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Authorised and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA



European Technical Assessment ETA-21/0461 of 2024/07/02

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 66 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

NBR-Plus

Product family to which the above construction product belongs:

Fire stopping product – penetration seals.

Manufacturer:

Flamro Brandschutz-Systeme GmbH
Am Sportplatz 2
DE-56291 Leiningen
Tel +49 4105 4090 0
Internet www.flamro.de

Manufacturing plant:

Plant LEI

This European Technical Assessment contains:

20 pages including 11 annexes which form an integral part of the document

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, based on:

European Assessment Document (EAD) No. 350454-00-1104 Fire Stopping and fire sealing products – Penetration seals

This version replaces:

The ETA with the same number issued on 2021-05-21

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II SPECIFIC PARTS

1 Technical description of product

The NBR-Plus Fire Protection Wrap is an intumescent material with a width of 2 x 62,5 mm or 125 mm and a thickness of approx. 1,5 mm, which is wrapped in one or more layers around the pipe or the pipe insulation. The NBR-Plus Fire Protection Wrap is installed in openings in fire classified walls or floors around pipes through walls made from concrete, aerated concrete, masonry, light weight partition structures, CLT (cross laminated timber) and shaft wall constructions, concrete floors or CLT floors.

The construction product NBR-Plus is produced in rolls, cut at factory. It may also be delivered as intumescent strips, mats, cuts, and stamps (bands, blocks, pads) of dimension of request.

The intumescent product may be equipped on one side with a self-adhesive tape and/or on the other side with a lamination. A glass filament fabric serves as the carrier material.

Detailed specifications for identification and performance criteria for fire safety regarding the construction product are given in the annexes of this ETA.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The construction product NBR-Plus is intended for use as a component with a fire protection effect in building elements, assembled systems or constructions that are subject to requirements related to fire protection. Their reactive effect prevents heat transmission and fire spreading in the event of fire.

Within the scope of this ETA, the fire resistance was demonstrated for pipes made of non-combustible Materials with combustible insulation made of e.g. FEF. Pipe penetrations seals are used to seal off openings in fire resistant walls or floors, which are penetrated by pipes, and serves to preserve the walls or floors fire resistance in the area of the penetrations.

NBR-Plus Fire Protection Wrap is assessed as a wrap described in clause 1.1 of EAD 350454-00-1104.

More information in table 3: "Performance of the product and references to the methods used for its

assessment".

The intumescent fire sealing products are to be installed according to the manufacturer's installation manual.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the NBR-plus of 10 years, provided the manufacturers conditions for the packaging, transport, storage, installation, use, maintenance and repair are met.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

Characteristic	Assessment of characteristic
3.1 Safety in case of fire (BWR2)	
Reaction to fire	The product is classified as class E in accordance with EN13501-1, and the EC Delegated regulation 2016/364/EU.
Resistance to fire	Classified in accordance with EN 13501-2 See annex 1 to 11
3.2 Hygiene, health, and the environment (BWR3)	
Content, emission and/or release of dangerous substances	No performance assessed
Air permeability	No performance assessed
Water Permeability	No performance assessed
3.3 Safety and accessibility in use (BWR4)	
Mechanical resistance and stability	No performance assessed
Resistance to impact/movement	No performance assessed
Adhesion	No performance assessed
Durability	Use category: Type X
3.4 Protection against noise (BWR5)	
Airborne sound insulation	No performance assessed
3.5 Energy Economy and heat retention (BWR6)	
Thermal properties	No performance assessed
Water vapour permeability	No performance assessed

3.6 Methods of verification

The product is fully covered by EAD 350454-00-1104 Firestopping and fire sealing products, Penetration Seals as a penetration seal, and fulfils the requirement for use category: X - Intended for use in conditions exposed to weathering. Products that meet requirements for type X, meet the requirements for all other types.

3.7 General aspects related to the fitness for use of the product

The European Technical Assessment is issued for the product based on agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide if such changes affect the ETA and consequently the validity of the CE marking based on the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

Additionally, the product was tested under specific application conditions according to EOTA TR 024, section 4.3:

- Exposure to a constant temperature of 80 °C for 40 days,
- Exposure to permanent wetness (water-immersion and permanent condensation) 4 weeks
- Exposure to solvents such as Butylacetat, Butanol, solvent naphtha and fuel oil
- Subsequent overpainting (tested with coatings based on acryl dispersion, alkyd resin, polyurethane acryl and epoxide resin)
- Exposure to intimate contact with plastics (PVC, PE)
- Exposure to intimate contact with metals (steel, copper aluminium)

After the exposure according to EOTA TR 024 no essential changes of the intumescent properties, expansion rate and expansion pressure could be detected.

It is assumed that:

- damages to the penetration seal are repaired accordingly,
- the installation of the penetration seal does not affect the stability of the adjacent building element – even in case of fire,
- the installations are fixed to the adjacent building element in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal.
- The support of the installations is maintained for the required period of the fire resistance and
- Pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

This European Technical Assessment does not address any risks associated with the emission of dangerous liquids or gases caused by failure of pipes in case of fire nor does it prove the prevention of the transmission of fire through heat transfer via the medium in the pipes.

The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this European Technical Assessment (see EN 1366-3:2009, clause 1)

The durability assessment does not make account of the possible effect on the penetration seal of substances permeating through the pipe walls.

The assessment does not cover the avoidance or the destruction of the penetration seal or of the adjacent building elements by forces caused by temperatures changes in case of fire. This has to be considered when designing the piping system.

NBR-plus is manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

4 Attestation and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 AVCP system

According to the decision 1999/454/EC of the European Commission, as amended, the system(s) of assessment and verification of constancy of performance is **system 1** (see Annex V to Regulation (EU) No 305/2011).

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2024-07-02 by



Thomas Bruun
Managing Director, ETA-Danmark

Annex 1**Product details, definitions, and specification of intended use**

Product and performance of the FLAMRO NBR-Plus Fire Protection Wrap:

Property	Parameter	Method
Density	1,10 g/cm ³ - 1,68 g/cm ³	3.1.5 of EOTA TR No 024
Content of non-volatile components	No performance assessed	
Weight loss due to heating	No performance assessed	
Dimensions	0,8 mm to 3,6	3.1.2.1 of EOTA TR No 024
Expansion ratio	21,8 nominal thickness 1,0 mm max +/- 20[%] interval <u>17,4 – 26,2</u> . 19,4 nominal thickness 3,0 mm max +/- 20[%] interval <u>15,5 – 23,3</u>	3.1.12 of EOTA TR No 024

Annex 2

General information and construction details

A.2 General information:

A.2.1 Wall/floor constructions

a. Flexible wall

The wall must have a minimum thickness of 100 mm and a metal profile frame lined on both faces with minimum 2 layers of 12,5 mm thick gypsum boards according to EN 520/gypsum plaster boards according to EN 18180.

b. Aerated concrete wall

The wall must have a minimum thickness of 150 mm and comprise aerated concrete with a minimum density of 600-650 kg/m³

c. Aerated concrete floor

The floor must have a minimum thickness of 150 mm and comprise aerated concrete with a minimum density of 500-550 kg/m³

A.3 Construction details

• **Penetration seal:**

- NBR-plus intumescent fire protection wraps
- Numbers/width: 1 x 125 mm or 2 x ≥ 62,5 mm
- Thickness: ~ 1,5 mm
- Layers: According to table

• **Protective insulation:**

- With or without protective insulation made of Rockwool “Klimarock” or FEF-Insulation.
- Length and width: According to table.

• **Annular gap filling material:**

Ablative or intumescent filler or non-combustible material (class A1 or A2-sl, d0 according to EN 13501-1) as e.g. concrete, cementitious or gypsum mortar.

• **Back-up filling material:**

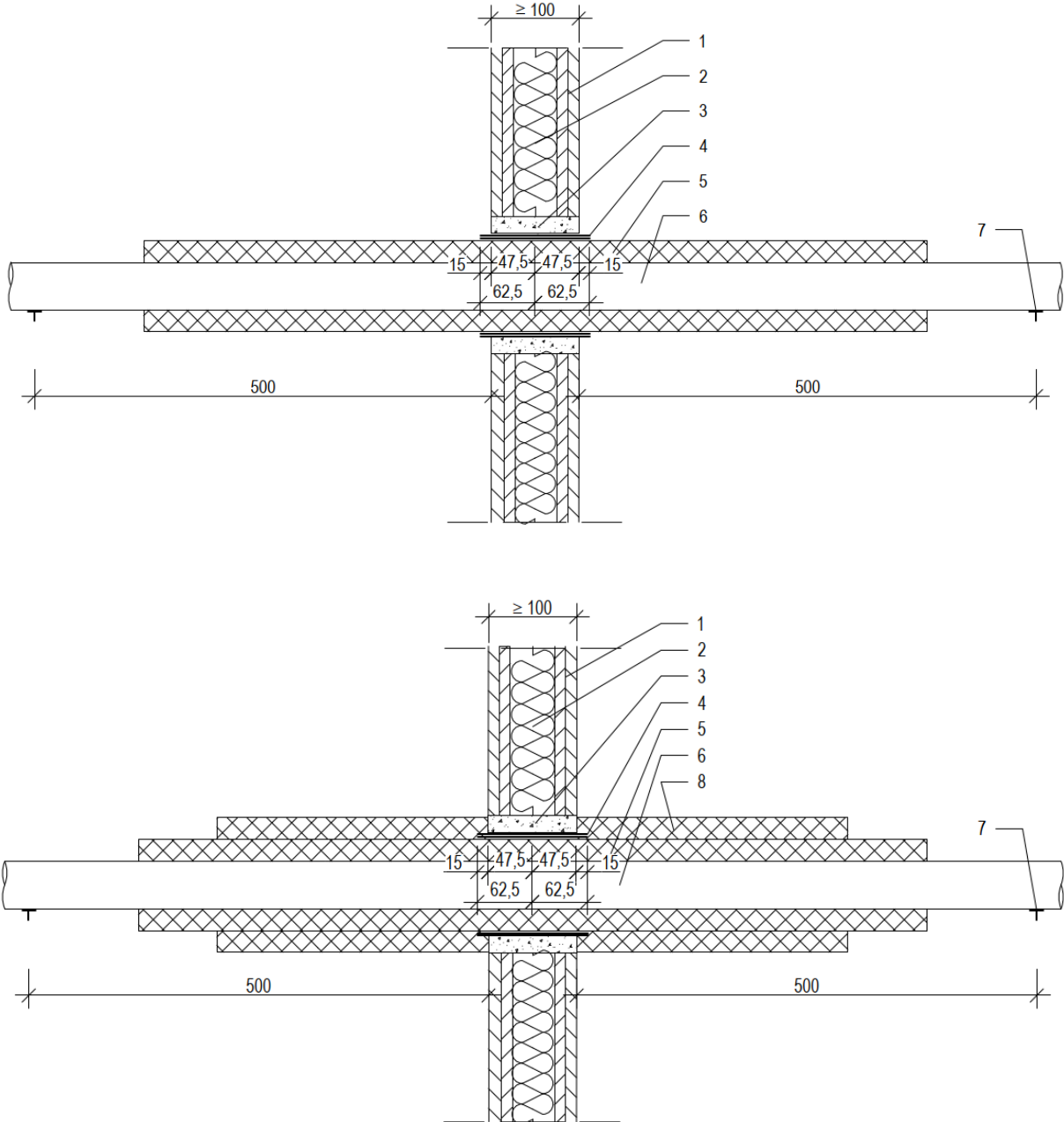
Loose stone wool.

• **Working Space:**

Working space between services ≥ 100 mm, gap – except for services marked “zero distance”.

NBR-plus	Annex 2
General information / Construction details	

Annex 3
Flexible wall installation ≥ 100 mm - Construction details



- | | |
|--|--------------------------|
| 1. Flexible wall ≥ 100 mm thickness | 5. Pipe insulation |
| 2. Mineral fibre board | 6. Non-combustible pipe |
| 3. Closure of annular gap | 7. First support |
| 4. Intumescent wrap | 8. Protective Insulation |

Dimensions in mm

NBR-plus	Annex 3
Flexible wall installation ≥ 100 mm - Construction details	

Annex 3.1

Flexible wall installation ≥ 100 mm - Fire resistance classes

Non-combustible pipes of copper, steel, stainless steel or cast iron with insulation made of FEF

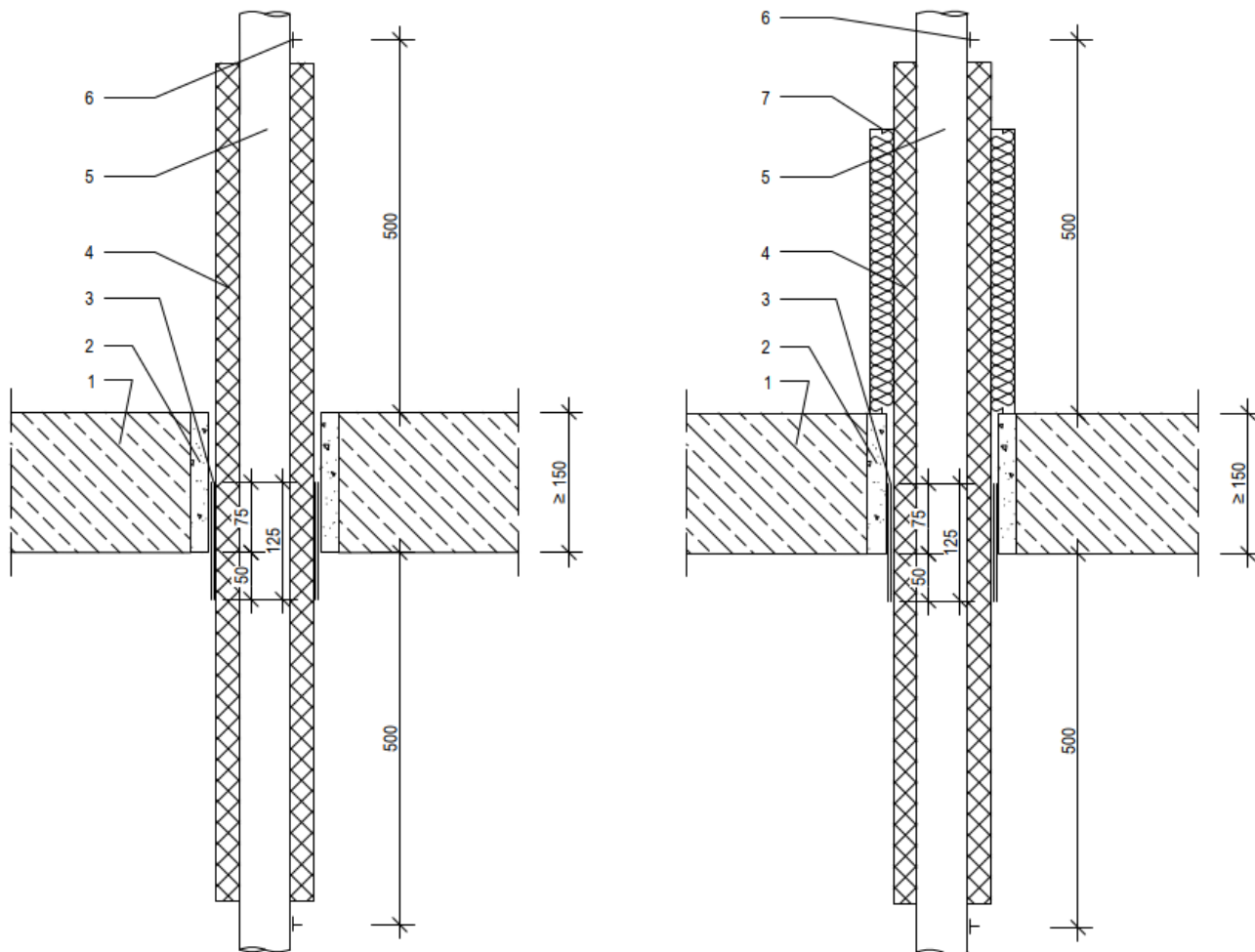
Fire resistance classes								
Pipe			Insulation		Intumescent wrap	Protective insulation		Classification
Type of pipe	\varnothing [mm]	Wall thickness [mm]	Type	Thickness [mm]	Layers	Type	Thickness [mm]	
Copper, Steel, Stainless steel, Cast iron	$\leq 15,0$	0,8 - 14,2	FEF	10,0	1	-	-	EI 120-C/U
	$> 15,0 - \leq 54,0$			10,0 - 38,0	2			
	$> 54,0 - \leq 88,9$	19,0 - 38,0		25,0				
Steel, Stainless steel, Cast iron	$> 15,0 - \leq 88,9$	0,8 - 14,2		19,0 - 38,0	FEF	19 x 250		
	$> 88,9 - \leq 114,3$	2,0 - 14,2		25,0 - 38,0			38 x 250	
	$> 114,3 - \leq 159,0$	3,2 - 14,2						
	$> 159,0 - \leq 219,1$	4,0 - 14,2						
Copper, Steel, Stainless steel, Cast iron	$\leq 42,0$	0,8 - 14,2	FEF	10,0	1	-	-	EI 90-C/U
	$> 42,0 - 88,9$	1,2 - 14,2		19,0 - 38,0	2			
Steel, Stainless steel, Cast iron	$> 219,1 - \leq 323,9$	4,0 - 14,2	FEF	39,0 - 48,0	2	Lamella mat	30 x 500	EI 60-C/U

Dimensions in mm

NBR-plus	Annex 3.1
Flexible wall installation ≥ 100 mm - Fire resistance classes	

Annex 4

Aerated concrete floor installation ≥ 150 mm - Construction details



- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Aerated concrete floor ≥ 150 mm thickness 2. Closure of annular gap 3. Intumescent wrap 4. Pipe insulation | <ol style="list-style-type: none"> 5. Non-combustible pipe 6. First support 7. Protective insulation |
|--|---|

Dimensions in mm

NBR-plus	Annex 4
Aerated concrete floor installation ≥ 150 mm - Construction details	

Annex 4.1

Aerated concrete floor installation ≥ 150 mm - Fire resistance classes

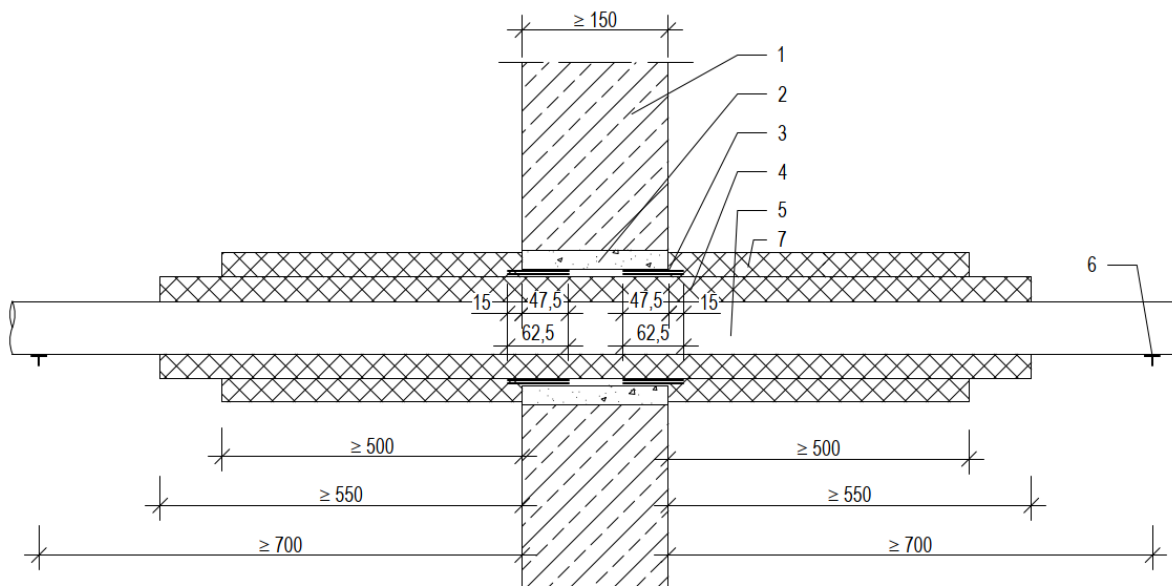
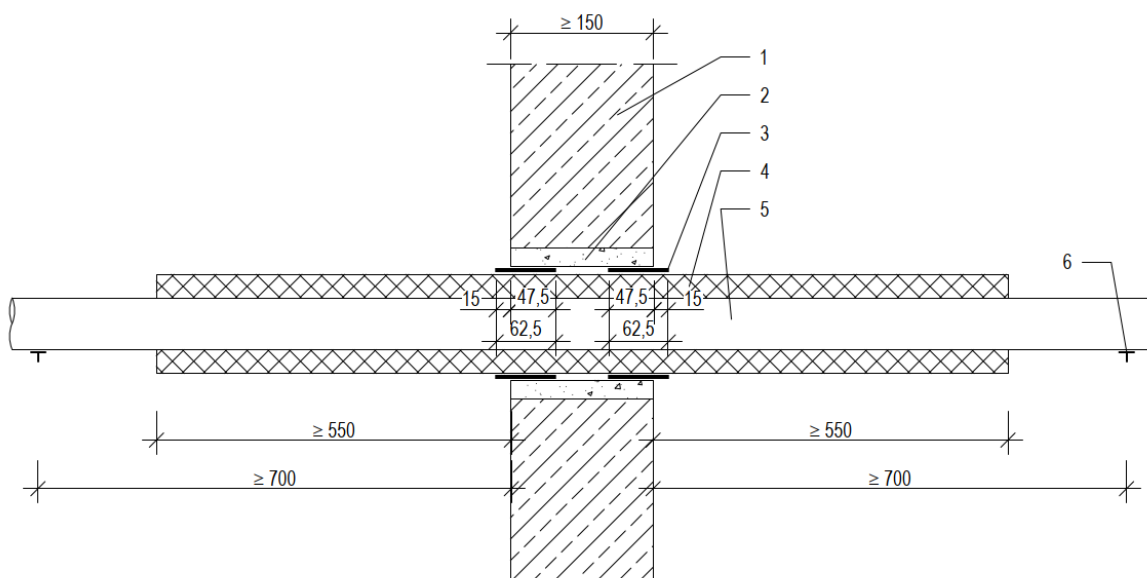
Non-combustible pipes of copper, steel, stainless steel or cast iron with insulation made of FEF or glass wool

Fire resistance classes								
Pipe			Insulation		Intumescent wrap	Protective insulation		Classification
Type of pipe	\varnothing [mm]	Wall thickness [mm]	Type	Thickness [mm]	Layers	Type	Thickness [mm]	
Copper, Steel, Stainless steel, Cast iron	$\leq 60,0$	0,6 - 14,2	FEF	13,0 - 40,0	2	-	-	EI 120-C/U
	$> 60,0 - \leq 88,9$	1,5 - 14,2		25,0				
	$\leq 54,0$		Glass wool	20,0 - 50,0				
	$\leq 88,9$	40,0						
		80,0		3				
100,0	4							
Steel, Stainless steel, Cast iron	$\leq 108,0$	2,0 - 14,2	FEF	19,0 - 39,0	2	-	-	EI 120-C/U
	$\leq 219,1$	4,5 - 14,2		19,0 - 26,0	2	Lamella mat	60 x 500	
	$\leq 273,0$	5,0 - 14,2		25,0 - 26,0			FEF	
	$\leq 323,9$	5,6 - 14,2		25,0				
				25,0 - 50,0	3			
Copper, Steel, Stainless steel, Cast iron	$\leq 42,0$	0,6 - 14,2	FEF	10,0	1	-	-	EI 90-C/U
	$> 42,0 - \leq 60,0$	1,2 - 14,2		9,0 - 40,0	2			
				13,0 - 40,0				
				19,0 - 38,0				
$> 60,0 - \leq 88,9$	1,5 - 14,2	13,0 - 40,0	FEF	25 x 250				
$\leq 114,3$	3,2 - 14,2	25,0 - 38,0		38 x 250				
Steel, Stainless steel, Cast iron	$\leq 159,0$	0,6 - 14,2	Glass wool	25,0 - 38,0	3	-	-	EI 90-C/U
	$> 159,0 - \leq 219,1$	4,0 - 14,2		25,0 - 38,0				
	$\leq 219,1$	4,5 - 14,2		60,0	4			
	$\leq 323,9$	5,6 - 14,2		100,0				

Dimensions in mm

Annex 5

Aerated concrete wall installation ≥ 150 mm - Construction details



- | | |
|--|--------------------------|
| 1. Concrete wall ≥ 150 mm thickness | 5. Non-combustible pipe |
| 2. Closure of annular gap | 6. First support |
| 3. Intumescent wrap | 7. Protective insulation |
| 4. Pipe insulation | |

Dimensions in mm

NBR-plus	Annex 5
Aerated concrete wall installation ≥ 150 mm - Construction details	

Annex 5.1
Aerated concrete wall installation ≥ 150 mm - Fire resistance classes

Non-combustible pipes of copper, steel, stainless steel or cast iron with insulation made of FEF or glass wool

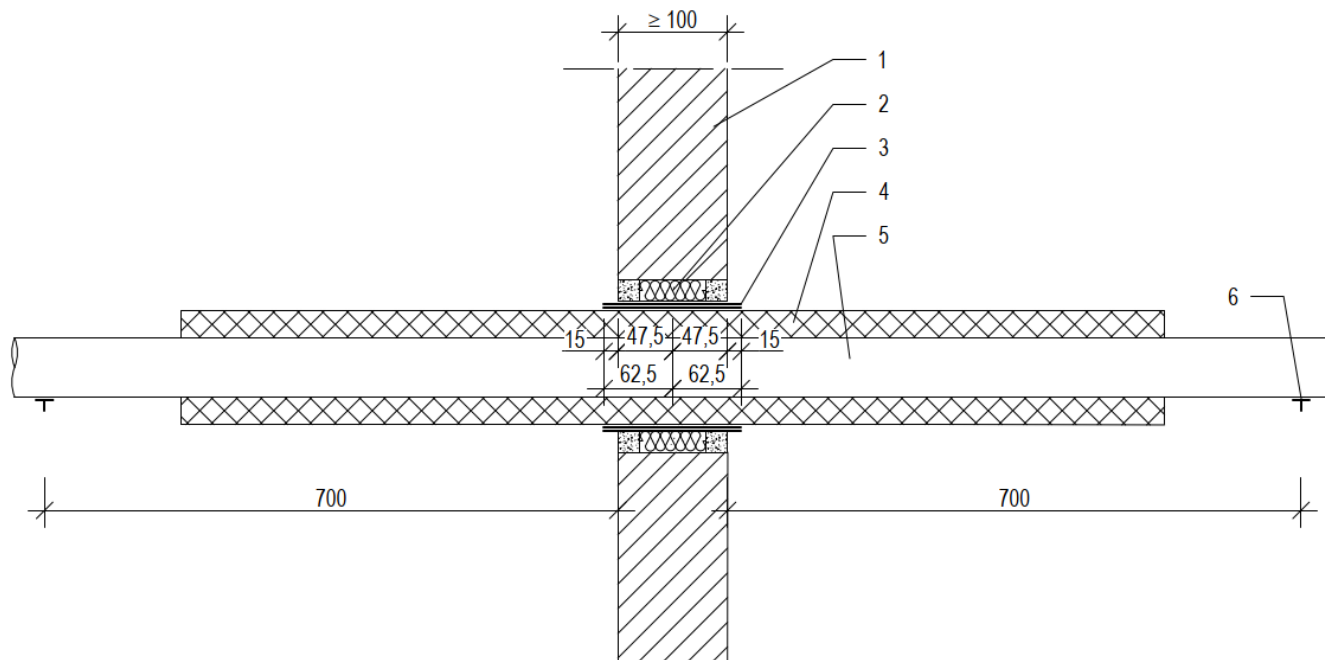
Fire resistance classes								
Pipe			Insulation		Intumescent wrap	Protective insulation		Classification
Type of pipe	\varnothing [mm]	Wall thickness [mm]	Type	Thickness [mm]	Layers	Type	Thickness [mm]	
Steel, Stainless steel, Cast iron	$\leq 323,9$	5,6 - 14,2	FEF	50,0	3	Lamella mat	60 x 750	EI 120-C/U
				25,0	2	FEF		
				50,0	3			
				25,0 – 50,0				
Steel, Stainless steel, Cast iron	$\leq 114,3$	3,2 - 14,2	FEF	19,0	2	-	-	EI 90-C/U
Steel, Stainless steel, Cast iron	$\leq 114,3$	3,2 - 14,2	FEF	19,0 – 25,0	2	-	-	EI 60-C/U
	$\leq 168,3$	4,0 - 14,2		25,0				
				50,0	3			

Dimensions in mm

NBR-plus	Annex 5.1
Aerated concrete wall installation ≥ 150 mm - Fire resistance classes	

Annex 6

CLT wall installation ≥ 100 mm - Construction details and fire resistance classes



Fire resistances classes

Non-combustible pipes of copper, steel, stainless steel or cast iron with insulation made of FEF

Fire resistance classes								
Pipe			Insulation		Intumescent wrap	Protective insulation		Classification
Type of pipe	\varnothing [mm]	Wall thickness [mm]	Type	Thickness [mm]	Layers	Type	Thickness [mm]	
Copper, Steel, Stainless steel, Cast iron	$\leq 28,0$	1,0 - 14,2	FEF	9,0 – 19,0	2	-	-	EI 90-C/U
	$\leq 60,0$	0,6 - 14,2		9,0 – 21,0				EI 60-C/U
Steel, Stainless steel, Cast iron	$\leq 110,0$	1,0 - 14,2		9,0 – 23,0				

1. Application CLT wall ≥ 100 mm thickness
2. Closure of annular gap
3. Intumescent wrap

4. Pipe insulation
5. Non-combustible pipe
6. First support

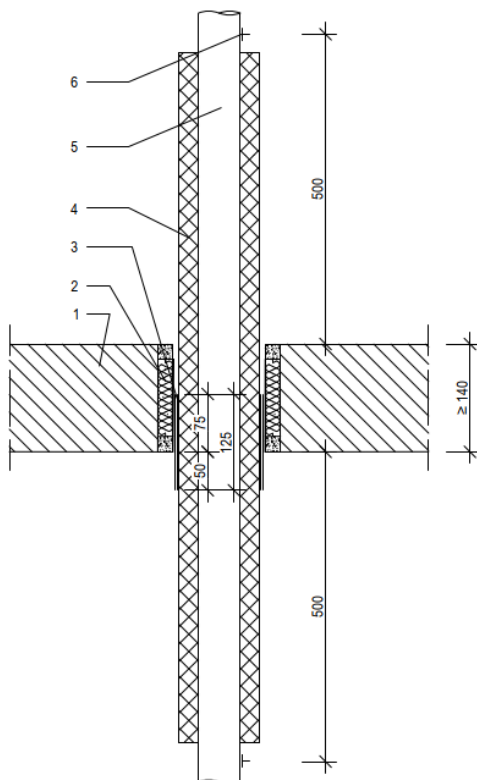
Dimensions in mm

NBR-plus	Annex 6
CLT wall installation ≥ 100 mm - Construction details and fire resistance classes	

Annex 7

CLT floor installation ≥ 140 mm - Construction details and fire resistance classes

Construction details



Fire resistance classes

Non-combustible pipes of copper, steel, stainless steel or cast iron with insulation made of FEF

Fire resistance classes								
Pipe			Insulation		Intumescent wrap	Protective insulation		Classification
Type of pipe	\varnothing [mm]	Wall thickness [mm]	Type	Thickness [mm]	Layers	Type	Thickness [mm]	
Copper, Steel, Stainless steel, Cast iron	$\leq 54,0$	1,0 - 14,2	FEF	9,0 – 21,0	2	-	-	EI 90-C/U
Steel, Stainless steel, Cast iron	$> 54,0 - \leq 110,0$	1,0 - 14,2	FEF	23,0	2	-	-	EI 90-C/U
	$\leq 110,0$			9,0 – 23,0				EI 60-C/U

- | | |
|--|-------------------------|
| 1. Application CLT floor ≥ 140 mm thickness | 4. Pipe insulation |
| 2. Closure of annular gap | 5. Non-combustible pipe |
| 3. Intumescent wrap | 6. First support |

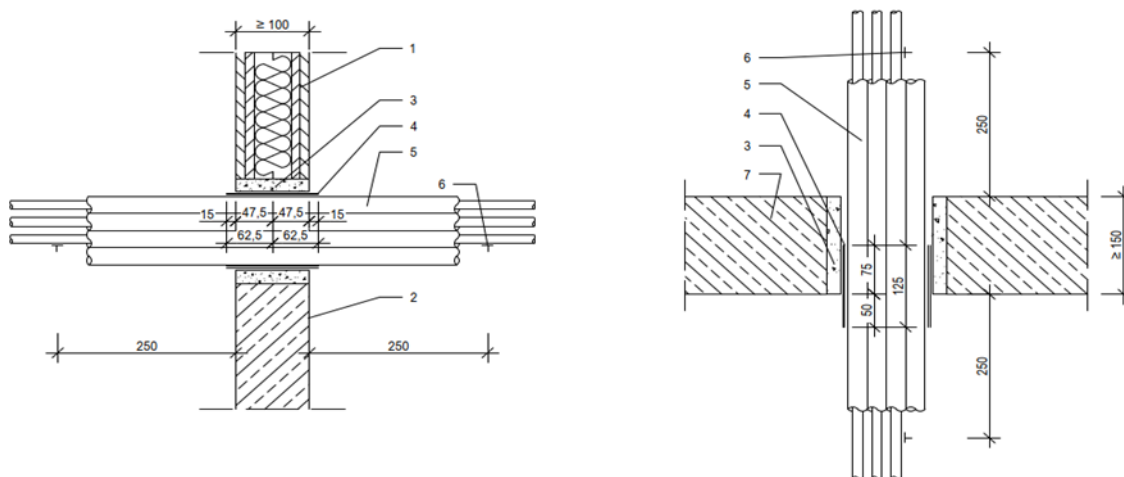
Dimensions in mm

NBR-plus	Annex 7
CLT floor installation ≥ 140 mm - Construction details and fire resistance classes	

Annex 8

Electrical installation conduits (EIC) - Construction details and fire resistance classes

Construction details



Fire resistance classes

Fire resistance classes					
Service		Cable	Intumescent wrap	Fire resistance class	
			Layers	Wall	Floor
EIC made of plastic	$\varnothing \leq 32$ mm	With/without	1	EI 120 U/U	EI 120 U/U
	$\varnothing \leq 63$ mm		2		
EIC made of plastic (bundle) (single EIC $\leq \varnothing 32$ mm)	$\varnothing \leq 100$ mm		2		
Linear arrangement of plastic EIC (single EIC $\leq \varnothing 32$ mm)	≤ 3 pcs.		1		

1. Flexible wall ≥ 100 mm thickness
2. Rigid wall ≥ 100 mm thickness
3. Closure of annular gap

4. Intumescent wrap
5. Electrical installation conduit
6. First support
7. Concrete floor ≥ 150 mm thickness

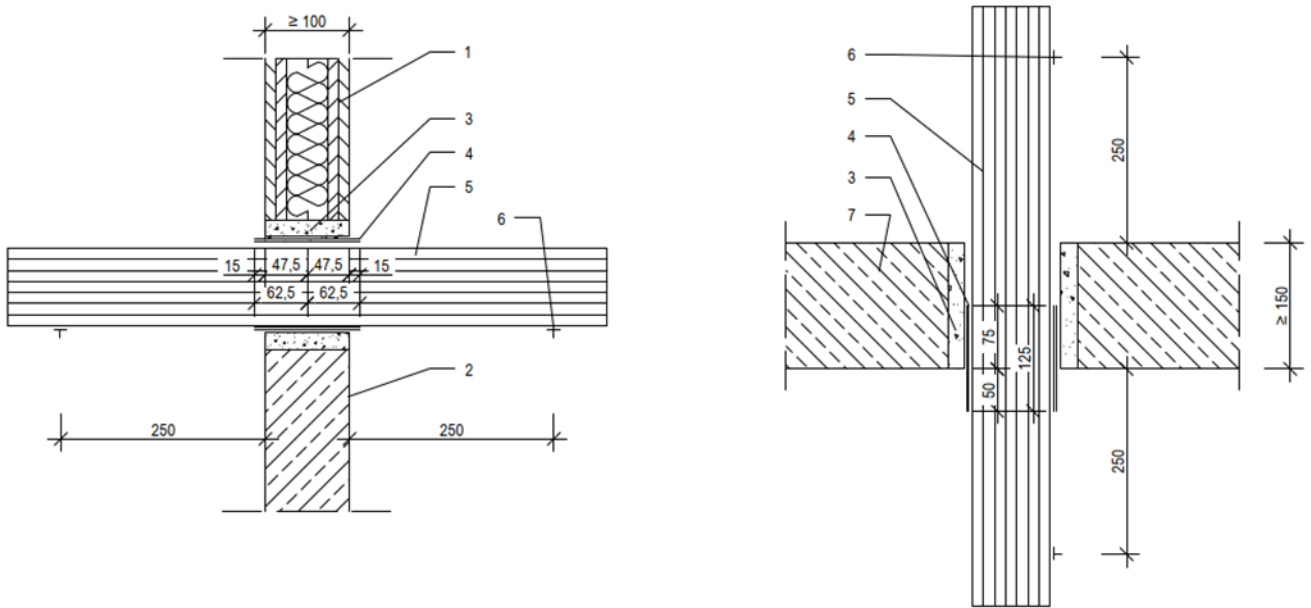
Dimensions in mm

NBR-plus	Annex 8
Electrical installation conduits (EIC) - Construction details and fire resistance classes	

Annex 9

Speedpipes - Construction details and fire resistance classes

Construction details



Fire resistance classes

Fire resistance classes				
Service		Intumescent wrap	Fire resistance class	
			Layer	Wall
Speedpipes	Bundle- $\varnothing \leq 50,0$	1	EI 120 U/U	EI 120 U/U
	Single- $\varnothing \leq 14,0$			

1. Flexible wall ≥ 100 mm thickness
2. Rigid wall ≥ 100 mm thickness
3. Closure of annular gap

4. Intumescent wrap
5. Speedpipes
6. First support
7. Concrete floor ≥ 150 mm thickness

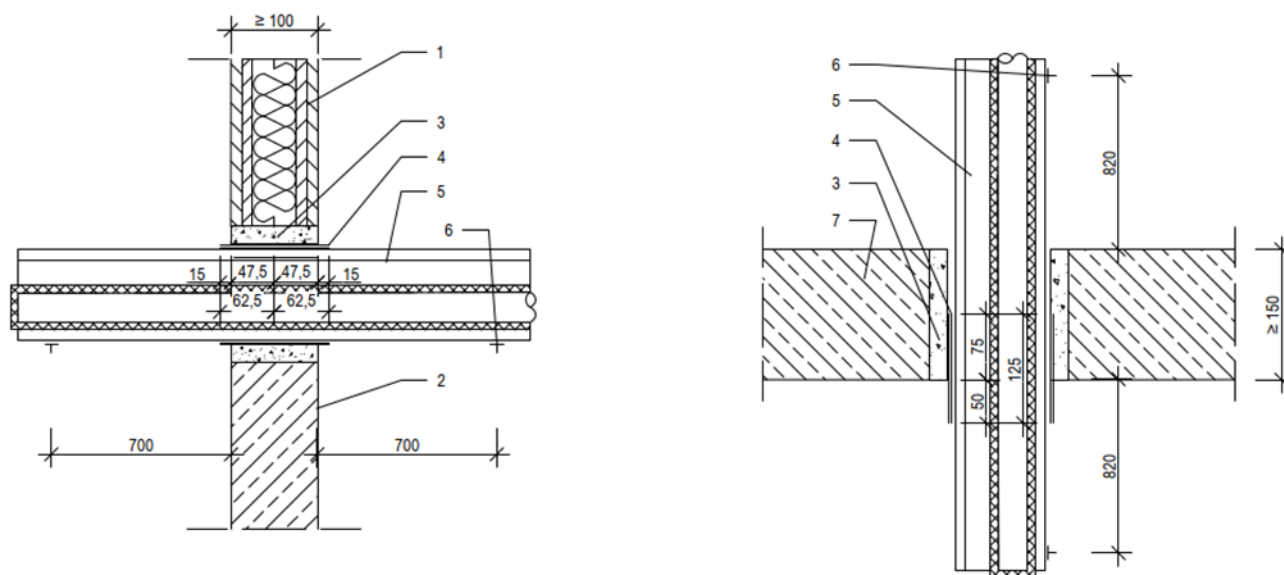
Dimensions in mm

NBR-plus	Annex 9
Speedpipes - Construction details and fire resistance classes	

Annex 10

HVAC-split line combinations - Construction details and fire resistance classes

Construction details



Fire resistance classes

Fire resistance classes			
Service	Intumescent wrap	Fire resistance class	
	Layer	Wall	Floor
Copper pipe $\leq 2x \text{ } \varnothing \leq 18$ + PE-Foam 9 mm + 1x PVC-U/PVC-C pipe $\varnothing \leq 25x 1,5$ mm + $\leq 3x$ cables $\varnothing \leq 14$ mm	2	EI 120	EI 120
Copper pipe $\leq 2x \text{ } \varnothing \leq 22$ + PE-Foam 9 mm + 1x PVC-U pipe $\varnothing \leq 25$ mm + $\leq 2x$ cables $\varnothing \leq 21$ mm	2 + lamella mat $\geq 250x30$ mm	-	EI 90

1. Flexible wall ≥ 100 mm thickness
2. Rigid wall ≥ 100 mm thickness
3. Closure of annular gap

4. Intumescent wrap
5. HVAC-split line combinations
6. First support
7. Concrete floor ≥ 150 mm thickness

Dimensions in mm

NBR-plus	Annex 10
HVAC-split line combinations - Construction details and fire resistance classes	

Annex 11

Description of possible additional components of the penetration seal

Description	Performance	Sample Product
Insulation made of flexible elastomeric foam (FEF) in accordance with EN 14304	Reaction to fire class acc. to EN 13501-1: B-s3, d0 resp. D-s1, do	Armalok 50 Armalok 100 ArmaFlex SE ArmaFlex XG AF/ArmaFlex AF/ArmaFlex Evo SH/ArmaFlex NH/ArmaFlex NH/ArmaFlex Smart HT/ArmaFlex ArmaFlex Ultima Kaiflex HT s2 Kaiflex KK Kaiflex KKplus s2 Kaiflex KKplus s3 FLEXEN Heizungskautschuk s2 FLEXEN Kältekautschuk Plus s2 isopren Plus isopren Polar Plus K-FLEX ST K-FLEX ST PLUS K-FLEX ECO K-FLEX H Eurobatex Eurobatex SC Eurobatex High Technology Eurobatex H Eurobatex H Super Eurobatex Glastec
Insulation made of polyethylene foam (PEF) in accordance with EN 14313	Reaction to fire class acc. to EN 13501-1: E	KeKelit Lexel Würth FLEXEN PE Würth FLEXEN Schallschutz Steinbacher Steinoflex 440 (Geberit)
Loose mineral wool in accordance with EN 14303	Reaction to fire class acc. to EN 13501-1: A1 Melting point: ≥ 1000 °C	Knauf Insulation LW; Rockwool "ProRox LF 970"
Mineral fibre board in accordance with DIN EN 13162	Reaction to fire class acc. to EN 13501-1: A1 Nominal Density: ≥ 150 kg/m ³ Melting point: ≥ 1000 °C	Rockwool "Hardrock 040" Paroc Pyrotech Slab 160 Rockwool "RP-GF 70"