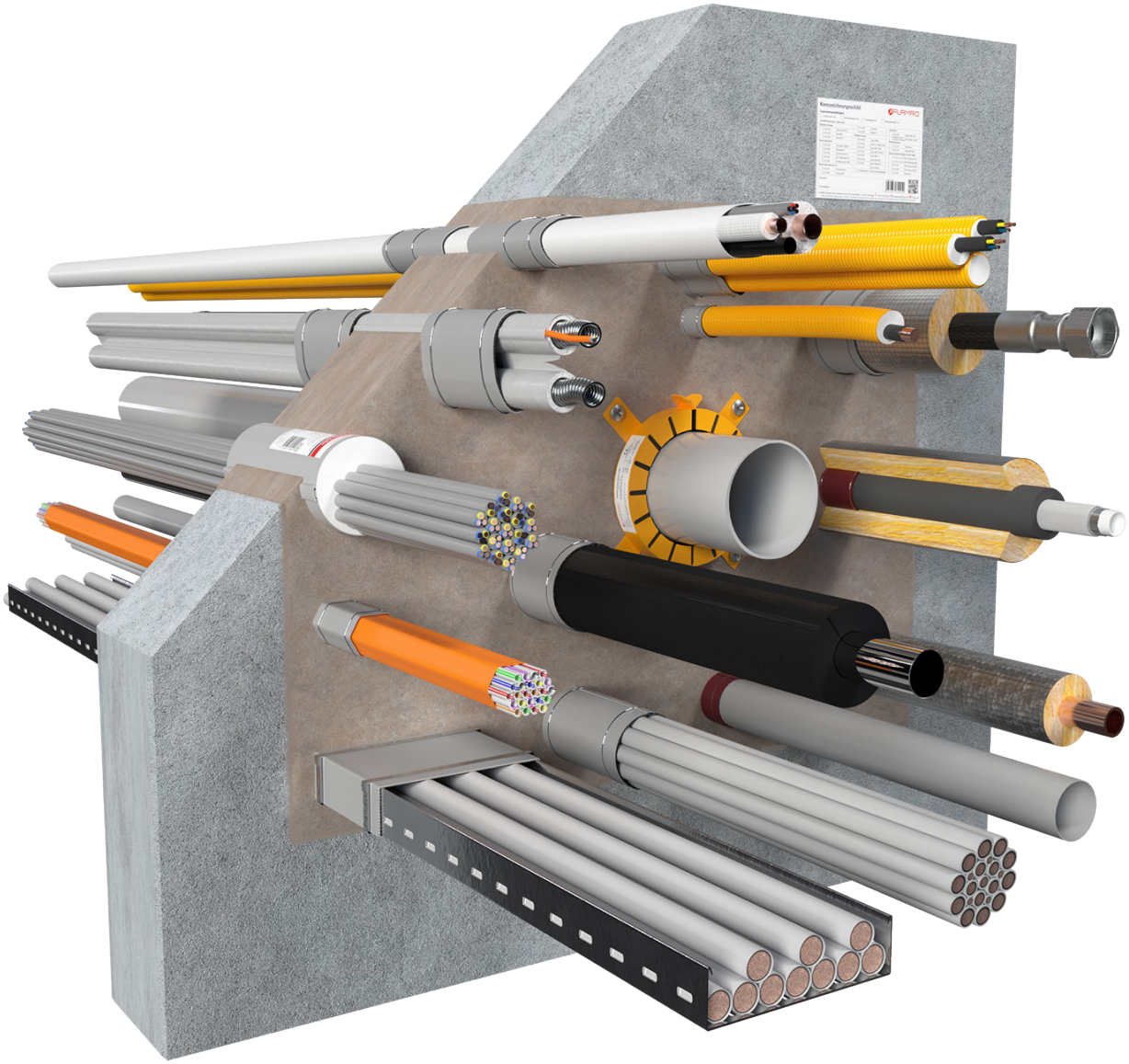
Novasit BM

Mixed penetration sealing system made of mortar

Fibre-free mixed penetration sealing system made of special mortar. For electrical cables and lines of all types, electrical installation conduits, combustible and non-combustible pipes and further services.

Fire resistance class: maximum EI 120 in accordance with EN 13501-2 as per ETA-16/0132



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Novasit BM

Table of contents

	Topic	Page
1.	**Preliminary remarks / overview**	**3**
1.1	Target group	3
1.2	Use of the instructions	3
1.2.1	Safety instructions	3
1.3	Field of application	4
1.4	Building elements	4
2.	**Fire resistance classes**	**5**
2.1	Walls	5
2.2	Floors	13
3.	**Minimum thicknesses / spacing distance to other installations**	**20**
4.	**Allowed services**	**21**
4.1	Cables / cable bundles / cable trays / electrical installation conduits / speedpipes	21
4.2	Combustible pipes	22
4.3	Multilayer pipes	23
4.4	Non-combustible pipes	23
4.5	Further allowed services	24
4.6	CT Cable Tube (for subsequent installations)	25
5.	**Spacing distance for services**	**26**
6.	**Used Products**	**28**
6.1	Declarations of Performance	29
7.	**Design variants**	**30**
7.1	Initial brackets (supports)	31
8.	**Fire protection measures**	**32**
8.1	Cables / cable bundles / cable trays	32
8.1.1	Design variant with fire protection wrap DG-CR 1.5	33
8.2	Electrical installation conduits (EIC) – single or bundled	34
8.2.1	Design variant with mineral fibre mats	35
8.3	speedpipes (PE pipes for optical fibre cables and micro cables)	36
8.4	Combustible pipes	37
8.4.1	Design variant with fire protection wrap DG-CR BS	37
8.4.2	Design variant with fire protection collar AWM II / Variant N II A	39
8.5	Multilayer pipes by Henco	41
8.6	Non-combustible pipes	42
8.6.1	Section insulation made of lamella mat Klimarock or mineral fibre sleeves Conlit 150U	42
8.6.2	Section insulation made of FEF ArmaFlex Protect	44
8.6.3	Section insulation made of combustible FEF insulation in acc. with EN 14304	45
8.7	HVAC split line combinations	46
8.8	Double solar pipes Nanosun^2	47
8.9	HANSA-FLEX AG hydraulic hoses with wire braid reinforcement	48
8.10	Subsequent installations with CT Cable Tube	49
9.	**Installation steps**	**51**

Novasit BM

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.
	Use protective mask with 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 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 Field of application

The mixed penetration sealing system Novasit BM using NOVASIT BM mortar in wall and floor openings belongs to the product type „mortar“ in accordance with EAD 350454-00-1104 and is assessed and evaluated accordingly.

The fire protection mortar NOVASIT BM is evaluated as a product for use in penetration seals in accordance with ETA-16/0132.

Reaction to fire

NOVASIT BM is classified as A1 in accordance with EN 13501-1.

Fire resistance

tested	covered			
	U/U	C/U	U/C	C/C
U/U	✓	✓	✓	✓
C/U	–	✓	–	✓
U/C	–	✓	✓	✓
C/C	–	–	–	✓

The fire resistance class of the seal is reduced to the fire resistance class of the penetrating service with the lowest fire resistance class.

Release of dangerous substances

The components of Novasit BM do not contain any substances identified as dangerous in the list of the European Commission.

Durability and serviceability

The fire protection mortar NOVASIT BM meets the requirements of Z_1 in accordance with EAD 350454-00-1104.

Novasit BM can be subjected to the conditions of interior rooms with and without exposure to moisture without substantial changes to the fire protection characteristics being expected.

1.4 Building elements

Solid walls

Made of masonry, concrete, reinforced concrete, aerated concrete, ceramic bricks, cavity bricks or perforated bricks with a thickness of ≥ 100 mm. The walls must be classified for the necessary fire resistance duration according to EN 13501-2.

Solid floors

Of concrete or reinforced concrete with a thickness of ≥ 150 mm.
The floors must be classified for the necessary fire resistance duration according to EN 13501-2.

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2. Fire resistance classes

2.1 Walls

Cables, cable bundles and cable trays		Fire resistance class	Source[1]
Cables Ø ≤ 32 mm		**EI 120**	**1, 2, 5**
Single-core non-sheathed cables (wires Ø ≤ 24 mm)		**EI 120**	**1**
Cable bundles Ø ≤ 60 mm		**EI 120**	**1**
Cable bundles Ø ≤ 100 mm		**EI 90 / E 120**	**2**
Cables, cable bundles and cable trays at a sealing thickness of 240 mm	**Measure**	**Fire resistance class**	**Source[1]**
Cables Ø ≤ 50 mm	240 mm sealing thickness	**EI 120**	**1**
Cables Ø ≤ 80 mm		**EI 90 / E 120**	**1**
Cable bundles Ø ≤ 100 mm		**EI 120**	**1**
Cables, cable bundles and cable trays with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
Cables Ø ≤ 50 mm	2× 2 layers, 125 mm	**EI 120**	**5**
Cables Ø ≤ 80 mm	2× 2 layers, 125 mm	**EI 90 / E 120**	**5**
	2× 2 layers, 150 mm	**EI 120**	**5**
Cable bundles Ø ≤ 100 mm	2× 1 layer, 125 mm	**EI 120**	**1, 2, 5**
Electrical installation conduits (EIC) with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
EIC Ø ≤ 32 mm	2× 1 layer, 125 mm	**EI 120 U/U**	**5**
EIC Ø ≤ 63 mm	2× 2 layers, 125 mm	**EI 120 U/U**	**5**
EIC bundle Ø ≤ 100 mm (single conduit Ø ≤ 32 mm)	2× 2 layers, 125 mm	**EI 120 U/U**	**5**
Electrical installation conduits (EIC) with non-combustible insulation made of mineral fibre lamella mat	**Measure**	**Fire resistance class**	**Source[1]**
EIC Ø ≤ 63 mm	lamella mat ≥ 500 mm × ≥ 30 mm	**EI 120 U/U**	**5**
speedpipes bundled or single, with/without optical fibre cable, with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
max. 24 pcs. pipe outer Ø ≤ 7	2× 1 layer, 125 mm	**EI 120 U/U**	**1**
max. 7 pcs. pipe outer Ø ≤ 10			
max. 5 pcs. pipe outer Ø ≤ 12			

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
6 → ETA 22/0051 7 → KB 02152/20/Z00NZP 8 → KB 319111905-A 9 → KB 1913.1/13/Z00NP 10 → KB 3.2/11-104-1
11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

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Installation in walls

Combustible pipes			
PVC-U, PVC-C, PP-H or PE 100 with/without 5 mm PE acoustic insulation and with intumescent wrap DG-CR BS	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 50.0 mm	2× 1 layer, 100 mm	**EI 120 U/U**	**1**
Pipe outer Ø ≤ 80.0 mm	2× 2 layers, 100 mm	**EI 120 U/U**	**1**
Pipe outer Ø ≤ 110.0 mm	2× 3 layers, 100 mm	**EI 120 U/U**	**1**
Pipe outer Ø ≤ 135.0 mm	2× 4 layers, 100 mm	**EI 120 U/C**	**1**
Pipe outer Ø ≤ 160.0 mm	2× 5 layers, 100 mm	**EI 120 U/C**	**1**
Combustible pipes with/without 5 mm PE acoustic insulation and with fire protection collar AWM II / Variant N II A	**Measure**	**Fire resistance class**	**Source[1]**
PVC-U, Geberit Silent Pro, GF Silenta Premium, Wavin SiTECH+, Valsir TriPlus			
Pipe outer Ø ≤ 160.0 mm	on both sides	**EI 120 U/U**	**6**
PE-HD, PP-H, Geberit Silent dB 20			
Pipe outer Ø ≤ 110.0 mm	on both sides	**EI 120 U/U**	**6**
Pipe outer Ø ≤ 160.0 mm	on both sides	**EI 90 U/U**	**6**
POLO-KAL NG, POLO-KAL XS, Conel Drain, REHAU RAUPIANO LIGHT			
Pipe outer Ø ≤ 110.0 mm	on both sides	**EI 120 U/U**	**6**
REHAU RAUPIANO PLUS, Pipelife MASTER 3 PLUS, KEKELIT PHONEX AS, Wavin AS			
Pipe outer Ø ≤ 50.0 mm	on both sides	**EI 120 U/U**	**6**

[1] 1 → 1883.1./14/Z00NP
2 → KB 3.2/11-104-1
3 → KB 3.2/11-103-1
4 → 01883.2/14/Z00NP
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6 → ETA 22/0051
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8 → KB 319111905-A
9 → KB 1913.1/13/Z00NP
10 → KB 3.2/11-104-1
11 → KB 01883.2/14/Z00NP
12 → PB 3096/155/10-CR
13 → KB K-3576/852/12-MPA BS
14 → KB 3.2/11-103-1

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Installation in walls			
Multilayer pipes			
Henco Pipes with non-combustible insulation made of lamella mat	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 12.0 mm, pipe wall thickness 1.6 mm	lamella mat ≥ 250 mm × ≥ 20 mm	**EI 120 U/C**	**5**
Pipe outer Ø ≤ 32.0 mm, pipe wall thickness 3.0 mm		**EI 120 U/C**	**5**
Pipe outer Ø ≤ 63.0 mm, pipe wall thickness 4.5 mm	lamella mat ≥ 250 mm × ≥ 30 mm	**EI 120 U/C**	**5**
Henco Pipes with PE foam insulation and intumescent wrap DG-CR BS	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 14.0 mm, pipe wall thickness 2.0 mm, PEF 6 mm	2× 1-layers, 100 mm + lamella mat ≥ 250 mm × ≥ 20 mm	**EI 120 U/C**	**5**
Pipe outer Ø ≤ 26.0 mm, pipe wall thickness 3.0 mm, PEF 6–13 mm		**EI 120 U/C**	**5**
Pipe outer Ø ≤ 32.0 mm, pipe wall thickness 2.0 mm, PEF 6–10 mm		**EI 120 U/C**	**5**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
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11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

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Installation in walls

Non-combustible pipes			
Copper with non-combustible insulation made of lamella mat	**Measure**	**Fire resistance class**	**Source[1]**
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	≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 88.9 mm	≥ 750 mm × ≥ 60 mm	**EI 120 C/U**	**1**
Steel, stainless steel or cast iron with non-combustible insulation made of lamella mat	**Measure**	**Fire resistance class**	**Source[1]**
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 ≤ 114.3 mm	≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 168.3 mm	≥ 1000 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 323.9 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	**EI 120 C/U**	**1**
Copper with non-combustible insulation Conlit 150U	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 15.0 mm	≥ 250 mm × ≥ 22.5 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 28.0 mm	≥ 500 mm × ≥ 26 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 54.0 mm	≥ 500 mm × ≥ 38 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × ≥ 36 mm	**EI 120 C/U**	**1**

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11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

Novasit BM

Installation in walls

Non-combustible pipes			
Steel, stainless steel or cast iron with non-combustible insulation Conlit 150U	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 15.0 mm	≥ 250 mm × ≥ 22.5 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 28.0 mm	≥ 500 mm × ≥ 26 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 54.0 mm	≥ 500 mm × ≥ 38 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 114.3 mm	≥ 750 mm × ≥ 33 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 168.3 mm	≥ 1000 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 219.1 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 323.9 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Copper with combustible insulation ArmaFlex Protect	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 28.0 mm	≥ 250 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 500 mm × 26 mm –51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 88.9 mm	≥ 500 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 1000 mm × 26 mm – 51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × 52 mm	**EI 120 C/U**	**1**
	≥ 1000 mm × 26 mm – 52 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 28.0 mm	≥ 250 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 500 mm × 26 mm – 51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 88.9 mm	≥ 500 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 1000 mm × 26 mm – 51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × 52 mm	**EI 120 C/U**	**1**
	≥ 1000 mm × 26 mm – 52 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**

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11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

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Installation in walls

Non-combustible pipes			
Copper with combustible FEF insulation in acc. with EN 14304 and fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 54.0 mm / 76.0 mm (floor)	2× 2 layers, 125 mm	**EI 120 C/U**	**5**
Pipe outer Ø ≤ 88.9 mm	2× 2 layers, 125 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**5**
Pipe outer Ø ≤ 108.0 mm	2× 2 layers, 125 mm + lamella mat ≥ 750 mm × ≥ 40 mm	**EI 120 C/U**	**5**

Steel, stainless steel or cast iron with combustible FEF insulation in acc. with EN 1430 and fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≥ 54.0 – ≤ 168.3 mm	2× 2 layers, 125 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**5**

[1] 1 → 1883.1./14/Z00NP
2 → KB 3.2/11-104-1
3 → KB 3.2/11-103-1
4 → 01883.2/14/Z00NP
5 → 02761.3/16/Z00NP
6 → ETA 22/0051
7 → KB 02152/20/Z00NZP
8 → KB 319111905-A
9 → KB 1913.1/13/Z00NP
10 → KB 3.2/11-104-1
11 → KB 01883.2/14/Z00NP
12 → PB 3096/155/10-CR
13 → KB K-3576/852/12-MPA BS
14 → KB 3.2/11-103-1

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Installation in walls

HVAC split line combinations with fire protection wrap DG-CR 1.5	Measure	Fire resistance class	Source[1]
copper pipe 1/ copper pipe 2 outer Ø 6–10 mm / 10–18 mm + pipe insulation made of PE-100 outer Ø ≤ 25 mm, t 1.8 mm + optional additional cables/pipes without spacing	2× 2 layers, 125 mm	**EI 120**	**1**
Double solar pipes Nanosun² with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
DN 16 and DN 25	wall 2× 1 layer, 125 mm	**EI 120 C/U**	**2**
Hydraulic hoses (also with wire braid reinforcement) with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
up to Ø 55.9 (HANSA-FLEX HD 200 (2SN)) (e.g. hydraulic hoses for elevators) with additional cable	2× 1 layer, 125 mm + lamella mat ≥ 250 mm × ≥ 20 mm	**EI 120**	**2**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
6 → ETA 22/0051 7 → KB 02152/20/Z00NZP 8 → KB 319111905-A 9 → KB 1913.1/13/Z00NP 10 → KB 3.2/11-104-1
11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

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Installation in walls

CT Cable Tube – options in walls					Source[1]
Length of CT [mm]		**150**	**200**	**300**	
Services	**additional measure**				
Cables Ø ≤ 21 mm	–	**EI 90 / E 120**	**EI 120**	**EI 120**	**7, 10**
Cables Ø ≤ 50 mm	–	–	–	**EI 90 / E 120**	**10**
Cables Ø ≤ 80 mm	solid wall	–	–	**EI 90 / E 120**	**10**
Cable bundles Ø ≤ 100 % with single cables Ø ≤ 21 mm	–	**EI 90 / E 120**	**EI 120**	**EI 120**	**7, 10**
CommScope HELIAX LDF (low density foam), Ø ≤ 16.002 mm	–	–	–	**EI 120 U/C**	**9**
CommScope 50Ω braided CNT, Ø ≤ 15.0 mm	–	–	–	**EI 120 U/C**	**9**
CommScope HELIAX AVA, Ø ≤ 28 mm	–	–	–	**E 120 U/C / EI 90 U/C**	**9**
CommScope HELIAX FSJ (super flexible), Ø ≤ 13.5 mm	–	–	–	**E 120 U/C / EI 90 U/C**	**9**
RFS RADIAFLEX RLK, Ø ≤ 28.5 mm	–	–	–	**EI 120 U/C**	**9**
RFS CELLFLEX LCF, Ø ≤ 27.8 mm	–	–	–	**EI 120 U/C**	**9**
EIC single Ø ≤ 40 mm, with/without cable Ø ≤ 21 mm	–	**EI 90 U/U E 120 U/U**	**EI 120 U/U**	**EI 120 U/U**	**8**
EIC bundled, with or without configuration, Ø ≤ 90 mm with conduit Ø ≤ 40 mm, with/without cable Ø ≤ 21 mm	–	**EI 90 U/U E 120 U/U**	**EI 120 U/U**	**EI 120 U/U**	**8**
Conduit bundle Ø ≤ 100 % with conduit Ø ≤ 32 mm, with/without cable Ø ≤ 21 mm		–	**EI 120 U/U**	**EI 120 U/U**	**7**
HVAC split line combination Pipe 1 / pipe 2 outer Ø 6–10 mm / 10–18 mm + 9 mm insulation made of PE foam; plastic pipe PVC-U, outer Ø up to 25 mm, s 1.5 mm + max. 3 additional cables up to Ø 14 mm without spacing	–	**EI 90 U/U**	**EI 90 U/U**	**EI 90 U/U**	**8**
speedpipes,bundled or individually, with/without glass fibre cables, 7 mm ≤ Ø ≤ 14 mm bundle ≤ 100 %	–	**EI 120 U/U**	**EI 120 U/U**	**EI 120 U/U**	**8**
Combustible pipes made of PVC-U Outer Ø 20 mm, t = 1.5 mm ≤ outer Ø 32 mm, t = 2.4 mm	–	–	–	**EI 120 U/U**	**7**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
6 → ETA 22/0051 7 → KB 02152/20/Z00NZP 8 → KB 319111905-A 9 → KB 1913.1/13/Z00NP 10 → KB 3.2/11-104-1
11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

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2.2 Floors

Cables, cable bundles and cable trays		Fire resistance class	Source[1]
Cables Ø ≤ 32 mm		**EI 120**	**3, 5**
Single-core non-sheathed cables (wires Ø ≤ 24 mm)		**EI 120**	**1**
Cable bundles Ø ≤ 60 mm		**EI 120**	**1**
Cable bundles Ø ≤ 100 mm		**EI 60 / E 120**	**3**
Cables, cable bundles and cable trays at a sealing thickness of 240 mm	**Measure**	**Fire resistance class**	**Source[1]**
Cables Ø ≤ 50 mm	240 mm sealing thickness	**EI 90 / E 120**	**1**
Cables Ø ≤ 80 mm	240 mm sealing thickness	**EI 90 / E 120**	**1**
Cable bundles Ø ≤ 100 mm	240 mm sealing thickness	**EI 120**	**1**
Cables, cable bundles and cable trays with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
Cables Ø ≤ 50 mm	2× 2 layers, 125 mm	**EI 120**	**5**
Cables Ø ≤ 80 mm	2× 2 layers, 125 mm	**EI 120**	**5**
Cables Ø ≤ 80 mm	2× 2 layers, 150 mm	**EI 120**	**5**
Cable bundles Ø ≤ 100 mm	2× 1 layer, 125 mm	**EI 120**	**1, 3, 5**
Electrical installation conduits (EIC) with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
EIC Ø ≤ 32 mm	2× 1 layer, 125 mm	**EI 120 U/U**	**5**
EIC Ø ≤ 63 mm	2× 2 layers, 125 mm	**EI 120 U/U**	**5**
EIR Ø ≤ 100 mm	2× 3 layers, 125 mm + lamella mat ≥ 500 mm × ≥ 30 mm	**EI 120 U/U**	**5**
EIC bundle Ø ≤ 100 mm (single conduit Ø ≤ 32 mm)	2× 2 layers, 125 mm	**EI 120 U/U**	**5**
Electrical installation conduits (EIC) with non-combustible insulation made of mineral fibre lamella mat	**Measure**	**Fire resistance class**	**Source[1]**
EIC Ø ≤ 63 mm	lamella mat ≥ 500 mm × ≥ 30 mm	**EI 120 U/U**	**5**
speedpipes bundled or single, with/without optical fibre cable, with fire protection wrap DG-CR 1.5 – wrap width 125 mm	**Measure**	**Fire resistance class**	**Source[1]**
max. 24 pcs. pipe outer Ø ≤ 7	1× 1 layer	**EI 120 U/U**	**1**
max. 7 pcs. pipe outer Ø ≤ 10	1× 1 layer	**EI 120 U/U**	**1**
max. 5 pcs. pipe outer Ø ≤ 12	1× 1 layer	**EI 120 U/U**	**1**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
6 → ETA 22/0051 7 → KB 02152/20/Z00NZP 8 → KB 319111905-A 9 → KB 1913.1/13/Z00NP 10 → KB 3.2/11-104-1
11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

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Installation in floors			
Combustible pipes			
PVC-U, PVC-C, PP-H or PE 100 with/without 5 mm PE noise insulation, and with intumescent wrap DG-CR BS	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 50.0 mm	1× 1 layer, 100 mm	**EI 120 U/U**	**1**
Pipe outer Ø ≤ 80.0 mm	1× 2 layers, 100 mm	**EI 120 U/U**	**1**
Pipe outer Ø ≤ 110.0 mm	1× 3 layers, 100 mm	**EI 120 U/U**	**1**
Pipe outer Ø ≤ 135.0 mm	1× 4 layers, 100 mm	**EI 120 U/C**	**1**
Pipe outer Ø ≤ 160.0 mm	1× 5 layers, 100 mm	**EI 120 U/C**	**1**
Brennbare Rohre mit/ohne 5 mm PE-Schallschutzschlauch und mit Rohrmanschette AWM II / VARIANT N II A	**Measure**	**Fire resistance class**	**Source[1]**
PVC-U			
Pipe outer Ø ≤ 75.0 mm	deckenunterseitig	**EI 120 U/U**	**6**
Pipe outer Ø ≤ 160.0 mm	deckenunterseitig	**EI 90 U/U**	**6**
PE-HD	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 125.0 mm	deckenunterseitig	**EI 120 U/U**	**6**
Pipe outer Ø ≤ 160.0 mm	deckenunterseitig	**EI 90 U/U**	**6**
PP-H, Geberit Silent Pro, GF Silenta Premium	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 160.0 mm	deckenunterseitig	**EI 120 U/U**	**6**
POLO-KAL NG, Wavin SiTECH+	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 160.0 mm	deckenunterseitig	**EI 90 U/U**	**6**
POLO-KAL XS	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 110.0 mm	deckenunterseitig	**EI 120 U/U**	**6**
Pipe outer Ø ≤ 160.0 mm	deckenunterseitig	**EI 90 U/U**	**6**
Geberit Silent PP, CONEL DRAIN, REHAU RAUPIANO LIGHT	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 110.0 mm	deckenunterseitig	**EI 90 U/U**	**6**
Valsir TriPlus	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 50.0 mm	deckenunterseitig	**EI 90 U/U**	**6**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
6 → ETA 22/0051 7 → KB 02152/20/Z00NZP 8 → KB 319111905-A 9 → KB 1913.1/13/Z00NP 10 → KB 3.2/11-104-1
11 → KB 01883.2/14/Z00NP 12 → PB 3096/155/10-CR 13 → KB K-3576/852/12-MPA BS 14 → KB 3.2/11-103-1

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Installation in floors

Multilayer pipes

Henco Pipes with non-combustible insulation made of lamella mat	Measure	Fire resistance class	Source[1]
Pipe outer Ø ≤ 12.0 mm, pipe wall thickness 1.6 mm	lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	5
Pipe outer Ø ≤ 32.0 mm, pipe wall thickness 3.0 mm		EI 120 U/C	5
Pipe outer Ø ≤ 63.0 mm, pipe wall thickness 4.5 mm	lamella mat ≥ 250 mm × ≥ 30 mm	EI 120 U/C	5
Henco Pipes with PE foam insulation and intumescent wrap DG-CR BS – wrap width 100 mm	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 14.0 mm, pipe wall thickness 2.0 mm, PEF 6 mm	2× 1 layer + lamella mat ≥ 250 mm × ≥ 20 mm	EI 120 U/C	5
Pipe outer Ø ≤ 26.0 mm, pipe wall thickness 3.0 mm, PEF 6–13 mm		EI 120 U/C	5
Pipe outer Ø ≤ 32.0 mm, pipe wall thickness 2.0 mm, PEF 6–10 mm		EI 120 U/C	5

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
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Novasit BM

Installation in floors

Non-combustible pipes

Copper with non-combustible insulation made of lamella mat	Measure	Fire resistance class	Source[1]
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	≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 88.9 mm	≥ 750 mm × ≥ 60 mm	**EI 120 C/U**	**1**
Steel, stainless steel or cast iron with non-combustible insulation made of lamella mat	**Measure**	**Fire resistance class**	**Source[1]**
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 ≤ 114.3 mm	≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 168.3 mm	≥ 1000 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 323.9 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 30 mm	**EI 120 C/U**	**1**
Copper with non-combustible insulation Conlit 150U	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 15.0 mm	≥ 250 mm × ≥ 22.5 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 42.0 mm	≥ 500 mm × ≥ 19 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 54.0 mm	≥ 500 mm × ≥ 38 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × ≥ 36 mm	**EI 120 C/U**	**1**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
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Installation in floors

Non-combustible pipes			
Steel, stainless steel or cast iron with non-combustible insulation Conlit 150U	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 15.0 mm	≥ 250 mm × ≥ 22.5 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 28.0 mm	≥ 500 mm × ≥ 26 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 42.0 mm	≥ 500 mm × ≥ 19 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 54.0 mm	≥ 500 mm × ≥ 38 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 114.3 mm	≥ 750 mm × ≥ 33 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 168.3 mm	≥ 1000 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 219.1 mm	≥ 1000 mm × ≥ 40 mm + Lamellenmatte ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 323.9 mm	≥ 1000 mm × ≥ 40 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 90 / E 120 C/U**	**1**
Copper with combustible insulation ArmaFlex Protect	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 28.0 mm	≥ 250 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 500 mm × 26 mm – 51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 88.9 mm	≥ 500 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 1000 mm × 26 mm – 51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 108.0 mm	≥ 1000 mm × 52 mm	**EI 120 C/U**	**1**
	≥ 1000 mm × 26 mm – 52 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**
Steel, stainless steel or cast iron with combustible insulation ArmaFlex Protect	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 28.0 mm	≥ 250 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 500 mm × 26 mm – 51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 88.9 mm	≥ 500 mm × 25 mm	**EI 120 C/U**	**1**
	≥ 1000 mm × 26 mm – 51 mm	**EI 120 C/U**	**1**
Pipe outer Ø ≤ 170.0 mm	≥ 1000 mm × 26 mm – 52 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**1**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
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Installation in floors

Non-combustible pipes			
Copper with combustible FEF insulation in acc. with EN 14304 and fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≤ 54.0 mm	2× 2 layers, 125 mm	**EI 120 C/U**	**5**
Pipe outer Ø ≤ 88.9 mm	2× 2 layers, 125 mm + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**5**
Pipe outer Ø ≤ 108.0 mm	2× 2 layers, 125 mm + lamella mat ≥ 750 mm × ≥ 40 mm	**EI 120 C/U**	**5**

Steel, stainless steel or cast iron with FEF insulation in acc. with EN 14304 and fire protection wrap DG-CR 1.5 – wrap width 125 mm	**Measure**	**Fire resistance class**	**Source[1]**
Pipe outer Ø ≥ 76,0 – ≤ 168.3 mm	2× 2 layers + lamella mat ≥ 500 mm × ≥ 40 mm	**EI 120 C/U**	**5**
HVAC split line combinations with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
copper pipe 1/ copper pipe 2 outer Ø 6–10 mm / 10–18 mm + pipe insulation made of PE-100 outer Ø ≤ 25 mm, t 1.8 mm + optional additional cables/pipes without spacing	2× 2 layers, 125 mm	**EI 120**	**1**
Double solar pipes Nanosun² with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
DN 16 and DN 25	1× 1 layer, 125 mm	**EI 120 C/U**	**3**
Hydraulic hoses (also with wire braid reinforcement) with fire protection wrap DG-CR 1.5	**Measure**	**Fire resistance class**	**Source[1]**
up to Ø 55.9 (HANSA-FLEX HD 200 (2SN)) (e.g. hydraulic hoses for elevators) with additional cable	2× 1 layer, 125 mm + lamella mat ≥ 250 mm × ≥ 20 mm	**EI 120**	**3**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
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Novasit BM

Installation in floors

CT Cable Tube – options in floors					Source[1]
Length of CT [mm]		**150**	**200**	**300**	
Services	**additional measure**				
Cables Ø ≤ 21 mm	–	**EI 120**	**EI 120**	**EI 120**	**11**
Cables Ø ≤ 50 mm	–	–	–	**EI 60 / E 120**	**14**
	only 100% configuration	**EI 90 / E 90**	**EI 90 / E 90**	**EI 90 / E 90**	**12**
	lamella mat ≥ 250 mm × ≥ 30 mm + DG-CR 1.5, 1 layer, above seal	–	–	**EI 120**	**12**
Cables Ø ≤ 80 mm	–	–	–	**EI 60 / E 120**	**14**
Cable bundles Ø ≤ 100 % with single cables Ø ≤ 14 mm		**EI 90**	**EI 120**		**11, 13**
Cable bundles Ø ≤ 100 % with single cables Ø ≤ 21 mm	–	**EI 60 / E 90**	**EI 60 / E 90**	**EI 120**	**13, 14**
	DG-CR 1.5, 1 layer, 50 mm overlap above or below seal	**EI 120**	**EI 120**	**EI 120**	**11**
Max. 3 × electrical installation conduits (EIC) made of plastic, flexible Ø 32 mm with/without cables up to Ø 14 mm	–	**EI 90 U/U**	**EI 90 U/U**	–	**9**
Electrical installation conduits (EIC) made of plastic, flexible Ø 32 mm single, with/without cables up to Ø 21 mm	–	–	–	**EI 120**	**6**
Max. 3 × electrical installation conduits (EIC) made of plastic, flexible Ø ≤ 32 mm single or bundled Ø 100 %, with/without cables Ø ≤ 21 mm	–	–	–	**EI 120 U/U***	**11**
HVAC split line combination Pipe 1 / pipe 2 outer Ø 6–10 mm / 10–18 mm + 9 mm insulation made of PE foam; plastic pipe PE-100, outer Ø up to 25 mm, s 1.5 mm + max. 3 additional cables up to Ø 14 mm without spacing	–	**EI 90 U/U**	**EI 90 U/U**	**EI 90 U/U**	**9**
HVAC split line combination Pipe 1 / pipe 2 outer Ø 6–22 mm / 6–22 mm + 9 mm insulation made of PE foam; plastic pipe PE-100, outer Ø up to 25 mm, s 1.5 mm + max. 3 additional cables up to Ø 14 mm without spacing	lamella mat ≥ 250 mm × ≥ 30 mm above seal	**EI 120 U/U**	**EI 120 U/U**	**EI 120 U/U**	**11**
speedpipes bundled or single, with/without optical fibre cable max. 24 pcs. pipe outer Ø up to 7 mm max. 7 pcs. pipe outer Ø up to 10 mm max. 5 pcs. pipe outer Ø up to 12 mm	–	**EI 120 U/U**	**EI 120 U/U**	**EI 120 U/U**	**11**

[1] 1 → 1883.1./14/Z00NP 2 → KB 3.2/11-104-1 3 → KB 3.2/11-103-1 4 → 01883.2/14/Z00NP 5 → 02761.3/16/Z00NP
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* only floors ≥ 200 mm

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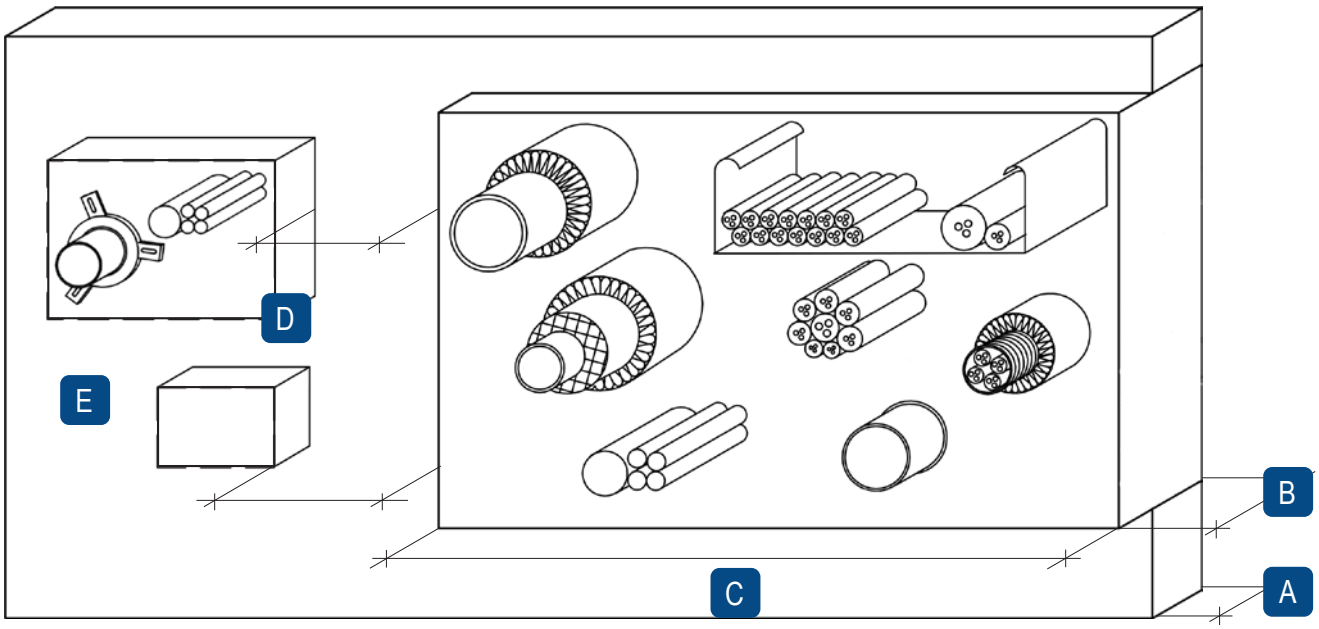
3. Minimum thicknesses / spacing distance to other installations

Dimensions			
		Solid wall [mm]	**Solid floor [mm]**
A	Thickness of building element	≥ 150	≥ 150
B	Thickness of penetration seal	≥ 150	≥ 150
C	Maximum dimensions of the opening (width × height)	1200 × 2000	1200 × 2000
D	Spacing distance to other cable or pipe penetration seals one or both openings > 400 × 400 mm	≥ 200	≥ 200
	both openings ≤ 400 × 400 mm	≥ 100	≥ 100
E	Spacing distance to other openings or installations one or both openings > 200 × 200 mm	≥ 200	≥ 200
	both openings ≤ 200 × 200 mm	≥ 100	≥ 100



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

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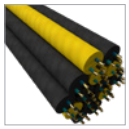
4. Allowed services

4.1 Cables / cable bundles / cable trays / electrical installation conduits / speedpipes

Electrical cables and lines of all types (including wave guides)

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



Cable bundles

Outer Ø ≤ 100 mm with individual 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, single, made of plastic

Outer Ø ≤ 100 mm, with or without cables Ø ≤ 50 mm.

Electrical installation conduits, bundled, made of plastic

Outer Ø ≤ 100 mm with individual conduits outer Ø ≤ 32 mm, with or without cables, individual cables Ø ≤ 21 mm.

speedpipes indoor (PE pipes for optical fibre cables and micro cables)

Made by Gabocom Systemtechnik GmbH, bundled or individual, with/without optical fibre cables

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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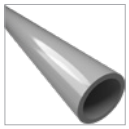
4.2 Combustible pipes



Up to an outer Ø ≤ 160 mm with or without 5 mm PE acoustic insulation.

In case of ventilated drain pipes and closed piping systems: the pipes may carry non-combustible liquids or gases (ventilation pipes excepted).

Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]
PVC-U, PVC-C (in acc. with standard EN 1329-1, EN 1453-1, EN 1542-1, EN 15493, DIN 8061/8062, EN 1566-1)	≤ 50.0	1.8–3.7
	≤ 110.0	2.2–8.2
	≤ 160.0	3.2–11.9
PP-H (in acc. with standard EN 1555-2, EN 12201-2+A1, DIN 8074/8075, EN 15874, DIN 8077/8078)	≤ 50.0	1.8–4.6
	≤ 110.0	2.7–10.0
	≤ 160.0	3.9–9.1
PE 100 (in acc. with standard EN 1555-2, EN 12201-2+A1, DIN 8074/8075)	≤ 50.0	1.8–4.8
	≤ 110.0	2.7–10.0
	≤ 160.0	3.9–9.1
PE-HD (in acc. with standard DIN 8074, DIN 19533, DIN 19535-1, DIN 19537-1)	≤ 110.0	
	≤ 125.0	
	≤ 160.0	
POLO-KAL NG	≤ 110.0	
	≤ 160.0	
POLO-KAL XS	≤ 110.0	
	≤ 160.0	
Geberit Silent-PP	≤ 110.0	
Geberit Silent-Pro	≤ 160.0	
Geberit Silent-db20	≤ 110.0	
	≤ 160.0	
GF Silenta Premium	≤ 160.0	
CONEL DRAIN	≤ 110.0	
REHAU RAUPIANO LIGHT	≤ 110.0	
REHAU RAUPIANO PLUS	≤ 50.0	

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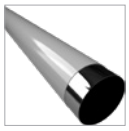
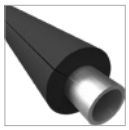
Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]
Valsir Triplus	≤ 50.0	
	≤ 160.0	
Pipelife MASTER 3 PLUS	≤ 50.0	
KE KELIT PHONEX AS	≤ 50.0	
Wavin AS	≤ 50.0	
Wavin SiTech+	≤ 160.0	

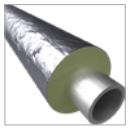
4.3 Multilayer pipes



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

4.4 Non-combustible pipes





Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]
Copper, steel, stainless steel, cast iron	Ø ≤ 15.0	≥ 0.8
	Ø > 15.0 – ≤ 108.0	≥ 1.0 – ≥ 2.5 / ≤ 14.2
Steel, stainless steel, cast iron	Ø > 108.0 – ≤ 323.9	≥ 2.6 – ≥ 7.5 / ≤ 14.2

The penetration seal may also be used for pipes made of other kinds of metal as long as the heat transfer rate is lower than that of steel or copper with a melting point of ≥ 1049 °C.

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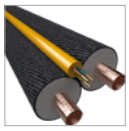
4.5 Further allowed services



HVAC split line combinations

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

Double or single copper pipe and pipe insulation of 9 mm thickness made of PE foam in accordance with EN 14313 with optional accompanying pipes (one plastic pipe (U/U) made of PVC-U, outer Ø 25 mm and pipe wall thickness 1.5 mm, in accordance with EN 1453-1 or EN 1452-1 and DIN 8061/ DIN 8062 and up to 2 sheathed lines with max. 5 cores of ≤ 1.5 mm², Ø ≤ 14 mm, or 4 sheathed lines Ø ≤ 21 mm without spacing.

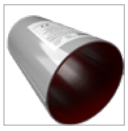
Double solar pipes Nanosun²

Pipes for solar thermal applications made of corrugated stainless steel with insulation, an additional line integrated in the insulation and a PVC sheath made by Aktarus Group Srl, Ø ≤ DN 25.

HANSA-FLEX hydraulic hoses with wire braid reinforcement

Of the type HD 200 (2SN) in accordance with DIN EN 853 for mineral oils, outer Ø ≤ 55.9 mm.

4.6 CT Cable Tube (for subsequent installations)



CT Cable Tube with intumescent inlining in accordance with ETA-16/0016

Depending on building element and services, cable tubes with a length of 150, 200 and 300 mm may be installed.

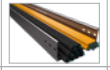
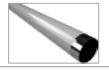
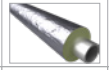
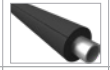
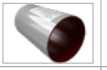
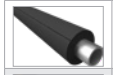
5. Spacing distance for services

Novasit BM – spacing distance in wall

	Cables	Cable bundles	Cable trays	EIC, single/bundled, made of plastic	Combustible pipes	Multilayer pipes	Non-combustible pipes with insulation made of mineral wool	Non-combustible pipes with FEF insulation	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Hydraulic hoses HANSA-FLEX	CT Cable Tube	Seal edge		
														Upper	Lower	Side
Cables	≥ 10 (≥ 50 one above the other)			cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 50	cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 35	≥ 35	≥ 40	≥ 100	≥ 25	≥ 45	≥ 65	≥ 30	≥ 0	≥ 0
Cable bundles	≥ 10 (≥ 50 one above the other)			≥ 100	≥ 50	≥ 100	≥ 35	≥ 35	≥ 40	≥ 100	≥ 25	≥ 45	≥ 65	≥ 30	≥ 0	≥ 0
Cable trays	≥ 10 (≥ 50 one above the other)			≥ 100	≥ 50	≥ 100	≥ 35	≥ 35	≥ 40	≥ 100	≥ 25	≥ 45	≥ 65	≥ 30	≥ 0	≥ 0
EIC, single/bundled, made of plastic	cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 100		≥ 0	≥ 100	≥ 100	≥ 80	≥ 80	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Combustible pipes	≥ 50			≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Multilayer pipes	cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 100		≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
Non-combustible pipes with insulation made of mineral wool	≥ 50			≥ 80	≥ 0	≥ 100	≥ 0	≥ 0	≥ 50	≥ 100	≥ 20	≥ 100	≥ 100	≥ 0		
Non-combustible pipes with FEF insulation	≥ 50			≥ 80	≥ 0	≥ 100	≥ 0	≥ 0	≥ 50	≥ 100	≥ 20	≥ 100	≥ 100	≥ 0		
HVAC split line combinations	≥ 40			≥ 100	≥ 50	≥ 100	≥ 50	≥ 50	≥ 25	≥ 85	≥ 100	≥ 100	≥ 100	≥ 0		
Double solar pipes Nanosun²	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 85	≥ 100	≥ 100	≥ 85	≥ 100	≥ 0		
speedpipes	≥ 25			≥ 100	≥ 100	≥ 100	≥ 20	≥ 20	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100	≥ 0		
Hydraulic hoses HANSA-FLEX	≥ 45			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 85	≥ 100	≥ 100	≥ 100	≥ 80		
CT Cable Tube	≥ 65			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 3	≥ 15		

All specifications in mm

Novasit BM – spacing distance in floor

															Bauteillaibung		
		Cables	Cable bundles	Cable trays	EIC, single/bundled, made of plastic	Combustible pipes	Multilayer pipes	Non-combustible pipes with insulation made of mineral wool	Non-combustible pipes with FEF insulation	HVAC split line combinations	Double solar pipes Nanosun²	speedpipes	Hydraulic hoses HANSA-FLEX	CT Cable Tube	Upper	Lower	Side
	Cables	seal thickness ≥ 150: ≥ 10, (≥ 50 one above the other) seal thickness ≥ 240: ≥ 0, (≥ 45 one above the other)			cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 50	cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 25	≥ 25	≥ 100	≥ 100	≥ 40	≥ 85	≥ 65	≥ 30	≥ 0	seal thickness ≥ 150: ≥ 10 seal thickness ≥ 240: ≥ 25
	Cable bundles	seal thickness ≥ 150: ≥ 10, (≥ 50 one above the other) seal thickness ≥ 240: ≥ 0, (≥ 45 one above the other)			≥ 100	≥ 50	≥ 100	≥ 25	≥ 25	≥ 100	≥ 100	≥ 40	≥ 85	≥ 65	≥ 30	≥ 0	seal thickness ≥ 150: ≥ 10 seal thickness ≥ 240: ≥ 25
	Cable trays	seal thickness ≥ 150: ≥ 10, (≥ 50 one above the other) seal thickness ≥ 240: ≥ 0, (≥ 45 one above the other)			≥ 100	≥ 50	≥ 100	≥ 25	≥ 25	≥ 100	≥ 100	≥ 40	≥ 85	≥ 65	≥ 30	≥ 0	seal thickness ≥ 150: ≥ 10 seal thickness ≥ 240: ≥ 25
	EIC, single/bundled, made of plastic	cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 100		≥ 0	≥ 100	≥ 100	≥ 60	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Combustible pipes	≥ 50			≥ 100	≥ 25	≥ 100	≥ 0	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Multilayer pipes	cables ≤ 21: ≥ 0 cables > 21: ≥ 100	≥ 100		≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Non-combustible pipes with insulation made of mineral wool	≥ 25			≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Non-combustible pipes with FEF insulation	≥ 25			≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	HVAC split line combinations	≥ 100			≥ 100	≥ 100	≥ 100	≥ 60	≥ 60	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Double solar pipes Nanosun²	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 80	≥ 100	≥ 30		
	speedpipes	≥ 40			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100	≥ 30		
	Hydraulic hoses HANSA-FLEX	≥ 85			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 80	≥ 100	≥ 100	≥ 100	≥ 35		
	CT Cable Tube	≥ 65			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 10	≥ 15		

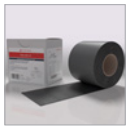
All specifications in mm

Novasit BM

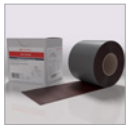
6. Used Products

NOVASIT BM
Fire protection mortar
20 kg bag – Art. no. 01161000
10 kg pail – Art. no. 01161010

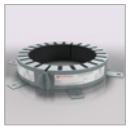
FLAMMOTECT-A
Filler
12.5 kg pail – Art. no. 01155134
310 ml cartridge – Art. no. 01155115



DG-CR 1.5
Fire protection wrap
Roll, 10 m × 125 mm – Art. no. 01261931



DG-CR BS
Fire protection wrap
Roll, 10 m × 100 mm – Art. no. 01264931



AWM II
fire protection collar
Ø 32–400 mm
Art. no. 01142032–01142400

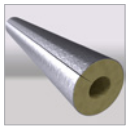
Variant N II A
fire protection collar
Ø 32–160 mm – Art. no. 15032–15160

Recommended tools

Mixing container – mortar cask,
mixing paddle
Masonry tools (round dippers)

CT Cable Tube

consisting of CT Cable Tube and two flexible foam plugs
Ø 60 mm / L 150 mm – Art. no. 01276101
Ø 90 mm / L 150 mm – Art. no. 01279101
Ø 90 mm / L 200 mm – Art. no. 01279201
Ø 90 mm / L 300 mm – Art. no. 01279301
Ø 120 mm / L 150 mm – Art. no. 01271151
Ø 120 mm / L 200 mm – Art. no. 01271201
Ø 120 mm / L 300 mm – Art. no. 01271301



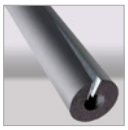
Mineral fibre lamella mat or pipe sleeves

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

for example:

Bezeichnung	Nominal bulk density [kg/m³]	DIN/ abZ/abP
Rockwool lamella mat KLIMAROCK Roll à 3.05 m² – Art. no. 01187100	40-50	DE0628031801 of 14.03.2018
Rockwool ProRox PS 960 (formerly ROCKWOOL Lapimus Pipe sleeve 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-Pi-pe_Sections 001 of 10.06.2013
Isover mineral fibre mat MD2 and MD2/A	80	DE0002-Pro-tect_EN14303 002 of 09.02.2015
Isover mineral fibre mat MDD and MDD/A	115	

Novasit BM



Section and protective insulations

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

for example:

Name	DIN/abZ/abP
Armaflex Protect	(0543-CPR-2016-001 of 01.04.2015)
AF/Armaflex	0543-CPR-2016-001 of 01.04.2015
SH/Armaflex	0543-CPR-2013-013 of 01.01.2015
NH/Armaflex	0552-CPR-2013-015 of 08.08.2018
FEF Kaiflex KKplus s1	DoP KKplus s1 01032018001 of 01.03.2018
FEF Kaiflex HTplus	DoP HTplus s1 01032018001 of 01.03.2018
K-Flex R90	P-2300/871/16-MPA BS of 04.10.2016
flexen Heizungskautschuk	LE_5258006015_00_M_flexen_Heizungskautschuk of 30.06.2013
flexen Kältekautschuk	LE_0869806006_00_M_flexen_Kältekautschuk of 30.06.2013

6.1 Declarations of Performance

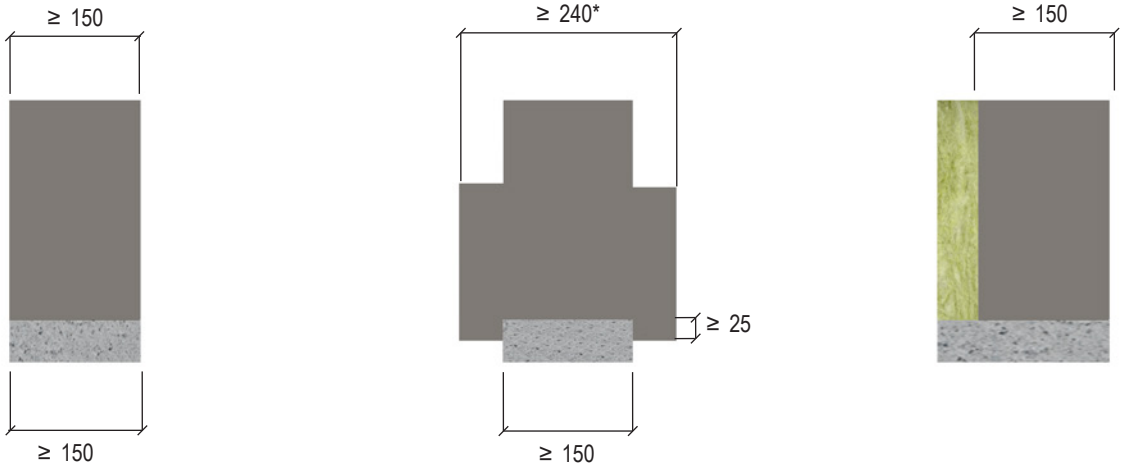
Declarations of Performance for flamro products are available for download on our website:
https://svt-global.com/downloads

Novasit BM

7. Design 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 in walls, shuttering may be necessary on one side. When installing in floors, shuttering may be necessary on the lower side.
- When installing in floors, seal surfaces > 500 × 500 mm without services or cable trays must be provided with an appropriate friction-locked steel reinforcement.

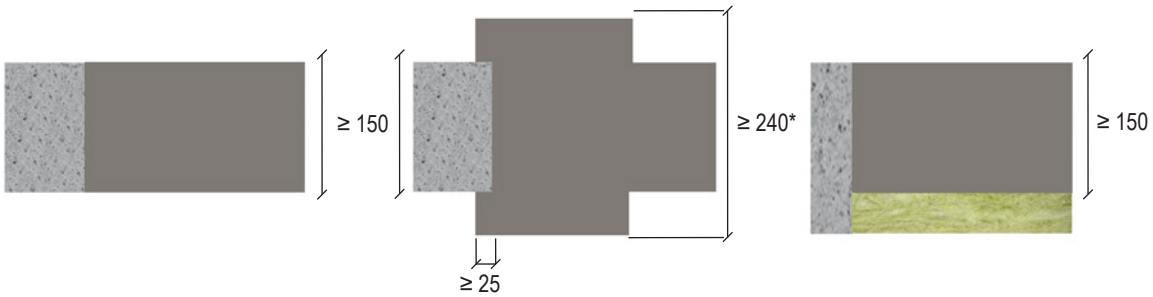
Design variants in walls



Variants using NOVASIT BM fire protection mortar
Permanent shuttering with – for example – a mineral fibre mat (non-combustible, melting point > 1000 °C)

All specifications in mm

Design variants in floors



Variants using NOVASIT BM fire protection mortar
Permanent shuttering with – for example – a mineral fibre mat (non-combustible, melting point > 1000 °C)

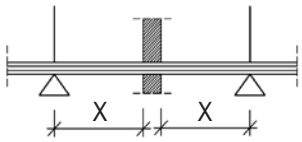
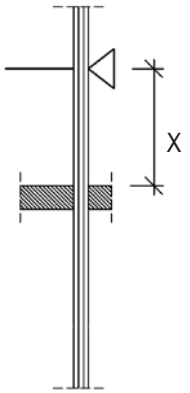
All specifications in mm

* Seal thickness 240 mm, see page 27

Novasit BM

7.1 Initial brackets (supports)

Essential parts of the brackets/supports for the installations used with the penetration sealing system must be non-combustible (building material category DIN 4102-A) and installed at distances as follows:

		wall – X [mm]	floor – X [mm]
 	cables, cable bundles, cable trays	≤ 500 mm	≤ 400 mm
	electrical installation conduits	≤ 500 mm	≤ 500 mm
	combustible pipes	≤ 500 mm	≤ 500 mm
	multilayer pipes	≤ 400 mm	≤ 400 mm
	non-combustible pipes with mineral wool insulation	L* + 50 mm	L* + 50 mm
	non-combustible pipes with FEF insulation	L* + 50 mm	L* + 50 mm
	double solar pipes Nanosun²	≤ 500 mm	≤ 500 mm
	speedpipes (PE pipes for optical fibre cables and micro cables)	**	**
	HVAC split line combinations	≤ 500 mm	≤ 500 mm
	HANSA-FLEX hydraulic hoses with wire braid reinforcement	≤ 500 mm	≤ 500 mm
	Cable Tube installations	≤ 300 mm	≤ 300 mm
Initial bracket (support) of the installations made of steel or equivalent material.	* L = insulation length **according to manufacturer		

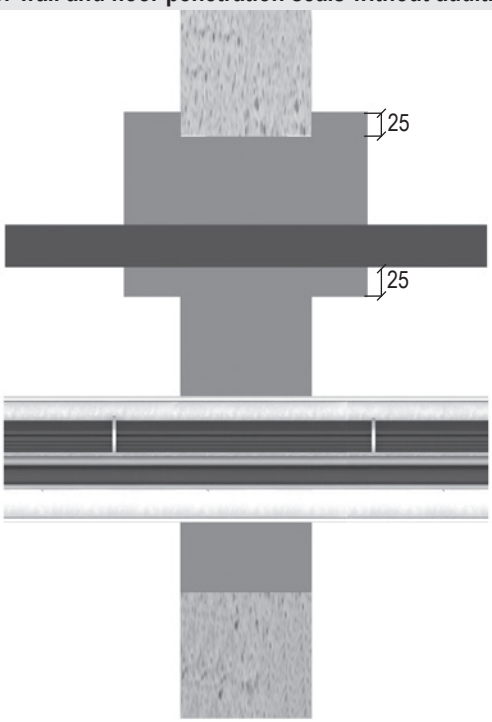
Novasit BM

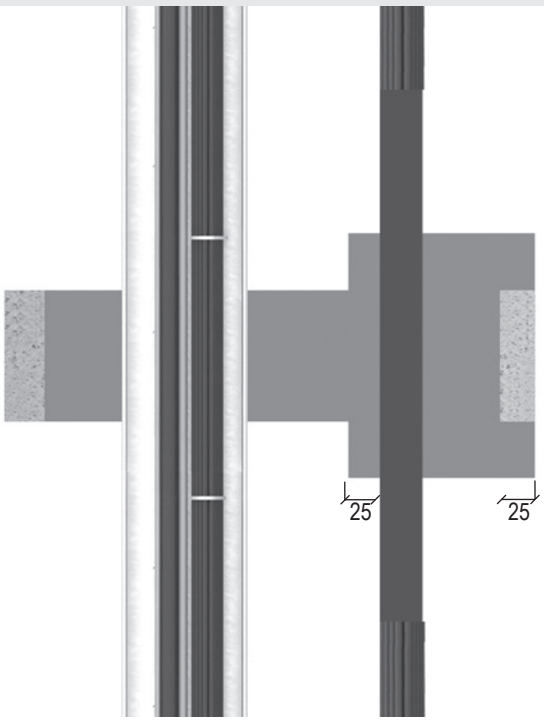
8. Fire protection measures

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 gussets 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.
- In case of cable support structures made of sheet steel or hollow aluminium profiles, the spars must be drilled and filled with the ablative filler FLAMMOTECT-A in the penetration area (necessary measures must be coordinated on site).

Design for wall and floor penetration seals without additional measures





For thicknesses and design variants, see page 29

All specifications in mm

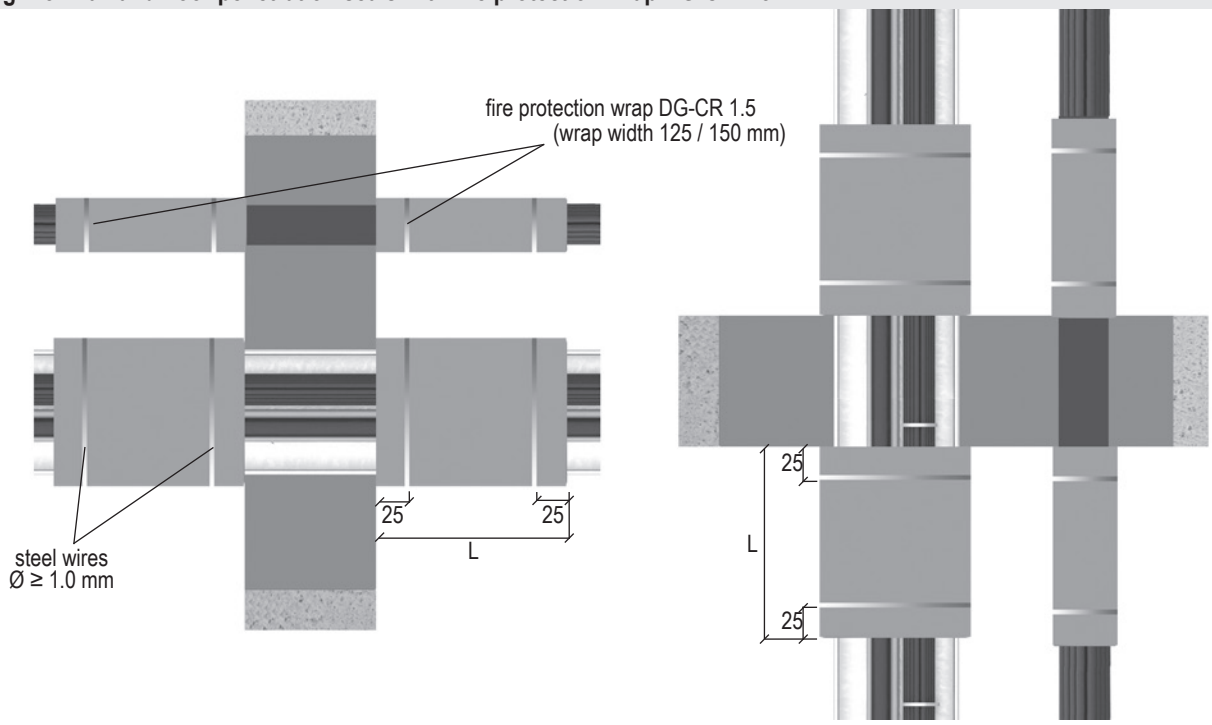
Service	Dimensions [mm]	Seal thickness [mm]	Fire resistance class	
			Wall	Floor
Cables	Ø ≤ 32	150	EI 120	EI 120
	Ø ≤ 50	240	EI 120	EI 90 / E 120
	Ø ≤ 80		EI 90 / E 120	EI 90
Single-core non-sheathed cables	Ø wires ≤ 24	150	EI 120	EI 120
Cable bundles	Ø ≤ 60		EI 120	EI 120
	Ø ≤ 100		EI 90 / E 120	EI 60 / E 120
		240	EI 120	EI 120

Novasit BM

8.1.1 Design variant with fire protection wrap DG-CR 1.5

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

Design for wall and floor penetration seals with fire protection wrap DG-CR 1.5



For thicknesses and design variants, see page 29

All specifications in mm

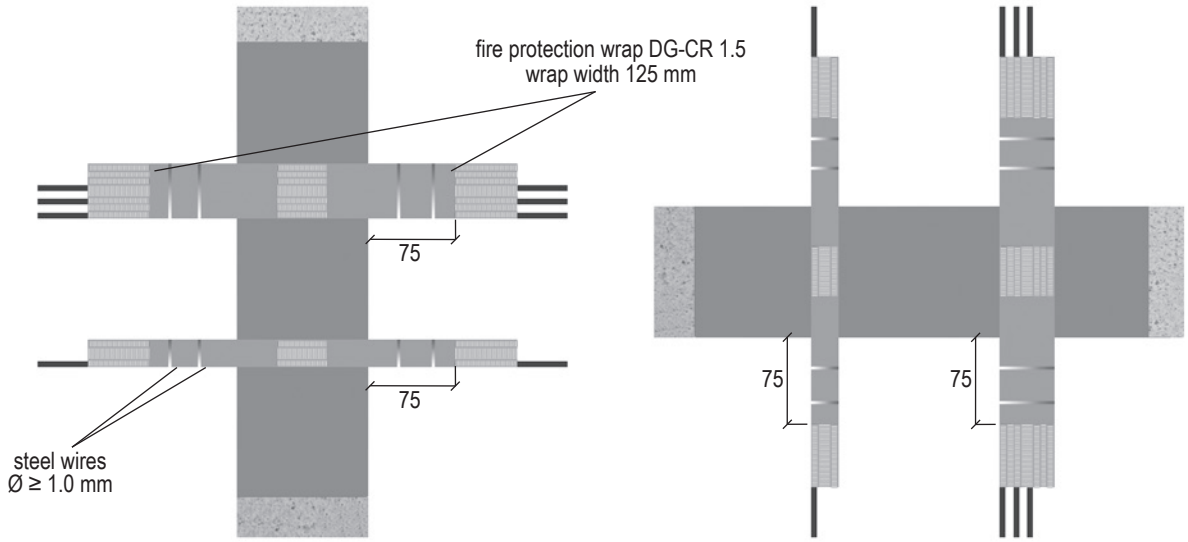
Service	Outer Ø [mm]	Fire protection wrap DG-CR 1.5						Fire resistance class	
		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
Cables	Ø ≤ 32	–	–	–	–	–	–	EI 120	EI 120
	Ø ≤ 50	125	2	2	45–60	0	125	EI 120	EI 120
	Ø ≤ 80							EI 90 / E 120	EI 120
		150					150	EI 120	EI 120
Cable bundles	Ø ≤ 100	125		1			125	EI 120	EI 120

Novasit BM

8.2 Electrical installation conduits (EIC) – single or bundled

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

Design for wall and floor penetration seals with fire protection wrap DG-CR 1.5



For thicknesses and design variants, see page 29

All specifications in mm

Service	Outer Ø [mm]	Fire protection wrap DG-CR 1.5						Fire resistance class	
		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
EIC made of plastic, single	EIC Ø ≤ 32 cables Ø ≤ 21	125	2	1	0	50	75	**EI 120 U/U**	**EI 120 U/U**
	EIC Ø ≤ 63 cables Ø ≤ 21			2					
EIC made of plastic, single*	EIC Ø ≤ 100 cables Ø ≤ 50			3				–	
EIR made of plastic, bundled	bundle Ø ≤ 100 EIC Ø ≤ 32 cables Ø ≤ 21			2				**EI 120 U/U**	

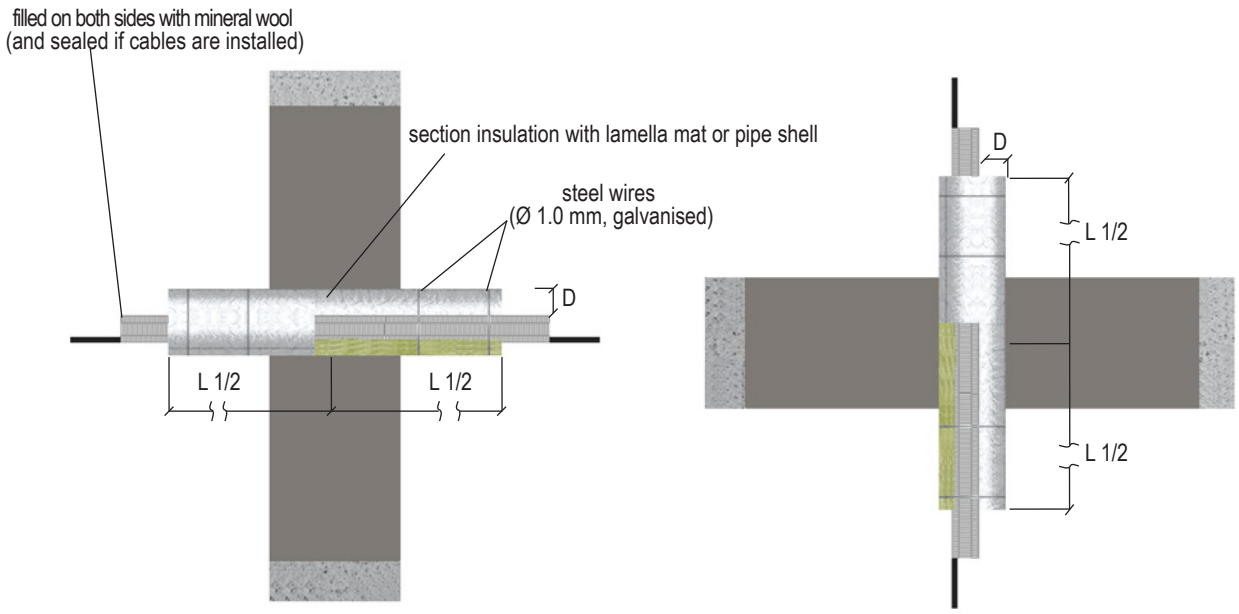
* with additional mineral fibre mat insulation (L1 ≥ 500 mm × D1 ≥ 30 mm)

Novasit BM

8.2.1 Design variant with mineral fibre mats

It is possible to install EIC with (cable Ø ≤ 22.0 mm) or without cables. The section insulation made of mineral wool must be fastened with tensioning straps or wires.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

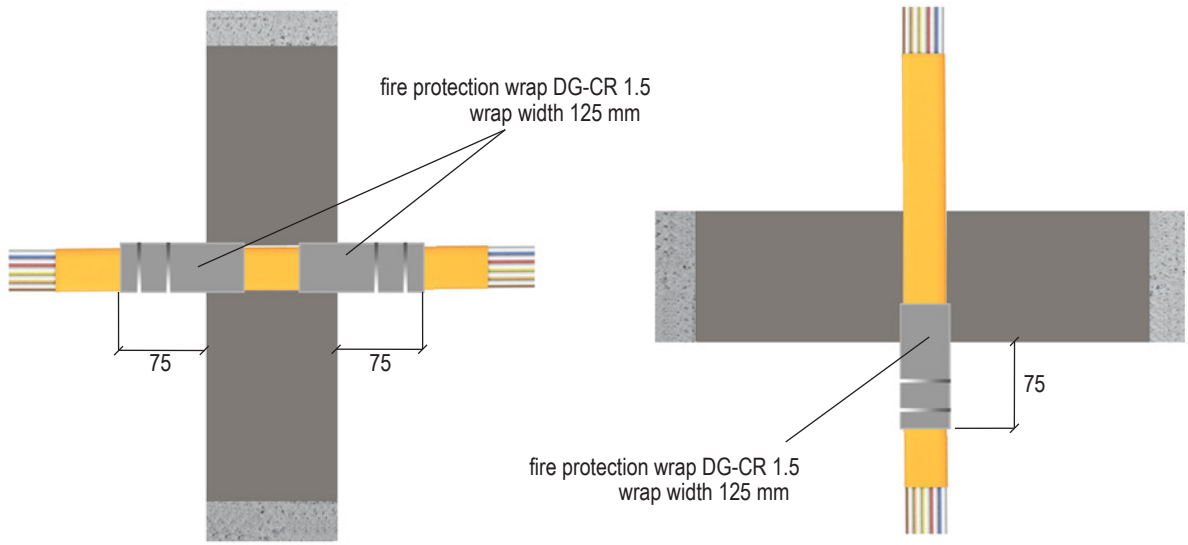
EIC material	EIC outer Ø [mm]	Section insulation		Fire resistance class	
		Thickness [mm]	Length L 1/2 [mm]	Wall	Floor
PE-HD	≤ 63	≥ 30	≥ 500	**EI 120 U/C**	**EI 120 U/C**

Novasit BM

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

- The speedpipes must be arranged vertically to the surface of the building element (pipe end configuration U/U).
- The speedpipes must be wrapped on both sides with the fire protection wrap DG-CR 1.5 (wrap width 125 mm).
- The fire protection wrap must be arranged in such a way that 50 mm are inside the seal.
- The fire protection wrap is coated on one side and equipped with a protective film. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Wall

Configuration	Pipe wall thickness [mm]	Fire protection wrap 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 pcs	≥ 1.5	125	2	1	0	50	75	EI 120 U/U
Ø 10.0 mm × 7 pcs	≥ 2.0							
Ø 12.0 mm × 5 pcs	≥ 2.0							

Floor

Configuration	Pipe wall thickness [mm]	Fire protection wrap 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 pcs	≥ 1.5	125	1	2	0	50	75	EI 120 U/U
Ø 10.0 mm × 7 pcs	≥ 2.0							
Ø 12.0 mm × 5 pcs	≥ 2.0							

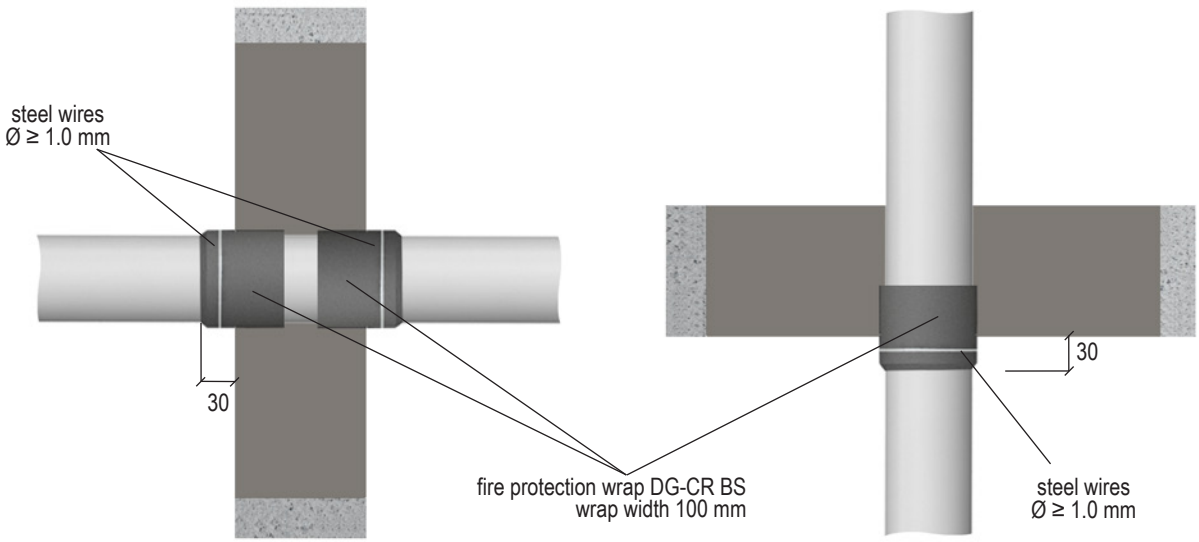
Novasit BM

8.4 Combustible pipes

8.4.1 Design variant with fire protection wrap DG-CR BS

- In wall seals two fire protection wraps DG-CR BS (wrap width 100 mm) must be installed on both sides of the wall. In floor seals one fire protection wrap must be installed on the lower side of the floor.
- Pipes must be arranged vertically to the surface of the building element.
- 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.
- Optionally a noise insulation ≤ 5 mm may be installed.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Novasit BM

Wall								
Pipe material	Dimensions [mm]	Fire protection wrap 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]	
PVC-U, PVC-C, PP-H, PE 100	≤ Ø 50	100	2	1	0	70	30	EI 120 U/U
	> Ø 50–80			2				
	> Ø 80–110			3				
	> Ø 110–135			4				EI 120 U/C
	> Ø 135–160			5				

Floor								
Pipe material	Dimensions [mm]	Fire protection wrap 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]	
PVC-U, PVC-C, PP-H, PE 100	≤ Ø 50	100	1	1	0	70	30	EI 120 U/U
	> Ø 50–80			2				
	> Ø 80–110			3				
	> Ø 110–135			4				EI 120 U/C
	> Ø 135–160			5				

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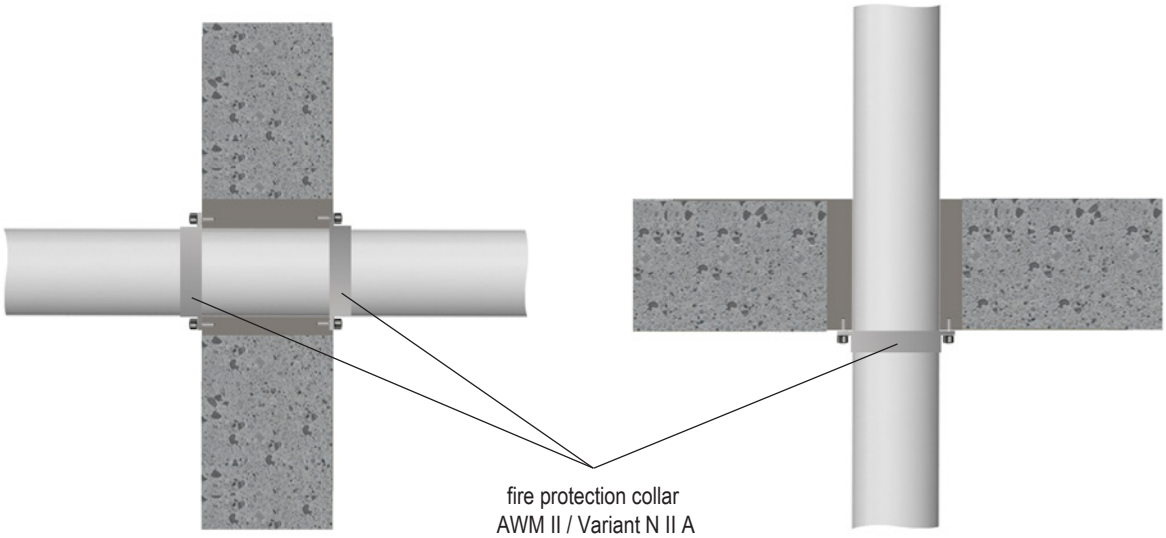
8.4.2 Design variant with fire protection collar AWM II / Variant N II A

- In wall seals two fire protection collars AWM II / Variant N II A must be installed on both sides of the wall. In floor seals one fire protection collar must be installed on the lower side of the floor.
- Pipes must be arranged vertically to the surface of the building element.
- 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.
- Optionally a noise insulation ≤ 5 mm may be installed.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

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Wall and floor				
Service	Outer Ø [mm]	Measure	Fire resistance class	
			Wall	Floor
PVC-U	≤ 75.0	Wall: AWM II / Variant N II A collar on both sides Floor: Variant N II A / N II KS collar on lower side	EI 120 U/U	EI 120 U/U
	≤ 160.0		EI 120 U/U	EI 90 U/U
PE-HD	≤ 110.0		EI 120 U/U	EI 120 U/U
	≤ 125.0		EI 90 U/U	EI 120 U/U
	≤ 160.0		EI 90 U/U	EI 90 U/U
PP-H	≤ 110.0		EI 120 U/U	EI 120 U/U
	≤ 160.0		EI 90 U/U	EI 120 U/U
POLO-KAL NG	≤ 110.0		EI 120 U/U	EI 90 U/U
	≤ 160.0		–	EI 90 U/U
POLO-KAL XS	≤ 110.0		EI 120 U/U	EI 120 U/U
	≤ 160.0		–	EI 90 U/U
Geberit Silent-PP	≤ 110.0		–	EI 90 U/U
Geberit Silent-Pro	≤ 160.0		EI 120 U/U	EI 120 U/U
Geberit Silent-db20	≤ 110.0		EI 120 U/U	–
	≤ 160.0		EI 90 U/U	–
GF Silenta Premium	≤ 160.0		EI 120 U/U	EI 120 U/U
CONEL DRAIN	≤ 110.0		EI 120 U/U	EI 90 U/U
REHAU RAUPIANO LIGHT	≤ 110.0		EI 120 U/U	EI 90 U/U
REHAU RAUPIANO PLUS	≤ 50.0		EI 120 U/U	–
Pipelife MASTER 3 PLUS	≤ 50.0		EI 120 U/U	–
KE KELIT PHONEX AS	≤ 50.0		EI 120 U/U	–
Wavin AS	≤ 50.0		EI 120 U/U	–
Wavin SiTech+	≤ 160.0		EI 120 U/U	EI 90 U/U
Valsir Triplus	≤ 50.0		EI 120 U/U	EI 90 U/U
	≤ 160.0		EI 120 U/U	–

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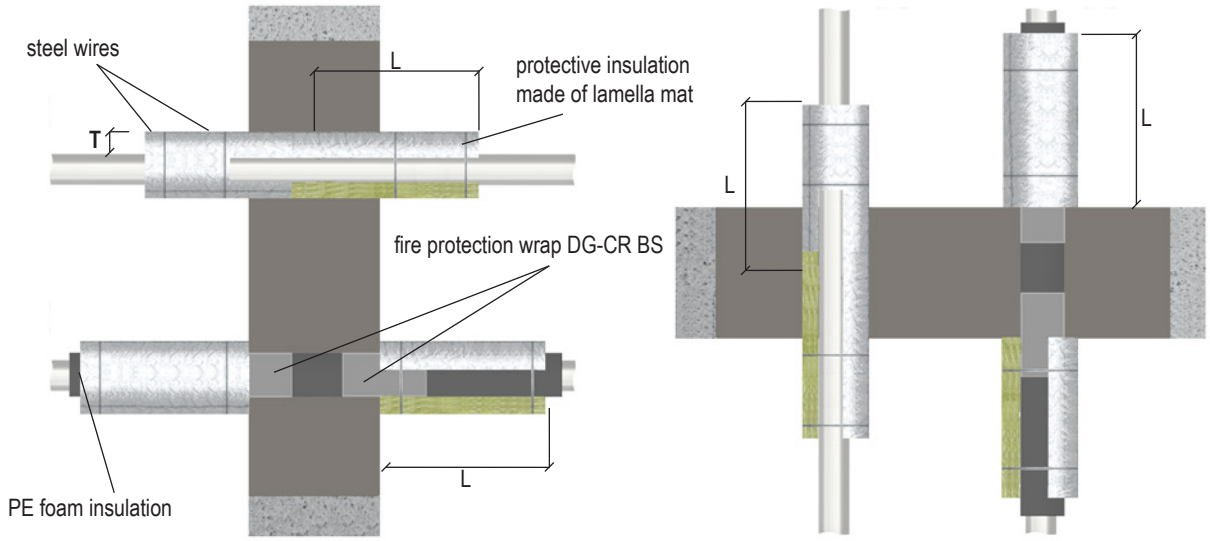
8.5 Multilayer pipes by Henco

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Outer Ø [mm]	Thickness of PEF insulation [mm]	Wall thickness [mm]	Fire protection wrap		Protective insulation		Fire resistance class	
			Width [mm]	Number of layers[n]	Length L [mm]	Thickness T [mm]	Wall	Floor
Multilayer pipes Henco Standard			–		**Lamella mat**		**EI 120 U/C**	**EI 120 U/C**
≤ 12 mm	–	1.6			≥ 250	≥ 20		
≤ 32 mm		3.0						
≤ 63 mm		4.5				≥ 30		
Multilayer pipes Henco Standard with PE foam insulation			**DG-CR BS**		**Lamella mat**			
≤ 14 mm	6	2.0	100 (50 inside seal/ 50 outside seal)	1 (25 mm overlap)	≥ 250	≥ 20		
≤ 26 mm	6–13	3.0						
≤ 32 mm	6–10	2.0						

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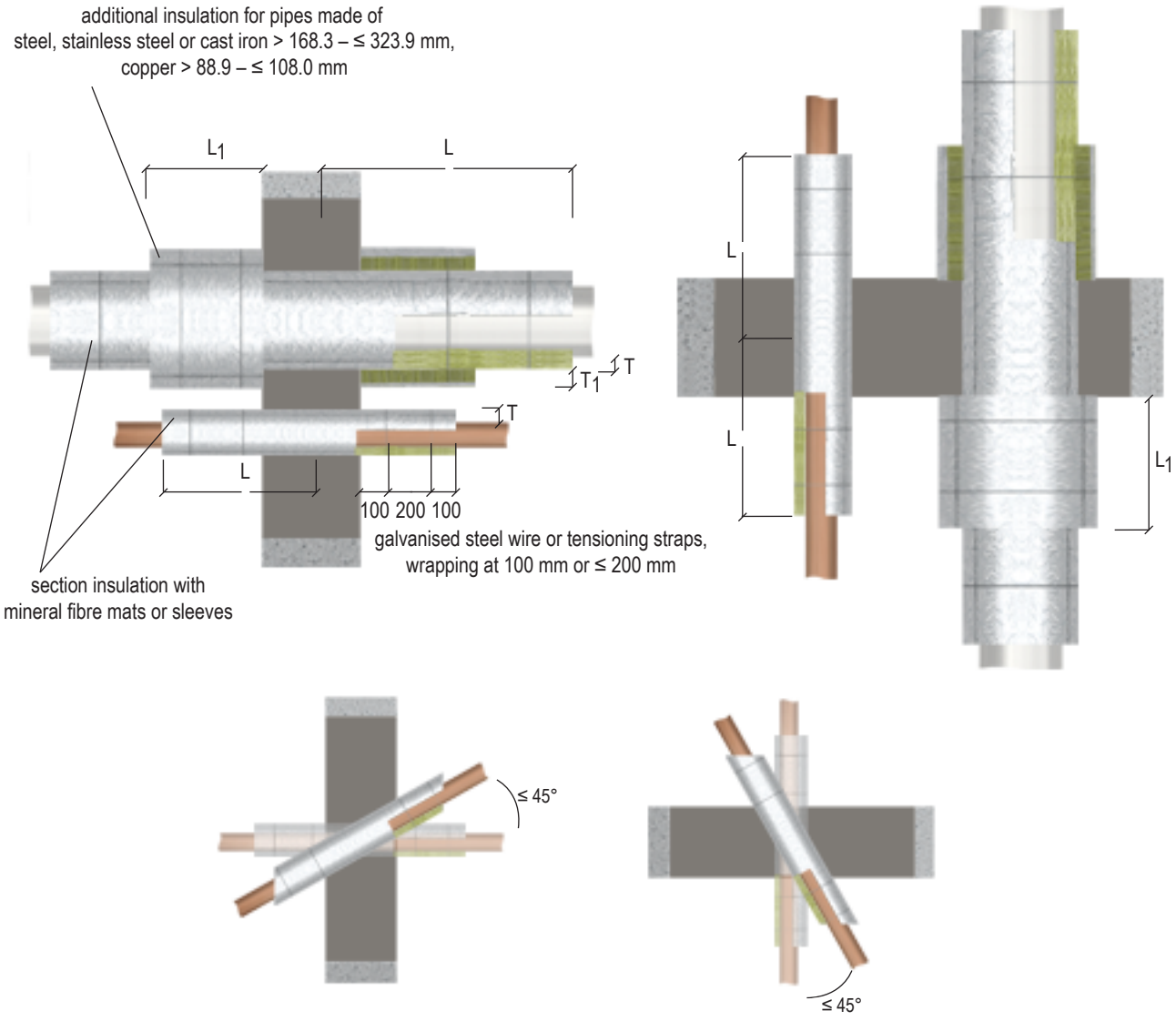
8.6 Non-combustible pipes

8.6.1 Section insulation made of lamella mat Klimarock or mineral fibre sleeves Conlit 150U

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

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

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Design with lamella mat Klimarock in wall and floor				
Pipe material	**Outer Ø [mm]**	**Insulation length L [mm]**	**Insulation thickness T [mm]**	**Fire resistance class**
Copper	Ø ≤ 15.0	≥ 250	≥ 20	**EI 120 C/U**
	Ø > 15.0 – ≤ 28.0	≥ 500	≥ 20	
	Ø > 28.0 – ≤ 42.0		≥ 30	
	Ø > 42.0 – ≤ 54.0		≥ 40	
	Ø > 54.0 – ≤ 88.9	≥ 750	≥ 60	
	Ø > 88.9 – ≤ 108.0*	≥ 1000	≥ 30	
Steel, stainless steel, cast iron	Ø ≤ 15.0	≥ 250	≥ 20	
	Ø > 15.0 – ≤ 28.0	≥ 500		
	Ø > 28.0 – ≤ 42.0		≥ 30	
	Ø > 42.0 – ≤ 114.3		≥ 40	
	Ø > 114.3 – ≤ 168.3	≥ 1000		
	Ø > 168.3 – ≤ 323.9*			

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

Design with mineral fibre sleeves Conlit 150U in wall and floor					
Pipe material	**Outer Ø [mm]**	**Insulation length L [mm]**	**Insulation thickness T [mm]**	**Fire resistance class**	
				Wall	**Floor**
Copper	Ø ≤ 15.0	≥ 250	≥ 20	**EI 120 C/U**	**EI 120 C/U**
	Ø > 15.0 – ≤ 28.0	≥ 500	≥ 20		–
	Ø > 28.0 – ≤ 42.0		≥ 30	–	**EI 120 C/U**
	Ø > 42.0 – ≤ 54.0		≥ 40		
	Ø > 54.0 – ≤ 108.0	≥ 750	≥ 60		
Steel, stainless steel, cast iron	Ø ≤ 15.0	≥ 250	≥ 22.5	**EI 120 C/U**	**EI 120 C/U**
	Ø > 15.0 – ≤ 28.0	≥ 500	≥ 26		
	Ø > 15.0 – ≤ 42.0		≥ 19	–	
	Ø > 28.0 – ≤ 54.0		≥ 38	**EI 120 C/U**	
	Ø > 54.0 – ≤ 114.3	≥ 750	≥ 33		
	Ø > 114.3 – ≤ 168.3	≥ 1000	≥ 40		
	Ø > 168.3 – ≤ 323.9*				**EI 90 / E 120 C/U**

* additional protective insulation with mineral fibre mat (L_1 ≥ 500 mm × T_1 ≥ 40 mm)

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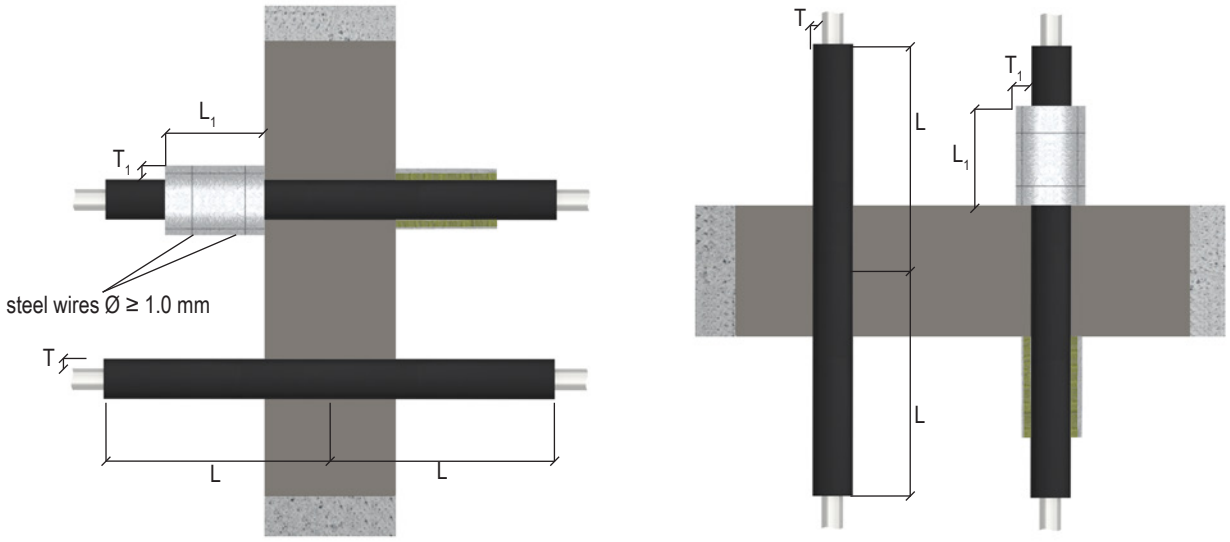
8.6.2 Section insulation made of FEF ArmaFlex Protect

- Depending on pipe wall thickness and outer diameter, an additional protective insulation with lamella 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 wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Design with FEF insulation ArmaFlex Protect

Pipe material	Outer Ø [mm]	Insulation length L [mm]	Insulation thickness T [mm]	Fire resistance class	
				Wall	Floor
Copper	Ø ≤ 28.0	≥ 250	25	EI 120 C/U	EI 120 C/U
	Ø ≤ 28.0	≥ 500	26–51		
	Ø > 28.0 – ≤ 88.9		25		
	Ø >28.0 – ≤ 88.9	≥ 1000	26 –51		
	Ø >88.9 – ≤ 108.0*		26 –52		
Steel, stainless steel, cast iron	Ø ≤ 28.0	≥ 250	25		
	Ø ≤ 28.0	≥ 500	26–51		
	Ø >28.0 – ≤ 88.9		25		
	Ø >28.0 – ≤ 88.9	≥ 1000	26–51		
	Ø >88.9 – ≤ 170.0		52		–
	Ø >88.9 – ≤ 170.0*		26–52		EI 120 C/U

* additional protective insulation with mineral fibre mat (L_1 ≥ 500 mm × T_1 ≥ 40 mm)

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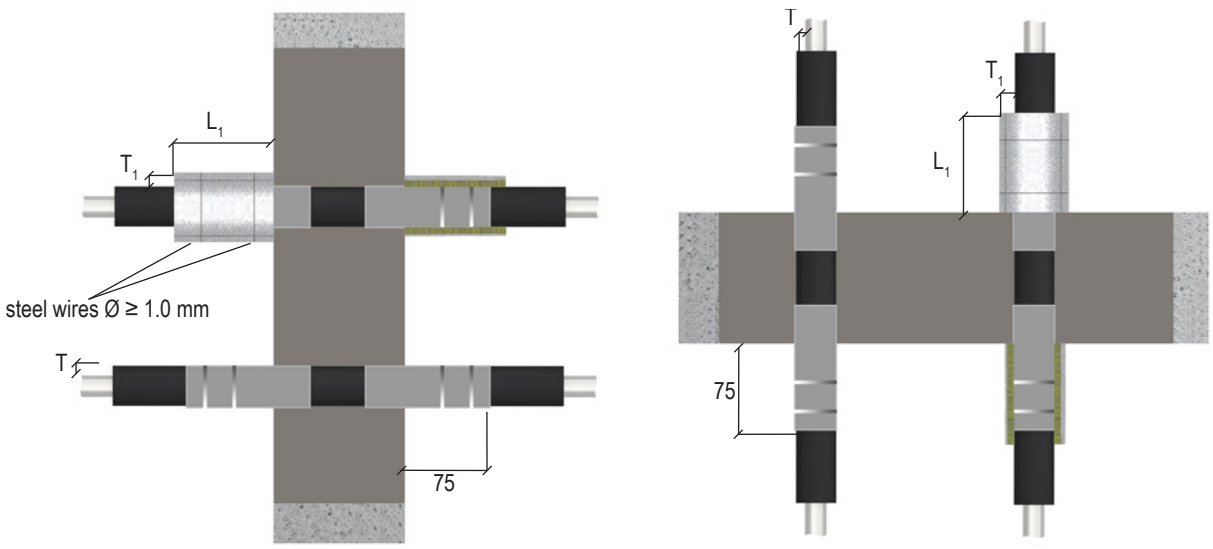
8.6.3 Section insulation made of combustible FEF insulation in acc. with EN 14304

- Depending on pipe wall thickness and outer diameter, an additional protective insulation with lamella 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.
- The fire protection wrap 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.
- The wrap (125 mm) must be applied in such a way that 50 mm are inside the seal.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Pipe		Insulation thickness T [mm]	Fire protection wrap DG-CR 1.5						Fire resistance class	
Material	Outer Ø [mm]		Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
Copper	Ø ≤ 28.0	9–25	125	2	2	0	50	75	EI 120 C/U	EI 120 C/U
	Ø ≤ 42.0	10–44								
	Ø ≤ 54.0	13–50								
	Ø ≤ 76.0	13							–	
		14–50								EI 90 C/U
	Ø ≤ 88.9*	19–50							EI 120 C/U	EI 120 C/U
	Ø ≤ 108.0**	25–50								
Steel, stainless steel, cast iron	Ø ≤ 168.3*	19–50							EI 120 C/U	EI 120 C/U

* additional protective insulation with mineral fibre mat (L_1 ≥ 500 mm × T_1 ≥ 40 mm)
**additional protective insulation with mineral fibre mat (L_1 ≥ 750 mm × T_1 ≥ 40 mm)

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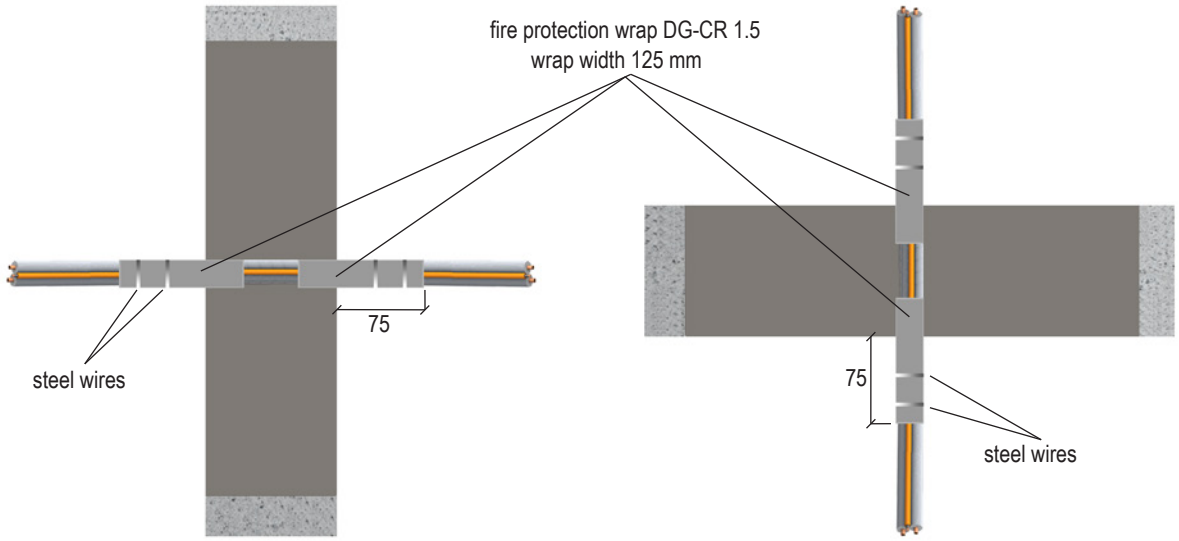
8.7 HVAC split line combinations

- HVAC split line combinations Tubolit DuoSplit (copper pipes with PE insulation, one plastic pipe PE-100 and two additional cables) must be installed at a right angle to the surface of the building element.
- The HVAC split line combinations must be wrapped with the fire protection wrap DG-CR 1.5 (width 125 mm).
- The fire protection wrap 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.
- The wrap (125 mm) must be applied in such a way that 50 mm are inside the seal.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Wall and floor

Pipe material	Outer Ø [mm]	Number of additional cables Ø ≤ 14 mm [n]	Pipe insulation [type, mm]	PE pipe Ø [mm]	Fire protection wrap 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]	
Copper	2× ≤ 10/18	2	PEF ≤ 9.0	≤ 25	125	2	2	0	50	75	**EI 120**

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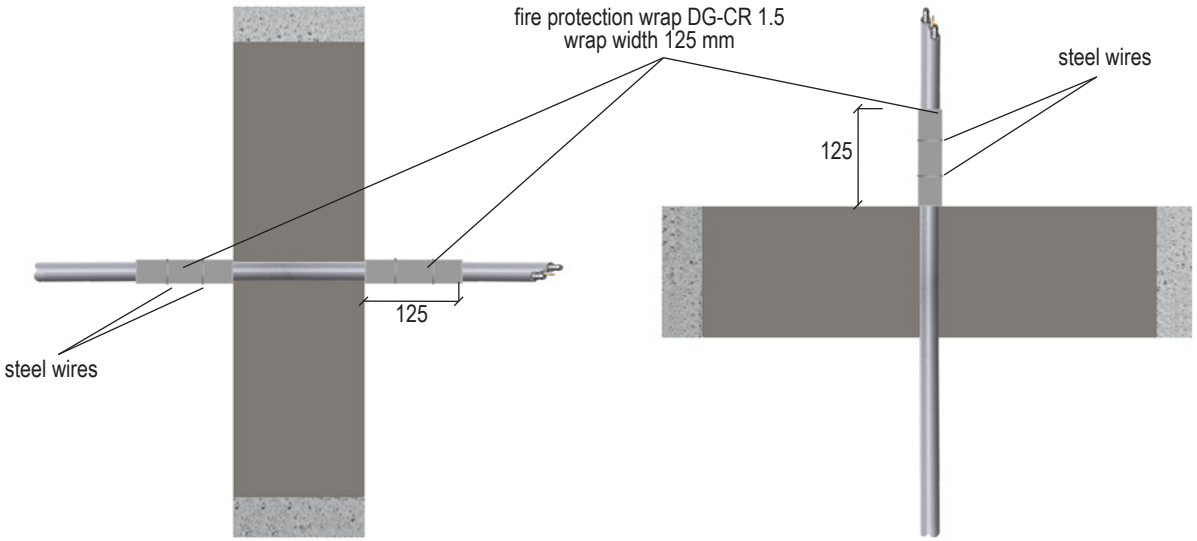
8.8 Double solar pipes Nanosun²

- The double solar pipes must be installed at a right angle to the surface of the building element (pipe end configuration U/U).
- In walls the double solar pipes must be wrapped on both sides with the fire protection wrap DG-CR 1.5 (wrap width 125 mm). In floors the wrap must be applied on the upper side.
- The fire protection wrap DG-CR 1.5 is coated on one side and equipped with a protective film. The film must be removed before applying the wrap. The wrap is applied with the coated side facing inwards and fastened with steel wires.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Wall

Pipe outer Ø [mm]	Fire protection wrap 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 16 – DN 25	125	2	1	≥ 40	0	125	**EI 120 C/U**

Floor

Pipe outer Ø [mm]	Fire protection wrap 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 16 – DN 25	125	1 (upper side)	1	≥ 40	0	125	**EI 120 C/U**

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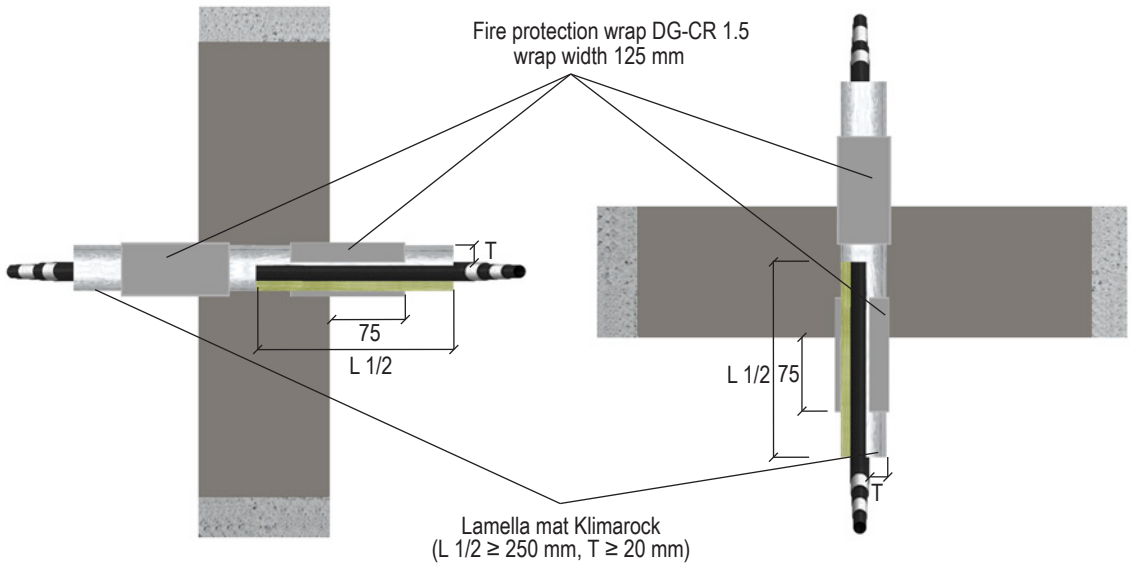
8.9 HANSA-FLEX AG hydraulic hoses with wire braid reinforcement

- The hoses must be installed at a right angle to the surface of the building element.
- The pipes must be wrapped with the lamella mat Klimarock in one layer centrally to the wall/floor axis in the seal (L 1/2 ≥ 250 mm, T ≥ 20 mm). The lamella mat must then be wrapped on each side with the fire protection wrap DG-CR 1.5 (wrap width 125 mm) with one layer without overlap.
- The fire protection wrap 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.
- The wrap (125 mm) must be applied in such a way that 50 mm are inside the seal.

Design for wall and floor penetration seals



For thicknesses and design variants, see page 29

All specifications in mm

Wall and floor

Pipe outer Ø [mm]	Protective insulation with lamella mat Klimarock		Fire protection wrap DG-CR 1.5						Fire resistance class
	Length L 1/2 [mm]	Thickness T [mm]	Wrap width [mm]	Number of wraps [n]	Number of layers [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	
≤ 55.9	≥ 250 mm	≥ 20 mm	125	2	1	0	50	75	**EI 120**

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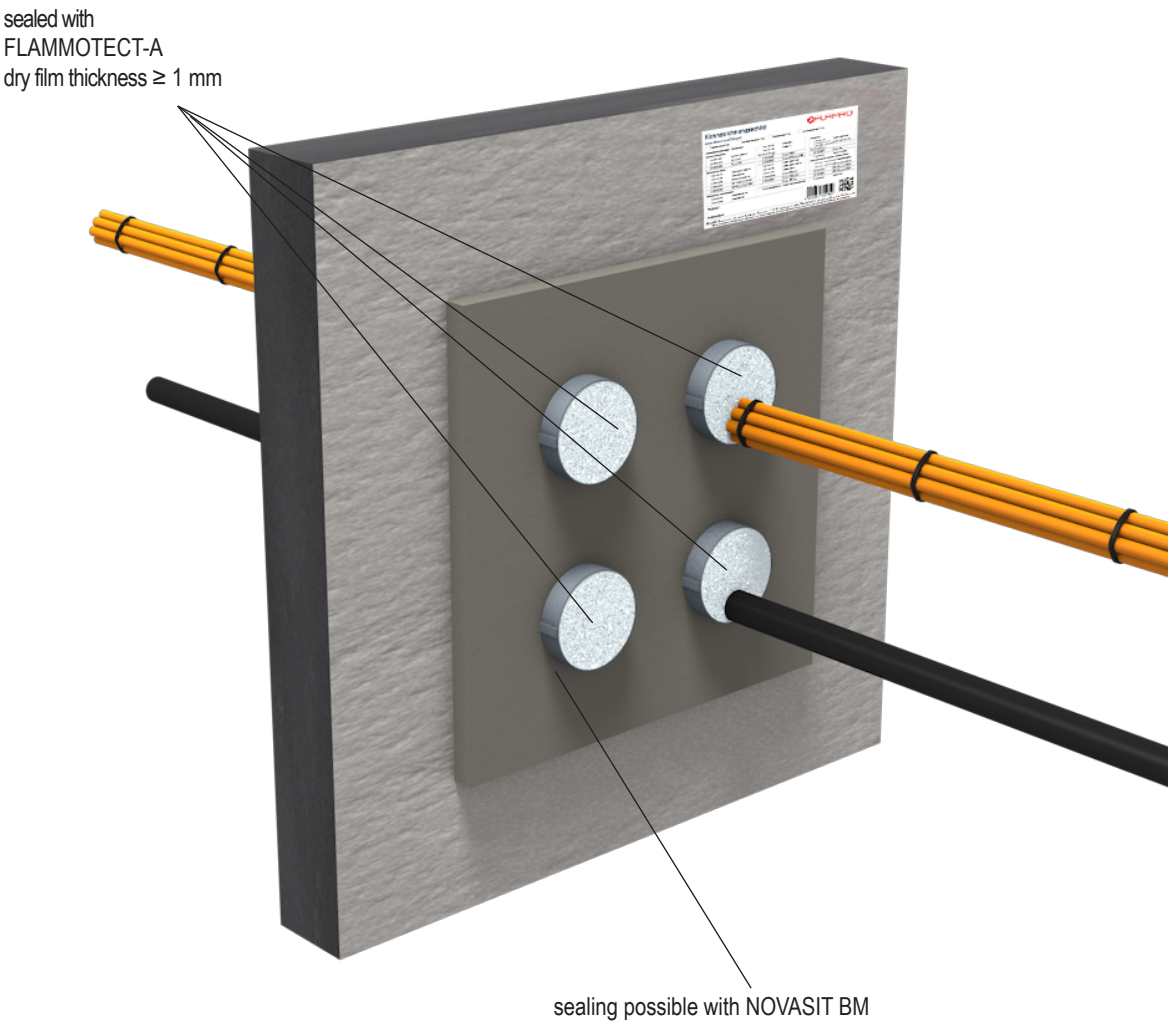
8.10 Subsequent installations with CT Cable Tube

- Depending on the installed services, Cable Tubes with lengths of 150, 200 and 300 mm may be used.
- Cables, cable bundles and electrical installation conduits may be installed directly adjacent to each other and to the inner Cable Tube wall.
- The Cable Tube may be used to seal openings without installations (blank seals).
- For detailed installation steps, please consult the Cable Tube installation instructions.
- For subsequent installations, the sealed soft foam plugs must be removed from the Cable Tube
- The remaining openings between the services and the Cable Tube as well as between the services themselves must be filled completely with the 40 mm soft foam plugs. Afterwards the plugs must be sealed with the ablative filler FLAMMOTECT-A.
- In floors with a thickness of ≥ 200 mm, two 150 mm Cables Tubes can be combined (using duct tape) to a 300 mm Cable Tube.

Measures for subsequent installations



For thicknesses and design variants, see page 29

All specifications in mm

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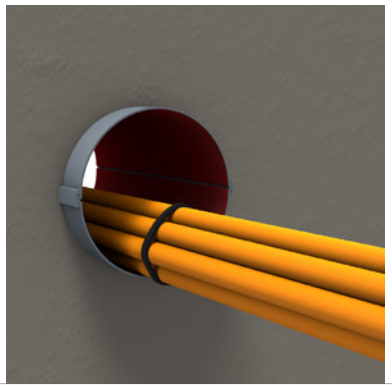
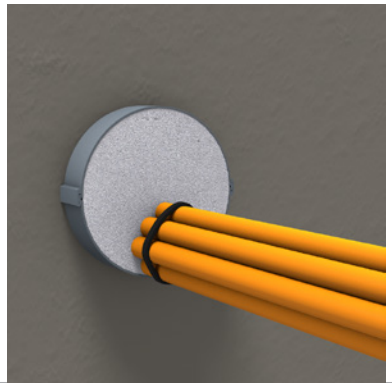
1. Remove the plugs on both sides.

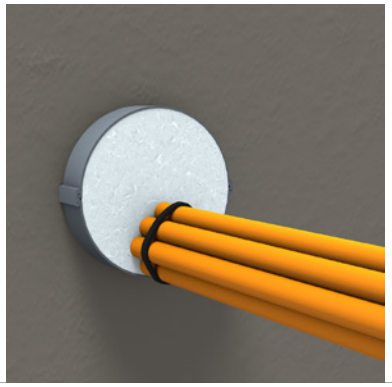
2. Install services in accordance with their respective approval.



3. Adjust the plugs to the services and insert them.



4. Seal plugs with FLAMMOTECT-A (dry film thickness ≥ 1 mm).



When subsequently installing electrical installation conduits without cables, the conduit openings must be filled with mineral wool and sealed with FLAMMOTECT-A.

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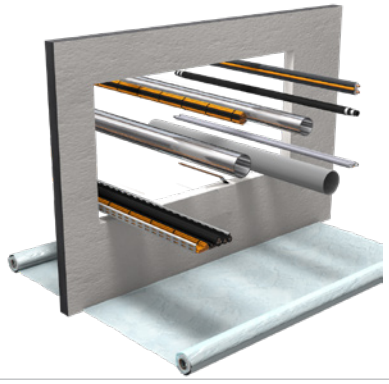
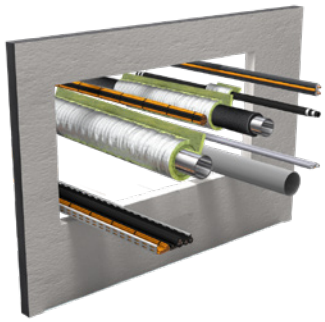
9. Installation steps

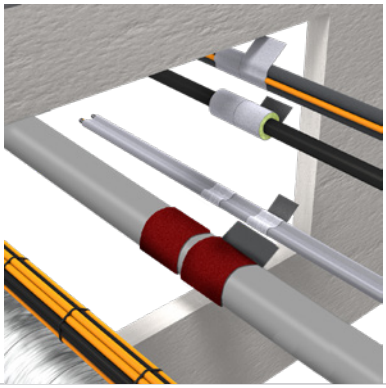
1. If necessary, cover the floor on both sides with protective sheets, clean the reveal and wet absorbing surfaces of the reveal with water. Prepare NOVASIT BM fire protection mortar according to the instructions on the packaging.



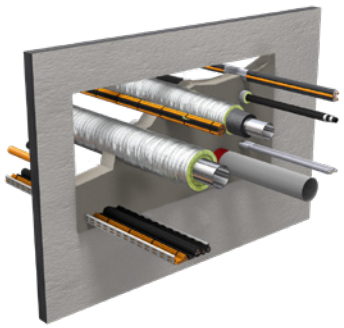
2. When additionally installing non-combustible pipes, apply sectional/protective insulation, when installing HANSA-FLEX hydraulic hoses, apply protective insulation as necessary.



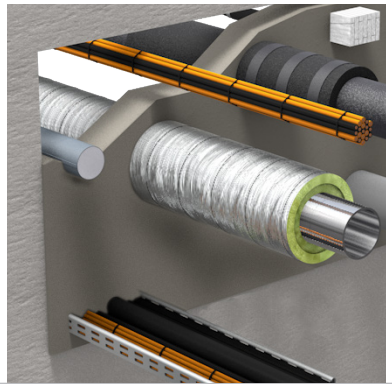
3. When additionally installing Nanosun², HVAC split line combinations or HANSA-FLEX hydraulic hoses, apply the fire fire protection wrap DG-CR 1.5, when installing combustible pipes, apply the fire protection wrap DG-CR BS as necessary.



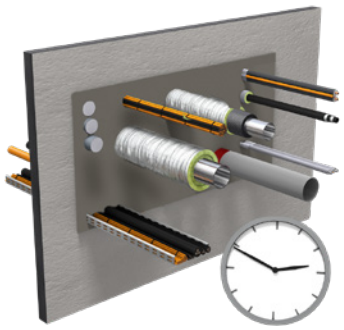
4. Apply the mortar in such a way that it tightly and firmly connects to the building element (sealing thickness ≥ 15 cm). All gussets and cavities must be filled completely.



5. Insert CT Cable Tube with additional services into the mortar, observing the necessary distances. Fill remaining openings completely. Seal the soft foam plugs with FLAMMOTECT-A.



6. After hardening, smooth the surfaces with the trowel and fully rework any shrinkage cracks. The same applies to any areas revealed after removing the formwork.



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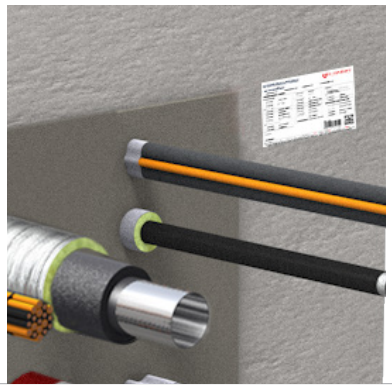
7. If required, label the penetration seal. Fill out the label neatly and attach it firmly next to/above (not on!) the penetration seal.



8. After the mortar residues have dried, remove them from cables, walls and floors, clean surfaces. Remove the protective sheets and ensure their proper disposal.