

System Flammotect 2 × 50 mm

Ablative mineral fibre board seal

Mixed penetration sealing system made of mineral fibre boards and an ablative coating for electrical installations of all types as well as for electrical installation conduits, combustible/non-combustible pipes and further services.

Fire resistance class max. EI 120 in accordance with EN 13501-2 as per ETA-22/0052



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1. Preliminary remarks / overview

1.1 Target group

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

1.2 Use of the instructions

Before starting work, read through these installation instructions completely once. Pay particular attention to the following safety instructions.

The authorisation holder assumes no liability for damage caused by failure to comply with these instructions.

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

Unless stated otherwise, all lengths are specified in mm.





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

Upon request, flamro 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. 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 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).

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1.3 Building elements

Cladding of the aperture edge 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

Plasterboard walls must have a minimum thickness of ≥ 100 mm.

The cladding of the aperture edge must consist of at least one layer with a thickness of ≥ 12.5 mm. When installing without cladding the seal size may not be larger than 800×600 mm or 600×800 mm.

Plasterboard walls with timber studs must be declared and installed with at least the same number of layers as tested. The distance between the opening and the studs and transoms must be ≥ 100 mm. The gap between seal and stud / timber girt is sealed with an insulation of at least 100 mm, reaction to fire class A1 or A2 according to EN 13501-1.

If one or more studs must be cut to install the seal, horizontal girts must be installed.

Standard plasterboard wall construction is not applicable for construction on the basis of sandwich panels or for plasterboard walls with one-sided cladding (shaft walls).

The supporting structure must have 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 duration according to EN 13501-2.

Solid floors

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

The floors must be classified for the desired fire resistance duration 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





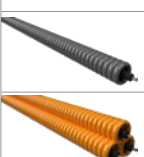

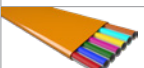
Sandwich panel walls PAROC AST-S/F with a thickness of ≥ 120 mm.

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2. Allowed services

For specific fire resistance classes and pipe end configurations depending on measurements and fire protection measures see the respective chapters on design variants starting on page 18.

2.1 Cables / electrical installation conduits / / wave guides / speedpipes

Service		Max. diameter [mm]	
	Cables	≤ 80	
	Cable bundles	≤ 100, cable Ø ≤ 21	
	Cable trays	✓	
	Single conduits	made of plastic	≤ 16
		made of steel	≤ 16
	CT Cable Tube	Length 300 mm, with cables Ø ≤ 21 mm and cable bundles Ø ≤ 100 mm made of single cables Ø ≤ 21 mm	
	Electrical installation conduits made of plastic	single	≤ 32 with or without cables
		bundled	≤ 100, conduit Ø ≤ 32, with or without cables
	Electrical installation conduits made of steel	single	≤ 32 with or without cables
	Coaxial cables and wave guides	CommScope HELIAX®	≤ 51.1
		RFS CELLFLEX®	≤ 50.3
		RFS RADIAFLEX®	≤ 48.2
	speedpipes	≤ 50, single Ø ≤ 14	

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2.2 Combustible pipes



Standard pipes			
Pipe material	in acc. with standard	Diameter [mm]	Pipe wall thickness
PVC-U	EN 1329-1, EN 1452-2, EN 1453-1, EN ISO 15493	≤ 160.0	1.8–14.6
PVC-C	EN 1566-1, EN ISO 15493, EN ISO 15877	≤ 160.0	1.8–14.6
PE-HD	EN 1519-1, EN 12201-2, EN ISO 15494, EN 12666-1	≤ 160.0	1.8–14.6
PP	EN 1451-1, EN ISO 15874, EN 15494, DIN 8077 / DIN 8078	≤ 160.0	1.8–14.6
PP-H	EN 1451-1, EN ISO 15874, EN 15494	≤ 75.0	1.8–8.2
ABS	EN 1455-1, EN ISO 15493	≤ 160.0	1.8–14.6
SAN + PVC	EN 1565-1	≤ 160.0	1.8–14.6

Non-standard pipes	
Type of pipe	Diameter [mm]
Geberit Silent-Pro	≤ 160.0
Geberit Silent-PP	≤ 160.0
Geberit Silent-dB20	≤ 160.0
POLOPLAST POLO-KAL NG	≤ 160.0
POLOPLAST POLO-KAL XS	≤ 160.0
POLOPLAST POLO-KAL 3S	≤ 110.0
CONEL DRAIN	≤ 160.0
Wavin AS	≤ 160.0
Wavin AS+	≤ 160.0
Wavin SiTech	≤ 110.0
Wavin SiTech+	≤ 160.0
REHAU RAUPIANO PLUS	≤ 160.0
REHAU RAUPIANO LIGHT	≤ 160.0
REHAU RAUSILENTO	≤ 160.0
GF Silenta Premium	≤ 160.0
Hakan Silenta Premium	≤ 160.0
Valsir Triplus	≤ 160.0
Pipelife MASTER 3	≤ 110.0
Pipelife MASTER 3 PLUS	≤ 160.0
KE KELIT PHONEX AS	≤ 160.0
Ostendorf Skolan dB	≤ 135.0

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2.3 Multilayer pipes



Type of pipe	Diameter [mm]
Henco	≤ 63.0
FRÄNKISCHE alpex L, FRÄNKISCHE alpex F50	≤ 75.0
Geberit Mepla	≤ 75.0
REHAU RAUTITAN stabil	≤ 40.0
KE KELIT KELOX	≤ 75.0

2.4 Non-combustible pipes



Pipe material	Diameter [mm]
Copper, steel, stainless steel, cast iron	≤ 88.9
Steel, stainless steel, cast iron	≤ 219.1

2.5 Other services



Service	Dimensions
HVAC split line combinations	Copper pipe ≤ 2 × Ø 22 mm, + 9 mm PE foam + 1 pipe PVC-U Ø ≤ 25.0 + ≤ 2 × cable Ø ≤ 21.0 mm or 3 × cable Ø ≤ 14.0 mm

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3. Thicknesses, sizes and spacing

Dimensions					
	Wall [mm]	Floor [mm]	Timber wall [mm]	Timber floor [mm]	Sandwich panel wall [mm]
Thickness of building element	≥ 100	≥ 150	≥ 100	≥ 150	≥ 120
Thickness of penetration seal	≥ 100	≥ 150	≥ 100	≥ 150	≥ 100
Maximum dimensions of the aperture (width × height)	2200 × 1100 / 1100 × 2200, without cladded aperture edge: 800 × 600 / 600 × 800	2600 × 1000 / ∞ × 800	1000 × 600 / 600 × 1000	1000 × 600 / 10 000 × 400	1000 × 1000
Distance to other penetration seals	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
Distance to other apertures or installations	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200

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

3.1 Initial supports

Penetrating services must be supported at the distances specified in the table below. In wall constructions support is required on both sides. In floor constructions support is required on the upper side of the floor. Essential parts of the supports must be non-combustible.

Initial supports	Wall	Floor
Cables, cable bundles, cable support structures		≤ 650
Electrical installation conduits with fire protection wrap NBR-plus		≤ 250
Electrical installation conduits with fire protection collar AWM II		≤ 500
speedpipes for glass fibre cables and micro cables		≤ 250
Combustible pipes	≤ 500	≤ 650
Multilayer pipes		≤ 650
Non-combustible pipes with section insulation made of mineral fibre mats or shells	≤ 650	≤ 850
Non-combustible pipes with section insulation made of FEF		≤ 500
HVAC split line combinations		≤ 250
All specifications in mm		

4. Spacing requirements for services



NOTE:

In timber components and sandwich panel walls, services must be installed at a distance of ≥ 100 mm to the aperture edge.

Spacing requirements in walls and floors

															Aperture edge				
		Single cables	Cable bundles	Cable support systems	CT Cable Tube	Coaxial cables and wave guides	speedpipes	Electrical installation conduits, single, made of steel	Electrical installation conduits made of plastic, single/bundled	Combustible pipes	Non-combustible pipes with FEF insulation	Non-combustible pipes with lamella mat insulation	Multilayer pipes	HVAC split line combinations	Upper	Lower	Side		
	Single cables	≥ 0	≥ 0	≥ 0	≥ 100	≥ 100	≥ 25	≥ 75	≥ 75	≥ 100	≥ 20	≥ 100	≥ 100	≥ 50	≥ 50	≥ 100	≥ 100	≥ 0	
	Cable bundles	≥ 0	≥ 0	≥ 0	≥ 100	≥ 100	≥ 25	≥ 75	≥ 75	≥ 100	≥ 20	≥ 100	≥ 100	≥ 50	≥ 50	≥ 100	≥ 100	≥ 0	
	Cable support systems	≥ 0	≥ 0	≥ 0 (horizontally) / ≥ 100 (vertically)	≥ 100	≥ 100	≥ 25	≥ 75	≥ 75	≥ 100	≥ 20	≥ 100	≥ 100	≥ 50	≥ 50	≥ 100	≥ 100	≥ 0	
	CT Cable Tube	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 75	≥ 100	≥ 100	≥ 50	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 10	
	Coaxial cables and wave guides	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	
	speedpipes	≥ 25	≥ 25	≥ 25	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	
	Electrical installation conduits, single, made of steel	≥ 75	≥ 75	≥ 75	≥ 75	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	
	Electrical installation conduits made of plastic, single/bundled	with fire protection wrap	≥ 75	≥ 75	≥ 75	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 75	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25
		with fire protection collar	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100
	Combustible pipes	with fire protection collar	≥ 20	≥ 20	≥ 20	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25
		with Endless Collar	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 75	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25
		with fire protection wrap	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25
	Non-combustible pipes with FEF insulation	≥ 0	≥ 0	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 100	≥ 100	≥ 25	
	Non-combustible pipes with lamella mat insulation	≥ 0	≥ 0	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 100	≥ 100	≥ 25	
	Multilayer pipes	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 100	≥ 100	≥ 25	
	HVAC split line combinations	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0	≥ 0	≥ 100	≥ 50	≥ 25	

All specifications in mm. All specifications refer to distances between the respective insulations and additional measures if applicable.

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5. Included products



**FLAMMOTECT-A
Coating**

12.5 kg pail – Art. no. 01155131



**Endless Collar
Fire protection collar**

Set with 10 m fire protection strip, 3 m stainless steel strap and 18 fasteners – Art. no. 01145303



**FLAMMOTECT-A
Solid emulsion**

12.5 kg pail – Art. no. 01155136



CT Cable Tube

CT Cable Tube and 2 soft foam plugs
Ø 120 mm / L 300 mm – Art. no. 01271301
Ø 90 mm / L 300 mm – Art. no. 01279301



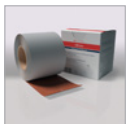
**FLAMMOTECT-A
Filler**

12.5 kg pail – Art. no. 01155134
310 ml cartridge – Art. no. 01155115



Mineral wool A1

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



**NBR-plus
Fire protection wrap**

Roll, 10 m × 125 mm
(separable into 2 × 62.5 mm)
– Art. no. 01261941



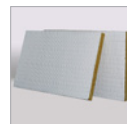
**Mineral fibre board
in acc. with EN 13162**

Criteria: density ≥ 150 kg/m³
Reaction to fire class A1 in acc. with EN 13501:1
Melting point ≥ 1000 °C.
(TR10) tensile strength vertical to board surface ≥ 10 kPa according to EN 1607
Thickness ≥ 50 mm



**KSL-W
Fire protection wrap**

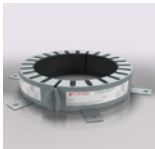
Roll, 10 m × 50 mm self-adhesive – Art. no. 15510
Roll, 20 m × 50 mm self-adhesive – Art. no. 15520
Roll, 10 m × 100 mm self-adhesive – Art. no. 15530

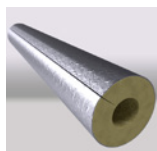


Mineral fibre boards

Pre-coated on both sides with FLAMMOTECT-A
Dimensions 1000 × 600 × 50 mm
Box with 4 pcs. – Art. no. 01181155

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	AWM II fire protection collar Ø 32 mm – Ø 160 mm				
Dimensions [mm]	Inner Ø collar [mm]	Outer Ø collar [mm]	Overall height [mm]	Number of tabs [n]	Art. no.
32	36–40	50–54	26.0	2	01142032
40	44–48	58–62	26.0	2	01142040
50	54–57	68–71	26.0	2	01142050
63	67–70	94–97	26.0	4	01142063
75	79–83	106–110	26.0	4	01142075
90	94–100	132–138	26.6	4	01142090
110	114–120	155–161	26.6	4	01142110
125	129–135	172–178	40.0	4	01142125
140	144–152	200–206	40.0	6	01142140
160	164–169	220–225	40.0	6	01142160



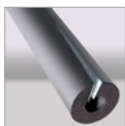
Lamella mat or pipe shells made of mineral fibres

Classification: A2-S1, d0 or A1 in acc. with EN 13501-1
 Minimum bulk density: 35 kg/m³
 Melting point ≥ 1000 °C

for example:

Name	Nominal bulk density [kg/m ³]	abP/DoP
Rockwool lamella mat Klimarock Roll, 3.05 m ² – Art. no. 01187100	40–50	DE0628031801 of 14.03.2018
Rockwool ProRox PS 960 (formerly ROCKWOOL Lapimus pipe shell 880)	95–150	PROPS960NL-03
Rockwool 800	90–115	DE0721011801 of 15.01.2018
Rockwool ProRox WM 950 (formerly WM 80/RTD-2)	85	PROWM950D-03 of 04.05.2017
Rockwool ProRox WM WM 960 (formerly WM 100/ RBM)	100	PROWM960D-03 of 04.05.2017
Rockwool Conlit 150 U	150	P-NDS04-417
Isover Schalen Protect 1000 S, Isover Schalen Protect 1000 S Alu	70–90	DE0002-Pipe_Sections 001 of 10.06.2013
Isover mineral fibre mat MD2 and MD2/A	80	DE0002-Protect_EN14303 002 of 09.02.2015
Isover mineral fibre mat MDD and MDD/A	115	
PAROC Hvac Section AluCoat T	85–120	40361
PAROC Pro Section 100	100	40080
PAROC Hvac Lamella Mat AluCoat Fix	50	40236

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Section and protective insulations

made of flexible elastomeric foam (FEF)
in accordance with EN 14304

for example:

Name	abP/DoP
ArmaFlex Protect	(0543-CPR-2016-001, 01.04.2015)
AF/ArmaFlex	0543-CPR-2016-001, 01.04.2015
AF/ArmaFlex Evo	0543-CPR-2020-101
SH/ArmaFlex	0543-CPR-2013-013, 01.01.2015
NH/ArmaFlex	0552-CPR-2013-015, 08.08.2018
NH/ArmaFlex Smart	0543-CPR-2020-102
ArmaFlex LS	0551-CPR-2016-066
ArmaFlex Ultima	0543-CPR-2016-017
FEF Kaiflex KKplus s1	DoP KKplus s1 01032018001, 01.03.2018
FEF Kaiflex HTplus	DoP HTplus s1 01032018001 01.03.2018
K-Flex R90	P-2300/871/16-MPA BS, 04.10.2016
flexen Heizungskautschuk	LE_5258006015_00_M_flexen_Heizungskautschuk, 30.06.2013
flexen Kältekautschuk	LE_0869806006_00_M_flexen_Kältekautschuk, 30.06.2013
EUROBATEX	01/20190610
EUROBATEX HF	03/20171201

5.1 Declarations of Performance

The Declarations of Performance for the featured products are available for download on our website:

<https://svt-global.com/downloads>

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6. Design

6.1 Fire resistance classes

System Flammotect 2 × 50 mm meets the requirements of max. class EI 120 in acc. with EN 13501-2.

The fire resistance class of the sealing system is reduced to the fire resistance class of the installed service with the lowest fire resistance rating.

The fire resistance class of the sealing system is reduced to the maximum fire resistance class of the surrounding building element.

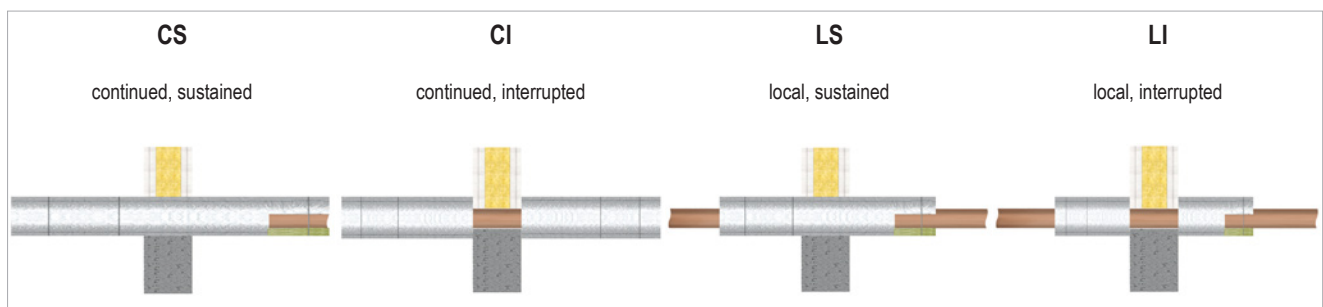
Building element	Fire resistance class
Plasterboard wall	max. EI 120
Plasterboard wall (without cladded aperture edge)	max. EI 90
Solid wall	max. EI 120
Solid floor	max. EI 120
Timber wall (CLT)	max. EI 90
Timber floor (CLT)	max. EI 90
Sandwich panel wall	max. EI 120

6.2 Pipe end configurations

Non-combustible pipes				
tested	included configurations			
	U/U	U/C	C/U	C/C
U/U	✓	✓	✓	✓
U/C	-	✓	✓	✓
C/U	-	-	✓	✓
C/C	-	-	-	✓

Combustible pipes				
tested	included configurations			
	U/U	U/C	C/U	C/C
U/U	✓	✓	✓	✓
U/C	-	✓	-	✓
C/U	-	✓	✓	✓
C/C	-	-	-	✓

6.3 Pipe insulation configurations



Results for LS insulation are also applicable to CS insulation.

Results for LI insulation are also applicable to CI insulation.

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7. Design variants

The sealing system may be used to close apertures without installations (reserve penetration for subsequent configurations).

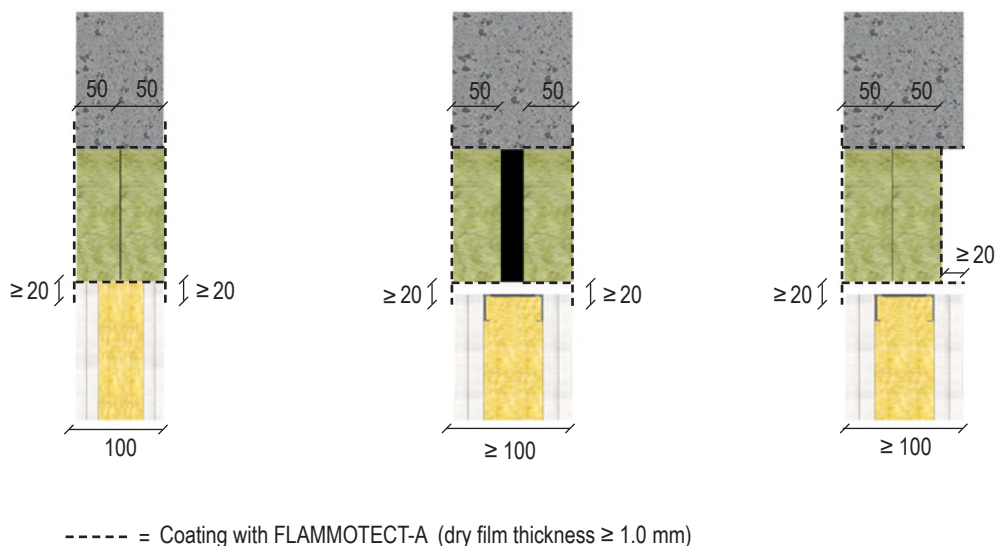
It is not necessary to clad the aperture opening in plasterboard walls. The maximum seal size is then reduced to 600 × 800 mm or 800 × 600 mm (see chapter “Thicknesses, sizes and spacing” on page 9).

Pieces of the mineral fibre boards must be coated with FLAMMOTECT-A so that they are glued together. The edges of the mineral fibre boards and/or the aperture edge must be coated with FLAMMOTECT-A so that the boards are glued to the building element.

Final coating of the outer board surface and a surrounding area of ≥ 20 mm with FLAMMOTECT-A (dry film thickness 1.0 mm). It is not necessary to glue the board layers together.

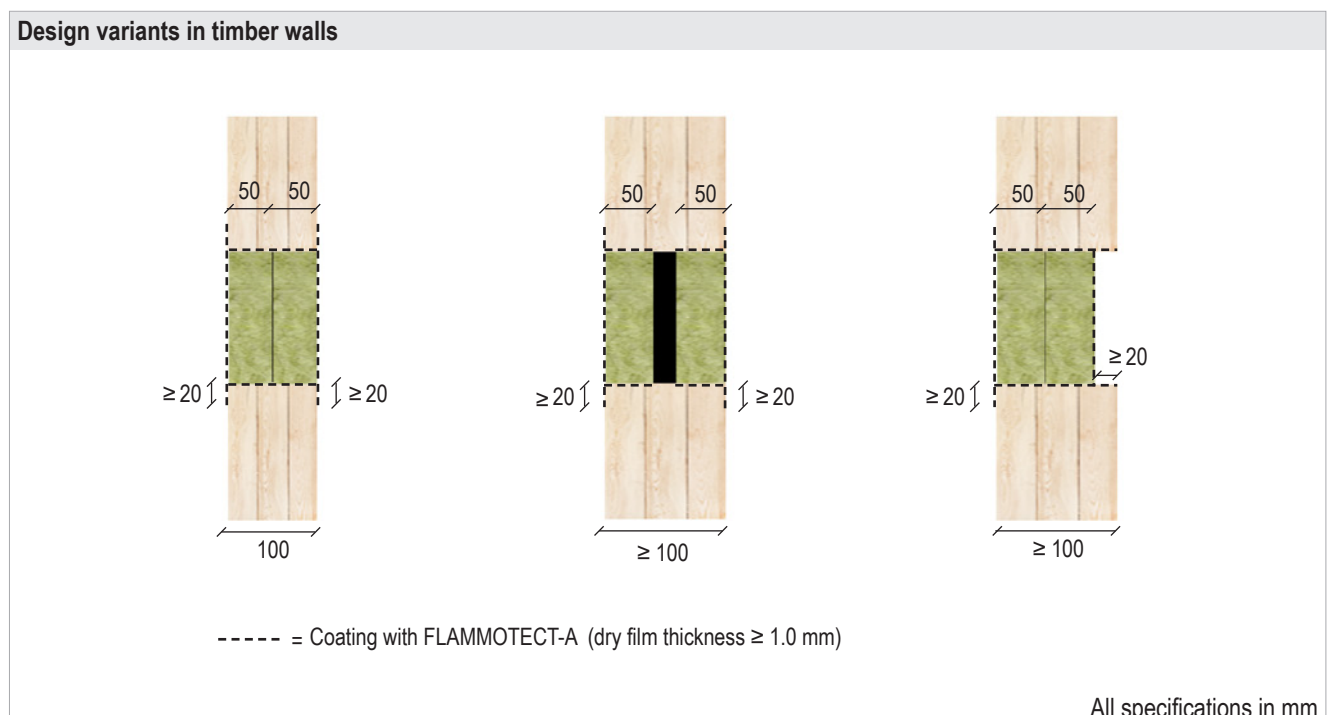
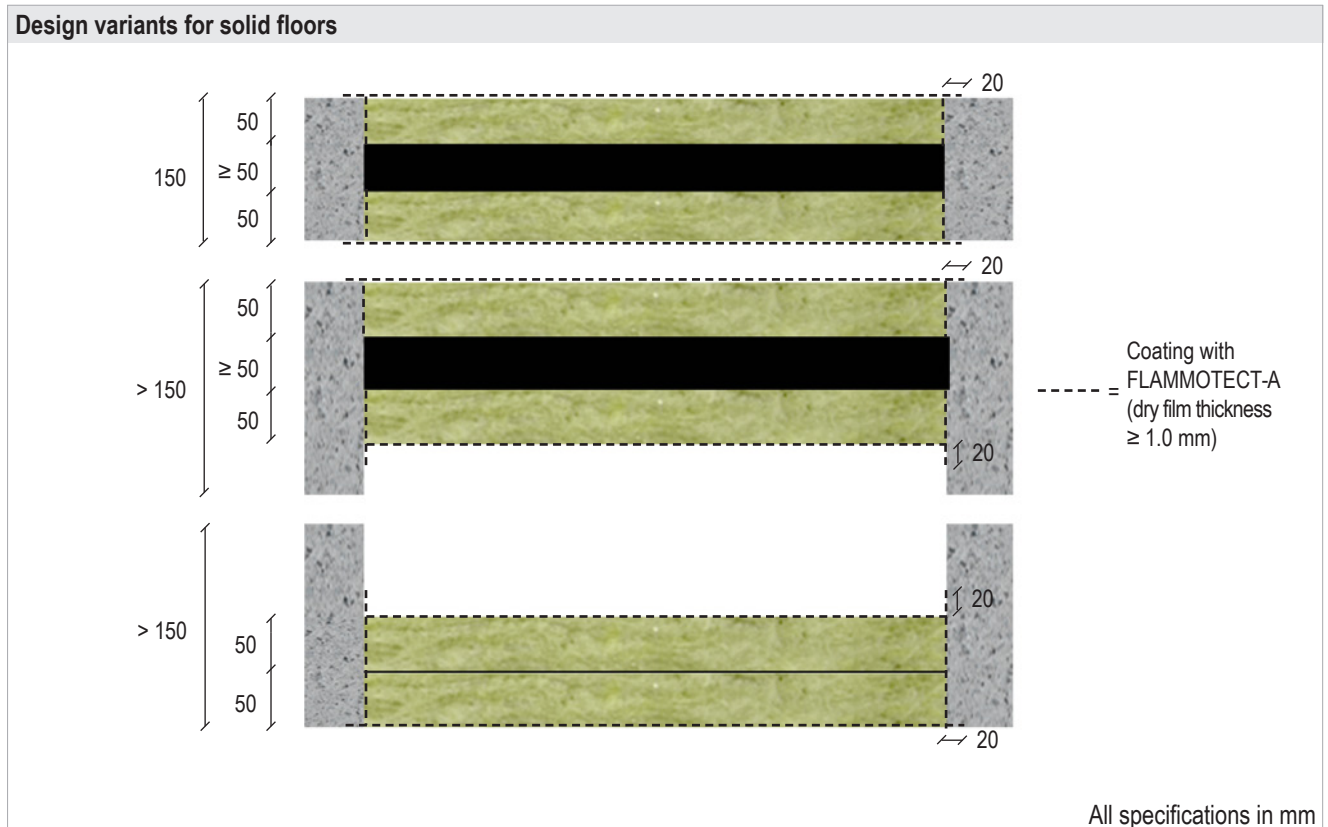
Sealing of annular gap: ≤ 5 mm by filling the entire depth with FLAMMOTECT-A, > 5 mm by filling with loose mineral wool and coating with FLAMMOTECT-A (dry film thickness ≥ 1 mm).

Design variants for plasterboard walls and solid walls

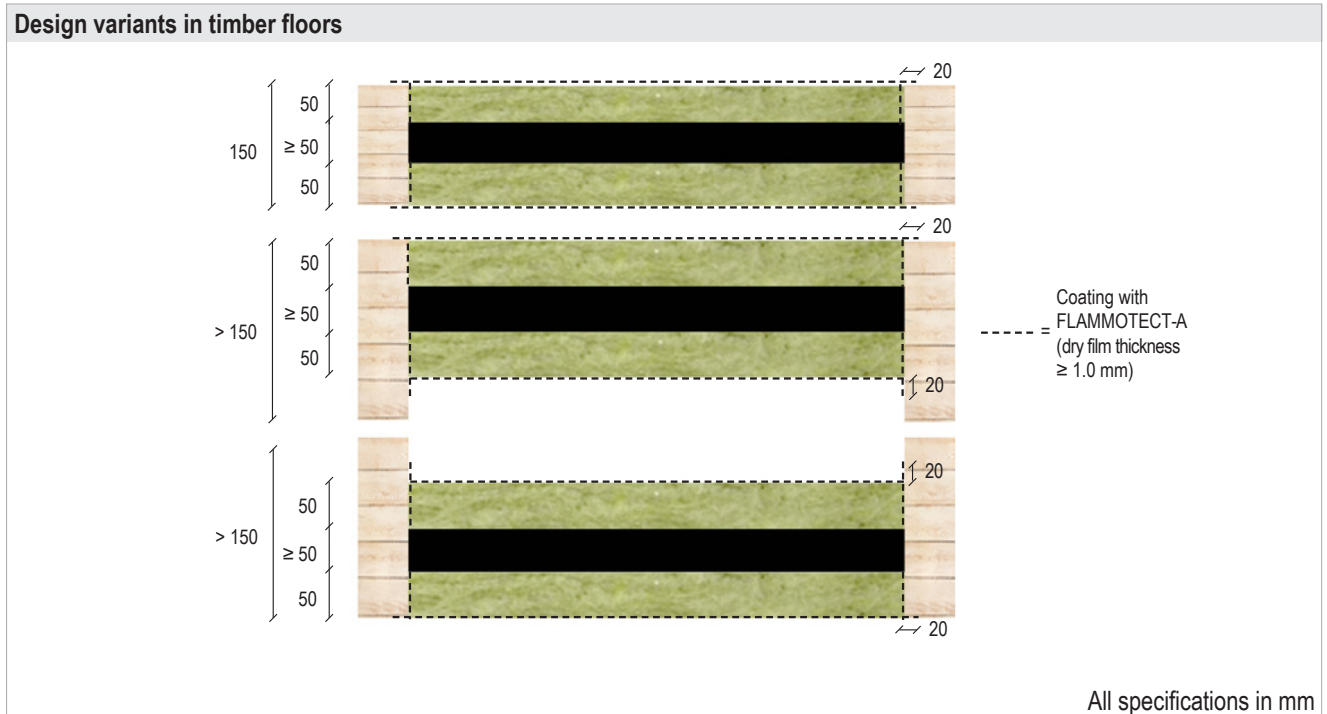


All specifications in mm

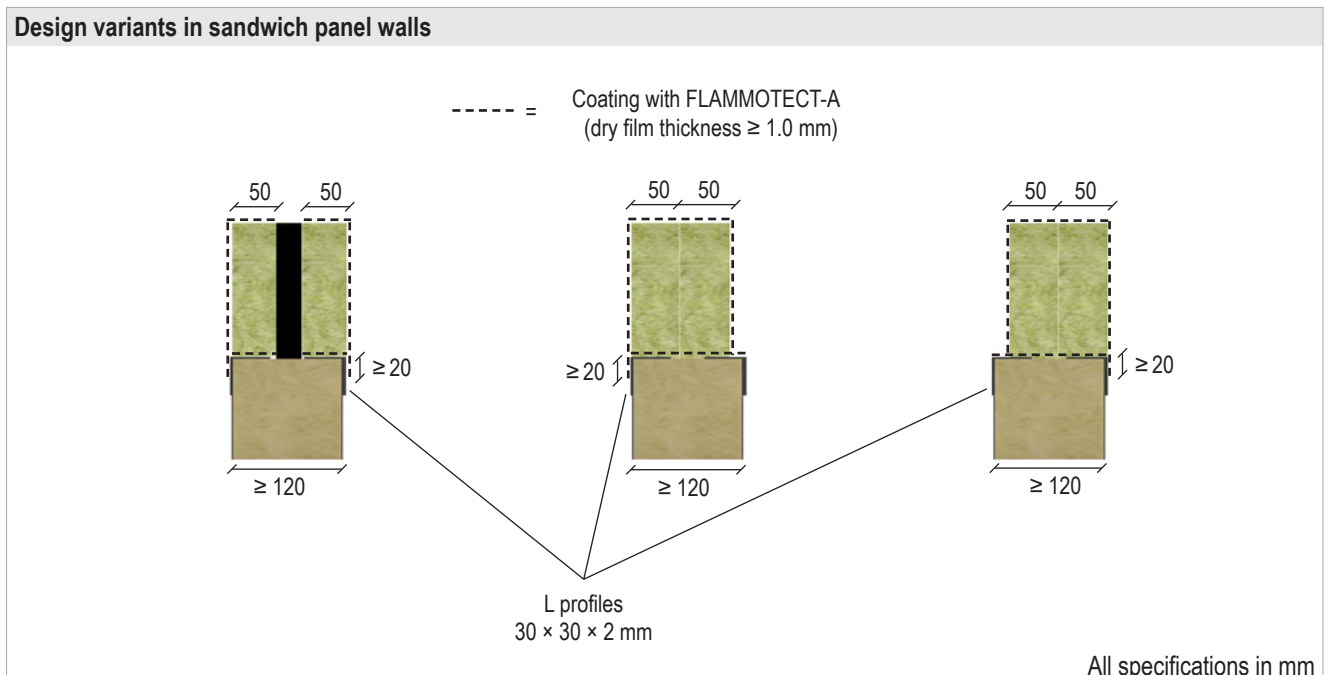
System Flammotect 2 × 50 mm



System Flammotect 2 × 50 mm



In timber walls and floors, the spacing distance between applied services and aperture edge must always be at least 100 mm (see chapter 5, Spacing requirements for services).



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

System Flammotect 2 × 50 mm

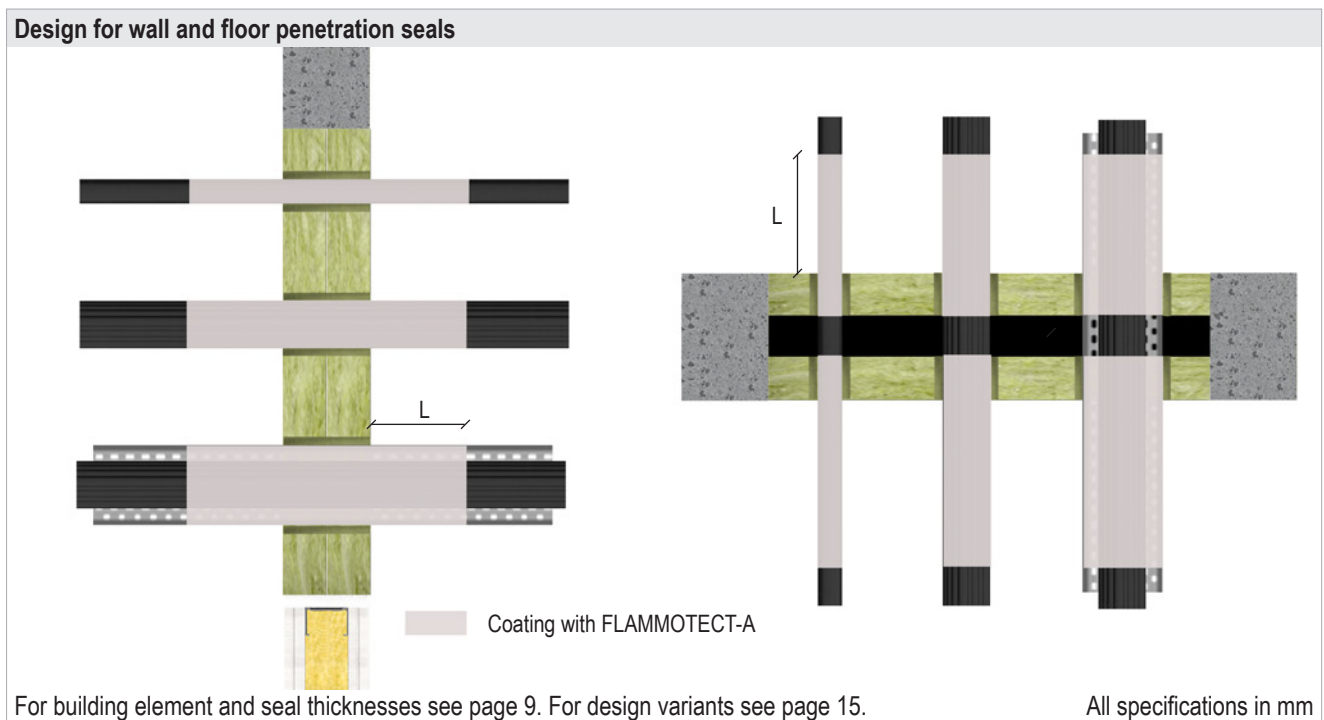
8. Fire protection measures

8.1 Cables / cable bundles / cable support systems

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.

In the penetrated area (inside the mineral fibre boards), all cables must be coated with FLAMMOTECT-A (dry film thickness ≥ 1.0 mm). It is not necessary to coat single cables (subsequent installation) $\varnothing \leq 21$ mm.

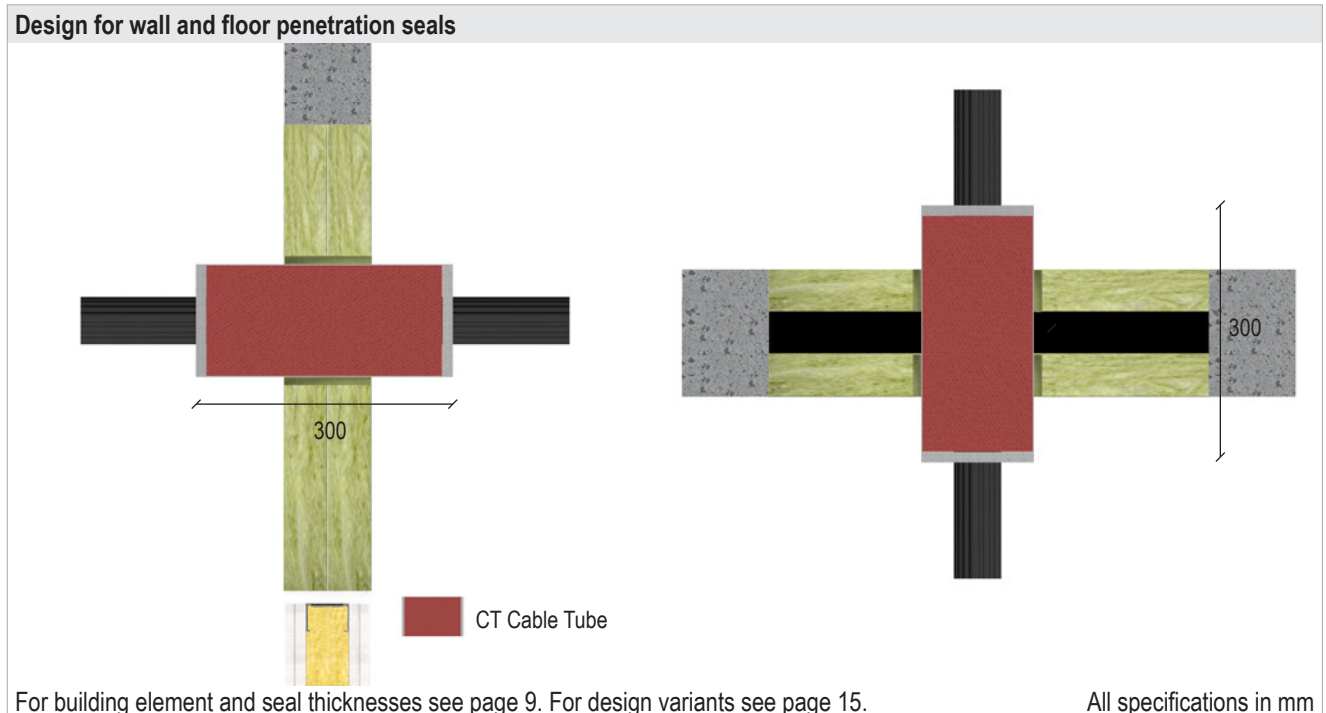


Service	Diameter [mm]	Fire protection coating FLAMMOTECT-A		Fire resistance class	
		Dry film thickness [mm]	Length of coating in front of seal L [mm]	Wall	Floor
Single cables (subsequent installation)	≤ 21	–	–	EI 120	EI 120
Cables	≤ 50	≥ 1.0	≥ 100	EI 120	EI 120
			≥ 100	EI 90	EI 90
	≥ 150		EI 90	EI 120	
	≥ 100		EI 90	EI 90	
Cable bundles with cables $\varnothing \leq 21$ mm	≤ 80		≥ 150	EI 90	EI 120
	≤ 100		≥ 100	EI 120	EI 120
Single conduits	made of steel	≤ 16	≥ 100	EI 120 U/C	EI 120 U/C
	made of plastic	≤ 16	≥ 100	EI 120 U/U	EI 120 U/U

System Flammotect 2 × 50 mm

8.1.1 Design with Cable Tube

The Cable Tube must be positioned in the centre of the seal.



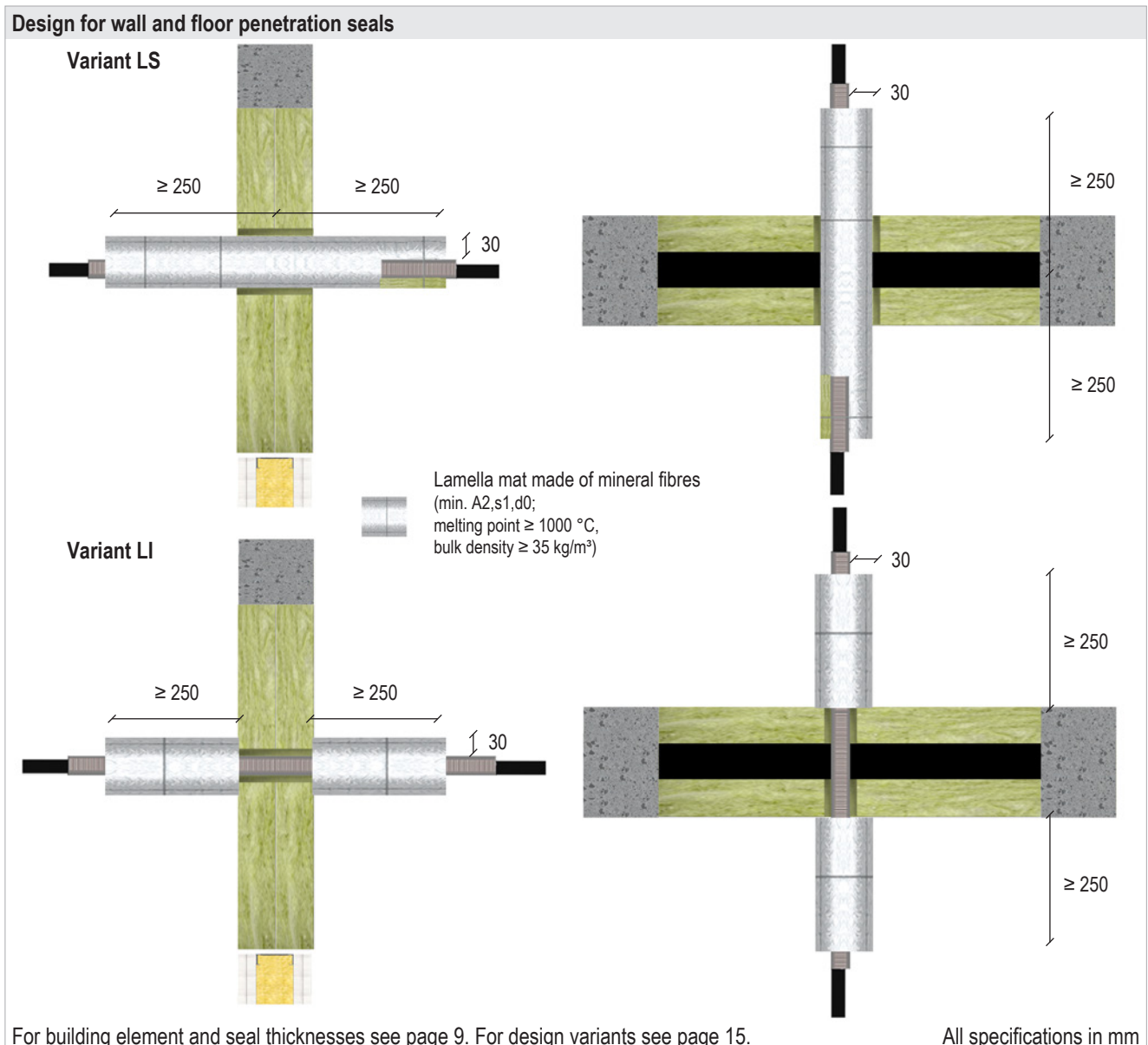
Service	Diameter [mm]	Length of Cable Tube [mm]	Fire resistance class	
			EI 90	EI 120
Cables	≤ 21	300	EI 90	EI 120
Cable bundles with cables $\varnothing \leq 21$ mm	≤ 100		EI 90	EI 120

System Flammotect 2 × 50 mm

8.2 Electrical installation conduits

8.2.1 Conduits made of steel

Conduits made of steel must be sealed on both sides in walls and on the lower side in floors at a depth of 15 mm with mineral wool and FLAMMOTECT-A. Conduits made of steel must protrude at least 350 mm from the seal. The lamella mat must be secured with winding wire against falling out.



Service	Dimensions	Lamella mat		Fire resistance class	
		Length in front of seal L [mm]	Thickness S [mm]	Wall	Floor
EIR made of steel – single	$\varnothing \leq 32$ with/without cables ($\varnothing \leq 21$)	≥ 200 (variant LS), ≥ 250 (variant LI)	30	EI 120 U/C	EI 120 U/C
EIR made of steel – multiple penetration in linear arrangement	≤ 3 EIR $\varnothing \leq 32$ with/without cables ($\varnothing \leq 21$)			EI 90 / E 120 U/C	EI 120 U/C

System Flammotect 2 × 50 mm

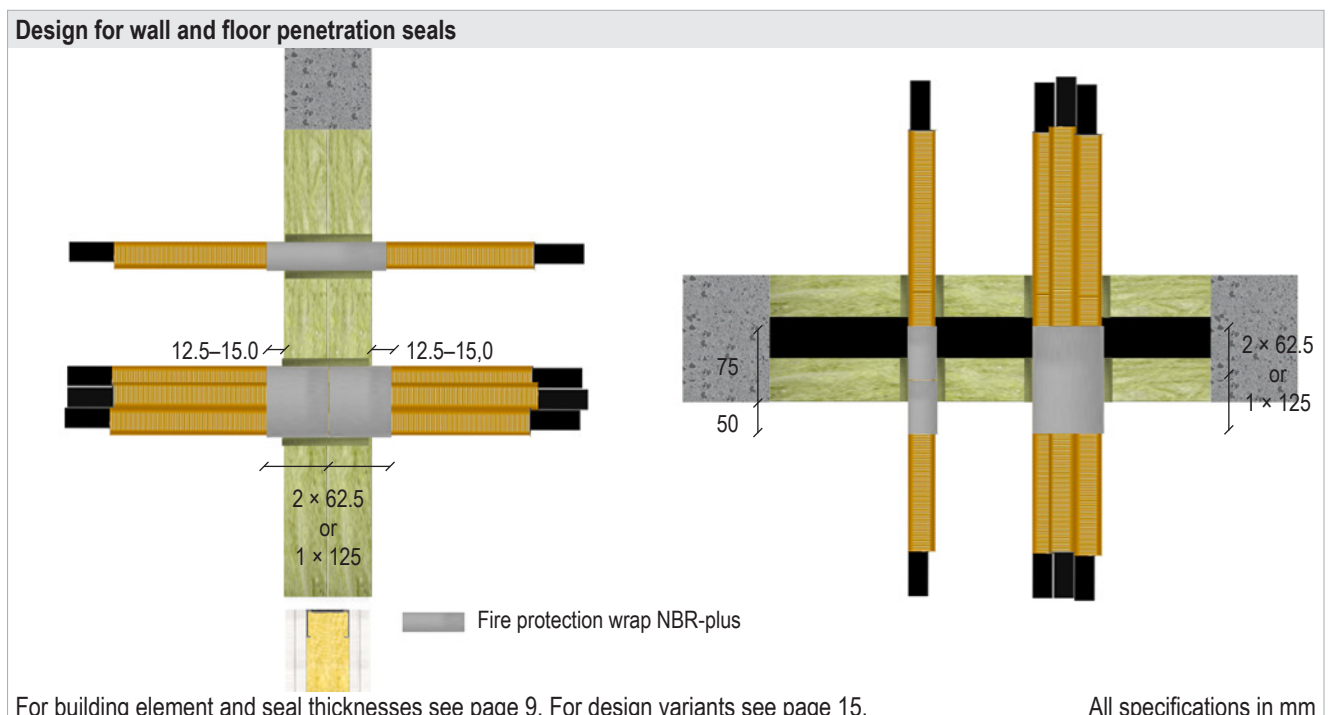
8.2.2 Electrical installation conduits made of plastic with fire protection wrap NBR-plus

Electrical installation conduits made of plastic must protrude at least 200 mm from the seal.

Electrical installation conduits must be wrapped with the fire protection wrap NBR-plus.

The fire protection wrap NBR-plus is coated on one side and equipped with a protective film. The film must be removed before applying the wrap with the coated side facing inwards.

For easier installation the wrap can be secured against falling out with duct tape or winding wire.



Service	Dimensions	Fire protection wrap NBR-plus			Fire resistance class	
		Width [mm]	Number of wraps [n]	Number of layers [n]	Wall	Floor
Conduits made of plastic, flexible or rigid – single	$\varnothing \leq 32$ with/without cables ($\varnothing \leq 21$)	1 × 125 or 2 × 62.5		1	EI 120 U/U	EI 120 U/U
	$\varnothing \leq 63$ with/without cables ($\varnothing \leq 21$)			2	EI 120 U/U	EI 90 U/U / E 120 U/U
Conduits made of plastic, flexible or rigid – bundled	$\varnothing \leq 32$ bundled $\varnothing \leq 100$ with/without cables ($\varnothing \leq 21$)			2	EI 120 U/U	EI 120 U/U
	Conduits made of plastic, flexible or rigid – multiple penetration in linear arrangement			≤ 3 EIR $\varnothing \leq 32$ with/without cables ($\varnothing \leq 21$)	1	EI 120 U/U

System Flammotect 2 × 50 mm

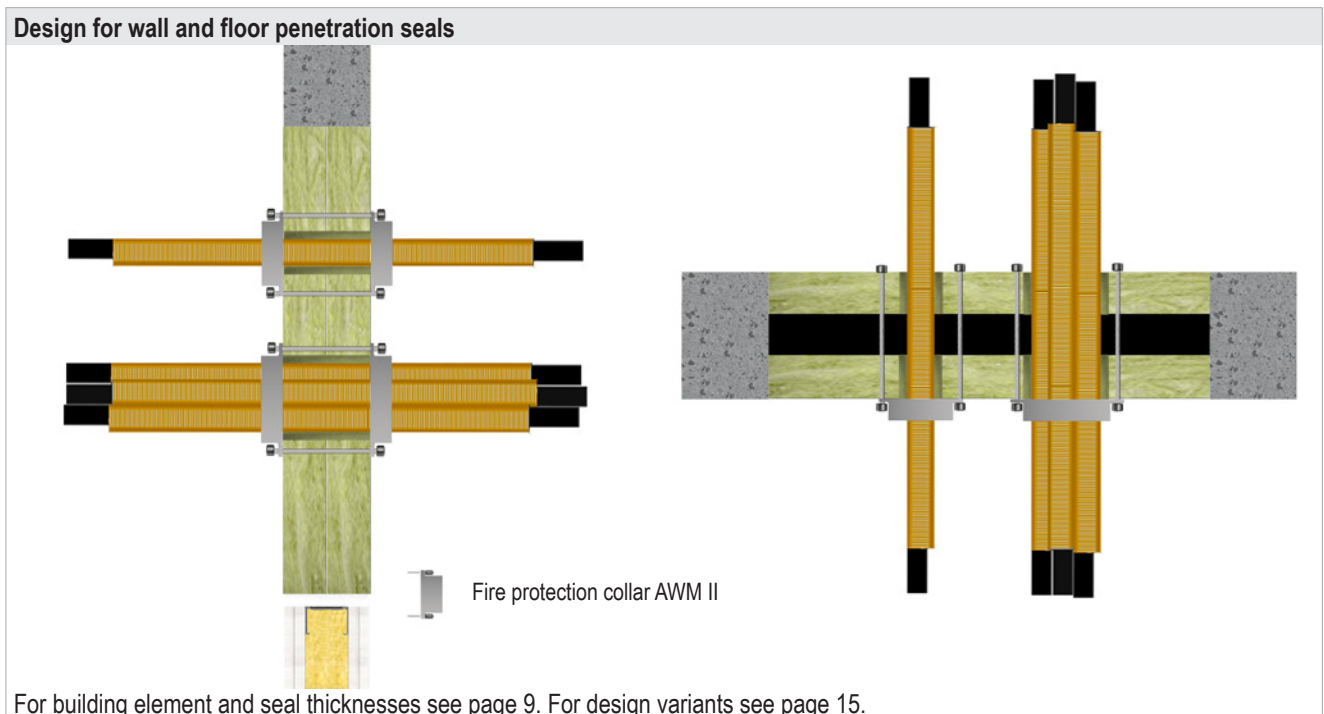
8.2.3 Electrical installation conduits made of plastic with fire protection collar AWM II

Always use the smallest collar fitting the diameter of the conduit or bundle of conduits.
(Distance between collar and conduit ≤ 15 mm).

Collars must be fastened to the seal with continuous threaded rods \varnothing M6–M8.

The ends of the conduits must be sealed on one side with FLAMMOTECT-A ≥ 10 mm. Conduits without cables must be filled with mineral wool (≥ 10 mm) and sealed with FLAMMOTECT-A (≥ 1 mm).

Bundles of conduits (minimum length on both sides of the seal 200 mm) must be fastened on both sides of the seal with for example self-adhesive tape or plastic cable ties after max. 100 mm..



Services	Dimensions [mm]	Fire protection collar AWM II	Fire resistance class	
			Wall	Floor
Conduits made of plastic, single	$\varnothing \leq 32$ (with/without cables $\varnothing \leq 21$)	on both sides in walls, on the lower side in floors	EI 120 U/U	EI 120 U/U
	$\varnothing \leq 63$ (with/without cables $\varnothing \leq 21$)		EI 90 U/C	EI 90 U/C
Conduits made of plastic, bundled	$\varnothing \leq 63$ bundled up to $\varnothing \leq 125$ (with/without cables $\varnothing \leq 21$)		EI 90 U/C	EI 90 U/C

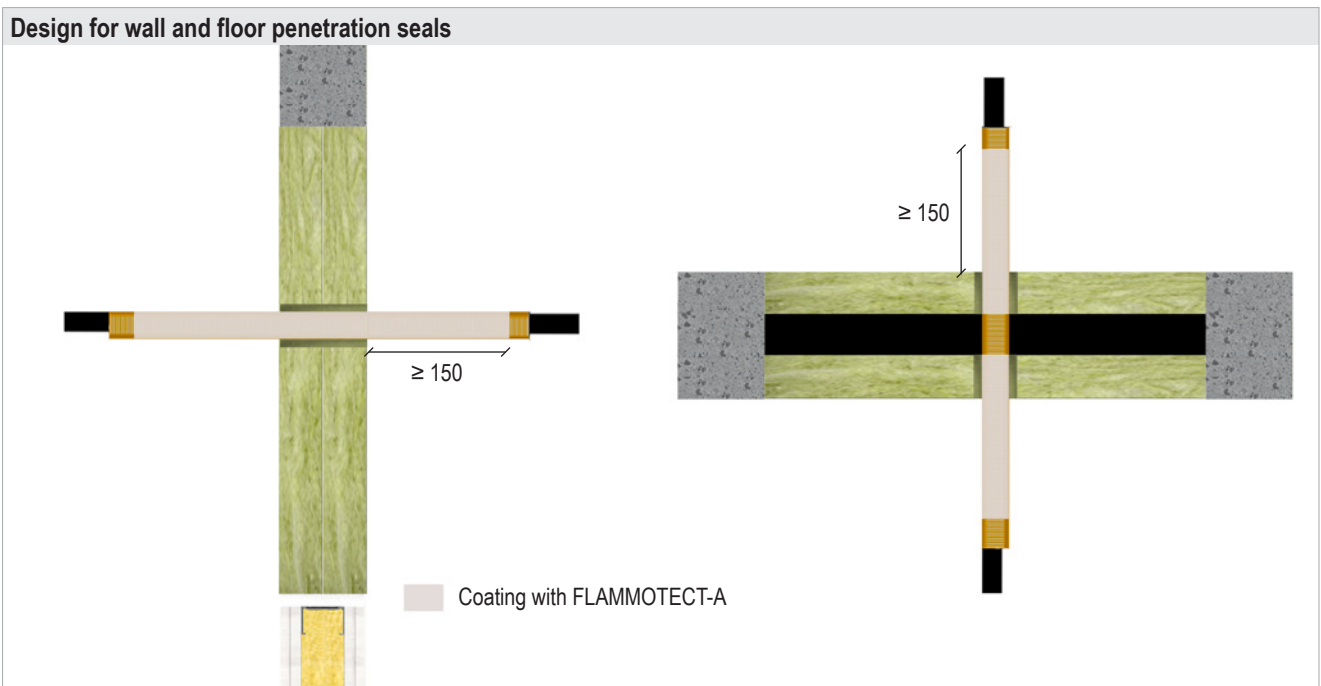
System Flammotect 2 × 50 mm

8.2.4 Electrical installation conduits made of plastic with FLAMMOTECT-A coating

Electrical installation conduits made of plastic must protrude at least 200 mm from the seal.

All conduits must be coated in the penetrated area (inside the mineral fibre boards) as well as on both sides of the seal at a length of ≥ 150 with FLAMMOTECT-A (dry film thickness ≥ 1.0 mm).

The ends of the conduits must be sealed on one side with FLAMMOTECT-A ≥ 10 mm. Conduits without cables must be filled with mineral wool (≥ 10 mm) and sealed with FLAMMOTECT-A (≥ 1 mm).



For building element and seal thicknesses see page 9. For design variants see page 15.

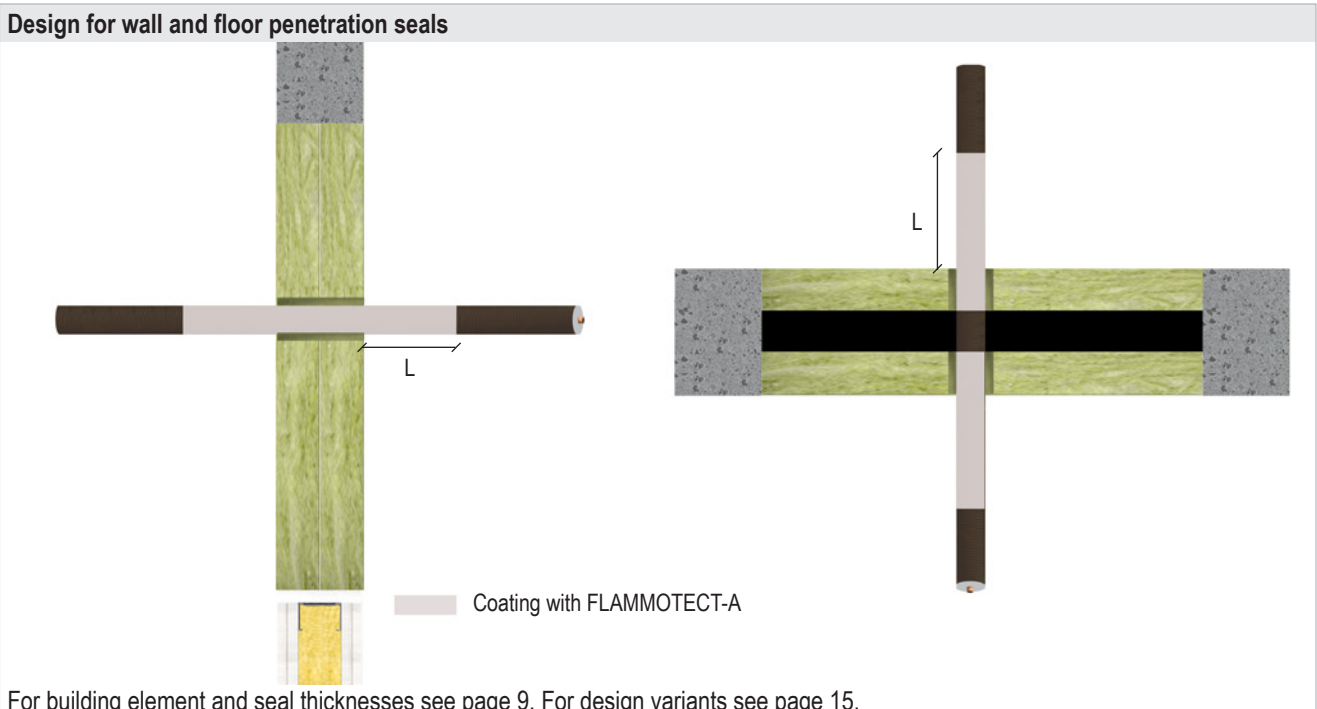
All specifications in mm

Service	Dimensions [mm]	Fire protection coating FLAMMOTECT-A		Fire resistance class	
		Dry film thickness [mm]	Length of coating in front of seal L [mm]	Wall	Floor
Conduits made of plastic, single	$\varnothing \leq 32$ (with/without cables $\varnothing \leq 21$)	≥ 1.0	≥ 150	EI 90 U/C	EI 90 U/C

System Flammotect 2 × 50 mm

8.3 Coaxial cables and wave guides

In the penetrated area (inside the mineral fibre boards), all coaxial cables and wave guides must be coated with FLAMMOTECT-A (dry film thickness ≥ 1.0 mm).



For building element and seal thicknesses see page 9. For design variants see page 15.

Service	Fire protection coating FLAMMOTECT-A		Fire resistance class	
	Dry film thickness [mm]	Length of coating in front of seal L [mm]	Wall	Floor
CommScope Heliax $\varnothing \leq 51.1$ mm	≥ 1.0	≥ 100	EI 120 U/C	–
		≥ 200	EI 120 U/C	EI 120 U/C
≥ 100		≥ 200	EI 120 U/C	EI 120 U/C
		≥ 200	EI 120 U/C	EI 120 U/C
RFS Radiaflex $\varnothing \leq 28.5$ mm		≥ 200	EI 120 U/C	EI 120 U/C
RFS Radiaflex $\varnothing \leq 48.2$ mm		≥ 100	EI 120 U/C	–

System Flammotect 2 × 50 mm

8.3.1 Design with lamella mat

The lamella mat must be secured with winding wire against falling out.

Design for floor penetration seals

Lamella mat made of mineral fibres
(min. A2,s1,d0;
melting point ≥ 1000 °C,
bulk density ≥ 35 kg/m³)

≥ 250

20–30

For building element and seal thicknesses see page 9. For design variants see page 15. All specifications in mm

Service	Sectional insulation made of lamella mat		Fire resistance class	
	Length [mm]	Thickness [mm]	Wall	Floor
CommScope Heliax Ø ≤ 51.1 mm	≥ 250	20–30	–	EI 120 U/C
RFS Cellflex Ø ≤ 50.3 mm			–	EI 120 U/C
RFS Radiaflex Ø ≤ 28.5 mm			–	EI 120 U/C

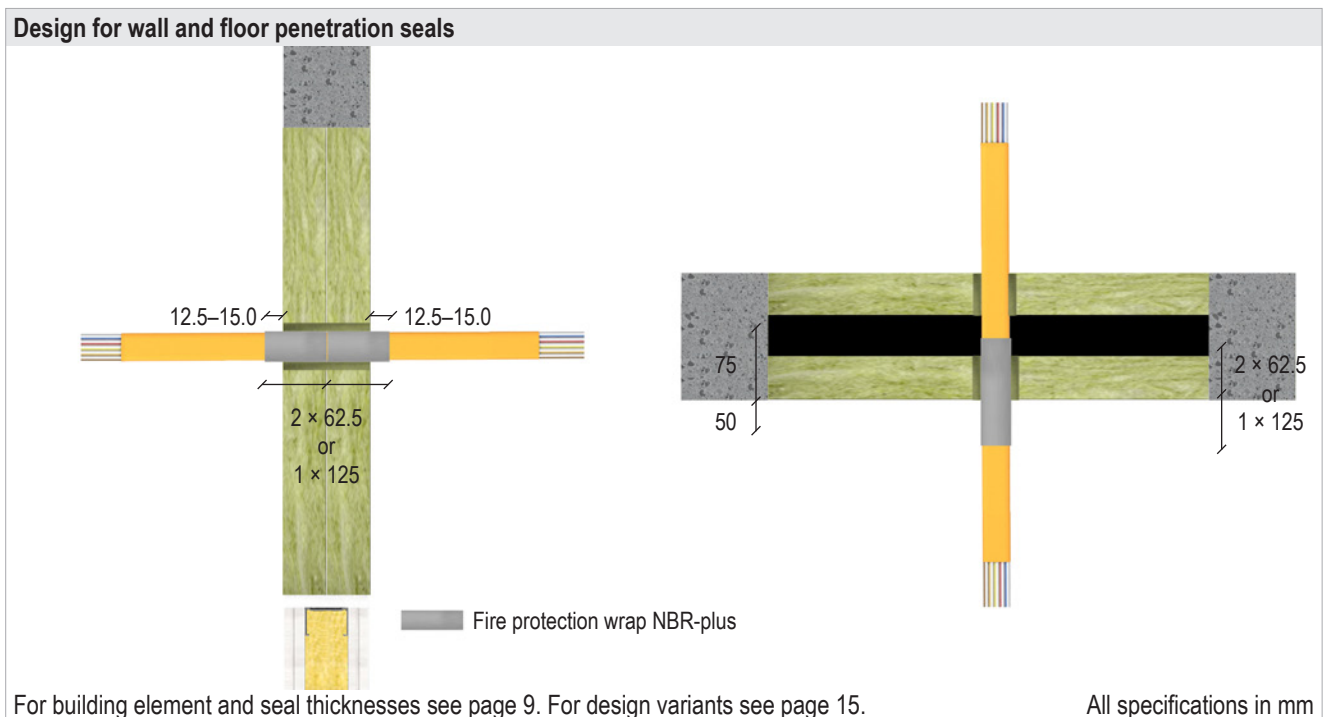
System Flammotect 2 × 50 mm

8.4 speedpipes

speedpipes must be wrapped with the fire protection wrap NBR-plus.

The fire protection wrap NBR-plus is coated on one side and equipped with a protective film. The film must be removed before applying the wrap with the coated side facing inwards.

For easier installation the wrap can be secured against falling out with duct tape or winding wire.



Arrangement	Fire protection wrap NBR-plus	Fire resistance class	
		Wall	Floor
Bundle $\varnothing \leq 50$ mm Single $\varnothing \leq 14$ mm	1 × 125 or 2 × 62.5, 1 layer	EI 120 U/U	EI 120 U/U

System Flammotect 2 × 50 mm

8.5 Combustible pipes

8.5.1 Design with fire protection collar AWM II

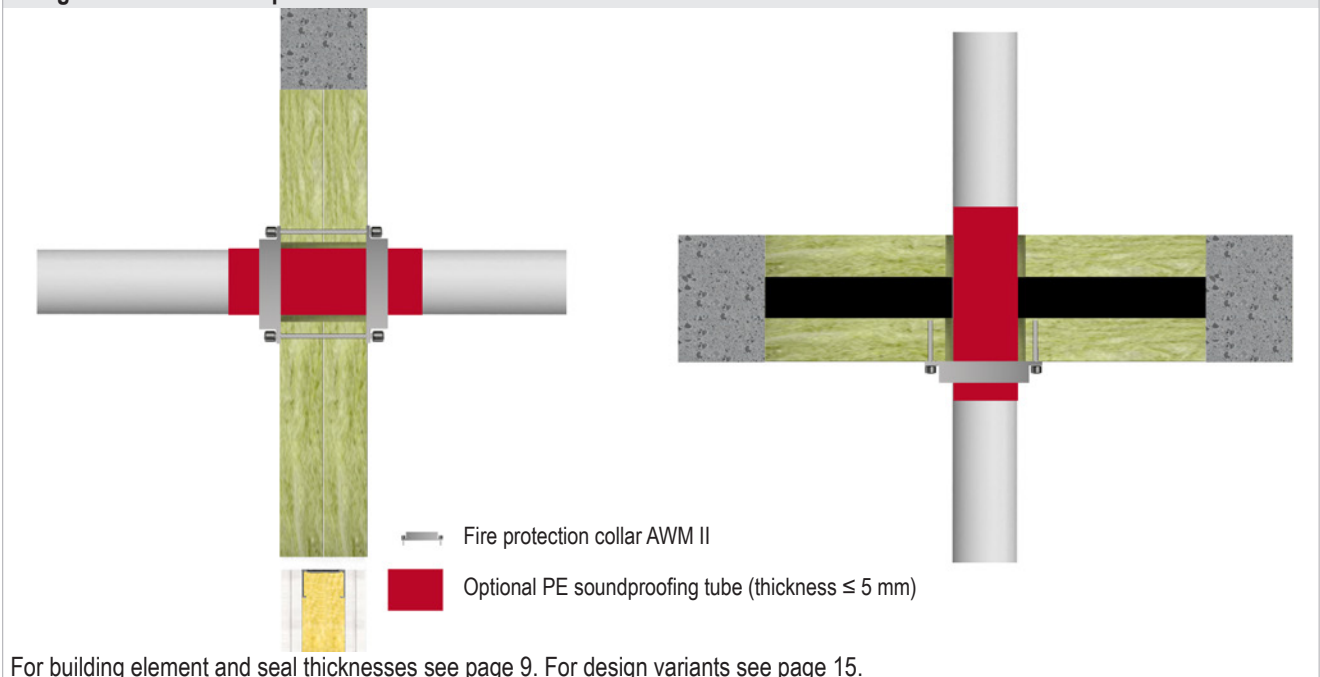
The fire protection collar must be attached on both sides in walls and on the lower side in floors. Always use the smallest fitting collar.

The collars must be fastened to the seal with the following coarse thread screws:

- Würth ASSY D (8 × 70 mm)
- HECO-TOPIX-plus (8 × 80 mm)
- SPAX T-STAR plus (8 × 80 mm)

or equivalent.

Design for wall and floor penetration seals



System Flammotect 2 × 50 mm

Pipe material / type	Pipe outer Ø [mm]	Pipe wall thickness [mm]	Fire protection collar AWM II	Fire resistance class	
				Wall	Floor
PVC-U, PVC-C	32.0–50.0	1.8–5.6	on both sides in walls, on the lower side in floors	EI 90 U/U	EI 90 U/U
		63.0–75.0		EI 90 U/U	EI 90 U/U
	90.0	1.8–10.0		EI 90 U/U	EI 90 U/U
	110.0	1.8–12.3		EI 90 U/U	EI 90 U/U
		1.8		EI 90 U/U	EI 120 U/U
	125.0	2.5		EI 120 U/U	EI 120 U/U
		2.5–9.3		EI 120 U/U	–
	140.0–160.0	3.2–11.9		–	EI 90 U/U
		3.2		–	EI 120 U/U
		4.0–14.6		EI 90 U/U	–
PE-HD, ABS, SAN+PVC	32.0–50.0	1.8–4.6	on both sides in walls, on the lower side in floors	EI 90 U/U	EI 90 U/U
		4.6		EI 120 U/U	EI 90 U/U
	63.0–75.0	2.2–6.9		EI 90 U/U	EI 90 U/U
	75.0	3.8–4.5		EI 120 U/U	EI 90 U/U
	90.0–110.0	2.7–4.3		EI 120 U/U	EI 90 U/U
	90.0	2.4–8.2		EI 90 U/U	EI 90 U/U
	110.0	2.7–10.0		EI 90 U/U	EI 90 U/U
		3.1		EI 120 U/U	EI 90 U/U
	125.0	3.1–4.2		EI 120 U/U	EI 90 U/U
		4.0–14.6		EI 90 U/U	EI 90 U/U
140.0–160.0	4.0	EI 120 U/U	EI 90 U/U		
PP	32.0–50.0	1.8–4.6	on both sides in walls, on the lower side in floors	–	EI 90 U/U
		1.8		EI 90 U/U	EI 120 U/U
	63.0–75.0	2.2–5.2		EI 90 U/U	EI 90 U/U
		2.2–6.9		–	EI 90 U/U
		2.2		EI 90 U/U	EI 120 U/U
	90.0	2.4–7.3		EI 90 U/U	EI 90 U/U
		2.4–8.2		–	EI 90 U/U
		2.4		EI 90 U/U	EI 120 U/U
	110.0	2.7–10.0		EI 90 U/U	EI 90 U/U
		10.0		EI 120 U/U	EI 120 U/U
	125.0	3.1–11.4		–	EI 90 U/U
		3.1		EI 90 U/U	EI 120 U/U
	140.0–160.0	4.0–14.6		EI 90 U/U	EI 90 U/U

System Flammotect 2 × 50 mm

Pipe material / type	Pipe outer Ø [mm]	Fire protection collar AWM II	Fire resistance class	
			Wall	Floor
REHAU RAUPIANO LIGHT	≤ 110.0	on both sides in walls, on the lower side in floors	EI 120 U/U	EI 90 U/U
	≤ 160.0		EI 120 U/U	–
REHAU RAUSILENTO	≤ 110.0		EI 120 U/U	EI 90 U/U
	≤ 160.0		EI 120 U/U	–
REHAU RAUPIANO PLUS	≤ 160.0		EI 120 U/U	–
CONEL DRAIN	≤ 110.0		EI 120 U/U	EI 90 U/U
Geberit Silent-db20	≤ 110.0		EI 120 U/U	EI 90 U/U*
	≤ 160.0		EI 90 U/U	EI 90 U/U*
Geberit Silent-Pro	≤ 110.0		EI 120 U/U	EI 90 U/U
	≤ 160.0		EI 120 U/U	EI 90 U/U*
Geberit Silent-PP	≤ 110.0		EI 120 U/U	EI 90 U/U
	≤ 160.0		EI 120 U/U	EI 90 U/U*
POLO-KAL NG / POLO-KAL XS	≤ 110.0		EI 120 U/U	EI 90 U/U
	≤ 160.0		EI 120 U/U	EI 90 U/U
POLO-KAL 3S	≤ 110.0		EI 120 U/U	EI 120 U/U**
Wavin AS	≤ 160.0		EI 90 U/U	–
Wavin AS+	≤ 160.0		EI 90 U/U	–
Wavin SiTech+	≤ 160.0		EI 120 U/U	EI 90 U/U
GF Silenta Premium	≤ 110.0		EI 120 U/U	EI 90 U/U
	≤ 160.0		EI 120 U/U	–
Hakan Silenta Premium	≤ 110.0	EI 120 U/U	EI 90 U/U	
	≤ 160.0	EI 120 U/U	–	
Valsir Triplus	≤ 160.0	EI 120 U/U	EI 90 U/U	
Pipelife MASTER 3 PLUS	≤ 160.0	EI 120 U/U	–	
KE KELIT PHONEX AS	≤ 160.0	EI 90 U/U	–	

* in acc. with. KB 321100704-A, Rev. 2
 ** in acc. with KB 321031804-A, Rev. 5

System Flammotect 2 × 50 mm

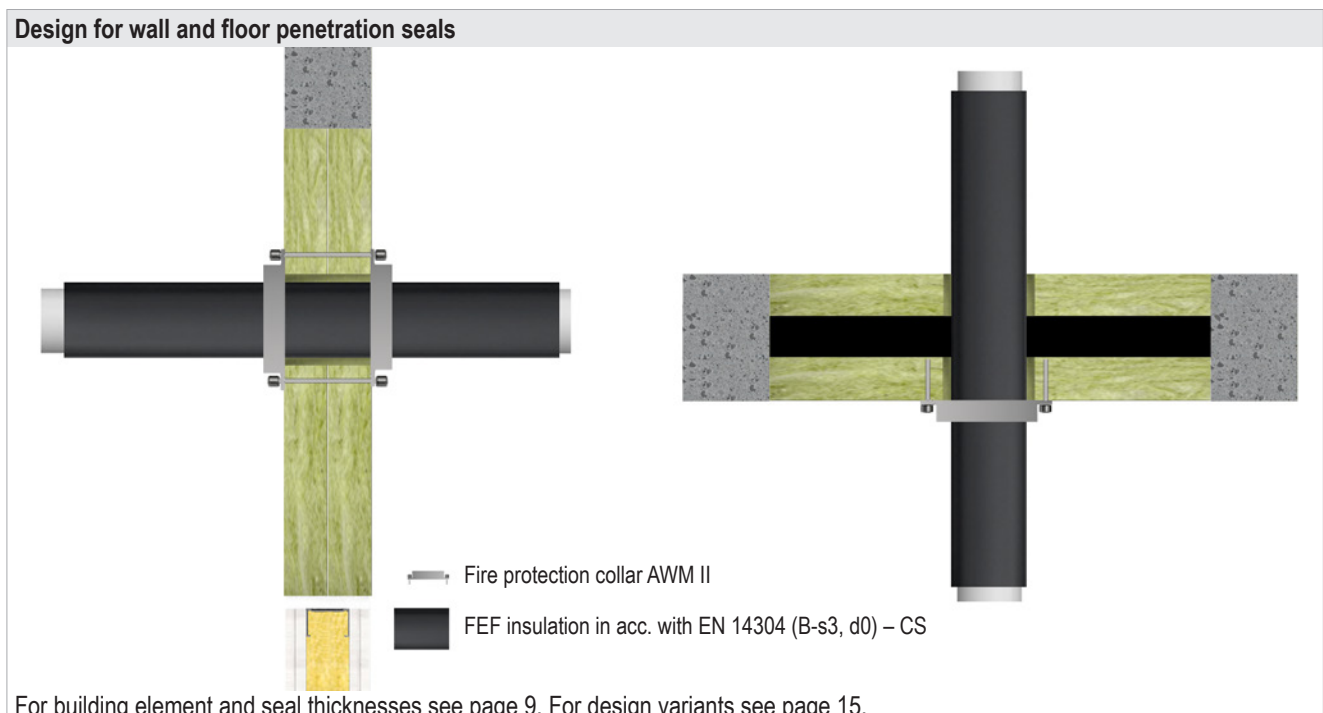
8.5.2 Design with FEF insulation and fire protection collar AWM II

The fire protection collar must be attached on both sides in walls and on the lower side in floors. Always use the smallest fitting collar.

The collars must be fastened to the seal with the following coarse thread screws:

- Würth ASSY D (8 × 70 mm)
- HECO-TOPIX-plus (8 × 80 mm)
- SPAX T-STAR plus (8 × 80 mm)

or equivalent.



For building element and seal thicknesses see page 9. For design variants see page 15.

Wall					
Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]	FEF insulation	Fire protection collar AWM II	Fire resistance class
			Thickness [mm]		
PP	32.0–50.0	1.8–4.6	6.0–32.0	on both sides	EI 120 U/U
	63.0–75.0	2.2–6.8			EI 120 U/U
	90.0–110.0	2.7–10.0			EI 120 U/U

Floor					
Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]	FEF insulation	Fire protection collar AWM II	Fire resistance class
			Thickness [mm]		
PP	32.0–50.0	1.8	6.0	on the lower side	EI 120 U/U
			6.0–32.0		EI 90 U/U
	63.0–75.0	2.2	6.0		EI 120 U/U
			EI 90 U/U		
	90.0–110.0	2.7	6.0–32.0		EI 120 U/U

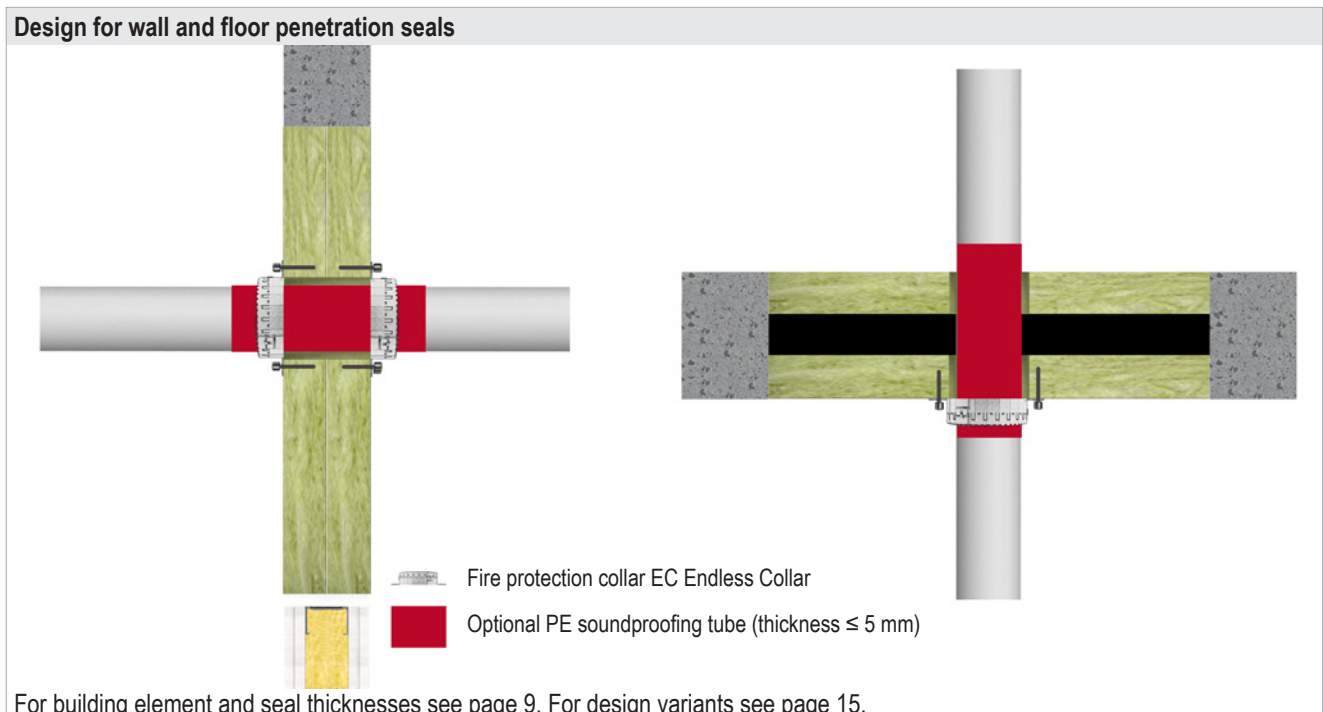
System Flammotect 2 × 50 mm

8.5.3 Design with fire protection collar EC Endless Collar

The fire protection collar must be attached on both sides in walls and on the lower side in floors. Always use the smallest fitting collar.

The collars must be fastened to the seal with the following coarse thread screws or coil spring fasteners:

- Würth ASSY D (8 × 70 mm)
- HECO-TOPIX-plus (8 × 80 mm)
- SPAX T-STAR plus (8 × 80 mm)
- Rockwool Conlit Screw
- Bohl Fireprotect Screw or equivalent.



Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]	EC Endless Collar	Fire resistance class	
				Wall	Floor
PVC-U, PVC-C	40.0–50.0	1.8–5.6	on both sides in walls, on the lower side in floors	–	EI 120 U/U*
		2.0–5.6		EI 90 U/U*	–
	63.0–75.0	1.9–7.0		EI 90 U/U*	–
		2.1–5.1		–	EI 120 U/U*
	90.0–110.0	1.8–9.0		EI 90 U/U*	–
		2.6–4.3		–	EI 120 U/U*
	125.0	2.3–9.8		EI 90 U/U*	–
		2.8–4.0		–	EI 120 U/U*
	140.0	3.0–3.6		–	EI 120 U/U*
	140.0–160.0	3.2–11.9		EI 90 U/U*	–
160.0	3.2	–	EI 120 U/U*		

* Fastened with coarse thread screws Würth ASSY D, HECO-TOPIX-plus or SPAX T-STAR plus.

** Fastened with coil spring fasteners Rockwool Conlit Screw or Bohl Fireprotect Screw.

System Flammotect 2 × 50 mm

Pipe material / type	Pipe outer Ø [mm]	Pipe wall thickness [mm]	EC Endless Collar	Fire resistance class	
				Wall	Floor
PE-HD, ABS, SAN+PVC	40.0–50.0	1.8–4.6	on both sides in walls, on the lower side in floors	EI 120 U/U*	–
		4.6		–	EI 90 U/U*
	63.0–75.0	2.2–3.8		EI 90 U/U*	–
		3.8		–	EI 90 U/U*
	90.0	2.4–3.3		EI 90 U/U*	–
		2.7–3.4		–	EI 90 U/U*
110.0	2.7	EI 90 U/U*		EI 90 U/U*	
PP	40.0–50.0	1.8–4.6		–	EI 120 U/U*
	63.0–75.0	2.2–6.8		–	EI 90 U/U*
		63.0		3.8–6.8	–
	75.0	5.2–6.8		–	EI 120 U/U*
	90.0–110.0	2.7		EI 120 U/U*	–
		2.7–10.0	–	EI 90 U/U*	
	90.0	7.3–10.0	–	EI 120 U/U*	
	110.0	10.0	–	EI 120 U/U*	
POLO-KAL NG / POLO-KAL XS	90.0	3.0	EI 90 U/U*	–	
	110.0	3.4	EI 120 U/U**	–	
			EI 90 U/U*	–	
			EI 120 U/U**	–	
125.0	3.9	EI 120 U/U**	–		
160.0	4.9	EI 120 U/U**	–		
REHAU RAUPIANO PLUS	75.0	1.9	EI 90 U/U*	EI 120 U/U*	
	90.0	2.2	EI 90 U/U*	EI 120 U/U*	
			EI 120 U/U**	–	
	110.0	2.7	EI 120 U/U**	–	
	125.0	3.1	EI 120 U/U**	–	
160.0	3.9	EI 120 U/U**	–		
Geberit Silent-PP	32.0	2.0	EI 120 U/U**	EI 90 U/U*, **	
	50.0	2.0	EI 120 U/U**	EI 90 U/U*, **	
	75.0	2.6	EI 120 U/U**	–	
	90.0	3.1	EI 90 U/U*	–	
			EI 120 U/U**	–	
110.0	3.6	EI 90 U/U*	–		
			EI 120 U/U**	–	

* Fastened with coarse thread screws Würth ASSY D, HECO-TOPIX-plus or SPAX T-STAR plus.

** Fastened with coil spring fasteners Rockwool Conlit Screw or Bohl Fireprotect Screw.

System Flammotect 2 × 50 mm

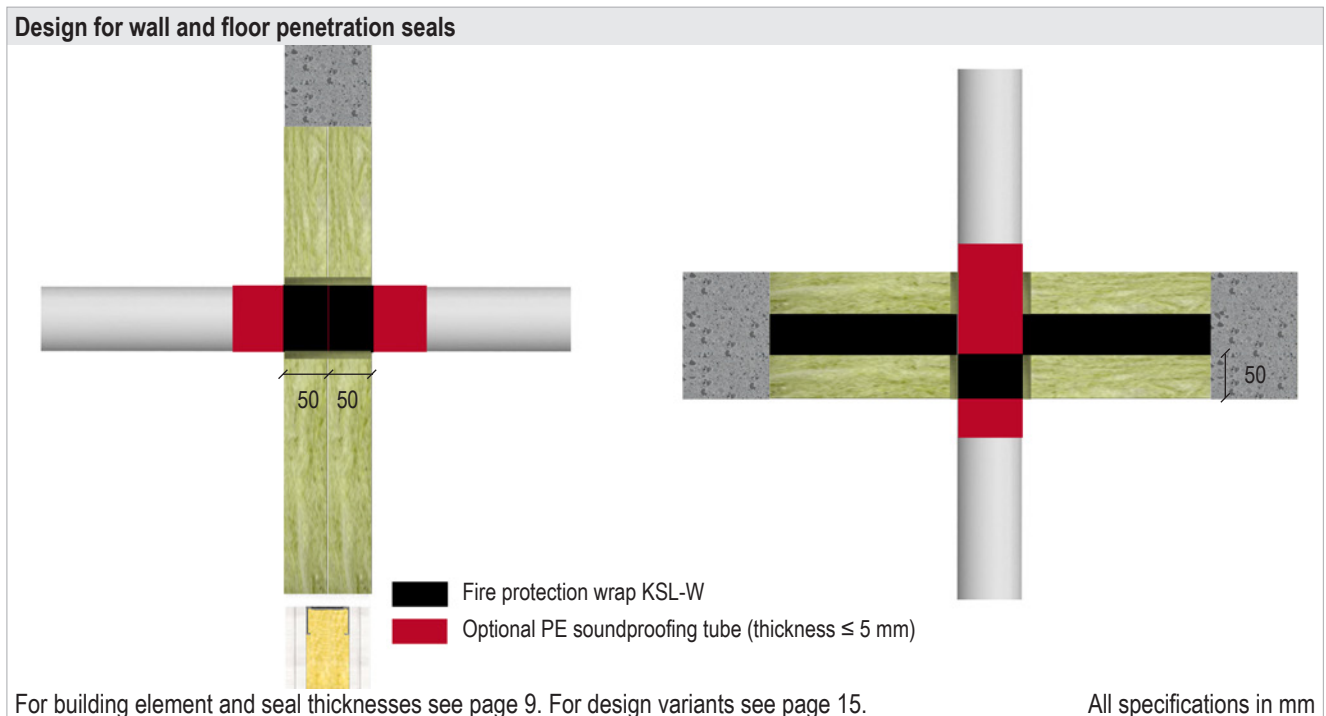
Pipe material / type	Pipe outer Ø [mm]	Pipe wall thickness [mm]	EC Endless Collar	Fire resistance class	
				Wall	Floor
Wavin SiTech+	32.0	2.0	on both sides in walls, on the lower side in floors	EI 90 U/U*	EI 90 U/U*
				EI 120 U/U**	EI 90 U/U**
	50.0	2.1		EI 90 U/U*	EI 90 U/U*
				EI 120 U/U**	EI 90 U/U**
	75.0	2.6		EI 90 U/U*	–
	90.0	3.1		EI 90 U/U*	–
110.0	3.6	EI 90 U/U*	–		

* Fastened with coarse thread screws Würth ASSY D, HECO-TOPIX-plus or SPAX T-STAR plus.

** Fastened with coil spring fasteners Rockwool Conlit Screw or Bohl Fireprotect Screw.

System Flammotect 2 × 50 mm

8.5.4 Design with fire protection wrap KSL-W



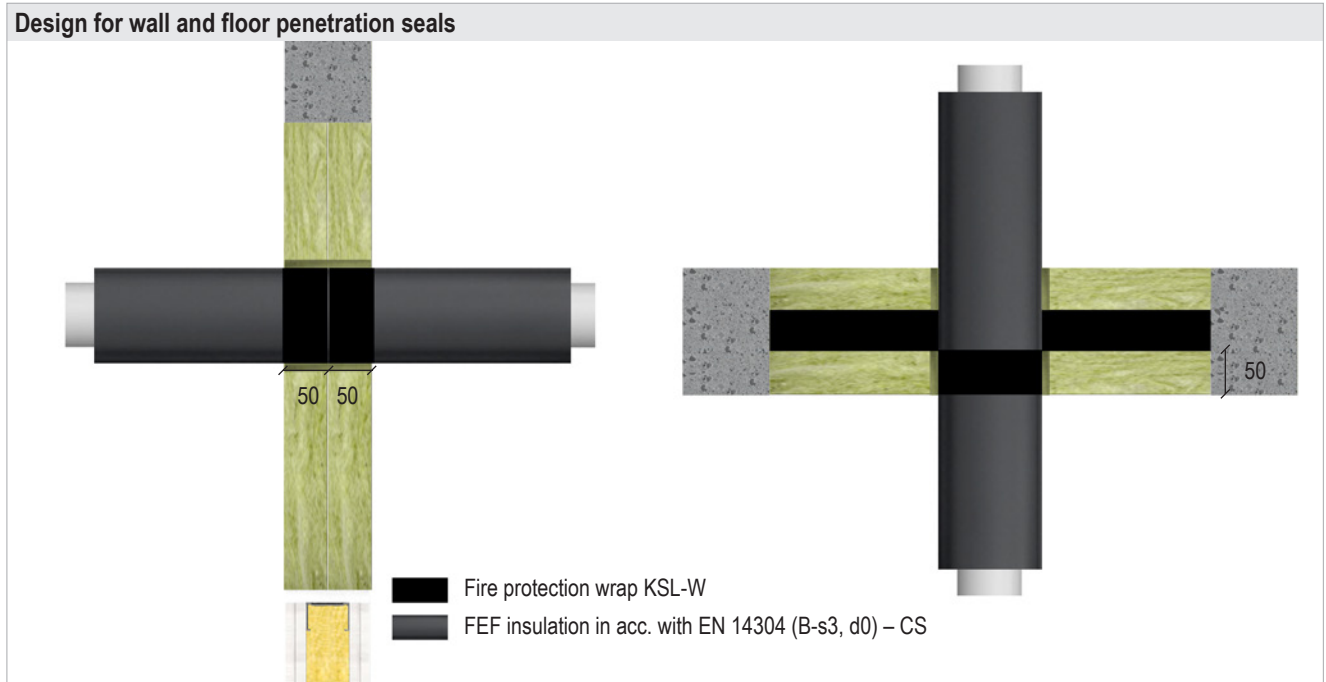
Pipe outer Ø [mm]	Pipe wall thickness [mm]	Fire protection wrap KSL-W		Fire resistance class	
		Number of wraps × layers		Wall	Floor
		Wall	Floor		
PVC-U, PVC-C					
32–50	1.8–5.6	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
63–110	1.8–12.3	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
PE-HD, ABS, SAN+PVC					
32–50	1.8–4.6	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
63–110	1.8–10.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
PP					
32–50	1.8–4.6	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
63–110	1.8–10.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U

System Flammotect 2 × 50 mm

Pipe outer Ø [mm]	Fire protection wrap KSL-W		Fire resistance class	
	Number of wraps × layers		Wall	Floor
	Wall	Floor		
Geberit Silent-PP				
≤ 50.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
Geberit Silent-Pro				
≤ 75.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
Geberit Silent-db20				
≤ 56.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
KE KELIT PHONEX AS				
≤ 56.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
Pipelife MASTER 3				
≤ 50.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
POLO-KAL NG / POLO-KAL XS				
≤ 50.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
REHAU RAUPIANO LIGHT				
≤ 50.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
REHAU RAUPIANO PLUS				
≤ 50.0	2 × 2 layers	–	EI 120 U/U	–
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
REHAU RAUSILENTO				
≤ 50.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
CONEL DRAIN				
≤ 50.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
Wavin SiTech+				
≤ 50.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 120 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
GF Silenta Premium				
≤ 58.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 90 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U
Hakan Silenta Premium				
≤ 58.0	2 × 2 layers	1 × 2 layers	EI 120 U/U	EI 90 U/U
≤ 110.0	2 × 4 layers	1 × 4 layers	EI 120 U/U	EI 120 U/U

System Flammotect 2 × 50 mm

8.5.5 Design with fire protection wrap KSL-W and FEF insulation



For building element and seal thicknesses see page 9. For design variants see page 15.

All specifications in mm

Wall				
Dimensions		FEF insulation	Fire protection wrap KSL-W	Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]	Thickness [mm]	Number of wraps × layers	
PP-H				
40.0–50.0	1.8–4.6	9.0–20.5	2 × 3 layers	EI 90 U/U
50.0–75.0	1.9–8.2	9.0–22.0		EI 90 U/U

Floor				
Dimensions		FEF insulation	Fire protection wrap KSL-W	Fire resistance class
Pipe outer Ø [mm]		Thickness [mm]	Number of wraps × layers	
Geberit Silent-db20				
56.0		17.0	1 × 2 layers	EI 120 U/U
≤ 110.0		18.0	1 × 4 layers	EI 90 U/U
135.0		18.5	1 × 5 layers	EI 120 U/U
160.0		19.0	1 × 6 layers	EI 120 U/U
Geberit Silent-PP				
≤ 50.0		17.0	1 × 2 layers	EI 120 U/U
≤ 110.0		18.0	1 × 4 layers	EI 120 U/U
≤ 125.0		18.5	1 × 5 layers	EI 120 U/U
Geberit Silent-Pro				
≤ 50.0		17.0	1 × 2 layers	EI 120 U/U
≤ 110.0		18.0	1 × 4 layers	EI 120 U/U

System Flammotect 2 × 50 mm

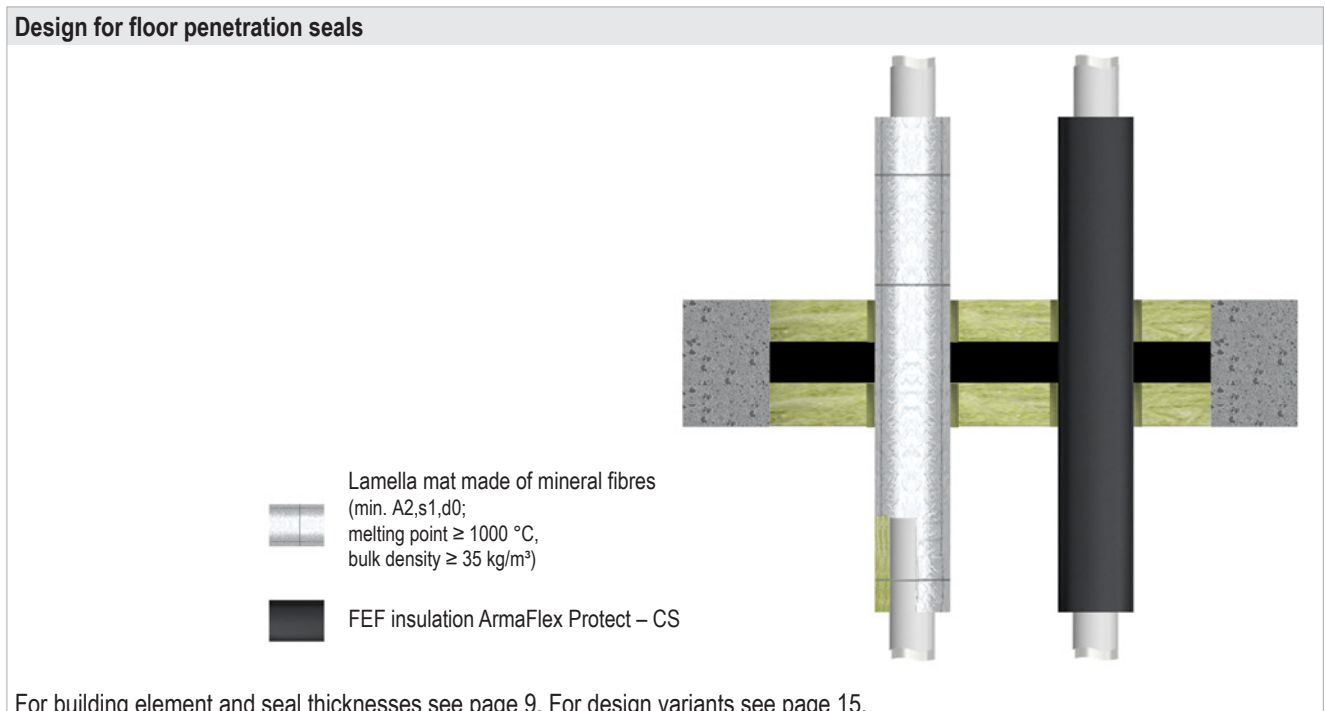
Floor			
Dimensions	FEF insulation	Fire protection wrap KSL-W	Fire resistance class
Pipe outer Ø [mm]	Thickness [mm]	Number of wraps × layers	
Ostendorf Skolan dB			
≤ 58.0	17.0	1 × 2 layers	EI 120 U/U
≤ 135.0	18.5	1 × 5 layers	EI 120 U/U
Pipelife MASTER 3 PLUS			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
POLO-KAL NG / POLO-KAL XS			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
REHAU RAUPIANO PLUS			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
REHAU RAUPIANO LIGHT			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
≤ 125.0	18.5	1 × 4 layers	EI 120 U/U
≤ 160.0	19.0	1 × 6 layers	EI 90 U/U
REHAU RAUSILENTO			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
≤ 125.0	18.5	1 × 4 layers	EI 120 U/U
≤ 160.0	19.0	1 × 6 layers	EI 90 U/U
CONEL DRAIN			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
≤ 125.0	18.5	1 × 4 layers	EI 120 U/U
≤ 160.0	19.0	1 × 6 layers	EI 90 U/U
Wavin SiTech			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
Wavin SiTech+			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
Wavin AS+			
≤ 50.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
Hakan Silenta Premium			
≤ 58.0	17.0	1 × 2 layers	EI 120 U/U
≤ 110.0	18.0	1 × 4 layers	EI 120 U/U
≤ 135.0	18.5	1 × 5 layers	EI 120 U/U

System Flammotect 2 × 50 mm

8.6 Multilayer pipes

8.6.1 Design with FEF insulation ArmaFlex Protect or lamella mat

The lamella mat must be secured with winding wire against falling out.



For building element and seal thicknesses see page 9. For design variants see page 15.

Floor					
Service		Insulation			Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]	Type	Length L [mm]	Thickness S [mm]	
Henco					
≤ 12	≥ 1.6	lamella mat	≥ 250	≥ 20	EI 90 U/C
		ArmaFlex Protect	≥ 240	≥ 13	EI 90 U/C
≤ 32	≥ 3.0	lamella mat	≥ 250	≥ 20	EI 90 U/C
		ArmaFlex Protect	≥ 240	≥ 13	EI 90 U/C
≤ 63	≥ 4.5	lamella mat	≥ 250	≥ 30	EI 90 U/C
		ArmaFlex Protect	≥ 240	$\geq 26 (2 \times 13)$	EI 90 U/C

System Flammotect 2 × 50 mm

8.6.2 Design with fire protection collar EC Endless Collar and FEF insulation

The fire protection collar must be attached on both sides in walls and on the lower side in floors. Always use the smallest fitting collar.

The collars must be fastened to the seal with the following coarse thread screws or coil spring fasteners:

- Würth ASSY D (8 × 70 mm)
- HECO-TOPIX-plus (8 × 80 mm)
- SPAX T-STAR plus (8 × 80 mm)

or equivalent.



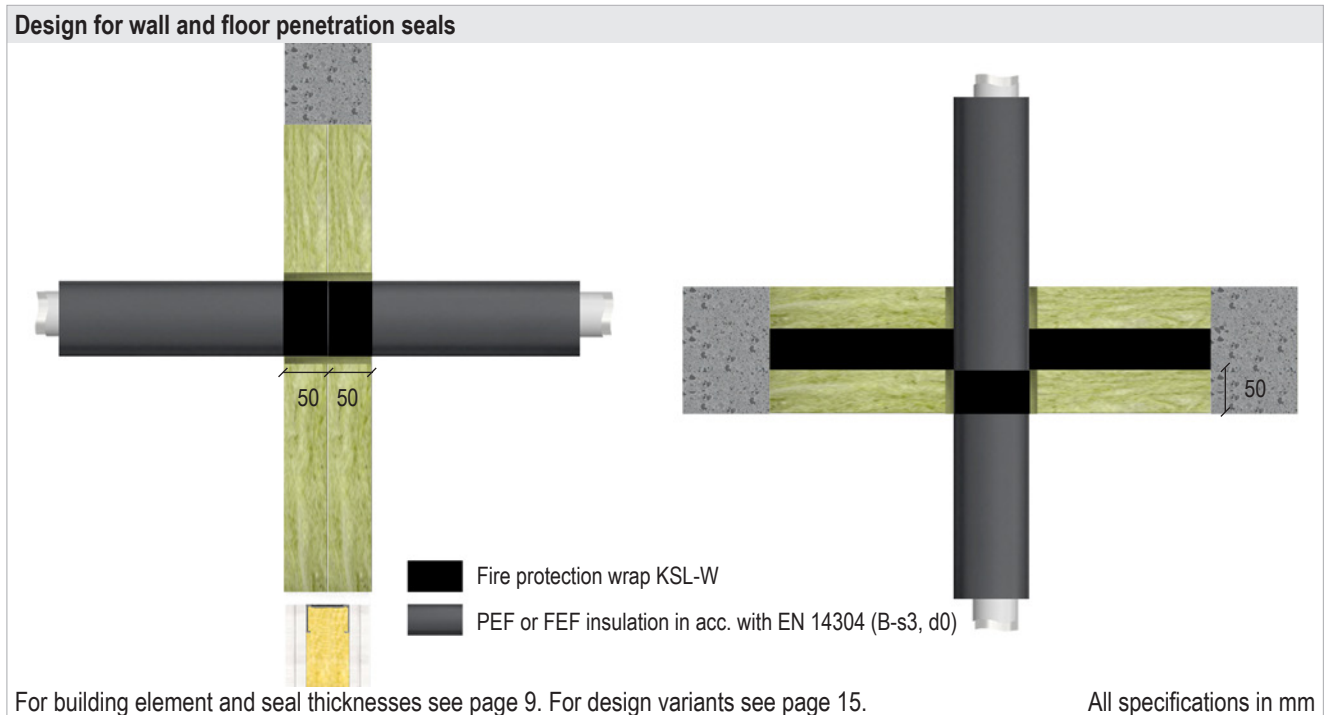
For building element and seal thicknesses see page 9. For design variants see page 15.

Wall					
Service		Insulation Thickness [mm]	EC Endless Collar		Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]		Installation	Layers	
FRÄNKISCHE alpex L, FRÄNKISCHE alpex F50					
16	2.0	8.0–30.0	on both sides	2	EI 120 U/C
32		9.0–11.5			EI 120 U/C

Floor					
Service		Insulation Thickness [mm]	EC Endless Collar		Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]		Installation	Layers	
FRÄNKISCHE alpex L, FRÄNKISCHE alpex F50					
16	2.0	9.0–38.0	on the lower side	2	EI 90 U/C
20					EI 90 U/C
26	3.0	10.0–38.0			EI 90 U/C
32					EI 90 U/C
40					EI 90 U/C
50	3.5	20.0–38.0			EI 90 U/C
63	4.5				EI 90 U/C
75	5.0	EI 90 U/C			

System Flammotect 2 × 50 mm

8.6.3 Design with FEF and PEF insulation and fire protection wrap KSL-W



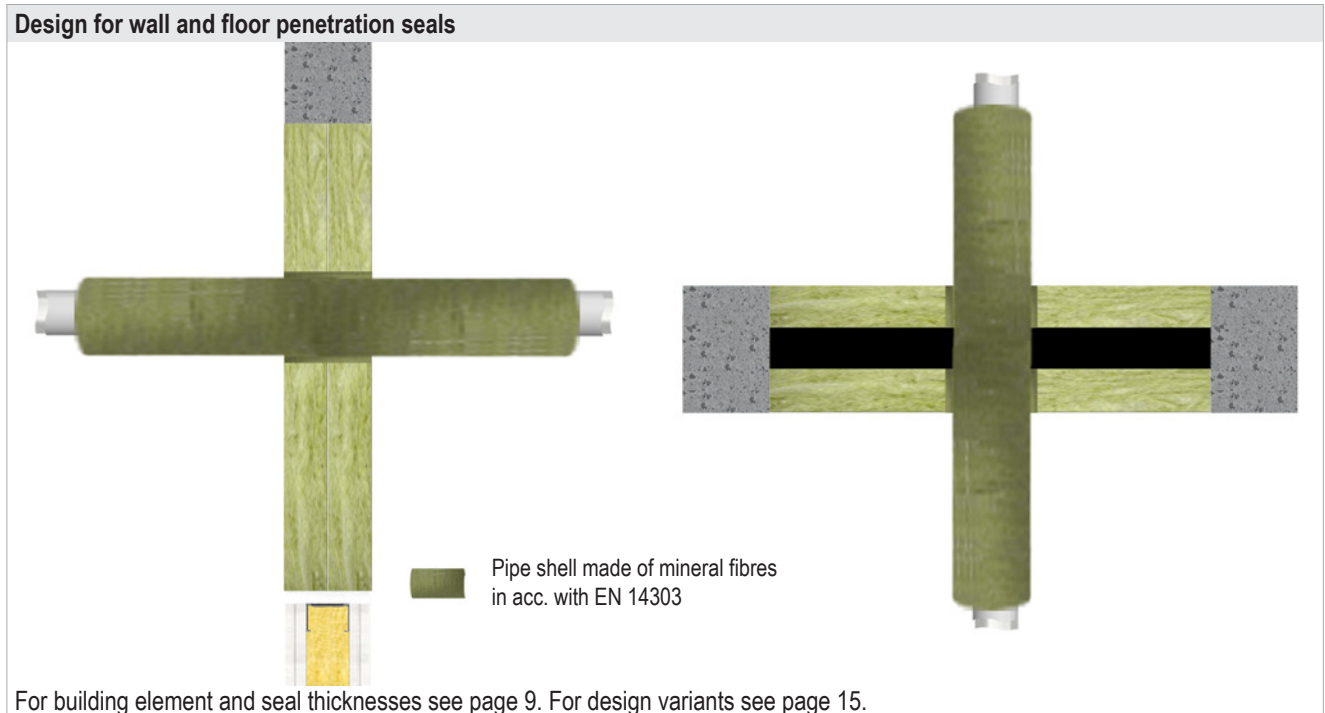
Installation with FEF insulation in acc. with EN 14304 (B-s3, d0)						
Pipe outer Ø [mm]	Pipe wall thickness [mm]	FEF insulation Thickness [mm]	Fire protection wrap KSL-W		Fire resistance class	
			Number of wraps × layers		Wall	Floor
			Wall	Floor		
Geberit Mepla						
16	2.25	8.0–32.0	2 × 1 layer	1 × 1 layer	EI 120 U/C	EI 120 U/C
20	2.50	8.0–32.0			EI 120 U/C	EI 120 U/C
26	3.00	8.5–35.0			EI 120 U/C	EI 120 U/C
32	3.00	9.0–35.0			EI 120 U/C	EI 120 U/C
40	3.50	9.0–35.0	2 × 2 layers	1 × 2 layers	EI 120 U/C	EI 120 U/C
50	4.00	9.0–35.0			EI 120 U/C	EI 120 U/C
63	4.50	9.0–39.0			EI 120 U/C	EI 120 U/C
75	4.70	9.5			EI 90 U/C	EI 90 U/C
		> 9.5 – 40.5			EI 120 U/C	EI 120 U/C
REHAU RAUTITAN stabil						
16	2.60	8.0–32.0	2 × 1 layer	1 × 1 layer	EI 120 U/C	EI 120 U/C
20	2.90	8.0–32.0			EI 120 U/C	EI 120 U/C
25	3.70	8.5–35.0			EI 120 U/C	EI 120 U/C
32	4.70	9.0–35.0	2 × 1 layer	1 × 2 layers	EI 120 U/C	EI 120 U/C
40	6.00	9.0–35.0	2 × 2 layers		EI 120 U/C	EI 120 U/C

System Flammotect 2 × 50 mm

Installation with FEF insulation in acc. with EN 14304 (B-s3, d0)							
Pipe outer Ø [mm]	Pipe wall thickness [mm]	FEF insulation	Fire protection wrap KSL-W		Fire resistance class		
		Thickness [mm]	Number of wraps × layers		Wall	Floor	
			Wall	Floor			
KE KELIT KELOX							
16	2.00	8.0–32.0	2 × 1 layer	1 × 1 layer	EI 120 U/C	EI 120 U/C	
18	2.00				EI 120 U/C	EI 120 U/C	
20	2.25				EI 120 U/C	EI 120 U/C	
25	2.50				EI 120 U/C	EI 120 U/C	
32	3.00	9.5–35.0	2 × 2 layers	1 × 2 layers	EI 120 U/C	EI 120 U/C	
40	4.00	9.5–35.0			EI 120 U/C	EI 120 U/C	
50	4.50				EI 120 U/C	EI 120 U/C	
63	6.00	9.0–39.0			EI 120 U/C	EI 120 U/C	
75	7.50	9.0–40.5	EI 120 U/C	EI 120 U/C			
Henco							
20	2.0–3.0	8.0–32.0	2 × 1 layer	–	EI 120 U/C	–	
32	3.0	8.0–32.0		–	EI 120 U/C	–	
Installation with PEF insulation							
Pipe outer Ø [mm]	Pipe wall thickness [mm]	PEF insulation	Fire protection wrap KSL-W		Fire resistance class		
		Thickness [mm]	Number of wraps × layers		Wall	Floor	
			Wall	Floor			
Geberit Mepla							
16	2.25	6.0–13.0	2 × 1 layer	1 × 1 layer	EI 120 U/C	EI 120 U/C	
20	2.50				EI 120 U/C	EI 120 U/C	
26	3.00				EI 120 U/C	EI 120 U/C	
32	3.00				EI 120 U/C	EI 120 U/C	
REHAU RAUTITAN stabil							
16	2.60	4.0–26.0	2 × 1 layer	1 × 1 layer	EI 120 U/C	EI 120 U/C	
20	2.90				EI 120 U/C	EI 120 U/C	
25	3.70				4.0–26.0	EI 120 U/C	–
					26.0	–	EI 120 U/C
32	4.70	4.0–26.0	2 × 1 layer	EI 120 U/C	–		
		26.0		–	EI 120 U/C		
KE KELIT KELOX							
18	2.00	4.0–13.0	2 × 1 layer	1 × 1 layer	EI 120 U/C	EI 120 U/C	
20	2.25				EI 120 U/C	EI 120 U/C	
25	2.50				EI 120 U/C	EI 120 U/C	
32	3.00				EI 120 U/C	EI 120 U/C	
Henco							
20	2.0–3.0	6.0–13.0	2 × 1 layer	1 × 1 layer	EI 120 U/C	EI 120 U/C	
32	3.0	6.0–13.0		–	EI 120 U/C	–	
		13.0		1 × 1 layer	–	EI 120 U/C	

System Flammotect 2 × 50 mm

8.6.4 Design with pipe shells made of mineral fibres



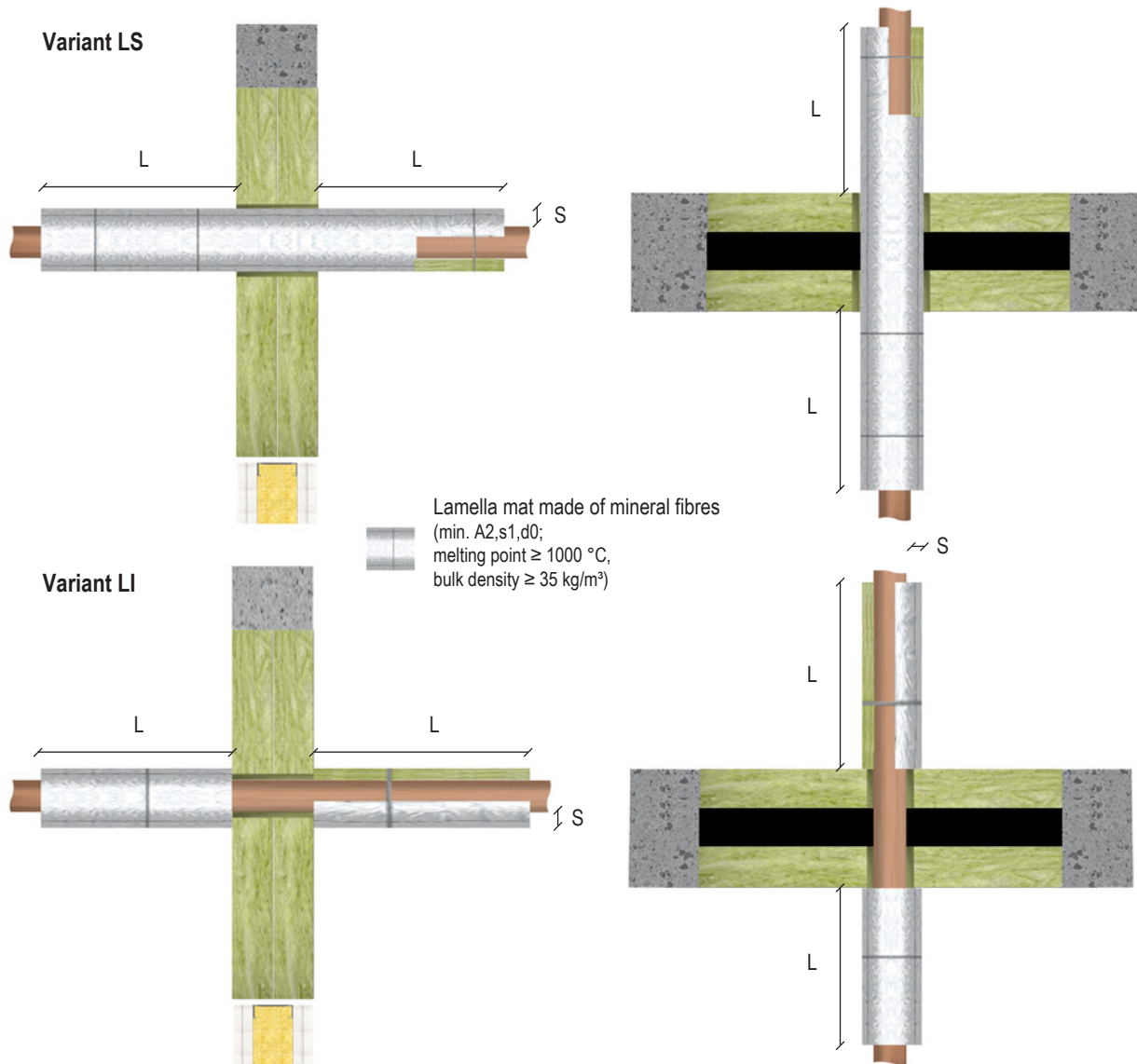
Pipe outer Ø [mm]	Insulation thickness [mm]	Fire resistance class	
		Wall	Floor
Geberit Mepla			
16	20–30	EI 120 U/C	EI 120 U/C
20		EI 120 U/C	EI 120 U/C
26	20–40	EI 120 U/C	EI 120 U/C
32		EI 120 U/C	EI 120 U/C
40	20–50	EI 120 U/C	EI 120 U/C
50		EI 120 U/C	EI 120 U/C
63	20–60	EI 120 U/C	EI 120 U/C
75	20–80	EI 120 U/C	EI 120 U/C

System Flammotect 2 × 50 mm

8.7 Non-combustible pipes

8.7.1 Design with lamella mat

Design for wall and floor penetration seals



For building element and seal thicknesses see page 9. For design variants see page 15.

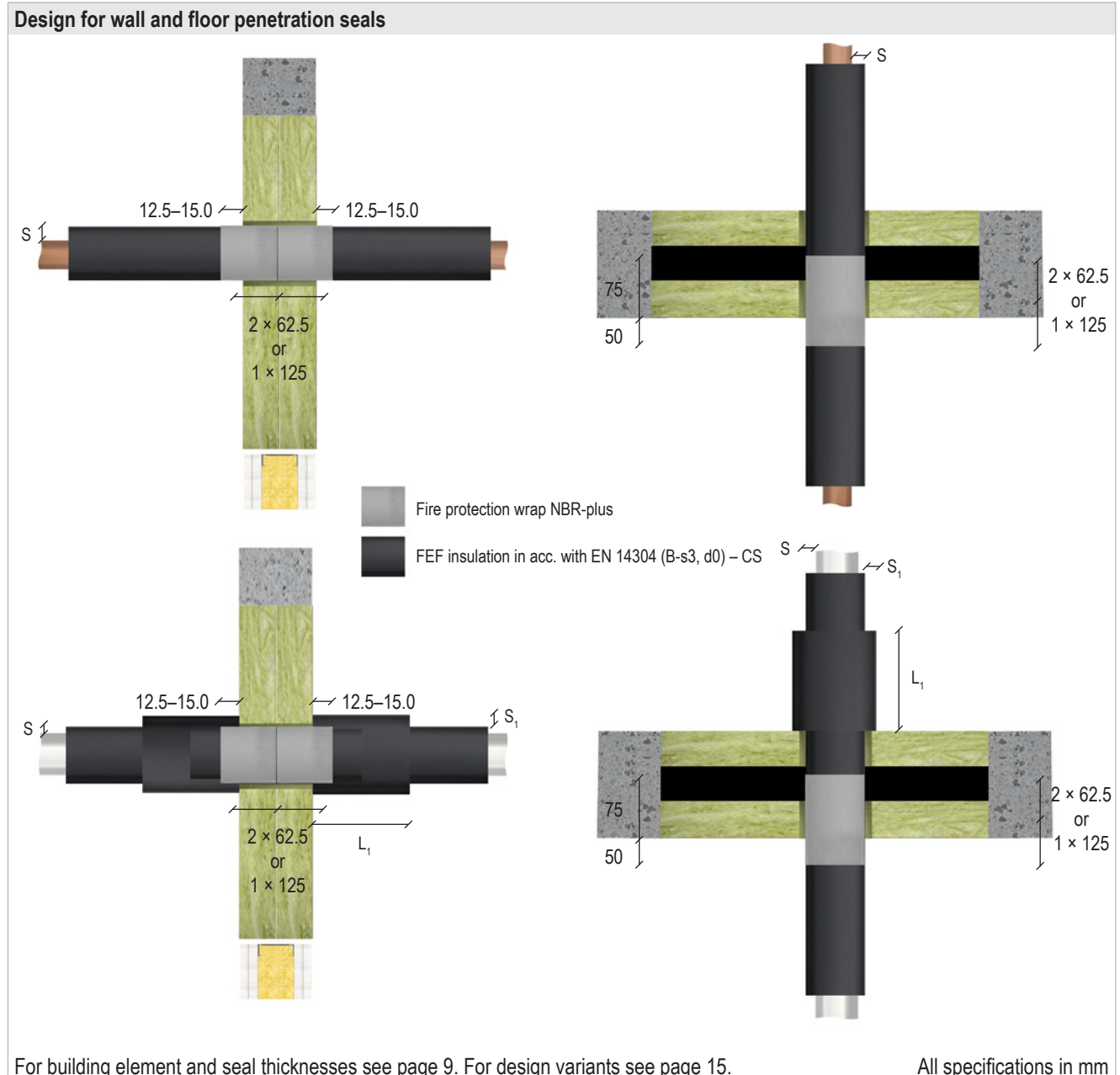
System Flammotect 2 × 50 mm

Wall				
Service		Mineral fibre lamella mat		Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]	Length L [mm]	Thickness S [mm]	
Copper, steel, stainless steel or cast iron				
≤ 22.0	0.6–14.2	≥ 450 on both sides	20–100	EI 120 U/C
> 22.0 – ≤ 60.0		≥ 200 on both sides	30–100	EI 120 U/C
> 60.0 – ≤ 88.9		≥ 450 on both sides	30–100	EI 120 U/C
Steel, stainless steel or cast iron				
≤ 42.0	1.8–14.2	≥ 200 on both sides	30–100	EI 120 U/C
> 42.0 – ≤ 114.3	1.8/3.2–14.2	≥ 450 on both sides	30–100	EI 120 U/C
> 114.3 – ≤ 159.0	3.2/4.0–14.2	≥ 1200 on both sides	100	EI 120 U/C
> 114.3 – ≤ 219.1	3.2/4.5–14.2	≥ 1200 on both sides	30–100	EI 90 U/C

Floor				
Service		Mineral fibre lamella mat		Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]	Length L [mm]	Thickness S [mm]	
Copper, steel, stainless steel or cast iron				
≤ 22.0	0.6–14.2	≥ 425 on both sides	20–100	EI 120 U/C
> 22.0 – ≤ 42.0		≥ 175 on both sides	30–100	EI 120 U/C
		≥ 425 on both sides	30–100	EI 120 U/C
		≥ 675 on both sides	30–100	EI 90 U/C
> 42.0 – ≤ 88.9				
Steel, stainless steel or cast iron				
≤ 42.0	1.8–14.2	≥ 125 on both sides	30–100	EI 120 U/C
> 42.0 – ≤ 114.3	1.8/3.2–14.2	≥ 425 on both sides	30–100	EI 120 U/C
> 114.3 – ≤ 159.0	3.2/4.0–14.2	≥ 1175 on both sides	30–100	EI 120 U/C
> 114.3 – ≤ 219.1	3.2/4.5–14.2	≥ 1175 on both sides	30	EI 120 U/C
		≥ 1175 on both sides	30–100	EI 90 U/C

System Flammotect 2 × 50 mm

8.7.2 Design with FEF insulation and fire protection wrap NBR-plus

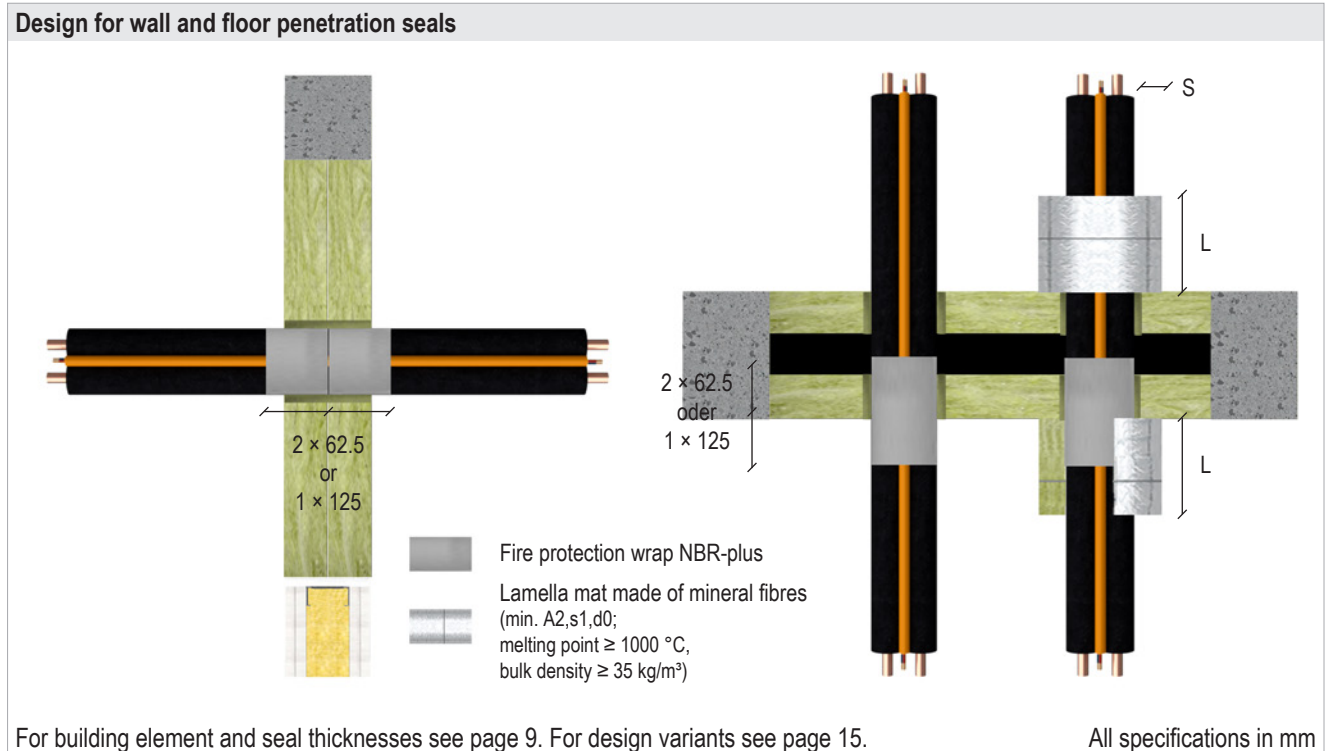


System Flammotect 2 × 50 mm

Wall							
Service		Section insulation made of FEF	Protective insulation made of FEF		Fire protection wrap NBR-plus		Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]	Thickness S [mm]	Length L ₁ [mm]	Thickness S ₁ [mm]	Number of wraps [n]	Number of layers [n]	
Copper, steel, stainless steel or cast iron							
≤ 15.0	0.8–14.2	10.0	–	–	1 × 125 or 2 × 62.5	1	EI 120 U/C
> 15.0 – ≤ 54.0		19.0–38.0				2	EI 120 U/C
> 54.0 – ≤ 88.9		25.0				2	EI 120 U/C
≤ 42.0		10.0				1	EI 90 U/C
> 42.0 – ≤ 88.9		19.0–38.0				2	EI 90 U/C
Steel, stainless steel or cast iron							
≤ 15.0	0.8–14.2	10.0–38.0	–	–	1 × 125 or 2 × 62.5	2	EI 120 U/C
> 15.0 – ≤ 88.9		19.0–38.0				2	EI 120 U/C
> 88.9 – ≤ 114.3		19.0–38.0	250	19		2	EI 120 U/C
> 114.3 – ≤ 159.0		25.0–38.0	250	19		2	EI 120 U/C
> 159.0 – ≤ 219.1		25.0–38.0	600	38		2	EI 120 U/C
Floor							
Service		Section insulation made of FEF	Protective insulation made of FEF		Fire protection wrap NBR-plus		Fire resistance class
Pipe outer Ø [mm]	Pipe wall thickness [mm]	Thickness S [mm]	Length L ₁ [mm]	Thickness S ₁ [mm]	Number of wraps [n]	Number of layers [n]	
Copper, steel, stainless steel or cast iron							
≤ 42.0	0.6–14.2	9.0–40.0	–	–	1 × 125 or 2 × 62.5	2	EI 90 U/C
> 42.0 – ≤ 60.0		10.0				1	EI 90 U/C
		13.0–40.0				2	EI 90 U/C
≤ 60.0		13.0–40.0				2	EI 120 U/C
> 60.0 – ≤ 88.9		25.0				2	EI 120 U/C
	19.0–38.0	2	EI 90 U/C				
Steel, stainless steel or cast iron							
≤ 159.0	0.6–14.2	25.0–38.0	250	25	1 × 125 or 2 × 62.5	2	EI 90 U/C
> 159.0 – ≤ 219.1			250	38			EI 90 U/C

System Flammotect 2 × 50 mm

8.8 HVAC split line combinations

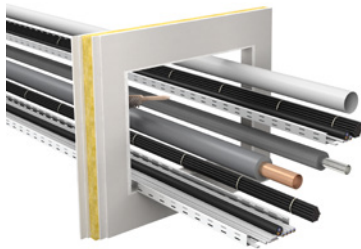


Combination	Fire protection wrap NBR-plus		Mineral fibre lamella mat		Fire resistance class	
	Number of wraps [n]	Number of layers [n]	Length L [mm]	Thickness S [mm]	Wall	Floor
Copper pipe ≤ 2 × Ø 18 mm, + 9 mm PE foam, + 1 pipe PVC-U Ø ≤ 25.0 × 1.5 mm, + ≤ 3 × cables Ø ≤ 14.0 mm	1 × 125 or 2 × 62.5	2	–	–	EI 120	EI 120
Copper pipe ≤ 2 × Ø 22 mm, + 9 mm PE foam, + 1 pipe PVC-U Ø ≤ 25.0 × 1.5 mm, + ≤ 2 × cables Ø ≤ 21.0 mm	1 × 125 or 2 × 62.5	2	≥ 250	≥ 30	–	EI 90

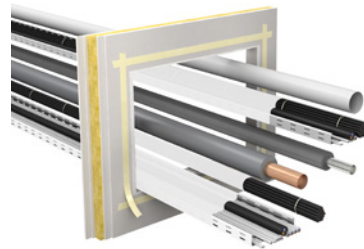
System Flammotect 2 × 50 mm

9. Installation steps

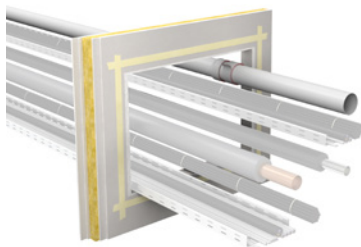
1. Clean the aperture edge. When installing in sandwich panel walls, attach L profiles with the dimensions 30 × 30 × 2 mm alongside the aperture edge on both sides of the seal.



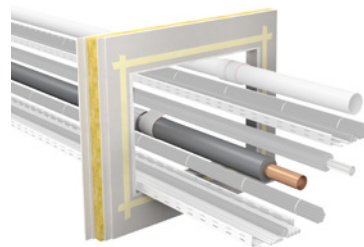
2. Mask the aperture with crepe tape on all sides, keeping 20 mm distance to the edge. Coat the cables with FLAMMOTECT-A; alternatively apply fire protection wrap.



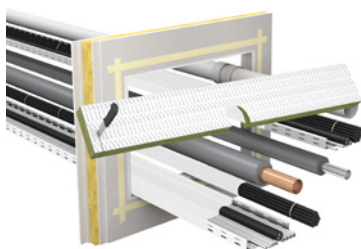
3. Apply fire protection wraps to services, if necessary.



4. Apply the required fire protection wraps to non-combustible pipes.



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



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

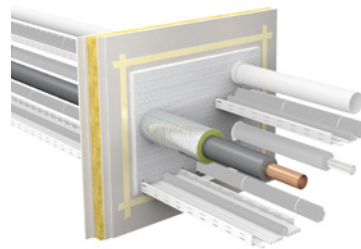


System Flammotect 2 × 50 mm

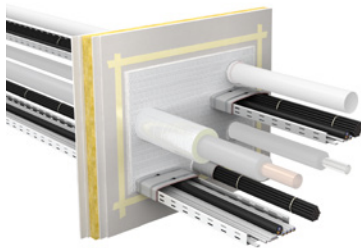
7. Seal the remaining opening/joints with mineral fibre or fill them with FLAMMOTECT-A.



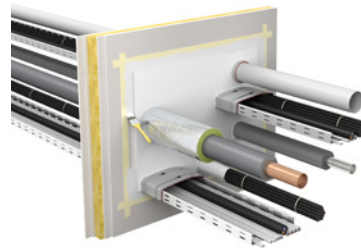
8. Apply lamella mat insulation to pipes, if necessary.



9. Alternatively to cable coating:
Wrap cables, cables bundles and cable support systems with NBR-plus.



10. Final coating with FLAMMOTECT-A. Install pipe collars if necessary.



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

