm for ventilated drain pipes and closed piping systems. The pipes may carry non-combustible liquids or gases (ventilation pipes excepted).

PVC-U, PVC-C		**PP-H**		**PE 100**	
Standards: EN 1329-1, EN 1453-1, EN 1542-1, EN 15493, DIN 8061/8062, EN 1566-1		Standards: EN 1555-2, EN 12201-2+A1, DIN 8074/8075, EN 15874, DIN 8077/8078		Standards: EN 1555-2, EN 12201-2+A1, DIN 8074/8075	
Pipe outer Ø [mm]	**Pipe wall thickness [mm]**	**Pipe outer Ø [mm]**	**Pipe wall thickness [mm]**	**Pipe outer Ø [mm]**	**Pipe wall thickness [mm]**
≤ 50	1.8–3.7	≤ 50	1.8–4.6	≤ 50	1.8–4.6
≤ 70	1.9/2.0–5.2	≤ 70	2.0/2.1–5.2	≤ 70	2.0/2.1–6.4
≤ 90	2.0/2.1–6.7	≤ 90	2.3/2.4–5.8	≤ 90	2.3/2.4–8.2
≤ 110	2.2–8.2	≤ 110	2.6/2.7–6.3	≤ 110	2.6/2.7–10.0

PYRO-SAFE® Flammotect Single Layer

4.3 Multilayer pipes

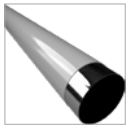
4.3.1 Henco Pipes



Multilayer pipes made of aluminium and crosslinked PE (PE-Xc/Al/PE Xc). Made by Henco. Pipe outer Ø ≤ 63.0 mm.

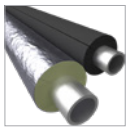
Pipe outer Ø [mm]	Pipe wall thickness [mm]
≤ 12	1.6
≤ 14	2.0
≤ 32	3.0
≤ 63	4.5

4.3.2 Uponor MLC Pipe White S



Multilayer pipes made of aluminium and PE-RT (PE-RT/Al/PE-RT). Made by Uponor. Pipe outer Ø ≤ 110.0 mm, wall thickness 10.0

4.4 Non-combustible pipes



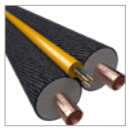
Pipes made of copper, steel, stainless steel or cast iron

Pipe material / insulation	Pipe outer Ø [mm]
Copper with non-combustible pipe insulation made of mineral fibre e. g. lamella mat	≤ 88.9
Steel, stainless steel or cast iron with non-combustible pipe insulation made of mineral fibre e. g. lamella mat	≤ 219.1
Copper with combustible pipe insulation NH/ArmaFlex	≤ 108.0
Steel, stainless steel, cast iron with combustible pipe insulation NH/ArmaFlex	≤ 170.0
Copper with combustible pipe insulation ArmaFlex Protect	≤ 88.9
Steel, stainless steel or cast iron with combustible pipe insulation ArmaFlex Protect	≤ 170.0
Copper with combustible pipe insulation made of polyisocyanurate (PIR)	≤ 88.9
Steel, stainless steel or cast iron with combustible pipe insulation made of polyisocyanurate (PIR)	≤ 219.1

Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]
Copper, steel, stainless steel, cast iron	≤ 15.0	≥ 0.8
	≤ 22.0	≥ 1.0
	≤ 42.0	≥ 1.2
	≤ 54.0	≥ 1.5
	≤ 88.9	≥ 2.0
Steel, stainless steel, cast iron	≤ 114.3	≥ 3.6
	≤ 170.0	≥ 2.9
	≤ 219.1	≥ 5.0

PYRO-SAFE® Flammotect Single Layer

4.5 Further allowed services



HVAC split line combinations

e. g. Tubolit DuoSplit or Tubolit Split made by Armacell or combinations with equivalent parameters

Double- or single copper pipe and pipe insulation of 9 mm thickness made of PE foam in accordance with EN 14313 with optional accompanying lines (one plastic pipe (U/U) made of PVC-U, outer Ø 25 mm and pipe wall thickness 1.5 mm, in accordance with EN 1453-1 or EN 1452-1 and DIN 8061/ DIN 8062 and up to 3 sheathed lines with max. 5 cores of ≤ 1.5 mm², Ø ≤ 14 mm, or 4 sheathed lines Ø ≤ 21 mm without spacing.

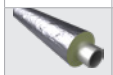
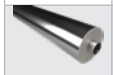
Double solar pipes Nanosun²

Pipes for solar thermal applications made of corrugated stainless steel with insulation, an accompanying line integrated in the insulation and a PVC sheath made by Aktarus Group Srl, DN 16 to DN 40.

5. Spacing distances for services

All specifications refer to spacing distances between insulations and additional measures if required.

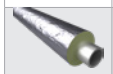
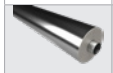
Spacing distances in plasterboard walls and solid walls

		Cables	Cable bundles	Cable trays	Electrical installation conduits single or bundled	Combustible pipes	Multilayer pipes	Non-combustible pipes; insulation made of lamella mat	Non-combustible pipes; insulation made of FEF	Non-combustible pipes; insulation made ofPIR	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Seal edge		
														Upper	Under	Side
	Cables	≥ 0*			≥ 0***	≥ 50	≥ 10***	≥ 70**	≥ 25	≥ 100	≥ 25	≥ 25	≥ 25	≥ 10	≥ 0	≥ 0
	Cable bundles	≥ 0*			≥ 0***	≥ 50	≥ 10***	≥ 70**	≥ 25	≥ 100	≥ 25	≥ 25	≥ 25	≥ 10	≥ 0	≥ 0
	Cable trays	≥ 0*			≥ 0***	≥ 50	≥ 10***	≥ 70**	≥ 25	≥ 100	≥ 25	≥ 25	≥ 25	≥ 10	≥ 0	≥ 0
	Electrical installation conduits single or bundled	≥ 0			≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 25	≥ 25
	Combustible pipes	≥ 50			≥ 100	≥ 25	≥ 100	≥ 25	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 50	≥ 50
	Multilayer pipes	≥ 10***			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Non-combustible pipes; insulation made of lamella mat	≥ 70**			≥ 100	≥ 25	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Non-combustible pipes; insulation made of FEF	≥ 25			≥ 100	≥ 50	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Non-combustible pipes; insulation made of PIR	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	HVAC split line combinations	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Double solar pipes Nanosun²	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 0
	speedpipes	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 0

** Distance above each other ≥ 50
** Distance for cables / cable bundles / cable trays with wrap ≥ 50
*** If cable ≤ 21 then distance ≥ 0

Dimensions in mm

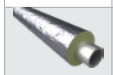
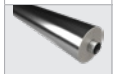
Spacing distances in timber and sandwich panel walls

														Seal edge		
		Cables	Cable bundles	Cable trays	Electrical installation conduits single or bundled	Combustible pipes	Multilayer pipes	Non-combustible pipes; insulation made of lamella mat	Non-combustible pipes; insulation made of FEF	Non-combustible pipes; insulation made ofPIR	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Upper	Under	Side
	Cables	≥ 0*			≥ 0***	≥ 50	≥ 10***	≥ 70**	≥ 25	≥ 100	≥ 25	≥ 25	≥ 25	≥ 100	≥ 100	≥ 100
	Cable bundles	≥ 0*			≥ 0***	≥ 50	≥ 10***	≥ 70**	≥ 25	≥ 100	≥ 25	≥ 25	≥ 25	≥ 100	≥ 100	≥ 100
	Cable trays	≥ 0*			≥ 0***	≥ 50	≥ 10***	≥ 70**	≥ 25	≥ 100	≥ 25	≥ 25	≥ 25	≥ 100	≥ 100	≥ 100
	Electrical installation conduits single or bundled	≥ 0			≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Combustible pipes	≥ 50			≥ 100	≥ 25	≥ 100	≥ 25	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Multilayer pipes	≥ 10***			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Non-combustible pipes; insulation made of lamella mat	≥ 70**			≥ 100	≥ 25	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Non-combustible pipes; insulation made of FEF	≥ 25			≥ 100	≥ 50	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Non-combustible pipes; insulation made of PIR	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	HVAC split line combinations	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Double solar pipes Nanosun²	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100
	speedpipes	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100

** Distance above each other ≥ 50
** Distance for cables / cable bundles / cable trays with wrap ≥ 50
*** If cable ≤ 21 then distance ≥ 0

Dimensions in mm

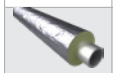
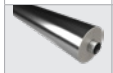
Spacing distances in solid floors

		Cables	Cable bundles	Cable trays	Electrical installation conduits single or bundled	Combustible pipes	Multilayer pipes	Non-combustible pipes; insulation made of lamella mat	Non-combustible pipes; insulation made of FEF	Non-combustible pipes; insulation made ofPIR	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Seal edge		
														Upper	Under	Side
	Cables	≥ 0*			≥ 0***	≥ 50	≥ 20***	≥ 50	≥ 25**	≥ 100	≥ 50	≥ 10	≥ 20	≥ 5	≥ 0	≥ 0
	Cable bundles	≥ 0*			≥ 0***	≥ 50	≥ 20***	≥ 50	≥ 25**	≥ 100	≥ 50	≥ 10	≥ 20	≥ 5	≥ 0	≥ 0
	Cable trays	≥ 0*			≥ 0***	≥ 50	≥ 20***	≥ 50	≥ 25**	≥ 100	≥ 50	≥ 10	≥ 20	≥ 5	≥ 0	≥ 0
	Electrical installation conduits single or bundled	≥ 0			≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 25	≥ 25
	Combustible pipes	≥ 50			≥ 100	≥ 25	≥ 100	≥ 25	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 50	≥ 50
	Multilayer pipes	≥ 20***			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Non-combustible pipes; insulation made of lamella mat	≥ 50			≥ 100	≥ 25	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Non-combustible pipes; insulation made of FEF	≥ 25**			≥ 100	≥ 50	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Non-combustible pipes; insulation made of PIR	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	HVAC split line combinations	≥ 50			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 0	≥ 0	≥ 0
	Double solar pipes Nanosun²	≥ 10			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 0
	speedpipes	≥ 20			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 20	≥ 100	≥ 100	≥ 0

** Distance above each other ≥ 50
** Distance for cables / cable bundles / cable trays with wrap ≥ 50
*** If cable ≤ 21 then distance ≥ 0

Dimensions in mm

Spacing distances in timber floors

														Seal edge		
		Cables	Cable bundles	Cable trays	Electrical installation conduits single or bundled	Combustible pipes	Multilayer pipes	Non-combustible pipes; insulation made of lamella mat	Non-combustible pipes; insulation made of FEF	Non-combustible pipes; insulation made ofPIR	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Upper	Under	Side
	Cables	≥ 0*			≥ 0***	≥ 50	≥ 20***	≥ 50	≥ 25**	≥ 100	≥ 50	≥ 10	≥ 20	≥ 100	≥ 100	≥ 100
	Cable bundles	≥ 0*			≥ 0***	≥ 50	≥ 20***	≥ 50	≥ 25**	≥ 100	≥ 50	≥ 10	≥ 20	≥ 100	≥ 100	≥ 100
	Cable trays	≥ 0*			≥ 0***	≥ 50	≥ 20***	≥ 50	≥ 25**	≥ 100	≥ 50	≥ 10	≥ 20	≥ 100	≥ 100	≥ 100
	Electrical installation conduits single or bundled	≥ 0			≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Combustible pipes	≥ 50			≥ 100	≥ 25	≥ 100	≥ 25	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Multilayer pipes	≥ 20***			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Non-combustible pipes; insulation made of lamella mat	≥ 50			≥ 100	≥ 25	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Non-combustible pipes; insulation made of FEF	≥ 25**			≥ 100	≥ 50	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Non-combustible pipes; insulation made of PIR	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	HVAC split line combinations	≥ 50			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Double solar pipes Nanosun²	≥ 10			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100
	speedpipes	≥ 20			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 20	≥ 100	≥ 100	≥ 100

** Distance above each other ≥ 50
** Distance for cables / cable bundles / cable trays with wrap ≥ 50
*** If cable ≤ 21 then distance ≥ 0

Dimensions in mm

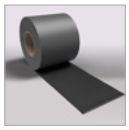
PYRO-SAFE® Flammotect Single Layer

6. Included products

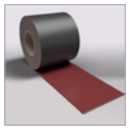
PYRO-SAFE® FLAMMOTECT-A
Coating
12.5 kg pail – Art. no. 01155101
15.0 kg pail – Art. no. 01155105

PYRO-SAFE® FLAMMOTECT-A
Solid emulsion
12.5 kg pail – Art. no. 01155106
15.0 kg pail – Art. no. 01155107

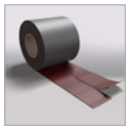
PYRO-SAFE® FLAMMOTECT-A
Filler
12.5 kg pail – Art. no. 01155104
15.0 kg pail – Art. no. 01155109
310 ml cartridge – Art. no. 01155125



PYRO-SAFE® DG-CR 1.5
Fire protection wrap
Roll, 10 m × 125 mm – Art. no. 01261125



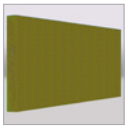
PYRO-SAFE® DG-CR BS
Fire protection wrap
Roll, 10 m × 100 mm – Art. no. 01264100



PYRO-SAFE® DG-CR PRO
Fire protection wrap
with central pre-slot
Roll, 10 m × 125 mm
(separable into 2× 62.5 mm)
– Art. no. 01261950

Mineral wool A1

Reaction to fire class in acc. with
EN 13501-1: A1
Melting point ≥ 1000 °C
10 kg bag – Product no. 01183000

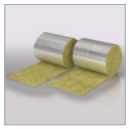


Mineral fibre board acc. to EN 13162

Criteria: Density ≥ 150 kg/m³
Reaction to fire class A1 in acc. with
EN 13501:1
Melting point ≥ 1,000 °C.
(TR10) tensile strength vertical to board
surface ≥ 10 kPa according to EN 1607
Thickness ≥ 60 mm

Mineral fibre boards
Pre-coated on one side with
PYRO-SAFE® FLAMMOTECT-A
Dimensions 1000 × 600 × 60 mm
Carton with 4 pcs. – Art. no. 01181160

PYRO-SAFE® Flammotect Single Layer

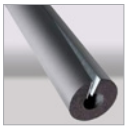


Lamella mat Klimarock

in accordance with DIN EN 14303 and
DoP DE0628071802 dated 13.07.2018
Reaction to fire class according to
EN 13501-1: Class A1
Dimensions 610 × 50 cm
Thickness 30 mm
Roll, 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/m³
Reaction to fire class A1 acc. to EN 13501-1
Thickness ≥ 30 mm

Recommended tools

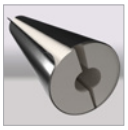
Filler, brush, masking tape,
mineral wool knife and saw,
if required: plastic film, folding ladder,
lock wire pliers, steel wire (galvanised)



Sectional and protective insulation

made of flexible elastomeric foam (FEF)

Name	DIN/ abZ/abP
NH/ArmaFlex	DIN EN 14304
ArmaFlex Protect	DIN EN 14304



PIR pipe sleeve

made of polyisocyanurate
with PVC or aluminium foil

Manufacturer:	swisspor AG, CH-6312 Steinhausen
Density:	~32 kg/m³
DoP:	LE-013.1.0-HT-15.2
or PIR pipe sleeves with equivalent parameters	

6.1 Declarations of Performance

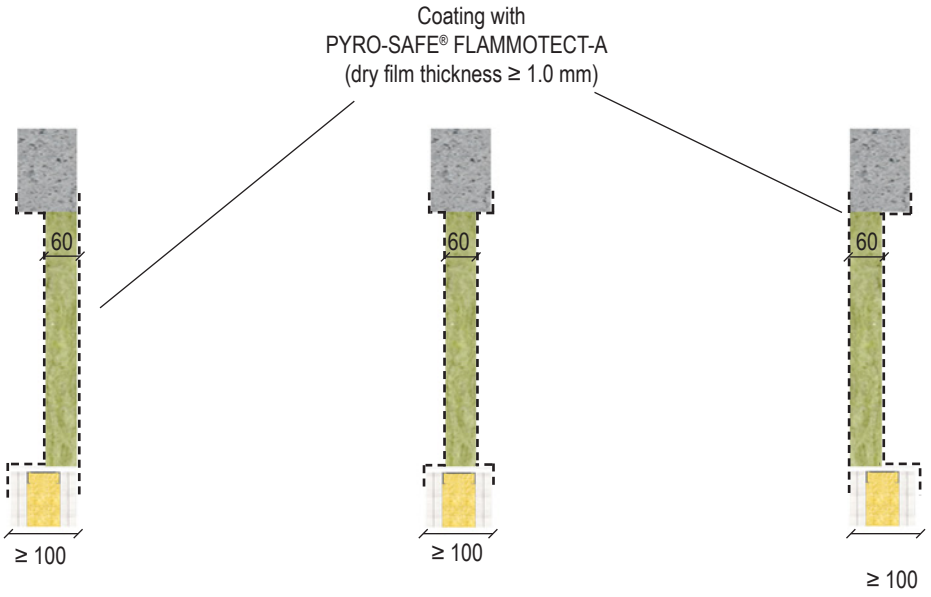
The Declarations of Performance for the included svt products are available for download on our website:
https://svt-global.com/downloads

PYRO-SAFE® Flammotect Single Layer

7. Regulations and variants

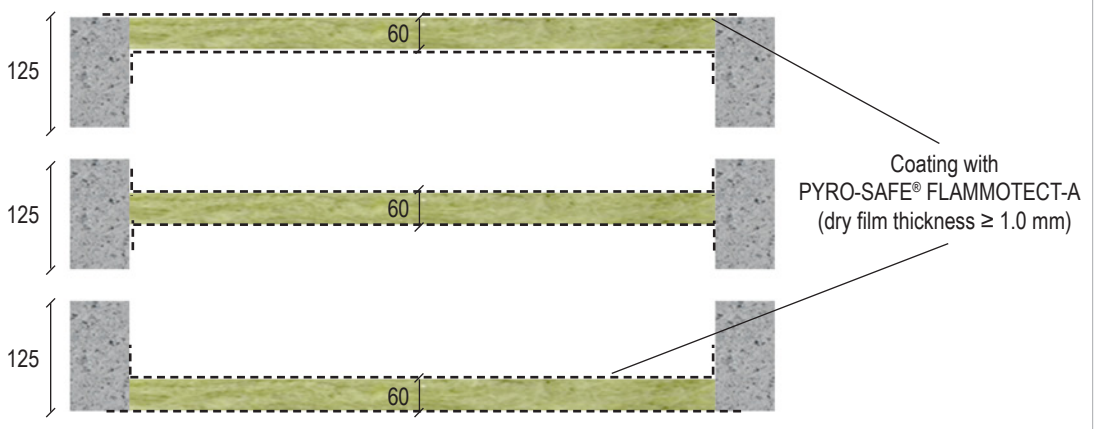
- The sealing system may be used to close openings without installations (reserve penetration for subsequent configurations).
- The penetration sealing system surface of mineral fibre boards and their edges, and 20 mm all around on the structural element must be coated with PYRO-SAFE® FLAMMOTECT-A (with a dry film thickness of at least 1.0 mm).
- Annular gaps ≤ 5 mm around cables, cable bundles, cable trays as well as speedpipes, double solar pipes and HVAC split line combinations must be closed by applying PYRO-SAFE® FLAMMOTECT-A coating inside the penetration area. Gaps > 5 mm must be closed by filling them with loose mineral fibre wool and applying coating.
- Annular gaps ≤ 5 mm around combustible/non-combustible pipes must be closed by filling with loose mineral fibre wool.

Design variants in plasterboard walls and solid walls



Dimensions in mm

Desing variants in solid floors

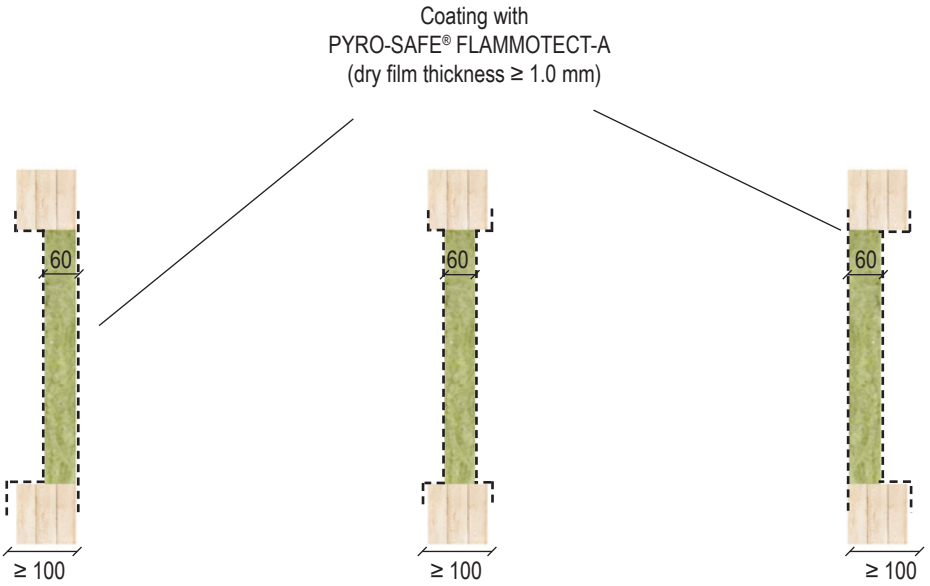


Dimensions in mm

PYRO-SAFE® Flammotect Single Layer

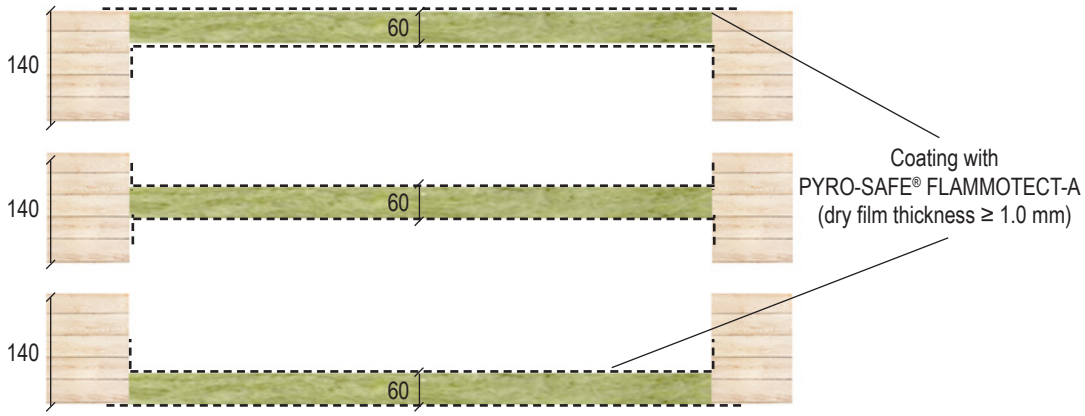
- In timber components, the spacing distance between applied services and seal edge must always be at least 100 mm (see chapter 5, Spacing distances for services).

Design variants in timber walls



Dimensions in mm

Design variants in timber floors

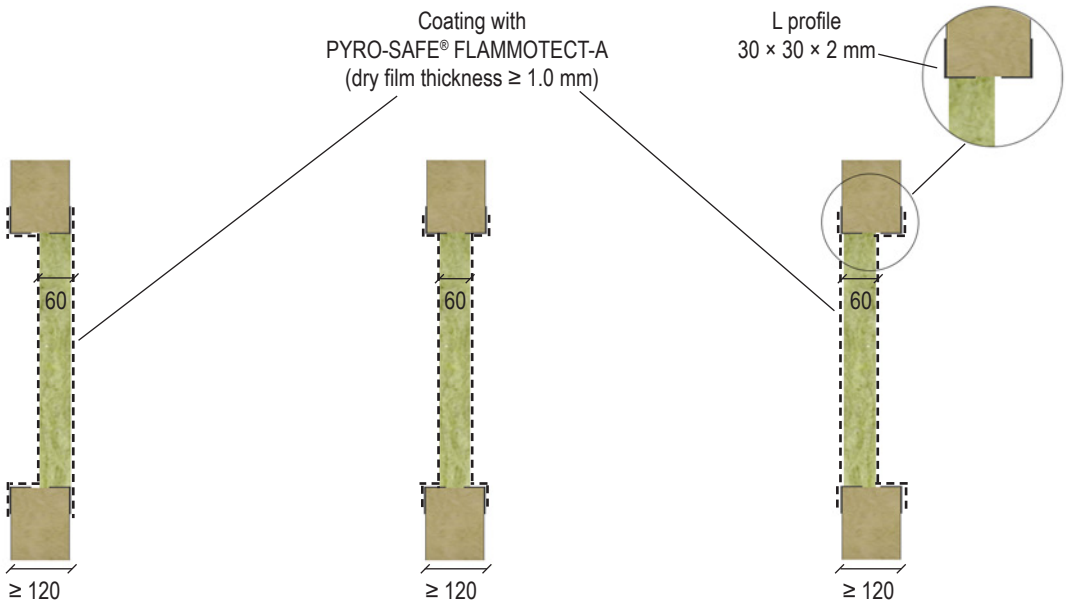


Dimensions in mm

PYRO-SAFE® Flammotect Single Layer

- On both sides of the seal L profiles with the dimensions 30 × 30 × 2 mm must be attached alongside the reveal.
- In sandwich panel walls, the spacing distance between applied services and seal edge must always be at least 100 mm (see chapter 5, Spacing distances for services).

Design variants in sandwich panel walls

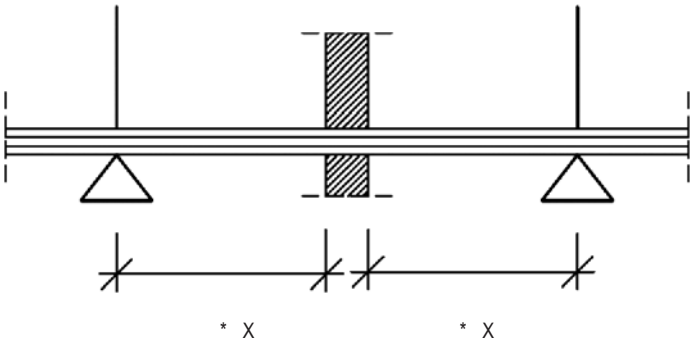


Dimensions in mm

PYRO-SAFE® Flammotect Single Layer

7.1 Initial brackets (supports)

The brackets/supports of the installations in front of the wall seal must be largely non-combustible (building material class DIN 4102-A) and installed at distances on both sides according to the overview.



Initial brackets (supports) of the installations in front of the wall penetration sealing system must be made of steel or equivalent material.

Initial brackets	Wall	Floor
Cables, cable bundles, cable trays	≤ 200	≤ 400
Combustible pipes	≤ 400	≤ 1000
Multilayer pipes	≤ 550	≤ 800
Non-combustible pipes – section insulation with mineral fibre mats or pipe sleeves	≤ 850	≤ 850
Non-combustible pipes made of copper – section insulation with NH/ArmaFlex (without protective insulation)	≤ 800	≤ 800
Non-combustible pipes – section insulation with NH/ArmaFlex (with protective insulation)	≤ 1000	≤ 1000
Non-combustible pipes made of copper – section insulation with ArmaFlex Protect	≤ 600	≤ 600
Non-combustible pipes made of steel, stainless stell or cast iron – section insulation with ArmaFlex Protect	≤ 1100	≤ 1100
Non-combustible pipes made of copper – section insulation with PIR	≤ 500*	≤ 850 mm
Double solar pipes Nanosun²	according to manufacturer information	
speedpipes for glass fibre cables and micro cables	according to manufacturer information	
HVAC split line combinations	≤ 500	≤ 500
		Dimensions in mm

* ≤ 530 mm (from wall surface)

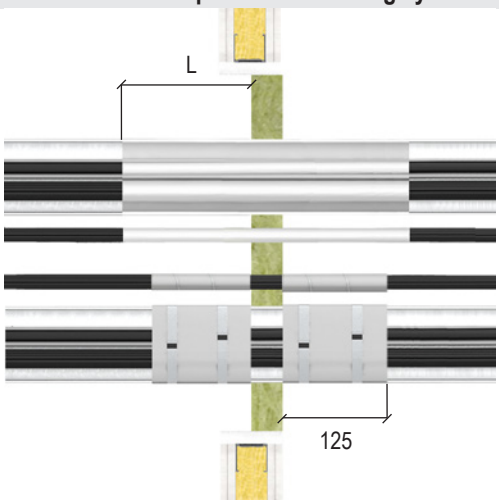
PYRO-SAFE® Flammotect Single Layer

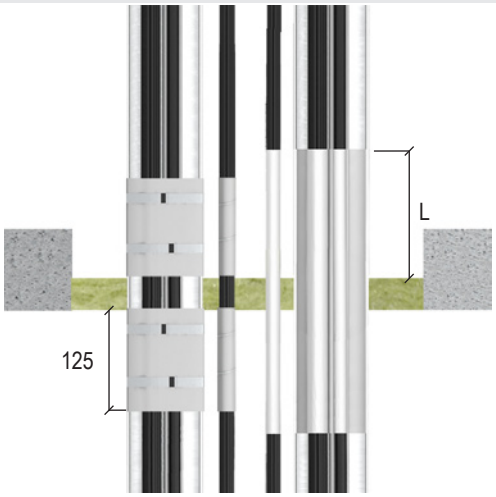
8. Fire protection measures

8.1 Cables / cable bundles / cable trays

- Cables and cable bundles may be installed with or without cable trays.
- Cable bundles may be installed unopened in the seal. It is not necessary to fill the interstices if the bundles consist of parallel-running cables that are tightly packed, tied, stitched or welded together.
- The supporting structures for cable trays must be designed in such a way that the penetration seal will not be subjected to additional mechanical stress in case of fire.
- For cable support structures made of sheet steel or hollow aluminium profiles, the spars must be drilled and filled with the ablative coating PYRO-SAFE® FLAMMOTECT-A in the penetration area (on-site agreement of the measures required).

Design for wall and floor penetration sealing system





For component and seal thickness and design variants, see page 25

Dimensions in mm

Service	Dimensions	Fire protection coating PYRO-SAFE® FLAMMOTECT-A			Fire resistance class	
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	Wall	Floor
Cables	Ø ≤ 21 (through drill holes)	0.75	60	100	–	EI 90
	Ø ≤ 21	0.75		100	EI 60 / E 90	EI 60 / E 90
	Ø > 21 to ≤ 50	1.00		150		
	Ø > 50 to ≤ 80	1.00		150		
Cable bundles	Ø ≤ 100	0.75		100		
	Ø ≤ 100	1.00		150	EI 90	–

Service	Dimensions	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class	
		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Wall	Floor
Cables	Ø ≤ 21 (through drill holes)	125	2	1	≥ 45	0	125	EI 90	EI 90
	Ø ≤ 21							EI 60 / E 90	EI 60 / E 90
	Ø > 21 to ≤ 50								
	Ø > 50 to ≤ 80								
Cable bundles	Ø ≤ 100								

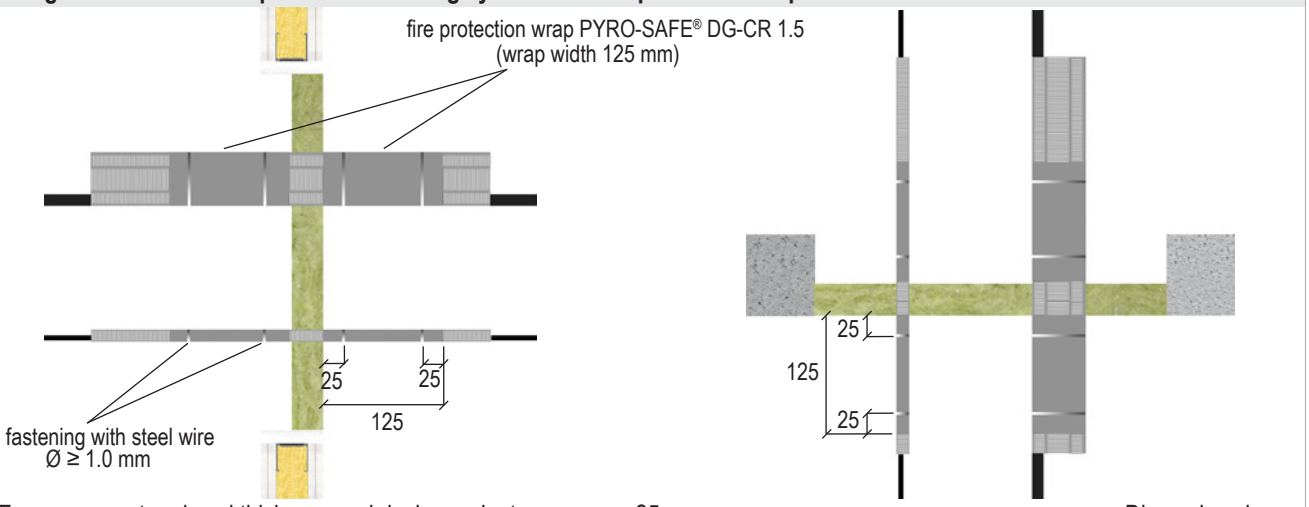
NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

8.2 Electrical installation conduits (EIC)

- It is possible to install both single and bundled EICs with or without cables.
- The EICs must be wrapped on both sides of the layer with the 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. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.

Design for wall and floor penetration sealing system with fire protection wrap PYRO-SAFE® DG-CR 1.5



For component and seal thickness and design variants, see page 25

Dimensions in mm

Service	Dimensions	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class	
		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Wall	Floor
EIC made of plastic single	up to Ø ≤ 32 (with/without cables Ø ≤ 21)	125	2	2	0	30	95	EI 60 / E 90 U/U	EI 90 U/U
EIC made of plastic bundled	up to Ø ≤ 100 (single EIC up to Ø ≤ 32, with/without cables Ø ≤ 21)								

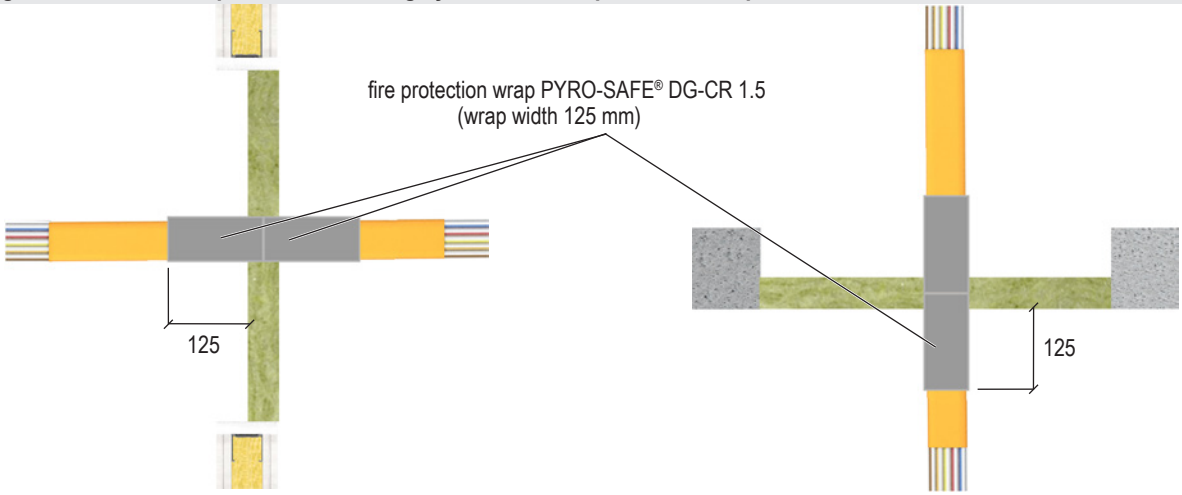
NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

8.3 speedpipes (PE pipes for glass fibre cables and micro cables)

- The speedpipes must be arranged vertically to the component surface.
- The speedpipes must be wrapped on both sides of the layer with the 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. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.

Design for wall and floor penetration sealing system with fire protection wrap PYRO-SAFE® DG-CR 1.5



For component and seal thickness and design variants, see page 25

Dimensions in mm

Configuration	Wall thickness [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class	
		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Wall	Floor
Ø 7.0 mm × 24 pcs.	≥ 1.5	125	2	1	0	30	95	EI 60 / E 90 U/U	EI 60 U/U
Ø 10.0 mm × 7 pcs.	≥ 2.0								
Ø 12.0 mm × 5 pcs.	≥ 2.0								

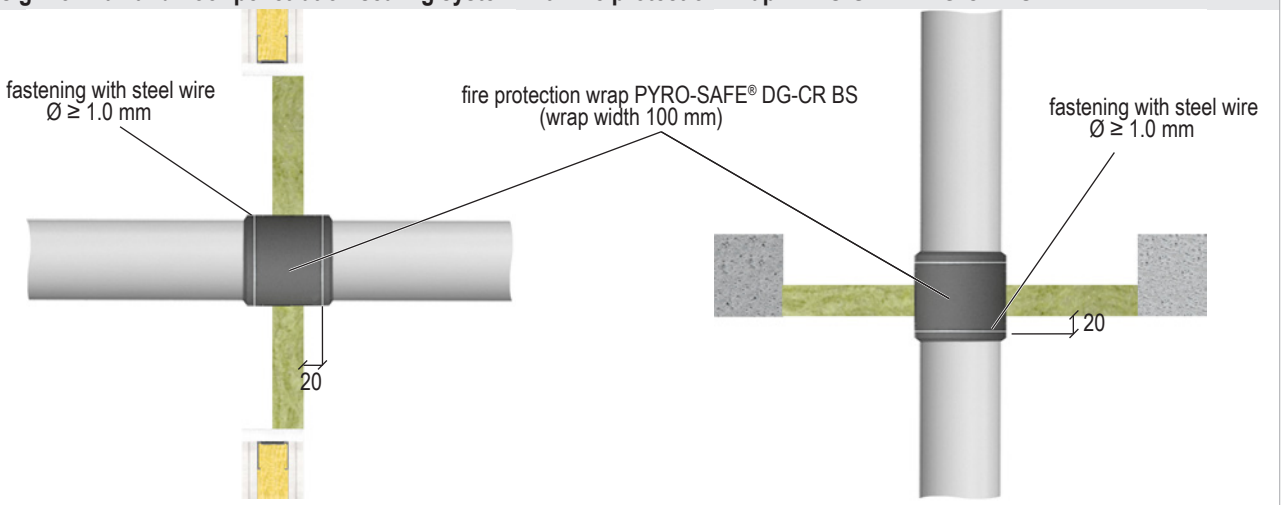
NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

8.4 Combustible pipes

- Combustible pipes must be arranged vertically to the component surface.
- Combustible pipes must be wrapped with the intumescent wrap PYRO-SAFE® DG-CR BS.
- The penetration sealing may only be used on pneumatic conveyors, compressed air lines etc. if the pipeline system is switched off in the event of a fire.

Design for wall and floor penetration sealing system with fire protection wrap PYRO-SAFE® DG-CR BS



For component and seal thickness and design variants, see page 25

Dimensions in mm

PYRO-SAFE® Flammotect Single Layer

Combustible pipes made of PVC-U, PVC-C								
Dimensions	Fire protection wrap PYRO-SAFE® DG-CR BS						Fire resistance class	
	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Wall	Floor
≤ Ø 50	100	1	1	0	60	40 (20 per side)	EI 90 U/U	EI 90 U/U
≤ Ø 70			2				EI 60 / E 90 U/U	EI 45 / E 90 U/U
≤ Ø 90			3					
≤ Ø 110			4					

Combustible pipes made of PE-100								
Dimensions	Fire protection wrap PYRO-SAFE® DG-CR BS						Fire resistance class	
	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Wall	Floor
≤ Ø 50	100	1	1	0	60	40 (20 per side)	EI 90 U/U	EI 90 U/U
≤ Ø 70			2				EI 60 / E 90 U/U	EI 60 / E 90 U/U
≤ Ø 90			3					
≤ Ø 110			4					

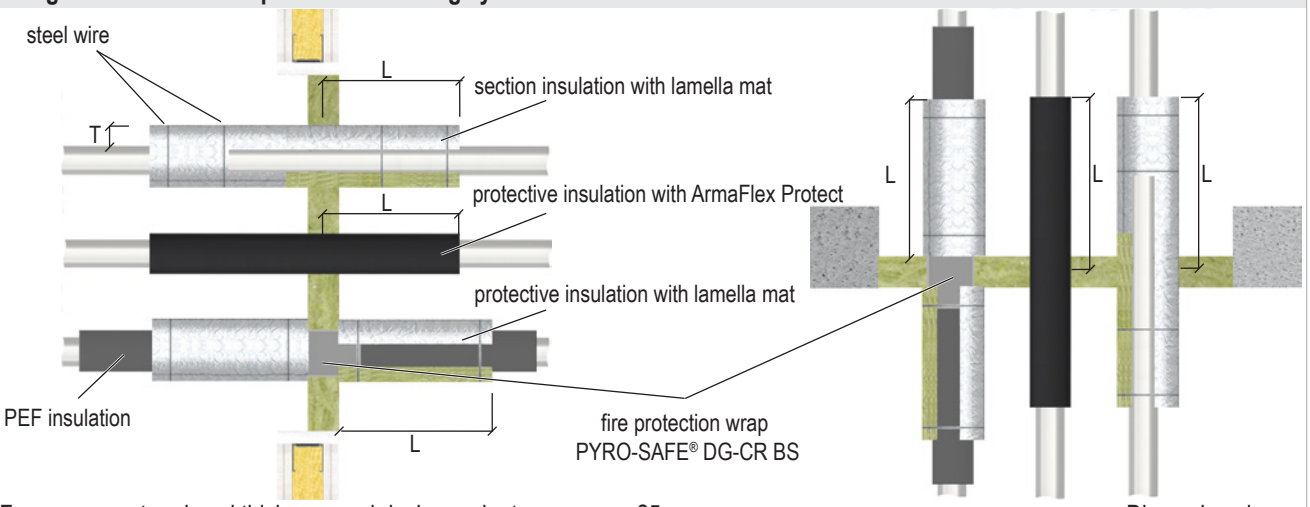
Combustible pipes made of PP-H								
Dimensions	Fire protection wrap PYRO-SAFE® DG-CR BS						Fire resistance class	
	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Wall	Floor
≤ Ø 50	100	1	1	0	60	40 (20 per side)	EI 90 U/U	EI 90 U/U
≤ Ø 70			2				EI 60 / E 90 U/U	
≤ Ø 90			3					
≤ Ø 110			4					

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

8.5 Multilayer pipes

Design for wall and floor penetration sealing system



For component and seal thickness and design variants, see page 25

Dimensions in mm

PYRO-SAFE® Flammotect Single Layer

Outer Ø [mm]	Insulation		Fire resistance class	
	Length L [mm]	Thickness T [mm]		
Mulitilayer pipes Henco Standard	**Lamella mat Klimarock**		**Wall**	**Floor**
≤ 12	≥ 250	≥ 20	EI 30 U/C	EI 90 U/C
≤ 32				
≤ 63		≥ 30		
Mulitilayer pipes Henco Standard	**ArmaFlex Protect**		**Wall**	**Floor**
≤ 12	≥ 240	≥ 13	EI 30 U/C	EI 90 U/C
≤ 32			EI 90 U/C	
≤ 63		≥ 26	EI 30 U/C	

Mulitilayer pipes Henco Standard with PEF insulation							Insulation		Fire resistance class	
Outer Ø [mm]	Fire protection wrap PYRO-SAFE® DG-CR BS						Lamella mat Klimarock			
	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Length L [mm]	Thickness T [mm]	Wall	Floor
≤ 14 mm	100	1	1	≥ 25	60	40 (20 per side)	≥ 250	≥ 20	EI 30 U/C	EI 90 U/C
≤ 26 mm										
≤ 32 mm										

Outer Ø [mm]	Insulation		Fire resistance class	
	Length L [mm]	Thickness T [mm]		
Mulitilayer pipes Uponor MLC pipe white S	**Lamella mat Klimarock**		**Wall**	**Floor**
≤ 110	≥ 250	≥ 30	–	EI 60 / E 90 U/C
	ArmaFlex Protect		**Wall**	**Floor**
	≥ 240	≥ 26	–	EI 60 U/C

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

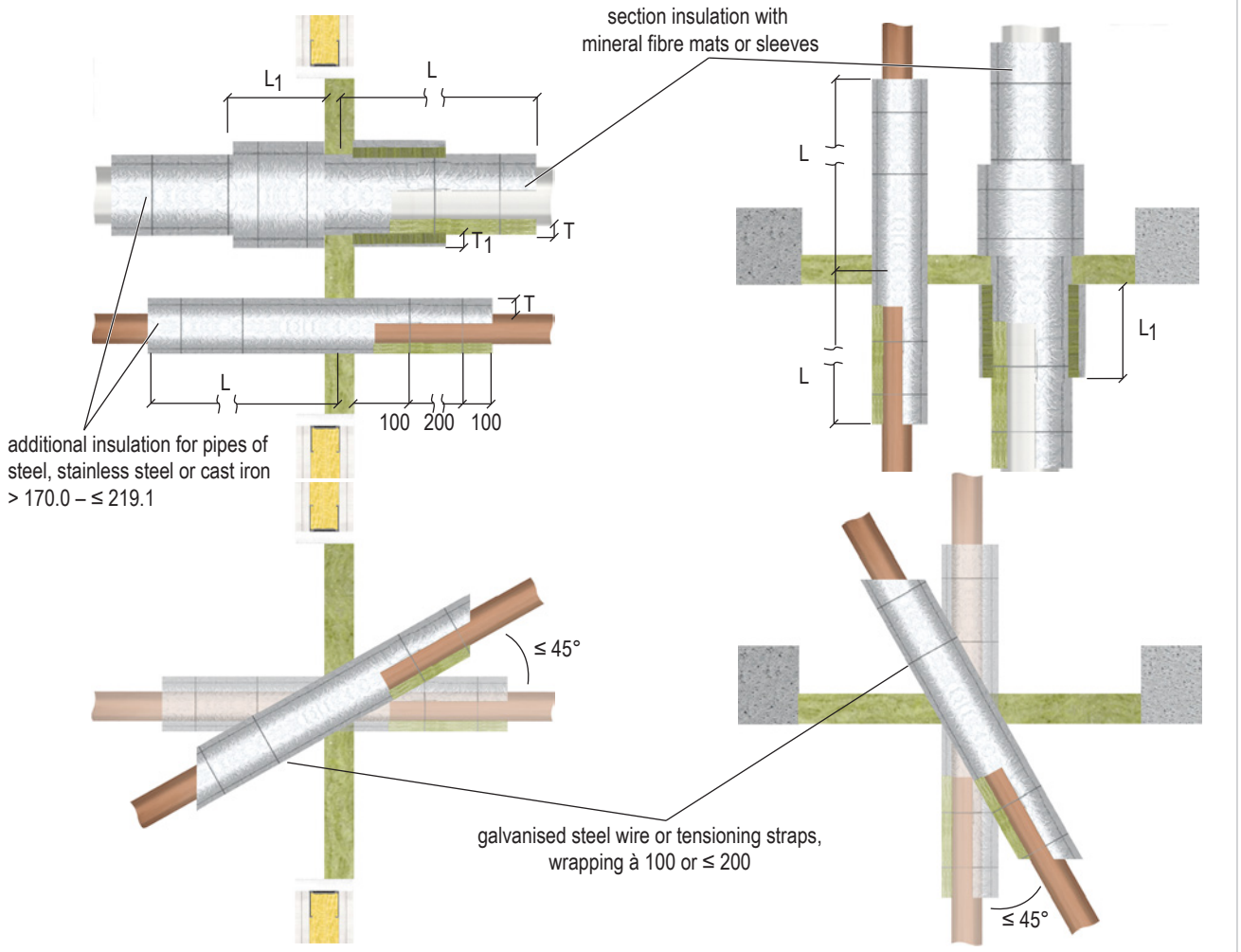
PYRO-SAFE® Flammotect Single Layer

8.6 Non-combustible pipes

8.6.1 Section insulation with mineral fibre mats or sleeves

- Non-combustible pipes require section insulation, for example with mineral fibre mats. Insulation made of mineral-fibre mats, for example, must be applied on non-combustible pipes. Depending on pipe wall thickness and outer diameter, an additional protective insulation with mineral fibre mats may be necessary.
- The insulation must be fastened to the pipe with tensioning straps or wire.
- In floor installations appropriate measures must be taken to prevent the insulation from slipping.
- Pipes can be installed at angles of 45–90° to the surface of the component.

Design for wall and floor penetration sealing system



For component and seal thickness and design variants, see page 25

Dimensions in mm

PYRO-SAFE® Flammotect Single Layer

Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]	Insulation length L [mm]	Insulation thickness T [mm]	Fire resistance class	
					Wall	Floor
Copper, steel, stainless steel, cast iron	Ø ≤ 15.0	≥ 0.8	≥ 250	≥ 20	EI 60 / E 90 C/U	EI 90 C/U
	Ø ≤ 22.0	≥ 1.0	≥ 250	≥ 60		
			≥ 500	≥ 20		
	Ø ≤ 54.0	≥ 1.5	≥ 500	≥ 30		
	Ø ≤ 88.9	≥ 2.0	≥ 800	≥ 40		
Steel, stainless steel, cast iron	Ø ≤ 88.9	≥ 2.0	≥ 800	≥ 40	EI 90 C/U	
	Ø ≤ 114.3	≥ 3.6	≥ 500	≥ 40	EI 60 / E 90 C/U	
	Ø ≤ 170.0	≥ 3.0	≥ 800*	≥ 60	EI 60 C/U	
	Ø ≤ 219.1	≥ 5.0	≥ 800*	≥ 60	EI 60 / E 90 C/U	

* additional protective insulation with mineral fibre mat (L_1 ≥ 500 mm × T_1 ≥ 30 mm)

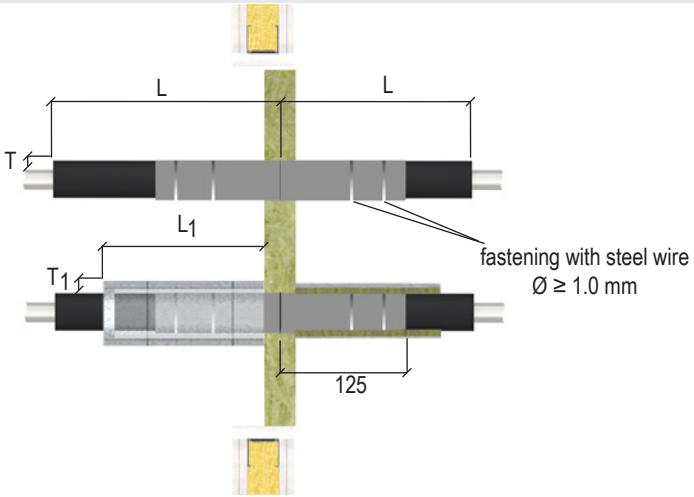
NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

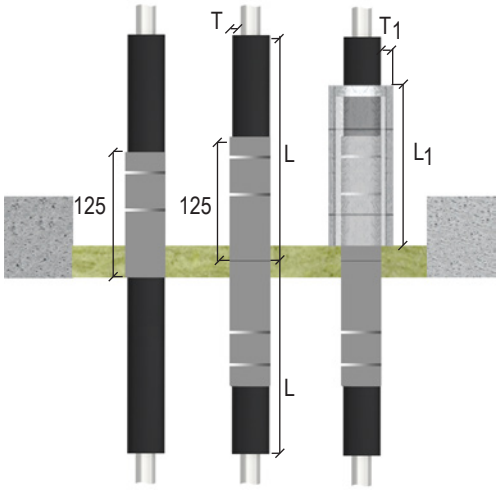
PYRO-SAFE® Flammotect Single Layer

8.6.2 Section insulation with FEF NH/ArmaFlex

- Non-combustible pipes using FEF section insulation with NH/ArmaFlex must be wrapped wth the 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. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.
- Depending on pipe wall thickness and outer diameter, an additional protective insulation with a lamella mat may be necessary.
- The insulation must be fastened to the pipe with tensioning straps or wire.
- In floor installations appropriate measures must be taken to prevent the insulation from slipping.

Design for wall and floor penetration sealing system





For component and seal thickness and design variants, see page 25

Dimensions in mm

PYRO-SAFE® Flammotect Single Layer

Installation in walls								
Pipes made of copper, steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex								
Insulation thickness T [mm]	**Fire protection wrap PYRO-SAFE® DG-CR 1.5**						**Protective insulation (L_1× T_1)**	**Fire resistance class**
	Wrap width [mm]	**Number of wraps [n]**	**Number of layers [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal L [mm]**		
Pipe outer Ø ≤ 15.0 mm								
13–24	125	2	2	0	30	95	–	EI 60 / E 90 C/U
25								EI 90 C/U
Pipe outer Ø ≤ 28.0 mm								
13–30	125	2	1	–	–	–	Lamella mat ≥ 250 mm × ≥ 20 mm	EI 60 / E 90 C/U
19–24			2				–	EI 90 C/U
25								
Pipe outer Ø ≤ 42.0 mm								
25–43	125	2	2	0	30	95	–	EI 60 / E 90 C/U
44								EI 90 C/U
Pipe outer Ø ≤ 54.0 mm								
29–57	125	2	2	0	30	95	Lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U
Pipe outer Ø ≤ 88.9 mm								
25 –89	125	2	2	0	30	95	Lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U
Pipe outer Ø ≤ 108.0 mm								
57	125	2	2	0	30	95	Lamella mat ≥ 750 mm × ≥ 40 mm	EI 90 C/U
Pipes made of steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex								
Insulation thickness T [mm]	**Fire protection wrap PYRO-SAFE® DG-CR 1.5**						**Protective insulation (L_1× T_1)**	**Fire resistance class**
	Wrap width [mm]	**Number of wraps [n]**	**Number of layers [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal L [mm]**		
25	125	2	2	0	30	95	Lamella mat ≥ 750 mm × ≥ 40 mm	EI 60 / E 90 C/U

Insulation with NH/ArmaFlex

Test case LS wall:

≥ 500 / ≥ 500 – Pipe outer Ø ≤ 28.0 mm

≥ 750 / ≥ 750 – Pipe outer Ø ≤ 42.0 mm

≥ 1000 / ≥ 1000 – Pipe outer Ø > 42.0 mm

Insulation length L in mm per side.

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

Installation in floors								
Pipes made of copper, steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex								
Insulation thickness T [mm]	**Fire protection wrap PYRO-SAFE® DG-CR 1.5**						**Protective insulation (L_1× T_1)**	**Fire resistance class**
	Wrap width [mm]	**Number of wraps [n]**	**Number of layers [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal L [mm]**		
Pipe outer Ø ≤ 15.0 mm								
13–19	125	2	2	0	30	95	–	EI 90 C/U
19–25		1			60	65 (above)		EI 60 / E 90 C/U
Pipe outer Ø ≤ 28.0 mm								
19–25	125	2	2	0	30	95	–	EI 90 C/U
25		1			60	65 (above)		EI 60 / E 90 C/U
Pipe outer Ø ≤ 42.0 mm								
25	125	2	2	0	30	95	–	EI 90 C/U
25–44		1			60	65 (above)		EI 60 / E 90 C/U
Pipe outer Ø ≤ 54.0 mm								
28 –57	125	1	1	0	60	65 (above)	–	EI 90 C/U
Pipe outer Ø ≤ 88.9 mm								
25–88	125	1	2	0	60	65 (above)	Lamella mat ≥ 500 mm × ≥ 40 mm	EI 90 C/U
89							Lamella mat ≥ 500 mm × ≥ 30 mm	
Pipe outer Ø ≤ 108.0 mm								
57	125	1	2	0	60	65 (above)	Lamella mat ≥ 1000 mm × ≥ 40 mm	EI 90 C/U
58–89								EI 60 C/U
Pipes made of steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex								
Insulation thickness T [mm]	**Fire protection wrap PYRO-SAFE® DG-CR 1.5**						**Protective insulation (L_1× T_1)**	**Fire resistance class**
	Wrap width [mm]	**Number of wraps [n]**	**Number of layers [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal L [mm]**		
25	125	1	2	0	60	65 (above)	Lamella mat ≥ 1000 mm × ≥ 40 mm	EI 60 / E 90 C/U
26 –85								EI 90 C/U

Insulation with NH/ArmaFlex

Test case LS floor:

≥ 350 / ≥ 1000 – Pipe outer Ø ≤ 88.9 mm

≥ 1000 / ≥ 1000 – Pipe outer Ø > 88.9 mm

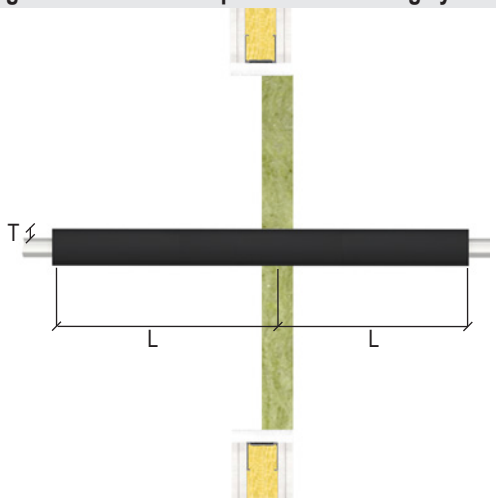
Insulation length L in mm below/above the component.

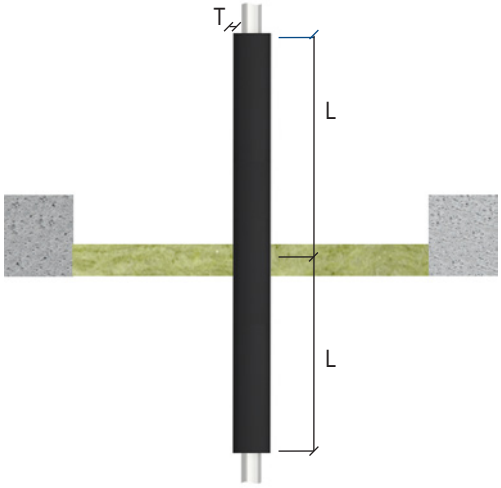
NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

8.6.3 Section insulation with FEF ArmaFlex Protect

Design for wall and floor penetration sealing system





For component and seal thickness and design variants, see page 25

Dimensions in mm

Pipe material	Pipe outer Ø [mm]	Insulation thickness T [mm]	Fire resistance class	
			Wall	Floor
Copper, steel, stainless steel, cast iron	Ø ≤ 15.0	19	EI 60 / E 90 C/U	
		20		
		25–51		
	Ø ≤ 22.0	20		
		25–51		
	Ø ≤ 54.0	25–51		
	Ø ≤ 88.9	25–51		
Steel, stainless steel, cast iron	Ø ≤ 170.0	26–52	EI 90 C/U	EI 60 / E 90 C/U

Insulation with ArmaFlex Protect

Test case LS wall and floor:

≥ 500 / ≥ 500 – Pipe outer Ø ≤ 88.9 mm

≥ 1000 / ≥ 1000 – Pipe outer Ø > 88.9 mm

Insulation length L in mm per side, in case of floor installation below/above the component.

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

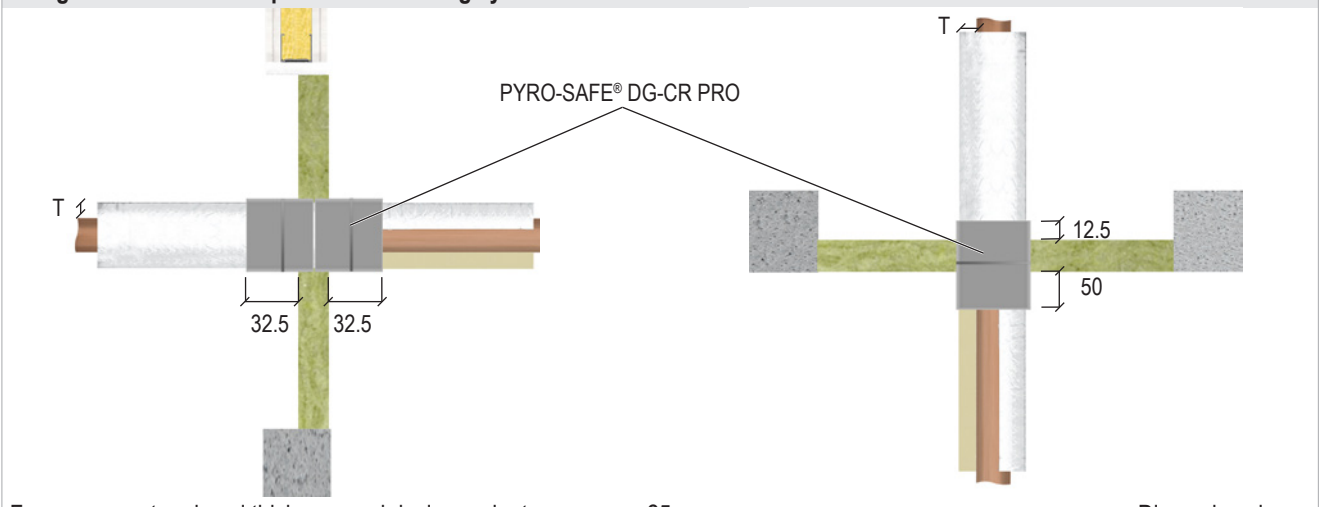
8.6.4 Section insulation with PIR

A pipe insulation of polyisocyanurate (PIR) consists of two half sleeves with identical dimensions. The longitudinal cut edges of the two sleeves abut and are either wrapped with a PVC foil, whose longitudinal seams are connected with plastic rivets, or with an aluminium/ PET sheath using self-adhesive longitudinal overlaps. In the latter case the longitudinal joint is additionally fitted with an aluminium tape of approx. 50 mm width.

The pipes must be wrapped on both sides with the fire protection wrap PYRO-SAFE® DG-CR PRO.

The fire protection wrap PYRO-SAFE® DG-CR PRO comes with a central pre-slot, so it can be longitudinally divided into two 62.5 mm sections using a boxcutter. The fire protection wrap PYRO-SAFE® DG-CR PRO is coated on one side and equipped with a protective film. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.

Design for wall and floor penetration sealing system



For component and seal thickness and design variants, see page 25

Dimensions in mm

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

Installation in walls									
Non-combustible pipes of copper, steel, stainless steel or cast iron									
Pipe		PIR insulation	Fire protection wrap PYRO-SAFE® DG-CR PRO						Fire resistance class
Outer Ø [mm]	Pipe wall thickness [mm]	Thickness T [mm]	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	
≤ 28.0	≥ 1.0 – ≤ 14.2	30	62.5	2	2	0	30	32.5	EI 60 C/U
		50			3				
≤ 88.9	≥ 1.5 – ≤ 14.2	80			4				

Non-combustible pipes of steel, stainless steel or cast iron									
Pipe		PIR insulation	Fire protection wrap PYRO-SAFE® DG-CR PRO						Fire resistance class
Outer Ø [mm]	Pipe wall thickness [mm]	Thickness T [mm]	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	
≤ 88.9	≥ 2.9 – ≤ 14.2	100	62.5	2	4	0	30	32.5	EI 60 C/U
≤ 133.0	≥ 3.6 – ≤ 14.2				4				
≤ 219.1	≥ 4.5 – ≤ 14.2	60			3				
	≥ 4.5 – ≤ 14.2	100			4				

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

Installation in floors

Non-combustible pipes of copper, steel, stainless steel or cast iron

Pipe		PIR insulation	Fire protection wrap PYRO-SAFE® DG-CR PRO						Fire resistance class
Outer Ø [mm]	Pipe wall thickness [mm]	Thickness T [mm]	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	
≤ 28.0	≥ 1.0 – ≤ 14.2	20	125	1	2	0	60	50 (below) + 12.5 (above)	EI 60 C/U
		50			3				EI 90 C/U
≤ 42.0	≥ 1.2 – ≤ 14.2	30			2				EI 60 C/U
		60			3				EI 60 C/U
≤ 54.0	≥ 1.5 – ≤ 14.2	30			2				EI 60 C/U
		80			4				EI 60 C/U
≤ 88.9	≥ 2.0 – ≤ 14.2	40			2				EI 60 C/U
		50			3				EI 60 C/U
		100			4				EI 60 C/U

Non-combustible pipes of steel, stainless steel or cast iron

Pipe		PIR insulation	Fire protection wrap PYRO-SAFE® DG-CR PRO						Fire resistance class
Outer Ø [mm]	Pipe wall thickness [mm]	Thickness T [mm]	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	
≤ 88.9	≥ 2.9 – ≤ 14.2	30	125	1	2	0	60	50 (below) + 12.5 (above)	EI 60 C/U
		100			4				
≤ 133.0	≥ 3.6 – ≤ 14.2	40			2				
		100			4				
≤ 219.1	≥ 4.5 – ≤ 14.2	40			2				
		60			3				
		100			4				

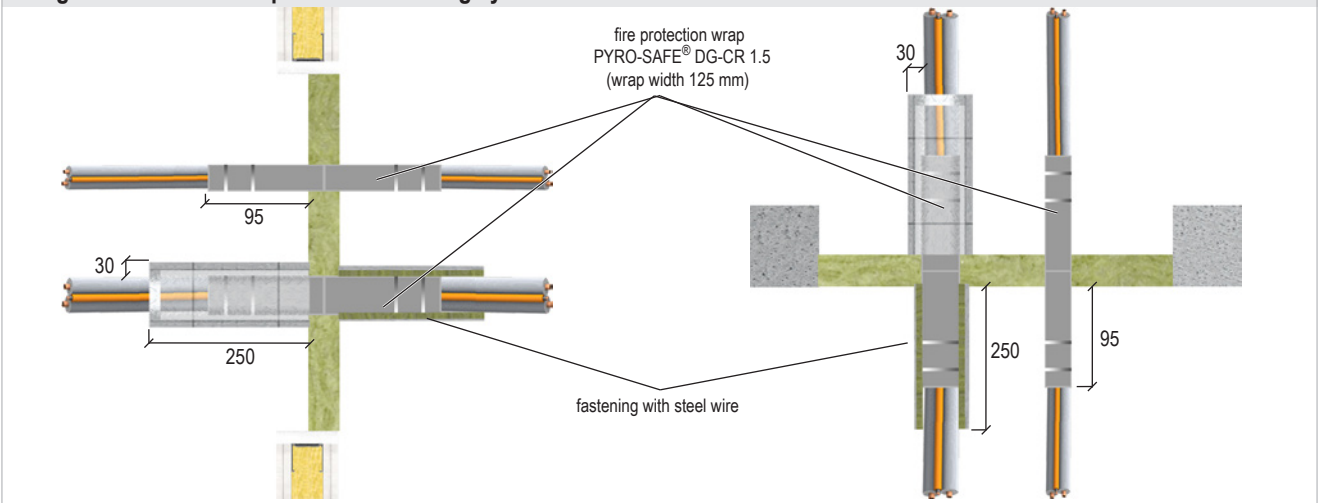
NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

8.7 HVAC split line combinations

- HVAC split line combinations Tubolit DuoSplit (copper pipes with PE insulation, one PE pipe and up to 4 accompanying cables) must be installed at a right angle to the surface of the component.
- The HVAC split line combinations must be wrapped with the fire protection wrap PYRO-SAFE® DG-CR 1.5 (width 125 mm, thickness 1,5 mm).
- The fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.
- An additional protective insulation with mineral fibre mats may be necessary. It must be fastened with steel wire and installed in such a way that it touches the surface of the seal.

Design for wall and floor penetration sealing system



For component and seal thickness and design variants, see page 25

Dimensions in mm

HVAC split line combination					Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class	
Outer Ø [mm]	Number of accompa-nying cables Ø ≤ 14 mm [n]	Insulation [type]	Insulation thickness [mm]	Accompanying pipe made of PE Ø [mm]	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
6/10	2 (Ø ≤ 14 mm)	PEF	≤ 9,0	≤ 25 Wall thickness 1.8–3.5	125	2	2	≥ 25	30	95	EI 60 / E 90	EI 45 / E 60
22/22*	4 (Ø ≤ 21 mm)			≤ 25 Wall thickness 1.8			1	0	30	95	EI 30	EI 90

* Additional protective insulation with mineral fibre mat (L_1 ≥ 250 mm × D_1 ≥ 30 mm)

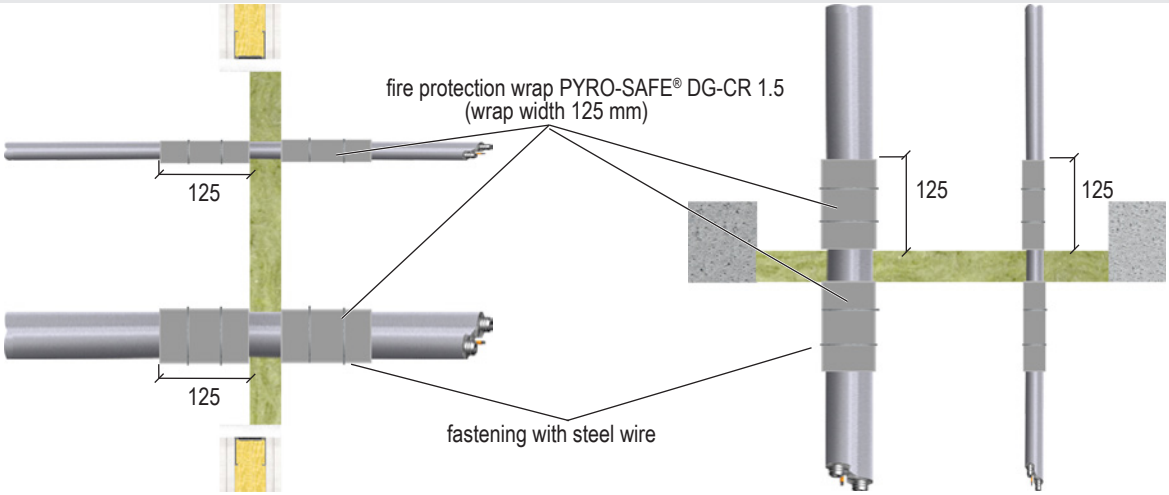
NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

PYRO-SAFE® Flammotect Single Layer

8.8 Double solar pipes Nanosun²

- The double solar pipes must be installed at a right angle to the surface of the component..
- The double solar pipes must be wrapped on both sides with the 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. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.

Design for wall and floor penetration sealing system



For component and seal thickness and design variants, see page 25

Dimensions in mm

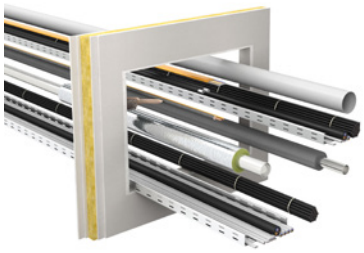
Pipe outer Ø [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class	
	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
DN 16	125	2	1	≥ 25	0	125	EI 90 U/U	EI 60 U/U
DN 40							EI 30 / E 90 U/U	EI 60 U/U

NOTE:
In timber components and sandwich panel walls the fire resistance class is reduced to max. EI 60.

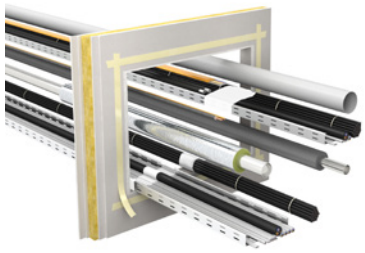
PYRO-SAFE® Flammotect Single Layer

9. Installation steps

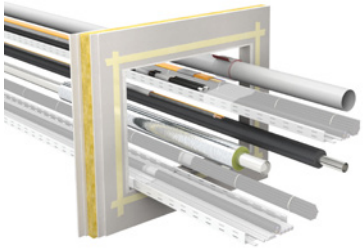
1. Clean the inside edges (reveal must be panelled). When installing in sandwich panel walls, attach L profiles with the dimensions 30 × 30 × 2 mm alongside the reveal on both sides of the seal.



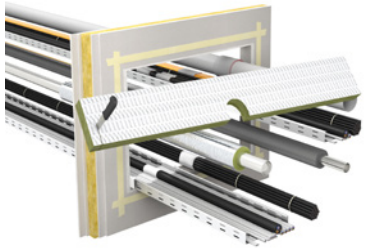
2. Mask the opening with crepe tape on all sides, keeping 20 mm distance to the edge. Coat the cables with PYRO-SAFE® FLAMMOTECT-A.



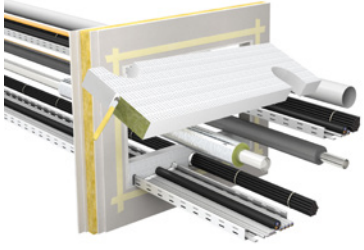
3. Wrap combustible pipes with PYRO-SAFE® DG-CR BS. Wrap multilayer pipes, speedpipes, non-combustible pipes with FEF insulation and HVAC split line combinations with PYRO-SAFE® DG-CR 1.5.



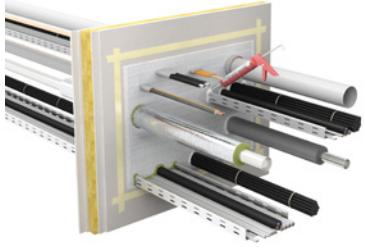
4. Cut mineral fibre boards to size (make cut-outs for the installations).



5. Coat the edges of the mineral fibre boards with PYRO-SAFE® FLAMMOTECT-A and firmly place boards in position.

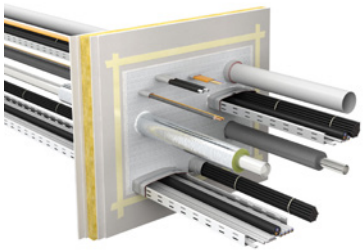


6. Seal the remaining opening / joint gaps with mineral fibre or fill with PYRO-SAFE® FLAMMOTECT-A.

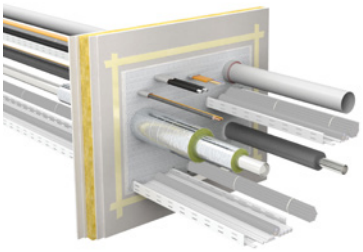


PYRO-SAFE® Flammotect Single Layer

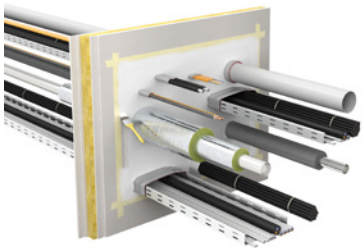
7. Coat cables along the required length with PYRO-SAFE® FLAMMOTECT-A or wrap them with PYRO-SAFE® DG-CR 1.5.



8. Wrap electrical installation conduits and double solar pipes with PYRO-SAFE® DG-CR 1.5 and apply additional protective insulation to non-combustible pipes, multilayer pipes and HVAC split line combinations, if necessary.



9. Final coating with PYRO-SAFE® FLAMMOTECT-A (dry film thickness ≥ 0.75 mm)



10. If required, label the penetration seal. Fill out the label neatly and attach it firmly next to/above (not on!) the penetration seal.