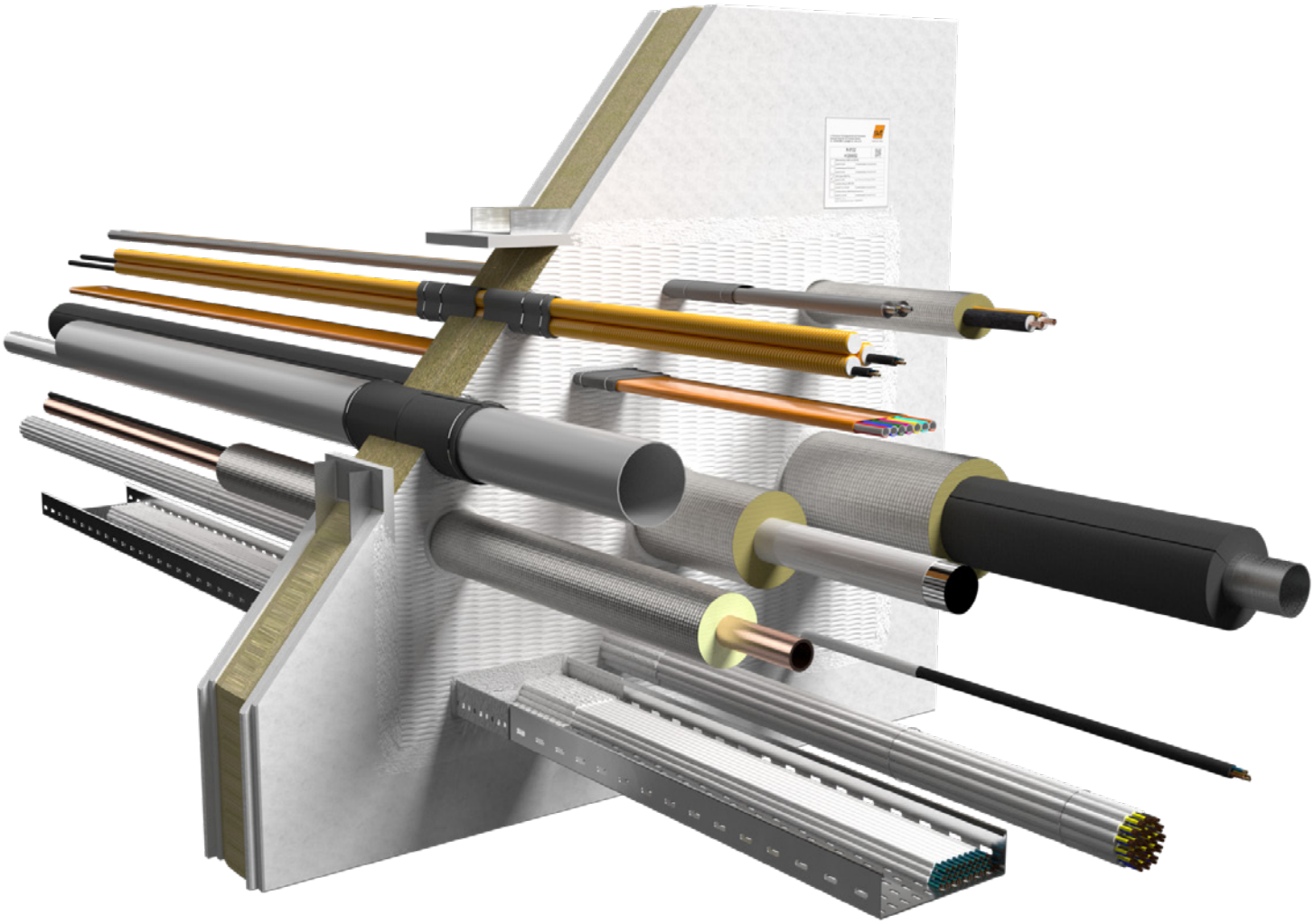
PYRO-SAFE®
Flammotect Double Layer

Ablative Mineral Fibre Board Seal

Mixed penetration sealing system made of mineral fibre boards and an ablative coating for electrical cables and lines of any type, electrical installation conduits, combustible/non-combustible pipes and other services.
Maximum fire resistance class EI 120 according to EN 13501-2 as per ETA-22/0052, KB 322042005-A, KB 321100703-A and KB 322081804-A



PYRO-SAFE®
Flammotect Double Layer

Table of contents

PYRO-SAFE®
Flammotect Double Layer

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 being stepped on, by suitable measures (e.g. by fencing or by covering with grating).

PYRO-SAFE®
Flammotect Double Layer

1.3 Field of application

The PYRO-SAFE® Flammotect double 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 Hardrock 040 and the mineral fibre mats Klimarock meet class A1; the pipe sleeves ProRox PS 960 meet class A2-s1,d0 for reaction to fire in accordance with EN 13501-1.

Resistance to fire

PYRO-SAFE® Flammotect double layer meets the maximum requirements of class EI 120 in accordance with EN 13501-2. The fire resistance class EI 120-U/U also covers all other possible endings (C/U, U/C and C/C) in accordance with EN 13501-2. The fire resistance class EI 120-C/U also covers all classes of the same fire resistance duration with the configuration -C/C in accordance with EN 13501-2. The -U/C configuration is also valid for -C/U and -C/C in accordance with EN 13501-2.

When installed in walls or floors with a lower fire resistance duration, the fire resistance duration of the penetration seal is also reduced to that of the fire resistance class of the wall or floor.

Release of dangerous substances

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 double 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.

PYRO-SAFE®
Flammotect Double Layer

1.4 Components

Cladding of reveal in plasterboard walls

Alongside the opening edge, corresponding to the wall panelling, with at least two 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.

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.

Solid walls

Made of masonry, concrete, reinforced concrete or aerated concrete with a density of ≥ 450 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 cellular concrete with a density of ≥ 550 kg/m³.

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

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.

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 is 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 ≥ 120 mm.

PYRO-SAFE®
Flammotect Double Layer

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 through boreholes	≥ 230 mm, dry film thickness ≥ 1 mm	EI 120	1
Cables Ø ≤ 21 mm	≥ 100 mm, dry film thickness ≥ 1 mm	EI 120	1
Cables Ø ≤ 50 mm	≥ 200 mm, dry film thickness ≥ 2 mm	EI 120	1
Cables Ø ≤ 80 mm	≥ 250 mm, dry film thickness ≥ 2 mm	EI 120	1
Cable bundles Ø ≤ 100 mm	≥ 100 mm, dry film thickness ≥ 1 mm	EI 120	1
Cables, cable bundles and cable trays with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 200 mm			
Cables Ø ≤ 21 mm through boreholes	2× 2-layer, 45–60 mm overlap	EI 120	1, 2
Cables Ø ≤ 80 mm	2× 2-layer, 45–60 mm overlap	EI 120	1, 2
Cable bundles Ø ≤ 100 mm	2× 2-layer, 45–60 mm overlap	EI 120	1
Electrical installation conduits with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
EIC single Ø ≤ 32 mm	2× 2-layer	EI 90 U/U	4
	2× 3-layer	EI 120 U/U	1
EIC bundled Ø ≤ 100 mm	2× 2-layer	EI 90 U/U	4
	2× 3-layer	EI 120 U/U	1
speedpipes bundled or single, with/without glass fibre cable, with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
max. 24 pcs. pipe outer-Ø ≤ 7 max. 7 pcs. pipe outer-Ø ≤ 10 max. 5 pcs. pipe outer-Ø ≤ 12	2× 2-layer	EI 120 U/C	1
Combustible pipes made of PVC-U with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50 mm	2× 1-layer	EI 120 U/U	1
Pipe outer Ø ≤ 80 mm	2× 2-layer	EI 120 U/U	1
Pipe outer Ø ≤ 110 mm	2× 3-layer	EI 120 U/U	1
Pipe outer Ø ≤ 160 mm	2× 4-layer	EI 120 U/C	1
Combustible pipes made of PE-100 with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50 mm	2× 1-layer	EI 120 U/U	1
Pipe outer Ø ≤ 80 mm	2× 2-layer	EI 120 U/U	1
Pipe outer Ø ≤ 110 mm	2× 3-layer	EI 120 U/U	1
Pipe outer Ø ≤ 160 mm	2× 4-layer	EI 120 U/C	1
Combustible pipes made of PP-H with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50 mm	2× 1-layer	EI 120 U/U	1
Pipe outer Ø ≤ 80 mm	2× 2-layer	EI 120 U/U	1
Pipe outer Ø ≤ 110 mm	2× 3-layer	EI 120 U/U	1
Pipe outer Ø ≤ 160 mm	2× 4-layer	EI 120 U/C	1

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PYRO-SAFE®
Flammotect Double Layer

Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
Multilayer pipes Henco Pipes with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 32 mm	≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 63 mm	≥ 250 mm × ≥ 30 mm	EI 120 U/C	1
Multilayer pipes Henco Pipes with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 12 mm	≥ 240 mm × 13 mm	EI 120 U/C	1
Pipe outer Ø ≤ 63 mm	≥ 240 mm × 26 mm (2× 13 mm)	EI 120 U/C	1
Multilayer pipes Henco Pipes with PEF insulation and intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 14 mm, thickness of insulation 6 mm	2× 1-layer, 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 26 mm, thickness of insulation 13 mm	2× 1-layer, 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 32 mm, thickness of insulation 6 –10 mm	2× 1-layer, 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
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	≥ 250 mm × ≥ 20 mm	EI 120 C/U	1
Pipe outer Ø ≤ 28.0 mm	≥ 500 mm × ≥ 20 mm	EI 120 C/U	1
Pipe outer Ø ≤ 42.0 mm	≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 54.0 mm	≥ 750 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 88.9 mm	≥ 750 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
	≥ 1000 mm × ≥ 30 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × ≥ 30 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 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 ≤ 114.3 mm	≥ 1000 mm × ≥ 30 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 60 mm	EI 120 C/U	1
	≥ 1000 mm × ≥ 60 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Non-combustible pipes made of copper, steel, stainless steel or cast iron with non-combustible insulation ProRox PS 960			
Pipe outer Ø ≤ 22.0 mm	≥ 1000 mm × ≥ 30 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 54.0 mm	≥ 1000 mm × ≥ 40 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 88.9 mm	≥ 1000 mm × ≥ 40 mm	EI 60 / E 120 C/U	2
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation ProRox PS 960			
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × ≥ 40 mm	EI 60 / E 120 C/U	2

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PYRO-SAFE®
Flammotect Double Layer

Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 10.0 mm	≥ 500 mm × 9 – 19 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 C/U	1
Pipe outer Ø ≤ 15.0 mm	≥ 750 mm × 9–25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 90 / E 120 C/U	1
	≥ 750 mm × 9 – 19 mm + ArmaFlex Protect ≥ 250 mm × 13 mm	EI 120 C/U	1
	Continuous isolation × 9–50 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 C/U	5
Pipe outer Ø ≤ 28.0 mm	≥ 750 mm × 9 – 25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 90 / E 120 C/U	1
	Continuous isolation × 10–50 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 C/U	5
	Continuous isolation × 89 mm + wrap 2× 1-layer + lamella mat ≥ 500 mm × ≥ 40 mm	EI 120 C/U	5
Pipe outer Ø ≤ 42.0 mm	≥ 750 mm × 10 – 50 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 C/U	1
	≥ 750 mm × 10 – 50 mm + wrap 2× 1-layer + ArmaFlex Protect ≥ 250 mm × 2× 13 mm	EI 120 C/U	1
	Continuous isolation × 89 mm + wrap 2× 1-layer + lamella mat ≥ 500 mm × ≥ 40 mm	EI 120 C/U	5
Pipe outer Ø ≤ 54:0 mm	≥ 1000 mm × 25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 90 / E 120 C/U	1
	Continuous isolation × 25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 C/U	5
	≥ 1000 mm × 29 - 57 mm + wrap 2× 1-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U	4
	Continuous isolation × 89 mm + wrap 2× 1-layer + lamella mat ≥ 500 mm × ≥ 40 mm	EI 120 C/U	5

PYRO-SAFE®
Flammotect Double Layer

Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
Pipe outer Ø ≤ 88:9 mm	≥ 1000 mm × 25 - 89 mm + wrap 2× 2-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 C/U	4
	Continuous isolation × 89 mm + wrap 2× 1-layer + lamella mat ≥ 500 mm × ≥ 40 mm	EI 120 C/U	5
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × 57 mm + wrap 2× 2-layer + lamella mat ≥ 750 mm × ≥ 40 mm	EI 90 C/U	4
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × 50–89 mm + wrap 2× 1-layer + lamella mat ≥ 750 mm × ≥ 60 mm	EI 120 C/U	1
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation Kaiflex ST and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 8.0 mm	≥ 2000 mm × 9–18 mm + wrap 2× 1-layer	EI 120 C/U	2
Pipe outer Ø ≤ 22.0 mm	≥ 2000 mm × 32 mm + wrap 2× 2-layer	EI 120 C/U	2
Pipe outer Ø ≤ 88.9 mm	≥ 2000 mm × 32 mm + wrap 2× 2-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	2
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation Kaiflex ST and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 170.0 mm	≥ 2000 mm × 10 –32 mm + wrap 2× 2-layer + lamella mat≥ 500 mm × ≥ 30 mm	EI 90 / E 120 C/U	2
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 10.0 mm	≥ 1000 mm × 16 mm	EI 120 C/U	2
Pipe outer Ø ≤ 15.0 mm	≥ 1000 mm × 19 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 22.0 mm	≥ 1000 mm × 20 mm	EI 120 C/U	2
Pipe outer Ø ≤ 28.0 mm	≥ 1000 mm × 25 mm	EI 60 / E 120 C/U	2
Pipe outer Ø ≤ 35.0 mm	≥ 1000 mm × 25 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 54.0 mm	≥ 1000 mm × 25 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 88.9 mm	≥ 1000 mm × 25 mm	EI 60 / E 120 C/U	2
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × 26 mm (2× 13 mm)	EI 90 / E 120 C/U	2

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PYRO-SAFE®
Flammotect Double Layer

Installation in walls			
Service	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 10.0 mm	≥ 1000 mm × 16 mm	EI 120 C/U	2
Pipe outer Ø ≤ 15.0 mm	≥ 1000 mm × 19 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 22.0 mm	≥ 1000 mm × 20 mm	EI 120 C/U	2
Pipe outer Ø ≤ 28.0 mm	≥ 1000 mm × 25 mm	EI 60 / E 120 C/U	2
Pipe outer Ø ≤ 35.0 mm	≥ 1000 mm × 25 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 54.0 mm	≥ 1000 mm × 25 mm	EI 90 / E 120 C/U	2
Pipe outer Ø ≤ 88.9 mm	≥ 1000 mm × 25 mm	EI 60 / E 120 C/U	2
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × 26 mm (2× 13 mm)	EI 90 / E 120 C/U	2

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, thickn. ≥ 1.0 mm – ≤ 14.2 mm	20 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	50 mm	2× 62.5 mm 3-layer	EI 120 C/U	6
Pipe outer Ø ≤ 42.0 mm, thickn. ≥ 1.2 mm – ≤ 14.2 mm	20 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	60 mm	2× 62.5 mm 3-layer	EI 120 C/U	6
Pipe outer Ø ≤ 54.0 mm, thickn. ≥ 1.5 mm – ≤ 14.2 mm	20 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	80 mm	2× 62.5 mm 4-layer	EI 60 C/U	6
Pipe outer Ø ≤ 88.9 mm, thickn. ≥ 1.5 mm – ≤ 14.2 mm	50 mm	2× 62.5 mm 3-layer	EI 60 C/U	6
Pipe outer Ø ≤ 88,9 mm, thickn. ≥ 2.0 mm – ≤ 14.2 mm	40 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	100 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
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, thickn. ≥ 2.9 mm – ≤ 14.2 mm	20 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	100 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
Pipe outer Ø ≤ 133.0 mm, thickn. ≥ 3.6 mm – ≤ 14.2 mm	30 mm	2× 62.5 mm 2-layer	EI 60 C/U	6
	40 mm	2× 62.5 mm 2-layer	EI 60 C/U	6
	100 mm	2× 62.5 mm 4-layer	EI 90 C/U	6
Pipe outer Ø ≤ 219.0 mm, thickn. ≥ 4.5 mm – ≤ 14.2 mm	100 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
Pipe outer Ø ≤ 219.1 mm, thickn. ≥ 4.5 mm – ≤ 14.2 mm	40 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	60 mm	2× 62.5 mm 3-layer	EI 120 C/U	6

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PYRO-SAFE®
Flammotect Double Layer

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			
Double (6-10/6-18 mm) or single copper pipe (6-22 mm) + PE-HD pipe ≤ 25 mm + max. 5 sheathed lines ≤ 21 mm	2× 1-layer + lamella mat ≥ 250 mm × ≥ 30 mm	EI 120 U/U	1
Double solar pipes Nanosun² with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
≤ DN 25	2× 1-layer	EI 120 C/U	2
≤ DN 40	2× 1-layer, 25 mm overlap	EI 60 / E 120 U/U	1
	2× 1-layer, 25 mm overlap + lamella mat ≥ 250 mm × ≥ 30 mm	EI 120 U/U	1

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PYRO-SAFE®
Flammotect Double Layer

2.2 Floors

Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Cables, cable bundles and cable trays with coating PYRO-SAFE® FLAMMOTECT-A			
Cables Ø ≤ 21 mm	≥ 250 mm, dry film thickness ≥ 1 mm	EI 120	1
Cables Ø ≤ 50 mm	≥ 250 mm, dry film thickness ≥ 2 mm	EI 120	1
Cables Ø ≤ 80 mm	≥ 250 mm, dry film thickness ≥ 2 mm	EI 120	1
Cable bundles Ø ≤ 100 mm	≥ 250 mm, dry film thickness ≥ 1 mm	EI 120	1
Cables, cable bundles and cable trays with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 200 mm			
Cables Ø ≤ 21 mm through boreholes	2× 2-layer, 45–60 mm overlap	EI 120	3
Cables Ø ≤ 80 mm	2× 2-layer, 45–60 mm overlap	EI 120	1, 3
Cable bundles Ø ≤ 100 mm	2× 2-layer, 45–60 mm overlap	EI 120	1, 3
Electrical installation conduits with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
EIC single Ø ≤ 32 mm	2× 2-layer	EI 90 U/U	4
EIC bundled Ø ≤ 100 mm	2× 2-layer	EI 90 U/U	4
Combustible pipes made of PVC-U with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50 mm	2× 1-layer	EI 120 U/U	1
Pipe outer Ø ≤ 80 mm	2× 2-layer	EI 120 U/U	1
Pipe outer Ø ≤ 110 mm	2× 3-layer	EI 120 U/U	1
Pipe outer Ø ≤ 160 mm	2× 4-layer	EI 120 U/C	1
Combustible pipes made of PE-100 with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50 mm	2× 1-layer	EI 120 U/U	1
Pipe outer Ø ≤ 80 mm	2× 2-layer	EI 120 U/U	1
Pipe outer Ø ≤ 110 mm	2× 3-layer	EI 120 U/U	1
Pipe outer Ø ≤ 160 mm	2× 4-layer	EI 90 U/C	1
Combustible pipes made of PP-H with intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 50 mm	2× 1-layer	EI 90 U/U	1
Pipe outer Ø ≤ 80 mm	2× 2-layer	EI 90 U/U	1
Pipe outer Ø ≤ 110 mm	2× 3-layer	EI 90 U/U	1
Pipe outer Ø ≤ 160 mm	2× 4-layer	EI 90 U/C	1

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PYRO-SAFE®
Flammotect Double Layer

Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Multilayer pipes Henco Pipes with non-combustible insulation of mineral fibre lamella mat			
Pipe outer Ø ≤ 32 mm	≥ 500 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 63 mm	≥ 500 mm × ≥ 30 mm	EI 120 U/C	1
Multilayer pipes Henco Pipes with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 12 mm	≥ 240 mm × 13 mm	EI 120 U/C	1
Pipe outer Ø ≤ 63 mm	≥ 240 mm × 26 mm (2× 13 mm)	EI 120 U/C	1
Multilayer pipes Henco Pipes with PEF insulation and intumescent wrap PYRO-SAFE® DG-CR BS – wrap width 100 mm			
Pipe outer Ø ≤ 14 mm, thickness of insulation 6 mm	2× 1-layer, 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 26 mm, thickness of insulation 13 mm	2× 1-layer, 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 32 mm, thickness of insulation 6 –10 mm	2× 1-layer, 25 mm overlap + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Non-combustible pipes made of copper, steel, stainless steel or cast iron with non-combustible insulation of mineral fibre lamella mat			
Pipe outer Ø ≤ 28.0 mm	≥ 500 mm × ≥ 20 mm	EI 120 C/U	1
Pipe outer Ø ≤ 42.0 mm	≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 54.0 mm	≥ 750 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
	≥ 750 mm × ≥ 30 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 88.9 mm	≥ 750 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
	≥ 1000 mm × ≥ 30 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × ≥ 30 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1

* Classification report no: 1 → KB 02417/14/Z00NP, 2 → KB 3.2/12-107-2, 3 → KB 3.2/12-157-2, 4 → 00924.1/15/Z00NP
5 → GS 01699/16/Z00NZP 6 → KB K-2401/311/20-MPA BS

PYRO-SAFE®
Flammotect Double Layer

Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation made of mineral fibre lamella mat			
Pipe outer Ø ≤ 114.3 mm	≥ 1000 mm × ≥ 30 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	1
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 60 mm	EI 120 C/U	1
Pipe outer Ø ≤ 323.9 mm	≥ 1250 mm × ≥ 60 mm + lamella mat ≥ 1000 mm × ≥ 60 mm	EI 120 C/U	1
Non-combustible pipes made of copper, steel, stainless steel or cast iron with non-combustible insulation ProRox PS 960			
Pipe outer Ø ≤ 22.0 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	3
Pipe outer Ø ≤ 54.0 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	3
Pipe outer Ø ≤ 88.9 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	3
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation ProRox PS 960			
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	3

* Classification report no: 1 → KB 02417/14/Z00NP, 2 → KB 3.2/12-107-2, 3 → KB 3.2/12-157-2, 4 → 00924.1/15/Z00NP
5 → GS 01699/16/Z00NZP 6 → KB K-2401/311/20-MPA BS

PYRO-SAFE®
Flammotect Double Layer

Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 10.0 mm	≥ 500 mm × 9 – 19 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 15.0 mm	≥ 750 mm × 9–25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
	≥ 750 mm × 9 – 19 mm + ArmaFlex Protect ≥ 250 mm × 13 mm	EI 120 U/C	1
Pipe outer Ø ≤ 28.0 mm	≥ 750 mm × 9 – 25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 42.0 mm	≥ 750 mm × 10 – 50 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
	≥ 750 mm × 10 – 50 mm + wrap 2× 1-layer + Armaflex Protect ≥ 250 mm × 2× 13 mm	EI 120 U/C	1
Pipe outer Ø ≤ 54.0 mm	≥ 1000 mm × 25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	1
Pipe outer Ø ≤ 88.9 mm	≥ 1000 mm × 25 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 40 mm	EI 90 U/C	1
	≥ 1000 mm × 89 mm + wrap 2× 1-layer + lamella mat ≥ 250 mm × ≥ 40 mm	EI 90 U/C	1
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × 57 mm + wrap 1× 2-layer + lamella mat ≥ 1000 mm × ≥ 40 mm	EI 90 C/U	4

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PYRO-SAFE®
Flammotect Double Layer

Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation NH/ArmaFlex and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × 50–89 mm + wrap 2× 1-layer + lamella mat ≥ 750 mm × ≥ 60 mm	EI 90 U/C	1
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation Kaiflex ST and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 8.0 mm	≥ 2000 mm × 9–18 mm + wrap 2× 1-layer	EI 120 C/U	3
Pipe outer Ø ≤ 88.9 mm	≥ 2000 mm × 9 –32 mm + wrap 2× 2-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 120 C/U	3
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation Kaiflex ST and fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Pipe outer Ø ≤ 170.0 mm	≥ 2000 mm × 10 –32 mm + wrap 2× 2-layer + lamella mat ≥ 500 mm × ≥ 30 mm	EI 90 / E 120 C/U	3
Non-combustible pipes made of copper, steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 8.0 mm	≥ 1000 mm × 16 mm	EI 120 C/U	3
Pipe outer Ø ≤ 15.0 mm	≥ 1000 mm × 19 mm	EI 120 C/U	3
Pipe outer Ø ≤ 22.0 mm	≥ 1000 mm × 20 mm	EI 120 C/U	3
Pipe outer Ø ≤ 28.0 mm	≥ 1000 mm × 25 mm	EI 120 C/U	3
Pipe outer Ø ≤ 35.0 mm	≥ 1000 mm × 25 mm	EI 120 C/U	3
Pipe outer Ø ≤ 54.0 mm	≥ 1000 mm × 25 mm	EI 90 / E 120 C/U	3
Pipe outer Ø ≤ 88.9 mm	≥ 1000 mm × 25 mm	EI 60 / E 120 C/U	3
Non-combustible pipes made of steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect			
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × 26 mm (2× 13 mm)	EI 90 / E 120 C/U	3

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Flammotect Double 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, thickn. ≥ 1.0 mm – ≤ 14.2 mm	30 mm	2× 62.5 mm 2-layer	EI 120 C/U	6
	50 mm	2× 62.5 mm 3-layer	EI 120 C/U	6
Pipe outer Ø ≤ 42.0 mm, thickn. ≥ 1.2 mm – ≤ 14.2 mm	30 mm	2× 62.5 mm 2-layer	EI 120 C/U	6
	60 mm	2× 62.5 mm 3-layer	EI 120 C/U	6
Pipe outer Ø ≤ 54.0 mm, thickn. ≥ 1.5 mm – ≤ 14.2 mm	30 mm	2× 62.5 mm 2-layer	EI 120 C/U	6
	80 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
Pipe outer Ø ≤ 88.9 mm, thickn. ≥ 2.0 mm – ≤ 14.2 mm	40 mm	2× 62.5 mm 2-layer	EI 120 C/U	6
	50 mm	2× 62.5 mm 3-layer	EI 120 C/U	6
	100 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
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, thickn. ≥ 2.9 mm – ≤ 14.2 mm	30 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	100 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
Pipe outer Ø ≤ 133.0 mm, thickn. ≥ 3.6 mm – ≤ 14.2 mm	40 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	100 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
Pipe outer Ø ≤ 219.0 mm, thickn. ≥ 4.5 mm – ≤ 14.2 mm	100 mm	2× 62.5 mm 4-layer	EI 120 C/U	6
Pipe outer Ø ≤ 219.1 mm, thickn. ≥ 4.5 mm – ≤ 14.2 mm	40 mm	2× 62.5 mm 2-layer	EI 90 C/U	6
	60 mm	2× 62.5 mm 3-layer	EI 120 C/U	6

* Classification report no.: 1 → KB 02417/14/Z00NP, 2 → KB 3.2/12-107-2, 3 → KB 3.2/12-157-2, 4 → 00924.1/15/Z00NP
5 → GS 01699/16/Z00NZP 6 → KB K-2401/311/20-MPA BS

PYRO-SAFE®
Flammotect Double Layer

Installation in floors			
Service	**Measure**	**Fire resistance class**	**Source***
HVAC split line combinations with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
Double (6–22 / 8–22 mm) or single copper pipe (6–22 mm) + PE-HD pipe ≤ 25 mm + max. 5 sheathed lines ≤ 21 mm	1× 2-layer + lamella mat ≥ 250 mm × ≥ 30 mm	EI 90 C/U	4
Double solar pipes Nanosun² with fire protection wrap PYRO-SAFE® DG-CR 1.5 – wrap width 125 mm			
≤ DN 25	–	EI 120 C/U	3
≤ DN 40	–	EI 120 C/U	3

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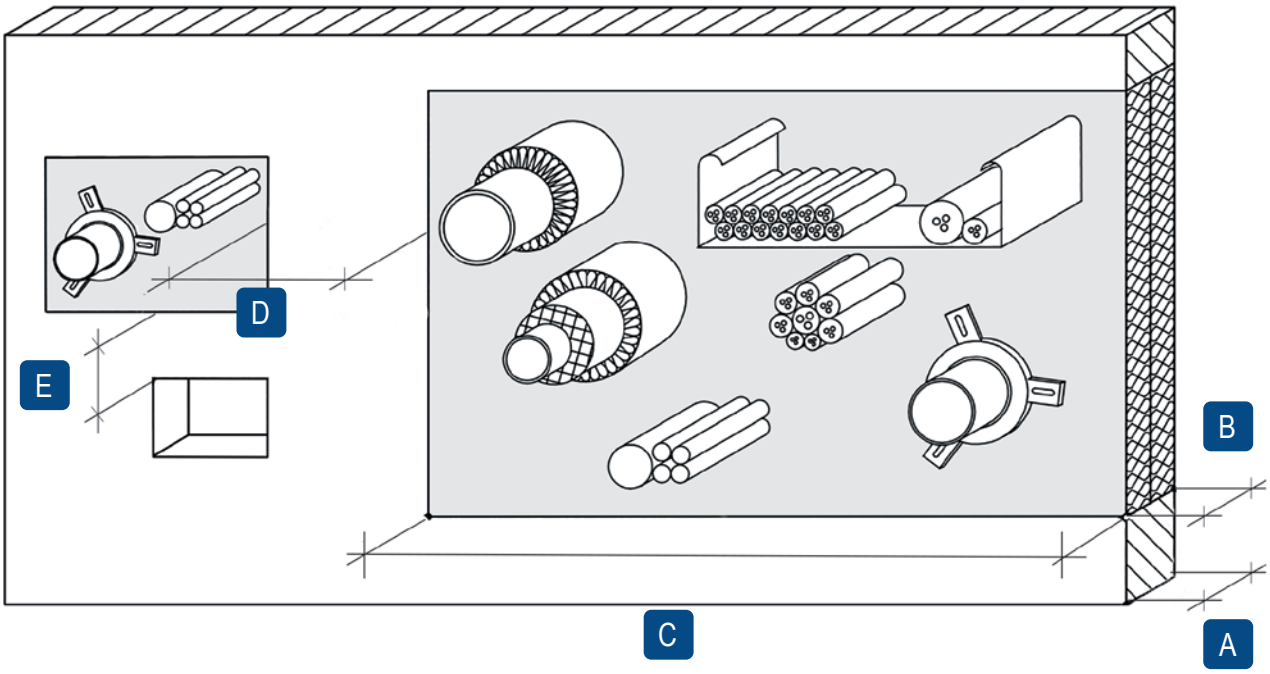
Flammotect Double Layer

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	≥ 150	≥ 100	≥ 140 (blank seal)	≥ 120
B	Penetration seal thickness	≥ 120	≥ 150	≥ 100	≥ 140 (blank) / ≥ 150 (with services)	≥ 120
C	Maximum dimensions of the component opening (width × height)	1400 × 2000	1400 × 2000	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



The total allowable cross section of the installations (outer dimensions) is ≤ 60% of the construction opening.

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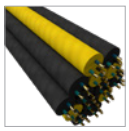
4. Allowed services

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

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

Maximum outer diameter of the individual cables ≤ 80 mm.



Cable bundles

Ø ≤ 100 mm with cables 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), single
made of plastic

Outer Ø ≤ 32 mm,
with/without cable Ø ≤ 21 mm.

Electrical installation conduits (EIC), bundled
made of plastic

Outer Ø ≤ 100 mm with single pipes,
outer Ø ≤ 32 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

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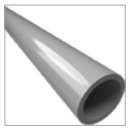
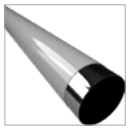
4.2 Combustible pipes



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]	**Wall thickness [mm]**	**Pipe outer Ø [mm]**	**Wall thickness [mm]**	**Pipe outer Ø [mm]**	**Wall thickness [mm]**
≤ 50	1.8–3.7	≤ 50	1.8–4.6	≤ 50	1.8–4.8
≤ 80	1.9–6.0	≤ 80	2.0–7.3	≤ 80	2.0–7.3
≤ 110	2.1–8.2	≤ 110	2.4–10.0	≤ 110	2.4–10.0
≤ 160	2.4–11.9	≤ 160	3.0–9.1	≤ 160	3.0–9.5

4.3 Multilayer pipes



Multilayer pipes made of aluminium and crosslinked PE. Made by Henco. Pipe outer Ø ≤ 63.0 mm.

Without PEF insulation	
Pipe outer Ø [mm]	**Wall thickness [mm]**
≤ 12	1.6
≤ 32	3.0
≤ 63	4.5
With PEF insulation	
Pipe outer Ø [mm]	**Wall thickness [mm]**
≤ 14	2.0
≤ 32	3.0

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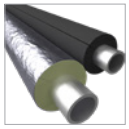
4.4 Non-combustible pipes



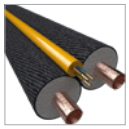
Pipes made of copper, steel, stainless steel or cast iron

Pipe material / insulation	Pipe outer Ø [mm]	Wall thickness min. / max. [mm]
Copper with non-combustible insulation made of mineral fibre, e.g. Klimarock	≤ 108.0	0.8–2.5
Steel, stainless steel, cast iron with non-combustible insulation made of mineral fibre, e.g. Klimarock	≤ 323.9*	2.9–7.1
Copper with non-combustible insulation made of mineral fibre ProRox PS 960	≤ 88.9	1.0–2.0
Steel, stainless steel, cast iron with non-combustible insulation made of mineral fibre Pro-Rox PS 960	≤ 170.0	3.0
Copper with combustible insulation ArmaFlex Protect	≤ 88.9	1.0–2.0
Copper with combustible insulation NH/ArmaFlex	≤ 108.0	0.8–2.9
Copper with combustible insulation Kaiflex ST	≤ 88.9	1.0–2.0
Steel, stainless steel, cast iron with combustible insulation ArmaFlex Protect	≤ 170.0	3.0
Steel, stainless steel, cast iron with combustible insulation NH/ArmaFlex		2.9
Steel, stainless steel, cast iron with combustible insulation Kaiflex ST		3.0
Copper with combustible insulation made of polyisocyanurate (PIR)	≤ 88.9	1.0–14.2
Steel, stainless steel, cast iron with combustible insulation made of polyisocyanurate (PIR)	≤ 219.1	2.9–14.2

* In walls outer Ø ≤ 170.0 mm

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

4.5 Further allowed services



HVAC split line combinations

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

Wall:

Double (6-10/6-18 mm) or single copper pipe (6-22 mm) and pipe insulation of 9 mm thickness made of PE foam in accordance with EN 14313 with optional accompanying lines (one plastic pipe made of PE-HD, up to outer Ø 25 mm and pipe wall thickness 1.8-3.5 mm and up to 3 sheathed lines with max. 5 cores à 1.5 mm, Ø ≤ 21 mm) without spacing.

Floor:

Double (6-22/8-22 mm) or single copper pipe (6-22 mm) and 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 PE-HD,outer Ø ≤ 25 mm and pipe wall thickness 1.8-3.5 mm in accordance with EN 1519-1, DIN 8074:2011, DIN 8075:2011 and 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 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 ProRox PS 960	Non-combustible pipes; insulation made of FEF ArmaFlex Protect	Non-combustible pipes; insulation made of FEF NH/ArmaFlex	Non-combustible pipes; insulation made of FEF Kaiflex ST	Non-combustible pipes; insulation made of PIR	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Seal edge		
																Upper	Under	Side
Cables	≥ 0			≥ 25	≥ 25	≥ 20	≥ 0	≥ 60	≥ 75	≥ 25	≥ 90	≥ 100	≥ 0	≥ 30	≥ 25	≥ 0		
Cable bundles	≥ 0			≥ 25	≥ 25	≥ 20	≥ 0	≥ 60	≥ 75	≥ 25	≥ 90	≥ 100	≥ 0	≥ 30	≥ 25	≥ 0		
Cable trays	≥ 0			≥ 25	≥ 25	≥ 20	≥ 0	≥ 60	≥ 75	≥ 25	≥ 90	≥ 100	≥ 0	≥ 30	≥ 25	≥ 0		
Electrical installation conduits single or bundled	≥ 25			≥ 25	≥ 100	≥ 100	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25		
Combustible pipes	≥ 25			≥ 100	≥ 25	≥ 100	≥ 100	≥ 50	≥ 100	≥ 40	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Multilayer pipes	≥ 20			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Non-combustible pipes; insulation made of lamella mat	≥ 0			≥ 60	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 50	≥ 100	≥ 0		
Non-combustible pipes; insulation made of ProRox PS 960	≥ 60			≥ 100	≥ 50	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 10		
Non-combustible pipes; insulation made of FEF ArmaFlex Protect	≥ 75			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 10		
Non-combustible pipes; insulation made of FEF NH/ArmaFlex	≥ 25			≥ 100	≥ 40	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Non-combustible pipes; insulation made of FEF Kaiflex ST	≥ 90			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 70	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50		
Non-combustible pipes; insulation made of PIR	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 36	≥ 100	≥ 100	≥ 100	≥ 100		
HVAC split line combinations	≥ 0			≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 25	≥ 100	≥ 0		
Double solar pipes Nanosun²	≥ 30			≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100	≥ 100		
speedpipes	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100		

Dimensions in mm

Spacing distances in timber and sandwich panel 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 ProRox PS 960	Non-combustible pipes; insulation made of FEF ArmaFlex Protect	Non-combustible pipes; insulation made of FEF NH/ArmaFlex	Non-combustible pipes; insulation made of FEF Kaiflex ST	Non-combustible pipes; insulation made of PIR	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Seal edge		
																	Upper	Under	Side
	Cables	≥ 0			≥ 25	≥ 25	≥ 20	≥ 0	≥ 60	≥ 75	≥ 25	≥ 90	≥ 100	≥ 0	≥ 30	≥ 25	≥ 100		
	Cable bundles	≥ 0			≥ 25	≥ 25	≥ 20	≥ 0	≥ 60	≥ 75	≥ 25	≥ 90	≥ 100	≥ 0	≥ 30	≥ 25	≥ 100		
	Cable trays	≥ 0			≥ 25	≥ 25	≥ 20	≥ 0	≥ 60	≥ 75	≥ 25	≥ 90	≥ 100	≥ 0	≥ 30	≥ 25	≥ 100		
	Electrical installation conduits single or bundled	≥ 25			≥ 25	≥ 100	≥ 100	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Combustible pipes	≥ 25			≥ 100	≥ 25	≥ 100	≥ 100	≥ 50	≥ 100	≥ 40	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Multilayer pipes	≥ 20			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Non-combustible pipes; insulation made of lamella mat	≥ 0			≥ 60	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 50	≥ 100	≥ 100		
	Non-combustible pipes; insulation made of ProRox PS 960	≥ 60			≥ 100	≥ 50	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Non-combustible pipes; insulation made of FEF ArmaFlex Protect	≥ 75			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Non-combustible pipes; insulation made of FEF NH/ArmaFlex	≥ 25			≥ 100	≥ 40	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Non-combustible pipes; insulation made of FEF Kaiflex ST	≥ 90			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 70	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Non-combustible pipes; insulation made of PIR	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 36	≥ 100	≥ 100	≥ 100	≥ 100		
	HVAC split line combinations	≥ 0			≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 25	≥ 100	≥ 100		
	Double solar pipes Nanosun²	≥ 30			≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100	≥ 100		
	speedpipes	≥ 25			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100		

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 ProRox PS 960	Non-combustible pipes; insulation made of FEF ArmaFlex Protect	Non-combustible pipes; insulation made of FEF NH/ArmaFlex	Non-combustible pipes; insulation made of FEF Kaiflex ST	Non-combustible pipes; insulation made of PIR	HVAC split line combinations	Double solar pipes Nanosun²	Seal edge		
															Upper	Under	Side
Cables	≥ 0			≥ 0 (≥ 100 to cables > 21)	≥ 25	≥ 0	≥ 50	≥ 60	≥ 75	≥ 0	≥ 90	≥ 100	≥ 100	≥ 100	≥ 0		
Cable bundles	≥ 0			≥ 0 (≥ 100 to cables > 21)	≥ 25	≥ 0	≥ 50	≥ 60	≥ 75	≥ 0	≥ 90	≥ 100	≥ 100	≥ 100	≥ 0		
Cable trays	≥ 0			≥ 0 (≥ 100 to cables > 21)	≥ 25	≥ 0	≥ 50	≥ 60	≥ 75	≥ 0	≥ 90	≥ 100	≥ 100	≥ 100	≥ 0		
Electrical installation conduits single or bundled	≥ 0 (≥ 100 to cables > 21)			≥ 25	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25		
Combustible pipes	≥ 25			≥ 100	≥ 25	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Multilayer pipes	≥ 0			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Non-combustible pipes; insulation made of lamella mat	≥ 50			≥ 60	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 0		
Non-combustible pipes; insulation made of ProRox PS 960	≥ 60			≥ 100	≥ 100	≥ 100	≥ 100	≥ 65	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 10		
Non-combustible pipes; insulation made of FEF ArmaFlex Protect	≥ 75			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 20		
Non-combustible pipes; insulation made of FEF NH/ArmaFlex	≥ 0			≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 70	≥ 100	≥ 100	≥ 100	≥ 0		
Non-combustible pipes; insulation made of FEF Kaiflex ST	≥ 90			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50		
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	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 0		
Double solar pipes Nanosun²	≥ 100			≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100		

Dimensions in mm

Spacing distances in timber 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 ProRox PS 960	Non-combustible pipes; insulation made of FEF ArmaFlex Protect	Non-combustible pipes; insulation made of FEF NH/ArmaFlex	Non-combustible pipes; insulation made of FEF Kaiflex ST	Non-combustible pipes; insulation made of PIR	HVAC split line combinations	Double solar pipes Nanosun²	Seal edge		
															Upper	Under	Side
Cables	≥ 0			≥ 0 (≥ 100 to cables > 21)	≥ 25	≥ 0	≥ 50	≥ 60	≥ 75	≥ 0	≥ 90	≥ 100	≥ 100	≥ 100	≥ 100		
Cable bundles	≥ 0			≥ 0 (≥ 100 to cables > 21)	≥ 25	≥ 0	≥ 50	≥ 60	≥ 75	≥ 0	≥ 90	≥ 100	≥ 100	≥ 100	≥ 100		
Cable trays	≥ 0			≥ 0 (≥ 100 to cables > 21)	≥ 25	≥ 0	≥ 50	≥ 60	≥ 75	≥ 0	≥ 90	≥ 100	≥ 100	≥ 100	≥ 100		
Electrical installation conduits single or bundled	≥ 0 (≥ 100 to cables > 21)			≥ 25	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
Combustible pipes	≥ 25			≥ 100	≥ 25	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
Multilayer pipes	≥ 0			≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
Non-combustible pipes; insulation made of lamella mat	≥ 50			≥ 60	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100		
Non-combustible pipes; insulation made of ProRox PS 960	≥ 60			≥ 100	≥ 100	≥ 100	≥ 100	≥ 65	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
Non-combustible pipes; insulation made of FEF ArmaFlex Protect	≥ 75			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
Non-combustible pipes; insulation made of FEF NH/ArmaFlex	≥ 0			≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 70	≥ 100	≥ 100	≥ 100	≥ 100		
Non-combustible pipes; insulation made of FEF Kaiflex ST	≥ 90			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 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	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 100		
Double solar pipes Nanosun²	≥ 100			≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100		

Dimensions in mm

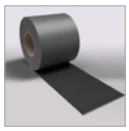
PYRO-SAFE®
Flammotect Double Layer

6. Included products

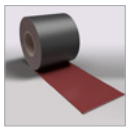
PYRO-SAFE® FLAMMOTECT-A
Coating
12.5 kg pail – Art. no. 01155101
15.0 kg pail – Art. no. 01155105

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

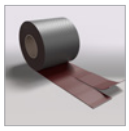
PYRO-SAFE® FLAMMOTECT-A
Filler
12.5 kg pail – Art. no. 01155104
15.0 kg pail – Art. no. 01155109



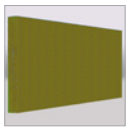
PYRO-SAFE® DG-CR 1.5
Fire protection wrap
Roll, 10 m × 125 mm – Art. no. 01261125



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

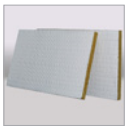


PYRO-SAFE® DG-CR PRO
Fire protection wrap
with central pre-slot
Roll, 10 m × 125 mm
(separable into 2× 62.5 mm)
– Art. no. 01261950



Mineral 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 à 4 pcs. – Art. no. 01181160

Mineral wool A1

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

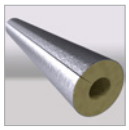
PYRO-SAFE®
Flammotect Double Layer

Lamella mat Klimarock

in accordance with DIN EN 14303 and
DoP DE0628071802 dated 13.07.2018
Reaction to fire class in acc. with
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 as long as they match the following requirements:
EN 14303
Density ≥ 40 kg/m³
Reaction to fire class A1 acc. to EN 13501-1
Thickness ≥ 30 mm

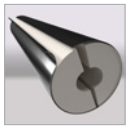
Recommended tools

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



Pipe sleeve ProRox PS 960

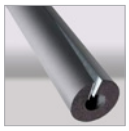
Density ≥ 100 kg/m³
DoP: PROPS960NL-03



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	



Sectional and protective insulation

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

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

6.1 Declarations of Performance

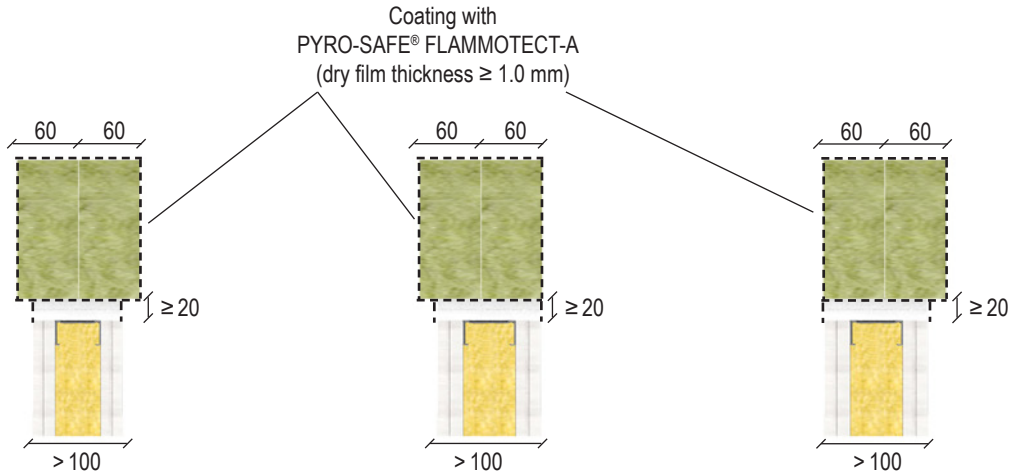
The Declarations of Performance for the included svt products are available for download on our website:
https://svt-global.com/downloads

PYRO-SAFE®
Flammotect Double Layer

7. Regulations and variants

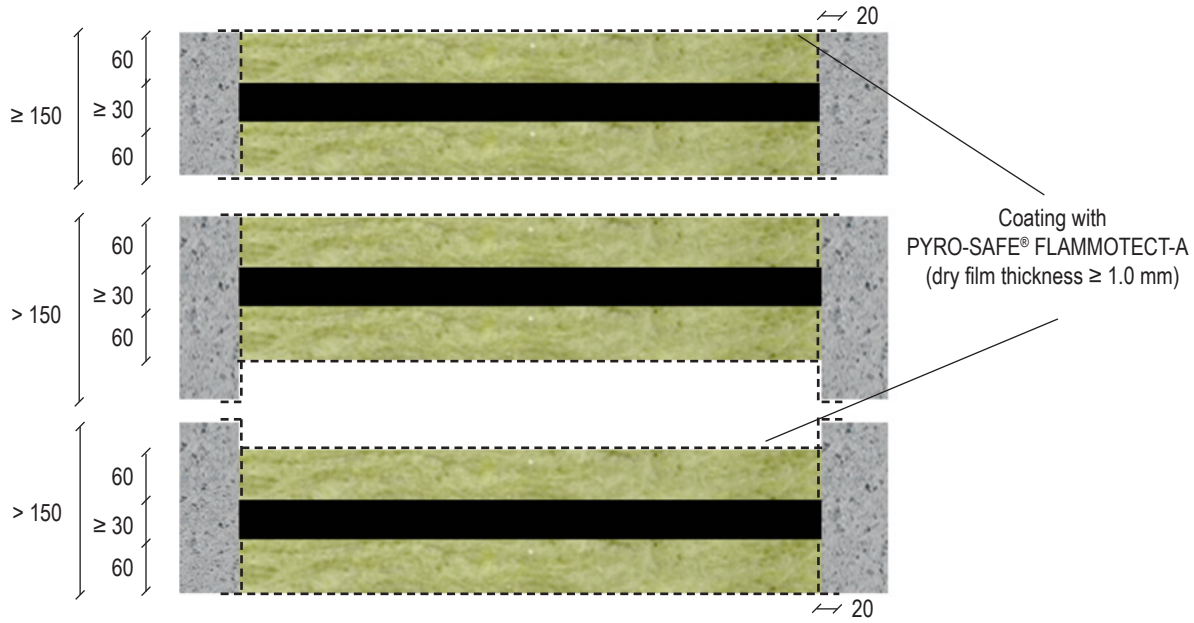
- The sealing system may be used to close openings without installations (reserve penetration for subsequent configurations).
- There must be suitable measures in the buildings to secure sealing systems in floors from being stepped on or subjected to loads.
- When installing the sealing system in plasterboard walls, continuous reveal cladding is necessary.
- The surface of the sealing system's mineral fibre boards, their edges as well a surrounding area of 20 mm on the component must be provided with a coating of PYRO-SAFE® FLAMMOTECT-A (dry film thickness ≥ 1.0 mm).
- The fire protection measures described on the following pages also apply to retrofitting

Design variants in plasterboars walls and solid walls



Dimensions in mm

Design variants in solid floors

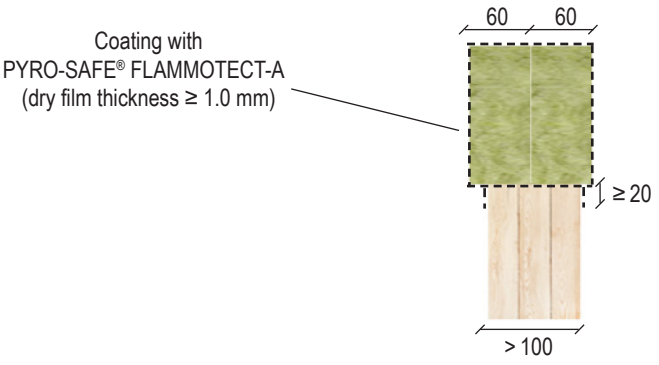


Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

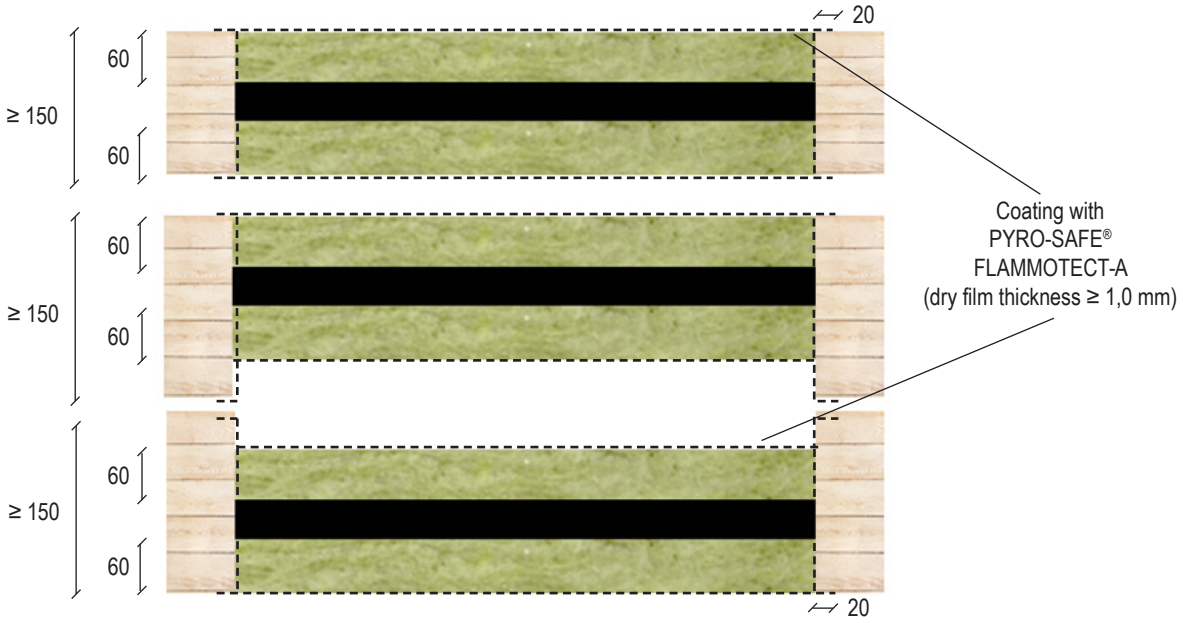
- In timber components, the spacing distance between applied services and seal edge must always be at least 100 mm (see chapter 5, Spacing distances for services).

Design variants in timber walls



Dimensions in mm

Design variants in timber floors

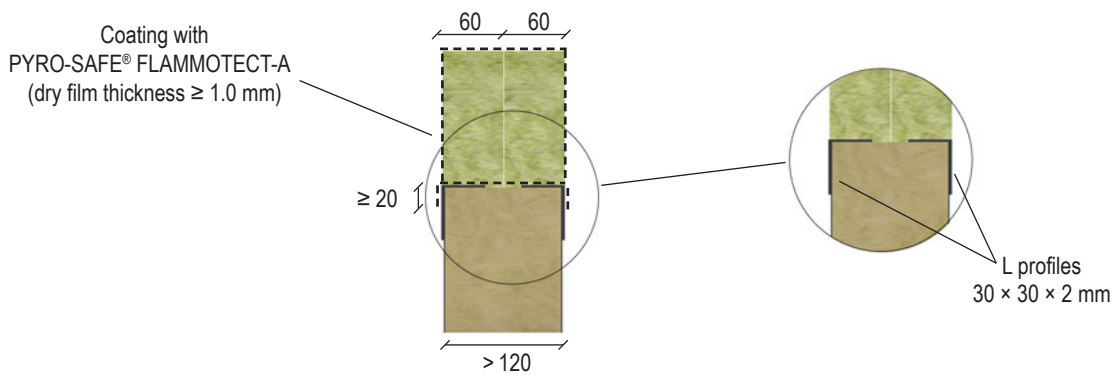


Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

- An L profile with the dimensions 30 × 30 × 2 mm must be attached alongside the reveal on both sides of the seal.
- 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

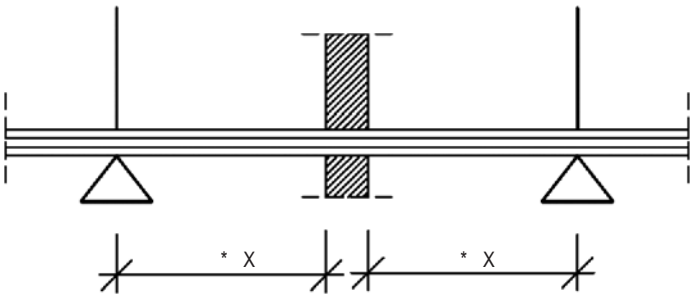


Dimensions in mm

PYRO-SAFE®
Flammotect Double 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 cable/pipe support		
Cables, cable bundles, cable trays, control cables	Wall	≤ 500 mm
	Floor	≤ 250 mm
Electrical installation conduits		≤ 500 mm
Combustible pipes		≤ 400 mm
Multilayer pipes (Henco Pipes)		≤ 550 mm
Non-combustible pipes – insulation made of mineral fibre mats or pipe sleeves		≤ 650 mm
Non-combustible pipes – insulation made of FEF		≤ 550 mm
Non-combustible pipes – insulation made of PIR	Wall	≤ 500 mm
	Floor	≤ 850 mm
Double solar pipes Nanosun²		≤ 500 mm
speedpipes for glass fibre cables and micro cables		as per manufacturer‘s specifications
HVAC split line combinations		≤ 500 mm

PYRO-SAFE®
Flammotect Double Layer

8. Fire protection measures

8.1 Cables / cable bundles / cable trays

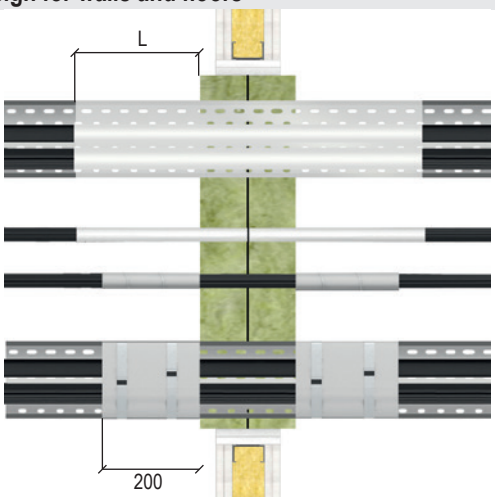
Cables and cable bundles may be installed with or without cable trays.

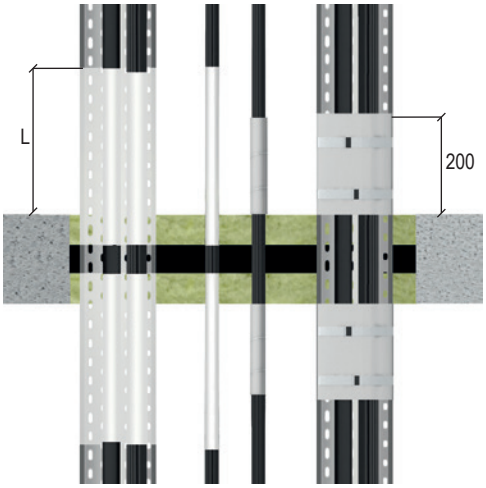
Cable bundles may be installed unopened in the seal. It is not necessary to fill the interstices if the bundles consist of parallel-running cables that are tightly packed, tied, stitched or welded together.

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.

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 walls and floors





For component and seal thickness and design variants, see page 29. Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

Installation in walls					
Service	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A (per side)			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	
Cables	Ø ≤ 21 (through boreholes)	≥ 1.0	0	≥ 200	EI 120
	Ø ≤ 21	≥ 1.0	60	≥ 100	EI 120
	Ø ≤ 80	≥ 2.0		≥ 200	EI 120
Cable bundles	Ø ≤ 100	≥ 1.0		≥ 100	EI 120

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 [mm]	
Cables	Ø ≤ 21 (through boreholes)	200	2	2	≥ 45	0	200	EI 120
	Ø ≤ 80							EI 120
Cable bundles	Ø ≤ 100							EI 120

Installation in floors					
Service	Dimensions [mm]	Fire protection coating PYRO-SAFE® FLAMMOTECT-A (per side)			Fire resistance class
		Dry film thickness [mm]	Inside seal [mm]	Outside seal L [mm]	
Cables	Ø ≤ 21	≥ 1.0	60	≥ 250	EI 120
	Ø ≤ 80	≥ 2.0		≥ 250	EI 120
Cable bundles	Ø ≤ 100	≥ 1.0		≥ 250	EI 120

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 [mm]	
Cables	Ø ≤ 21 (through boreholes)	200	2	2	≥ 45	0	200	EI 120
	Ø ≤ 80							EI 120
Cable bundles	Ø ≤ 100							EI 120

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

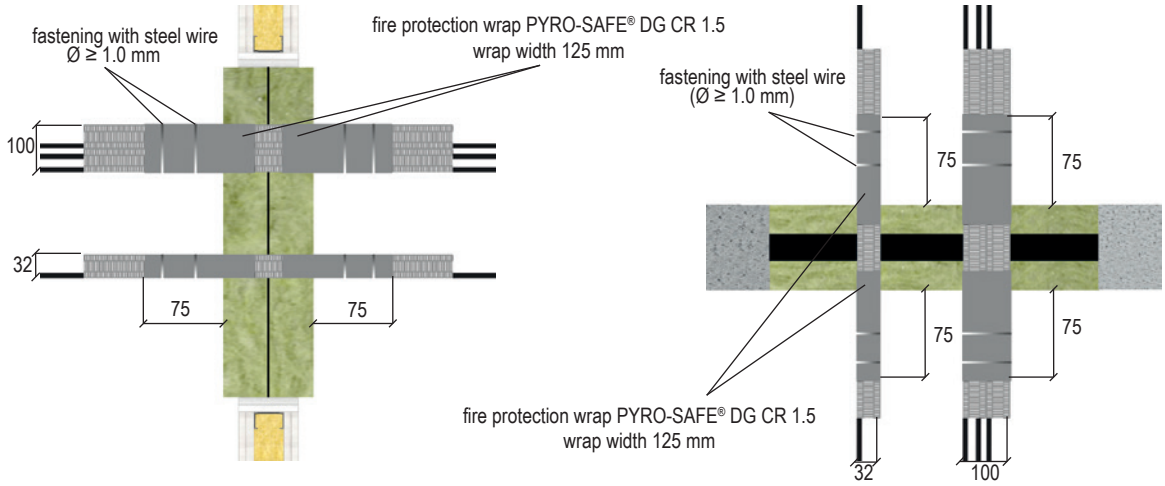
8.2 Electrical installation conduits (EIC), single or bundled

It is possible to install both single EICs (Ø ≤ 32 mm) and bundled EICs (Ø ≤ 100 mm with single conduits Ø ≤ 32 mm) with and without cables Ø ≤ 21 mm.

The electrical installation conduits 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 walls and floors



For component and seal thickness and design variants, see page 29.

Dimensions in mm

Installation in walls

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 [mm]	
EIC made of plastic, single	Ø ≤ 32 (with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 90 U/U
				3				EI 120 U/U
EIC made of plastic, bundled	Ø ≤ 100 (Single conduits Ø ≤ 32, with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 90 U/U
				3				EI 120 U/U

Installation in floors

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 [mm]	
EIC made of plastic, single	Ø ≤ 32 (with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 90 U/U
EIC made of plastic, bundled	Ø ≤ 100 (Single conduits Ø ≤ 32, with/without cables Ø ≤ 21)	125	2	2	0	50	75	EI 90 U/U

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

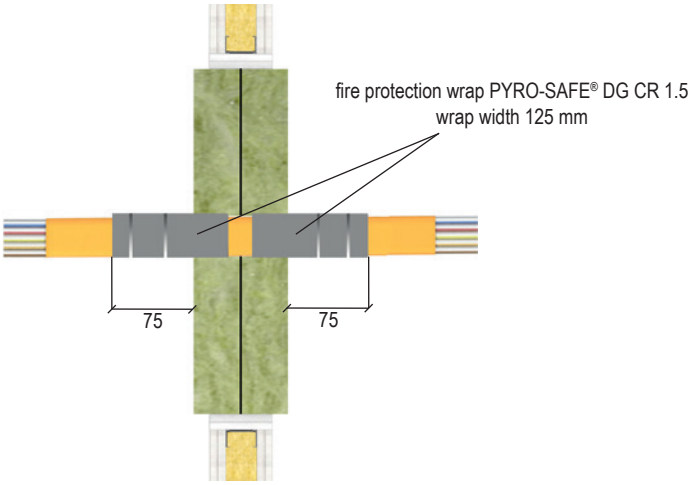
PYRO-SAFE®
Flammotect Double Layer

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

The speedpipes 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 walls



For component and seal thickness and design variants, see page 29.

Dimensions in mm

Installation in walls

Set-up speedpipes	Pipe 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 [mm]	
Ø 7.0 mm × 24 pieces	≥ 1.5	125	2	2	0	50	75	EI 120 U/C
Ø 10.0 mm × 7 pieces	≥ 2.0							
Ø 12.0 mm × 5 pieces	≥ 2.0							

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

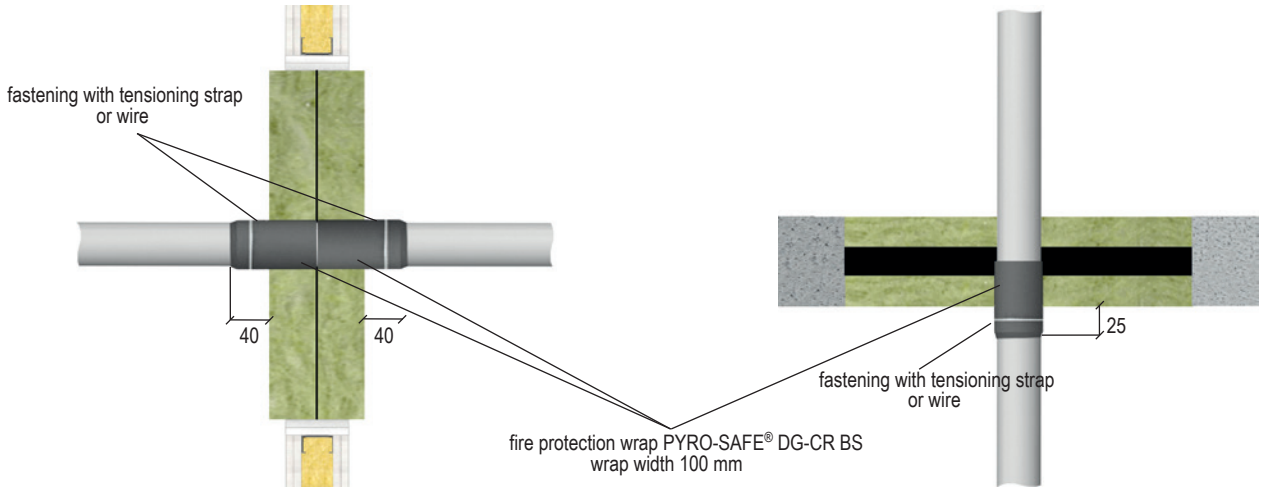
PYRO-SAFE®
Flammotect Double Layer

8.4 Combustible pipes

Combustible pipes must be wrapped with the intumescent wrap PYRO-SAFE® DG-CR BS. When installing in walls, the wrap must be applied on both sides of the seal, in floors only one wrap is necessary.

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 walls and floors



For component and seal thickness and design variants, see page 29.

Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

Installation in walls							
Combustible pipes made of PVC-U, PE-100							
Dimensions	**Intumescent 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 [mm]**	
≤ Ø 50	100	2	1	0	60	40	EI 120 U/U
≤ Ø 80		2	2		60	40	EI 120 U/U
≤ Ø 110		2	3		60	40	EI 120 U/U
≤ Ø 160		2	4		60	40	EI 120 U/C
Combustible pipes made of PP-H							
≤ Ø 50	100	2	1	0	60	40	EI 120 U/U
≤ Ø 80		2	2		60	40	EI 120 U/U
≤ Ø 110		2	3		60	40	EI 120 U/U
≤ Ø 160		2	4		60	40	EI 120 U/C

Installation in floors							
Combustible pipes made of PVC-U, PE-100							
Dimensions	**Intumescent 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 [mm]**	
≤ Ø 50	100	1	1	0	75	25	EI 120 U/U
≤ Ø 80		1	2		75	25	EI 120 U/U
≤ Ø 110		1	3		75	25	EI 120 U/U
≤ Ø 160		1	4		75	25	EI 120 U/C (PVC-U) EI 90 U/C (PE-100)
Combustible pipes made of PP-H							
≤ Ø 50	100	1	1	0	75	25	EI 90 U/U
≤ Ø 80		1	2		75	25	EI 90 U/U
≤ Ø 110		1	3		75	25	EI 90 U/U
≤ Ø 160		1	4		75	25	EI 90 U/C

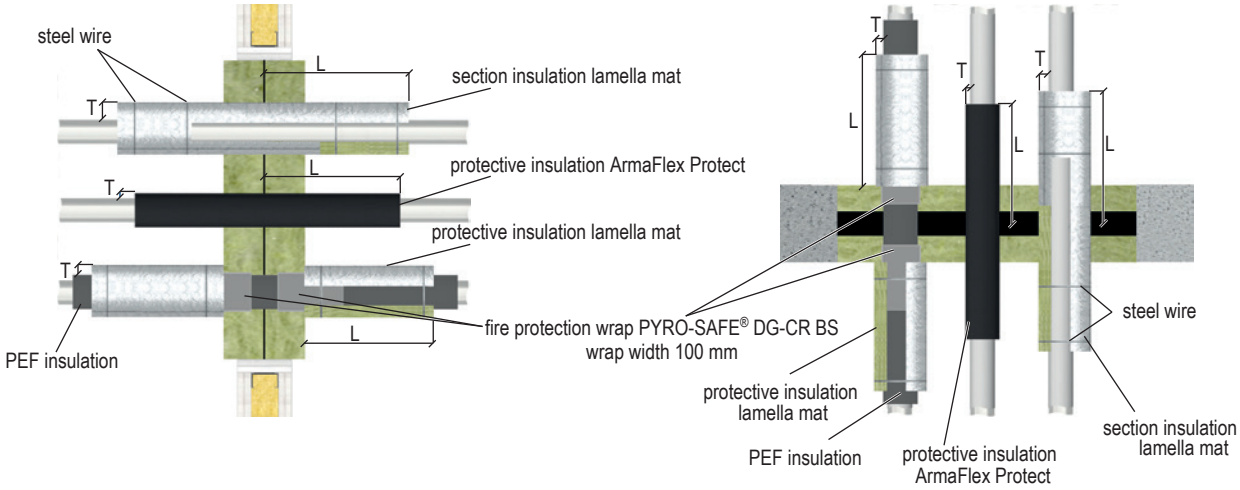
NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

8.5 Multilayer pipes (Henco Pipes)

Multilayer pipes with PEF insulation must be wrapped with the intumescent wrap PYRO-SAFE® DG-CR BS and provided with protective insulation made of mineral fibre (lamella mat Klimarock).

Design for walls and floors



For component and seal thickness and design variants, see page 29.

Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

Installation in walls			
Outer Ø [mm]	Insulation		Fire resistance class
	Length L [mm]	Thickness T [mm]	
Multilayer pipes Henco Standard	Lamella mat		
≤ 32	≥ 250	≥ 20	EI 120 U/C
≤ 63	≥ 250	≥ 30	EI 120 U/C
Multilayer pipes Henco Standard	ArmaFlex Protect		
≤ 12	≥ 240	13	EI 120 U/C
≤ 63		26 (2× 13)	EI 120 U/C

Multilayer pipes Henco Standard with PEF insulation									
Outer Ø [mm]	Intumescent wrap PYRO-SAFE® DG-CR BS						Protective insulation lamella mat		Fire resistance class
	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Length L [mm]	Thickness T [mm]	
≤ 32	100	2	1	≥ 25	50	50	≥ 250	≥ 20	EI 120 U/C

Installation in floors			
Outer Ø [mm]	Insulation		Fire resistance class
	Length L [mm]	Thickness T [mm]	
Multilayer pipes Henco Standard	Lamella mat		
≤ 32	≥ 500	≥ 20	EI 120 U/C
≤ 63	≥ 500	≥ 30	EI 120 U/C
Multilayer pipes Henco Standard	ArmaFlex Protect		
≤ 12	≥ 240	13	EI 120 U/C
≤ 63		26 (2× 13)	EI 120 U/C

Multilayer pipes Henco Standard with PEF insulation									
Outer Ø [mm]	Intumescent wrap PYRO-SAFE® DG-CR BS						Protective insulation lamella mat		Fire resistance class
	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Length L [mm]	Thickness T [mm]	
≤ 32	100	2	1	≥ 25	50	50	≥ 250	≥ 20	EI 120 U/C

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

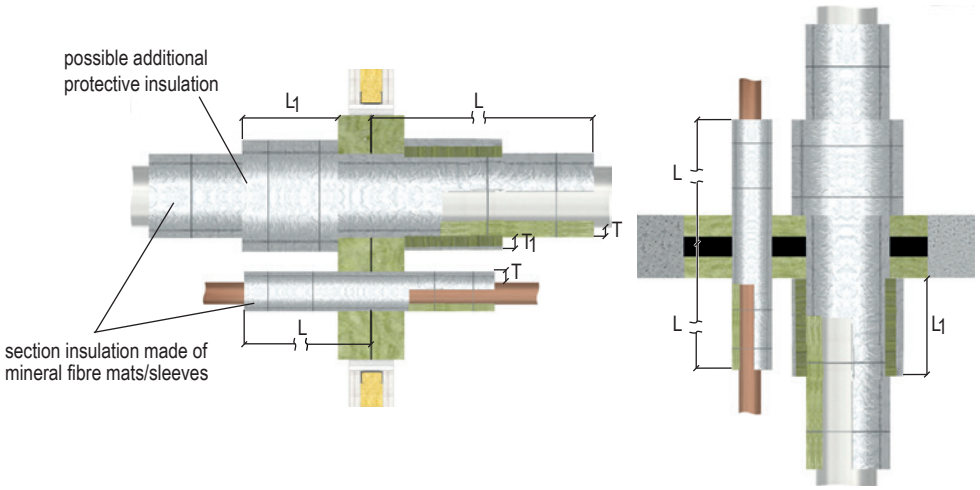
8.6 Non-combustible pipes
8.6.1 Insulation with lamella mat Klimarock

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.

Design for walls and floors



For component and seal thickness and design variants, see page 29.

Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

Installation in walls

Pipe material	Outer Ø [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		Fire resistance class
			Insulation length L [mm]	Insulation thickness T [mm]	Insulation length L_1 [mm]	Insulation thickness T_1 [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 15.0	≥ 0.8	≥ 250	≥ 20	–		EI 120 C/U
	Ø ≤ 28.0	≥ 1.0	≥ 500	≥ 20	–		EI 120 C/U
	Ø ≤ 42.0	≥ 1.2	≥ 500	≥ 30	–		EI 120 C/U
	Ø ≤ 54.0	≥ 1.5	≥ 750	≥ 40	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 88.9	≥ 2.0	≥ 750	≥ 40	≥ 500	≥ 30	EI 120 C/U
			≥ 1000	≥ 30	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 108.0	≥ 2.5	≥ 1000	≥ 30	≥ 500	≥ 30	EI 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 114.3	≥ 3.6	≥ 1000	≥ 30	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 170.0	≥ 2.9	≥ 1000	≥ 40	≥ 500	≥ 60	EI 120 C/U
			≥ 1000	≥ 60	≥ 500	≥ 30	EI 120 C/U

Installation in floors

Pipe material	Outer Ø [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		Fire resistance class
			Insulation length L [mm]	Insulation thickness T [mm]	Insulation length L_1 [mm]	Insulation thickness T_1 [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 15.0	≥ 0.8	≥ 500	≥ 20	–		EI 90 C/U
			≥ 500	≥ 20	≥ 250	≥ 20	EI 120 C/U
			≥ 500	≥ 20	–		EI 120 C/U
	Ø ≤ 42.0	≥ 1.2	≥ 500	≥ 30	–		EI 120 C/U
	Ø ≤ 54.0	≥ 1.5	≥ 750	≥ 40	≥ 500	≥ 30	EI 120 C/U
			≥ 750	≥ 30	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 88.9	≥ 2.0	≥ 750	≥ 40	≥ 500	≥ 30	EI 120 C/U
			≥ 1000	≥ 30	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 108.0	≥ 2.5	≥ 1000	≥ 30	≥ 500	≥ 30	EI 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 114.3	≥ 3.6	≥ 1000	≥ 30	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 170.0	≥ 2.9	≥ 1000	≥ 40	≥ 500	≥ 60	EI 120 C/U
	Ø ≤ 323.9	≥ 7.1	≥ 1250	≥ 60	≥ 1000	≥ 60	EI 120 C/U

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

8.6.2 Insulation with mineral fibre pipe sleeve ProRox PS 960

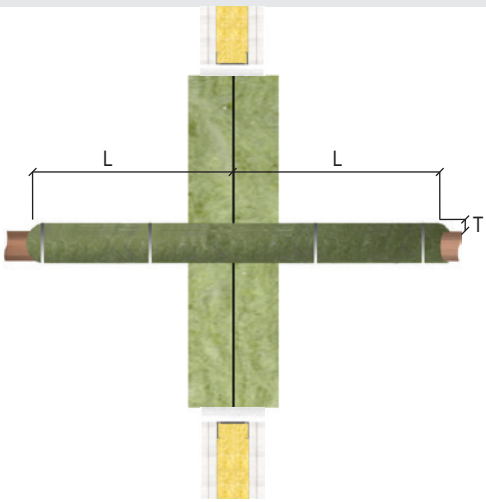
ProRox PS 960 pipe sleeves with or without aluminium lamination may be used.

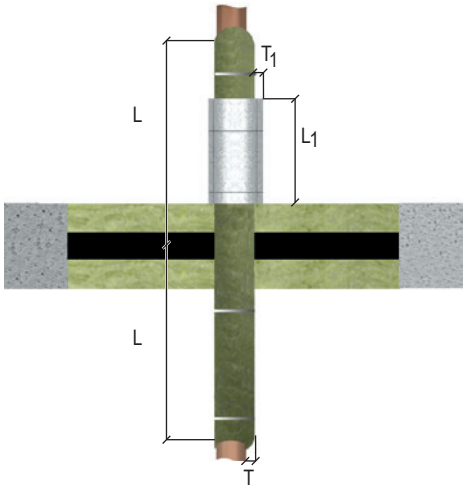
The insulation must be fastened to the pipe with tensioning straps or wire.

When installing in floors, a protective insulation with mineral fibre mats must be installed above the seal.

In floor installations appropriate measures must be taken to prevent the insulation from slipping.

Design for walls and floors





For component and seal thickness and design variants, see page 29.

Dimensions in mm

Installation in walls

Pipe material	Outer Ø [mm]	Pipe wall thickness [mm]	Section insulation		Fire resistance class
			Insulation length L [mm]	Insulation thickness T [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 22.0	≥ 1.0	≥ 1000	≥ 30	EI 90 / E 120 C/U
	Ø ≤ 54.0	≥ 1.5	≥ 1000	≥ 40	EI 90 / E 120 C/U
	Ø ≤ 88.9	≥ 2.0	≥ 1000	≥ 40	EI 60 / E 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 170.0	≥ 3.0	≥ 1000	≥ 40	EI 60 / E 120 C/U

Installation in floors

Pipe material	Outer Ø [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		Fire resistance class
			Insulation length L [mm]	Insulation thickness T [mm]	Insulation length L_1 [mm]	Insulation thickness T_1 [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 22.0	≥ 1.0	≥ 1000	≥ 40	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 54.0	≥ 1.5	≥ 1000	≥ 40	≥ 500	≥ 30	EI 120 C/U
	Ø ≤ 88.9	≥ 2.0	≥ 1000	≥ 40	≥ 500	≥ 30	EI 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 170.0	≥ 3.0	≥ 1000	≥ 40	≥ 500	≥ 30	EI 120 C/U

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

8.6.3 Insulation with FEF NH/ArmaFlex

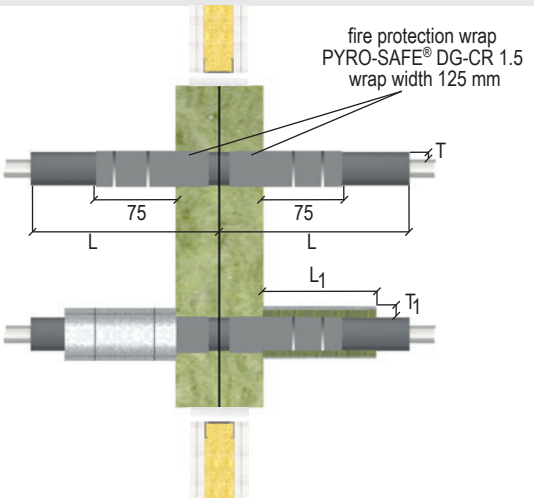
Section insulation made of FEF must pass through the component opening.

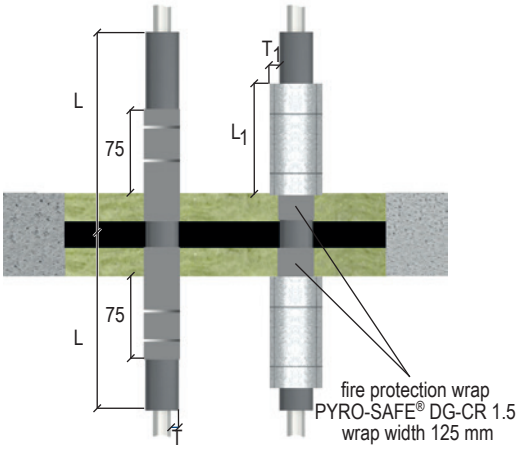
The pipes must be wrapped with the fire protection wrap PYRO-SAFE® DG-CR 1.5.

he 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.

Additionally, protective insulation must be installed and appropriate measures must be taken to prevent it from slipping.

Design for walls and floors





For component and seal thickness and design variants, see page 29.

Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

Insulation with FEF NH/ArmaFlex

Installation in walls

Pipe material	Outer Ø [mm]	Pipe wall thickness [mm]	Insulation length (L) × insulation thickness (T) [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5					Protective insulation		Fire resistance class
				Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Inside seal [mm]	Outside seal [mm]	Length L_1 [mm]	Thick-ness T_1 [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 10	≥ 0.8	≥ 500 × 9-19	125	2	1	50	75	250	20	EI 120 C/U
	Ø ≤ 15		≥ 750 × 9-25	125	2	1	50	75	250	20	EI 90 / E 120 C/U
			Continuous × 9-25	125	2	1	50	75	250	20	EI 120 C/U
			≥ 750 × 9-19	125	2	1	50	75	250*	13*	EI 120 C/U
		≥ 1.0	Continuous × 10-50	125	2	1	50	75	250	20	EI 120 C/U
	Ø ≤ 28	≥ 1.0	≥ 750 × 9-25	125	2	1	50	75	250	20	EI 90 / E 120 C/U
			Continuous × 25	125	2	1	50	75	250	20	EI 120 C/U
		≥ 1.2	Continuous × 10-50	125	2	1	50	75	250	20	EI 120 C/U
		≥ 2.0	Continuous × 89	125	2	1	50	75	500	40	EI 120 C/U
	Ø ≤ 42	≥ 1.2	≥ 750 × 10-50	125	2	1	50	75	250	20	EI 120 C/U
			≥ 750 × 10-50	125	2	1	50	75	250*	26 (2x 13)*	EI 120 C/U
		≥ 2.0	Continuous × 89	125	2	1	50	75	500	40	EI 120 C/U
	Ø ≤ 54	≥ 1.5	≥ 1000 × 25	125	2	1	50	75	250	20	EI 90 / E 120 C/U
			Continuous × 25	125	2	1	50	75	250	20	EI 120 C/U
			≥ 1000 × 29-57	125	2	1	50	75	500	30	EI 90 C/U
		≥ 2.0	Continuous × 89	125	2	1	50	75	500	40	EI 120 C/U
	Ø ≤ 88.9	≥ 2.0	≥ 1000 × 25-89	125	2	2	50	75	500	30	EI 90 C/U
			Continuous × 89	125	2	1	50	75	500	40	EI 120 C/U
	Ø ≤ 108	≥ 2.5	≥ 1000 × 57	125	2	2	50	75	750	40	EI 90 C/U
Steel, stainless steel, cast iron	Ø ≤ 170	≥ 2.9	≥ 1000 × 50-89	125	2	1	50	75	750	60	EI 120 C/U

* Protective insulation ArmaFlex Protect

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

Installation in floors											
Pipe material	Outer Ø [mm]	Pipe wall thickness [mm]	Insulation length (L) × insulation thickness (T) [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5					Protective insulation		Fire resistance class
				Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Inside seal [mm]	Outside seal [mm]	Length L_1 [mm]	Thickness T_1 [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 10	≥ 0.8	≥ 500 × 9-19	125	2	1	50	75	250	20	EI 120 U/C
	Ø ≤ 15		≥ 750 × 9-25	125	2	1	50	75	250	20	EI 120 C/U
			≥ 750 × 9-19	125	2	1	50	75	250*	13*	EI 120 U/C
	Ø ≤ 28	≥ 1.0	≥ 750 × 9-25	125	2	1	50	75	250	20	EI 120 U/C
	Ø ≤ 42	≥ 1.2	≥ 750 × 10-50	125	2	1	50	75	250	20	EI 120 U/C
			≥ 750 × 10-50	125	2	1	50	75	250*	26 (2× 13)*	EI 120 U/C
	Ø ≤ 54	≥ 1.5	≥ 1000 × 25	125	2	1	50	75	250	20	EI 120 U/C
	Ø ≤ 88.9	≥ 2.0	≥ 1000 × 25	125	2	1	50	75	250	40	EI 90 U/C
			≥ 1000 × 89	125	2	1	50	75	250	40	EI 90 U/C
	Ø ≤ 108	≥ 2.5	≥ 1000 × 57	125	1	1	125*	0*	1000**	40**	EI 90 C/U
Steel, stainless steel, cast iron	Ø ≤ 170	≥ 2.9	≥ 1000 × 50-89	125	2	1	50	75	750	60	EI 90 U/C

** Protective insulation ArmaFlex Protect
** Install wrap flush with lower board of the sealing system; the protective insulation may be installed on the upper side of the floor only.

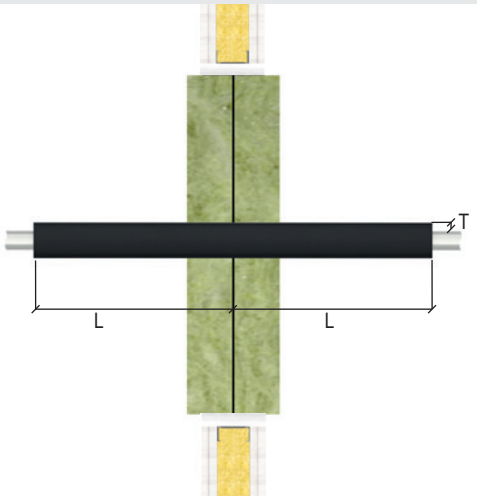
NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

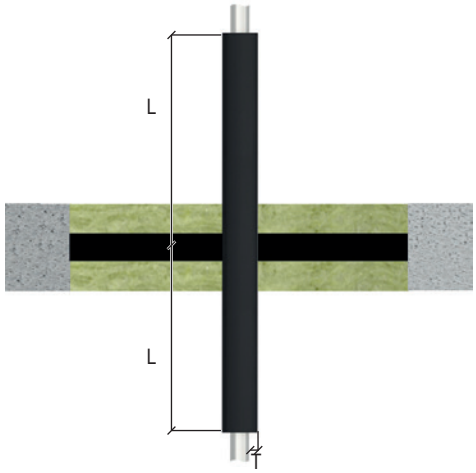
PYRO-SAFE®
Flammotect Double Layer

8.6.4 Insulation with FEF ArmaFlex Protect

Section insulation made of FEF must pass through the component opening.

Design for walls and floors without insulation





For component and seal thickness and design variants, see page 29.

Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

Installation in walls				
Pipe			Insulation	Fire resistance class
Material	Outer Ø [mm]	Pipe wall thickness [mm]	Length L [mm] × thickness T [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 10.0	≥ 1.0	≥ 1000 × 16	EI 120 C/U
	Ø ≤ 15.0	≥ 1.0	≥ 1000 × 19	EI 90 / E 120 C/U
	Ø ≤ 22.0	≥ 1.0	≥ 1000 × 20	EI 120 C/U
	Ø ≤ 28.0	≥ 1.0	≥ 1000 × 25	EI 60 / E 120 C/U
	Ø ≤ 35.0	≥ 1.5	≥ 1000 × 25	EI 90 / E 120 C/U
	Ø ≤ 54.0	≥ 1.5	≥ 1000 × 25	EI 90 / E 120 C/U
	Ø ≤ 88.9	≥ 2.0	≥ 1000 × 25	EI 60 / E 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 170.0	≥ 3.0	≥ 1000 × 26 (2× 13)	EI 90 / E 120 C/U

Installation in floors				
Pipe			Insulation	Fire resistance class
Material	Outer Ø [mm]	Pipe wall thickness [mm]	Length L [mm] × thickness T [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 8.0	≥ 1.0	≥ 1000 × 16	EI 120 C/U
	Ø ≤ 15.0	≥ 1.0	≥ 1000 × 19	EI 120 C/U
	Ø ≤ 22.0	≥ 1.0	≥ 1000 × 20	EI 120 C/U
	Ø ≤ 28.0	≥ 1.0	≥ 1000 × 25	EI 120 C/U
	Ø ≤ 35.0	≥ 1.5	≥ 1000 × 25	EI 120 C/U
	Ø ≤ 54.0	≥ 1.5	≥ 1000 × 25	EI 90 / E 120 C/U
	Ø ≤ 88.9	≥ 2.0	≥ 1000 × 25	EI 60 / E 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 170.0	≥ 3.0	≥ 1000 × 26 (2× 13)	EI 90 / E 120 C/U

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

8.6.5 Insulation with FEF Kaiflex ST

Section insulation made of FEF must pass through the component opening.

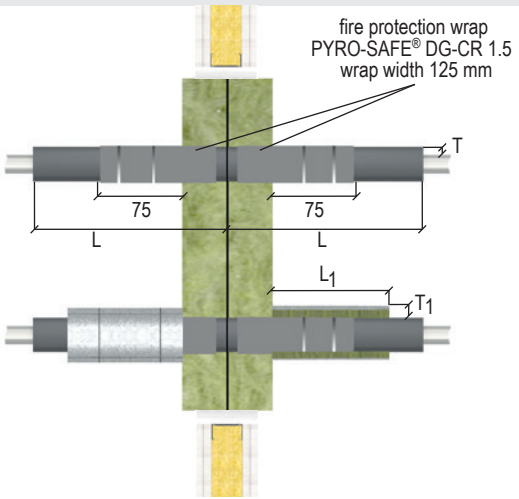
The pipes must be wrapped on both sides of the seal with the fire protection wrap PYRO-SAFE® DG-CR 1.5.

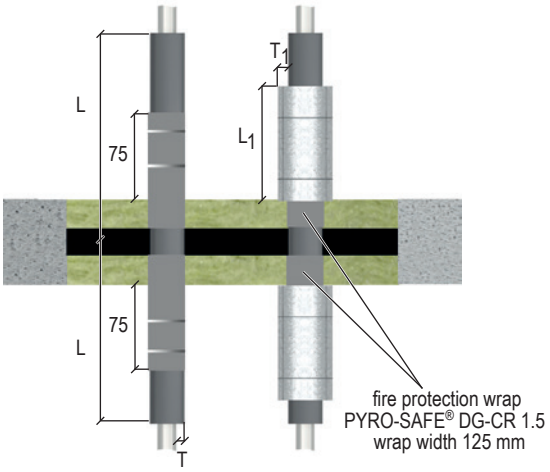
The fire protection wrap PYRO-SAFE® DG-CR 1.5 is coated on one side and equipped with a protective film. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.

Depending on the outer diameter of the pipe, protective insulation with FEF or the mineral fibre mat Klimarock may be necessary.

The protective insulation must be installed on both sides and appropriate measures must be taken to prevent it from slipping.

Design for walls and floors





For component and seal thickness and design variants, see page 29.

Dimensions in mm

PYRO-SAFE®
Flammotect Double Layer

Installation in walls

Pipe			Insulation length (L) × insulation thickness (T) [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Protective insulation		Fire resistance class
Material	Outer Ø [mm]	Pipe wall thickness [mm]		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Length L_1 [mm]	Thickness T_1 [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 8.0	≥ 1.0	≥ 2000 × 9–18	125	2	1	–	50	75	–		EI 120 C/U
	Ø ≤ 22.0	≥ 1.0	≥ 2000 × 32			2						EI 120 C/U
	Ø ≤ 88.9	≥ 1.5 / 2.0	≥ 2000 × 32							500	30	EI 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 170.0	≥ 3.0	≥ 2000 × 10-32									EI 90 / E 120 C/U

Installation in floors

Pipe			Insulation length (L) × insulation thickness (T) [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Protective insulation		Fire resistance class
Material	Outer Ø [mm]	Pipe wall thickness [mm]		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal L [mm]	Length L_1 [mm]	Thickness T_1 [mm]	
Copper, steel, stainless steel, cast iron	Ø ≤ 8.0	≥ 1.0	≥ 2000 × 9–18	125	2	1	–	50	75	–		EI 120 C/U
	Ø ≤ 88.9	≥ 1.5 / 2.0	≥ 2000 × 9–32			2				500	30	EI 120 C/U
Steel, stainless steel, cast iron	Ø ≤ 170.0	≥ 3.0	≥ 2000 × 10–32									EI 90 / E 120 C/U

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

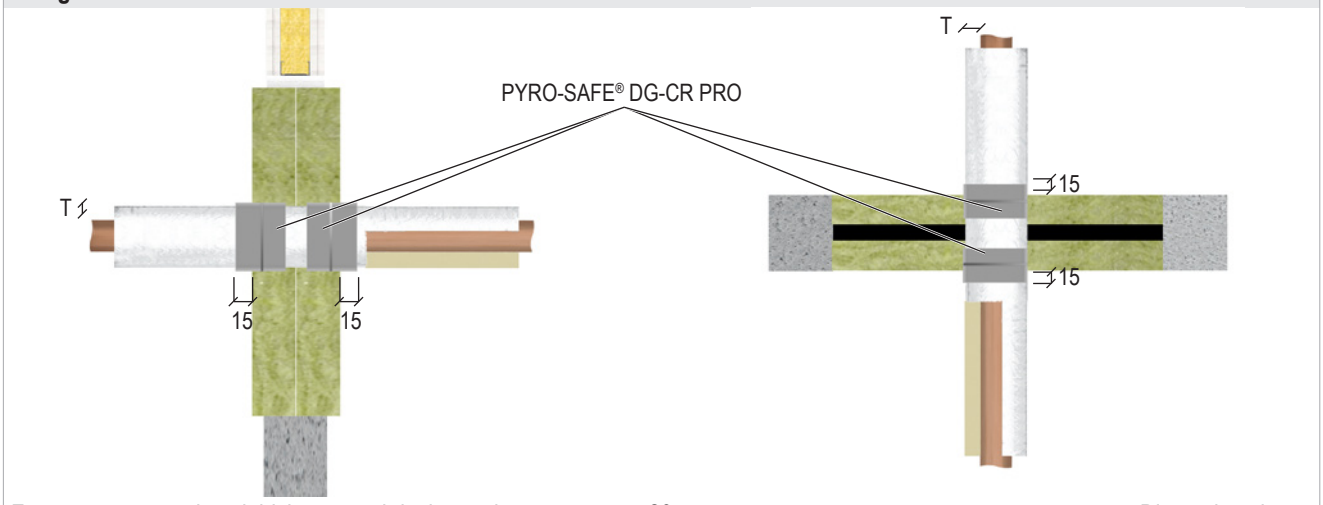
8.6.6 Insulation with PIR

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 walls and floors



For component and seal thickness and design variants, see page 29.

Dimensions in mm

PYRO-SAFE®
Flammotect Double 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	20	62.5	2	2	25	47.5	15	EI 90 C/U
		50			3				EI 120 C/U
≤ 42.0	≥ 1.2 – ≤ 14.2	20			2				EI 90 C/U
		60			3				EI 120 C/U
≤ 54.0	≥ 1.5 – ≤ 14.2	20			2				EI 90 C/U
		80			4				EI 60 C/U
≤ 88.9	≥ 2.0 – ≤ 14.2	40			2				EI 90 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	20	62,5	2	2	25	47,5	15	EI 90 C/U
		100			4				EI 120 C/U
≤ 133.0	≥ 3.6 – ≤ 14.2	30			2				EI 60 C/U
		40			2				EI 60 C/U
		100			4				EI 90 C/U
≤ 219.1	≥ 2.0 – ≤ 14.2	100			4				EI 120 C/U
		40			2				EI 90 C/U
		60			3				EI 120 C/U

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double 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	30	62,5	2	2	0	60	2,5	EI 120 C/U
		50			3				EI 120 C/U
≤ 42.0	≥ 1.2 – ≤ 14.2	30			2				EI 120 C/U
		60			3				EI 120 C/U
≤ 54.0	≥ 1.5 – ≤ 14.2	30			2				EI 120 C/U
		80			4				EI 120 C/U
		40			2				EI 120 C/U
		50			3				EI 120 C/U
≤ 88.9	≥ 2.0 – ≤ 14.2	100			4				EI 120 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	62.5	2	2	25	47.5	15	EI 90 C/U
		100			4				EI 120 C/U
≤ 133.0	≥ 3.6 – ≤ 14.2	40			2				EI 90 C/U
		100			4				EI 120 C/U
≤ 219.0	≥ 4.5 – ≤ 14.2	100			4				EI 120 C/U
≤ 219.1		40			2				EI 90 C/U
		60			3				EI 120 C/U

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

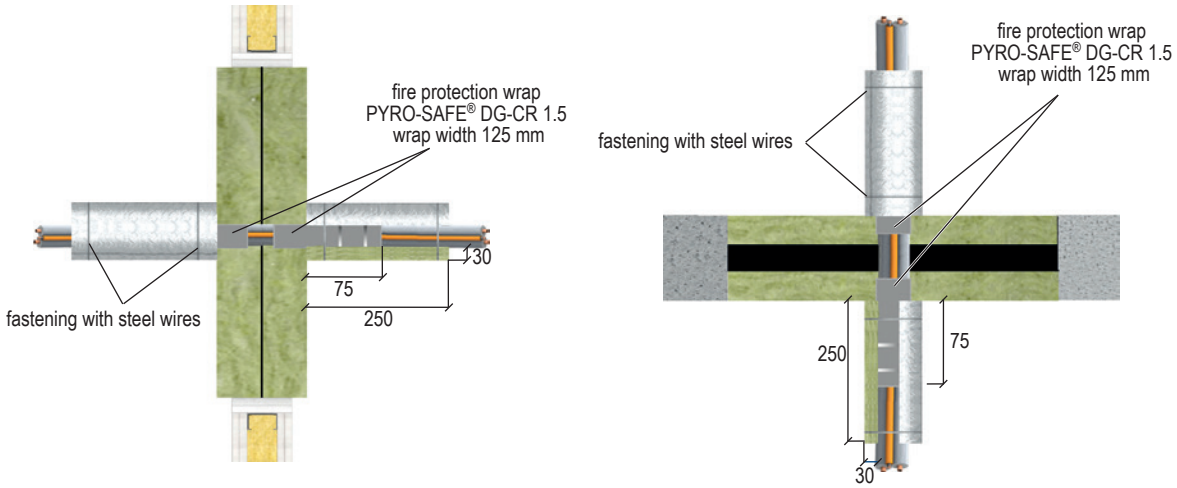
8.7 HVAC split line combinations

The HVAC split line combinations must be wrapped with the fire protection wrap PYRO-SAFE® DG-CR 1.5 on both sides. Also a protective insulation with lamella mats (≥ 250 mm × ≥ 30 mm) is necessary.

The protective insulation must be installed on both sides of the seal and appropriate measures must be taken to prevent the insulation from slipping..

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 walls and floors



For component and seal thickness and design variants, see page 29.

Dimensions in mm

Installation in walls

Pipe					Number of accompanying cables Ø ≤ 21 mm [n]	Accompa-nying pipe made of PE Ø [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
Material	Outer Ø [mm]	Wall thickness [mm]	Insulation [Type]	Insulation thickness [mm]			Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	
Copper	6–10 and 6–18	1.0	PEF	9	3 (max. à 5x1.5 mm²)	≤ 25 (thickn. 1.8–3.5)	125	2	1	–	50	75	EI 120 U/U
	6 –22												

Installation in floors

Pipe					Number of accompanying cables Ø ≤ 21 mm [n]	Accompa-nying pipe made of PE Ø [mm]	Fire protection wrap PYRO-SAFE® DG-CR 1.5						Fire resistance class
Material	Outer Ø [mm]	Wall thickness [mm]	Insulation [Type]	Insulation thickness [mm]			Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	
Copper	6–22 and 8–22	1.0	PEF	9	4	≤ 25 (thickn. 1.8–3.5)	125	1	2	–	50	75	EI 90 C/U
	6–22												

NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

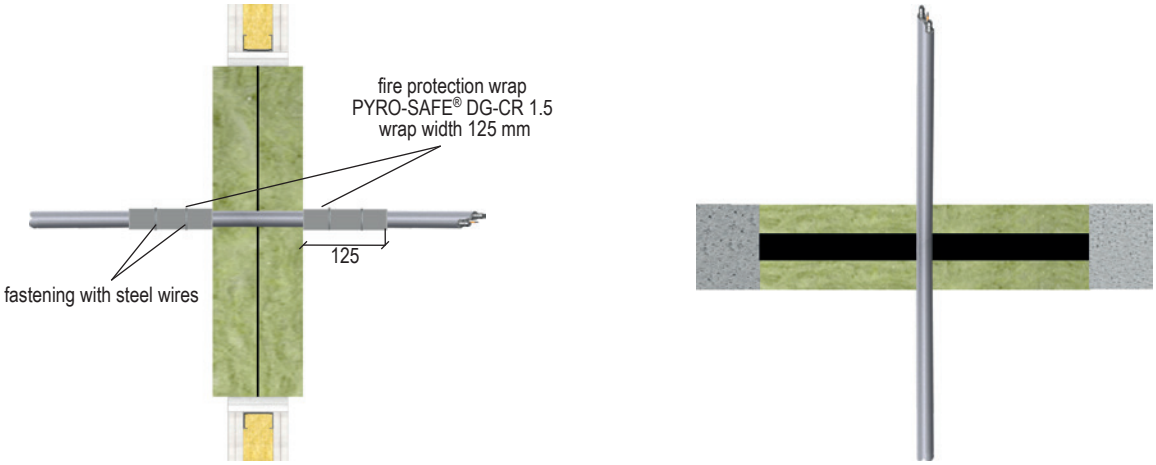
PYRO-SAFE®
Flammotect Double Layer

8.8 Double solar pipes Nanosun²

When installed in walls, the double solar pipes must be wrapped on both sides with the fire protection wrap PYRO-SAFE® DG-CR 1.5; a protective insulation with lamella mat may be necessary (DN 40, EI 120 U/U).

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 walls and floors



For component and seal thickness and design variants, see page 29.

Dimensions in mm

Installation in walls

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]	
≤ DN 25	125	2	1	–	–	125	EI 120 C/U
≤ DN 40	125	2	1	25	0	125	EI 60 E 120 U/U
	125	2	1	25	0	125	EI 120 U/U*

* Additional protective insulation with lamella mat (≥ 250 mm × ≥ 30 mm) required.

Installation in floors

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]	
≤ DN 25	–						EI 120 C/U
≤ DN 40	–						EI 120 C/U

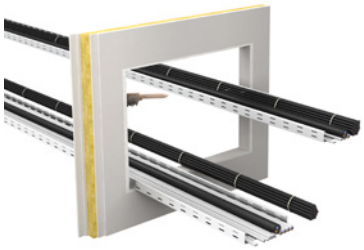
NOTE:
In timber components the fire resistance class is reduced to max. EI 90.

PYRO-SAFE®
Flammotect Double Layer

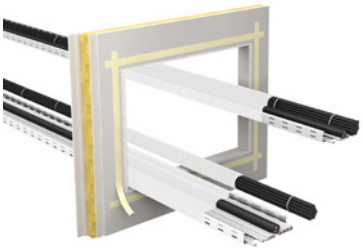
9. Installation steps

9.1 Installation steps for cable penetrations

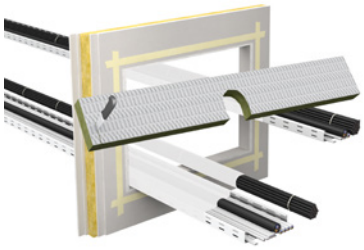
1. Clean the inside edges (reveal must be panelled). When installing in sandwich panel walls, attach L profiles with the dimensions 30 × 30 × 2 mm alongside the reveal on both sides of the seal.



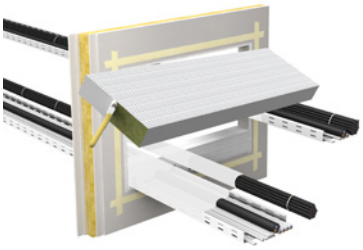
2. Mask the opening with crepe tape on all sides, keeping 20 mm distance to the edge. Coat the cables with PYRO-SAFE® FLAMMOTECT-A; alternatively apply fire protection wrap.



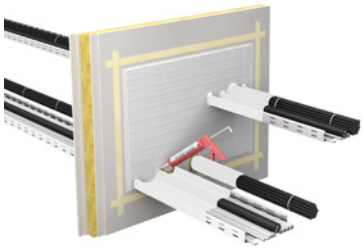
3. Cut mineral fibre boards to size (make cut-outs for the installations).



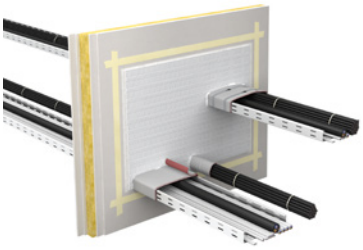
4. Coat the edges of the mineral fibre boards with PYRO-SAFE® FLAMMOTECT-A and firmly place boards in position.



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

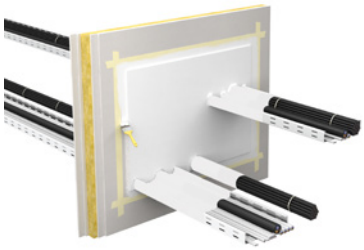


6. Alternative to cable coating:
wrap cables, cable bundles, cable trays with PYRO-SAFE® DG-CR 1.5



PYRO-SAFE®
Flammotect Double Layer

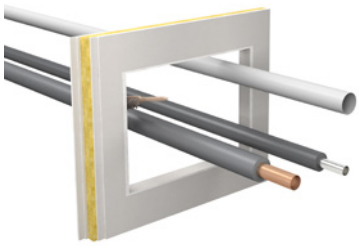
Installation steps for cable penetrations

7. Final coating with PYRO-SAFE® FLAMMOTECT-A. 	8. Label the penetration seal. Fill out the label neatly and attach it firmly next to/above (not on!) the penetration seal. 

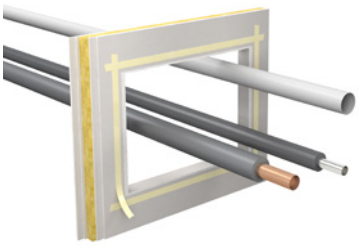
PYRO-SAFE®
Flammotect Double Layer

9.2 Installation steps for pipe penetrations

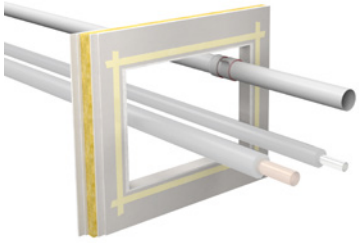
1. Clean the inside edges (reveal must be panelled). When installing in sandwich panel walls, attach L profiles with the dimensions 30 × 30 × 2 mm alongside the reveal on both sides of the seal.



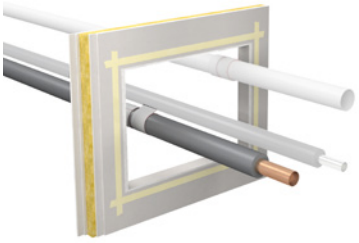
2. Mask the opening with crepe tape on all sides, keeping 20 mm distance to the edge.



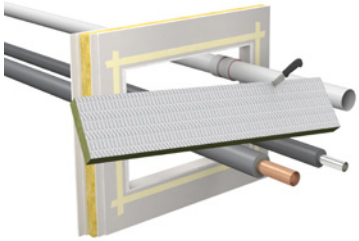
3. Wrap combustible pipes with PYRO-SAFE® DG-CR BS according to page 37.



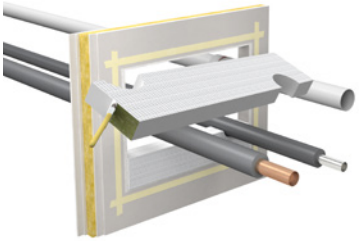
4. Wrap non-combustible pipes with combustible insulation with PYRO-SAFE® DG-CR 1.5 according to page44.



5. Cut mineral fibre board to size (make cut-outs for the installations).

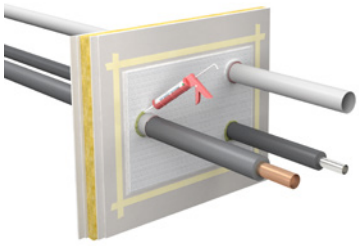
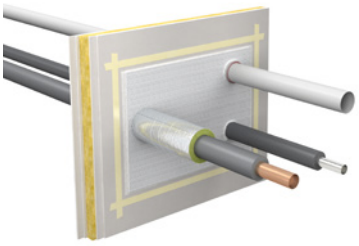
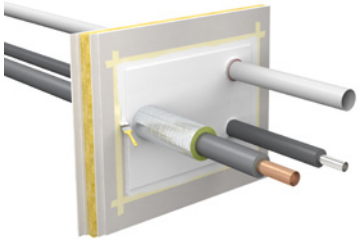
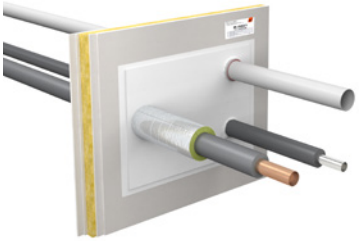


6. Coat the edges of the mineral fibre boards with PYRO-SAFE® FLAMMOTECT-A and firmly place boards in position.



PYRO-SAFE®
Flammotect Double Layer

Installation steps for pipe penetrations

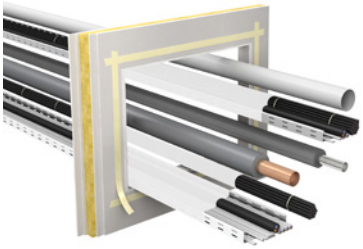
7. Seal the remaining opening / joint gaps with mineral fibre or fill with PYRO-SAFE® FLAMMOTECT-A. 	8. Apply protective insulation to pipes as necessary. 
9. Final coating with PYRO-SAFE® FLAMMOTECT-A. 	10. Label the penetration seal. Fill out the label neatly and attach it firmly next to/above (not on!) the penetration seal. 

PYRO-SAFE®
Flammotect Double Layer

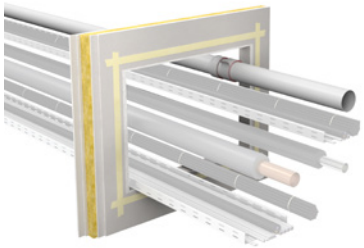
9.3 Installation steps for mixed penetrations

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.

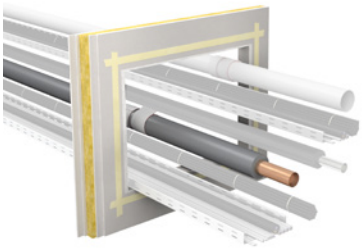
2. Mask the opening with crepe tape on all sides, keeping 20 mm distance to the edge. Coat the cables with PYRO-SAFE® FLAMMOTECT-A; alternatively apply fire protection wrap.



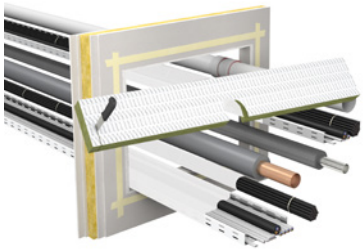
3. Wrap combustible pipes with PYRO-SAFE® DG-CR BS according to page 37.



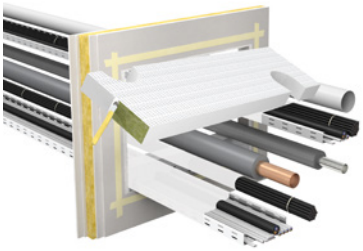
4. Wrap non-combustible pipes with combustible insulation with PYRO-SAFE® DG-CR 1.5 according to page 44.



5. Cut mineral fibre board to size (make cut-outs for the installations).



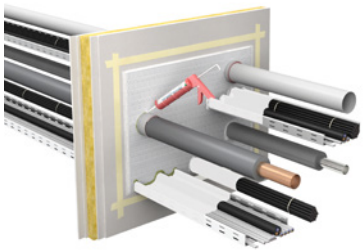
6. Coat the edges of the mineral fibre boards with PYRO-SAFE® FLAMMOTECT-A and firmly place boards in position.



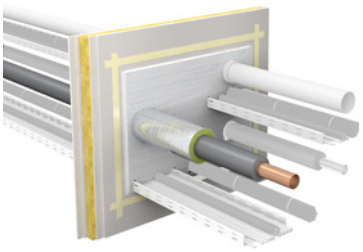
PYRO-SAFE®
Flammotect Double Layer

Installation steps for mixed penetrations

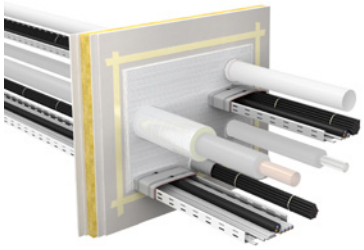
7. Seal the remaining opening / joint gaps with mineral fibre or fill with PYRO-SAFE® FLAMMOTECT-A.



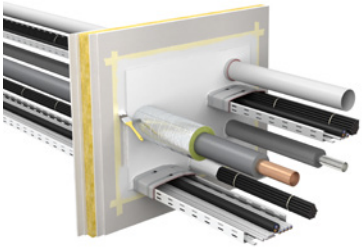
8. Apply lamella mat insulation to pipes as necessary, according to page 49.



9. Alternative to cable coating:
wrap cables, cable bundles, cable trays with PYRO-SAFE® DG-CR 1.5



10. Final coating with PYRO-SAFE® FLAMMOTECT-A.



11. Label the penetration seal. Fill out the label neatly and attach it firmly next to/above (not on!) the penetration seal.