Institut für Brandschutztechnik
und Sicherheitsforschung

CLASSIFICATION REPORT

in acc. with EN 13501-2:2016

Product name: **“FLAMRO Products in CLT floors”**

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1. Introduction

This Classification Report defines the fire resistance class assigned to the installation situations of “FLAMRO Products in CLT floors” in compliance with the procedures given in EN 13501-2:2016.

2. Details of classified building components and products

2.1. Function type

The function of all FLAMRO construction products listed in this classification report is to resist fire in cross laminated timber (CLT) load-bearing structures in horizontal orientation, according to the characteristic product behaviour, as specified in section 5 of EN 13502-2:2016.

2.1.1. BSB

The construction product BSB is defined as a fire protection brick and is used for sealing pipes and cables.

2.1.2. FLAMMOTECT-A

The construction product FLAMMOTECT-A is defined as a coating system. FLAMMOTECT-A is used to coat or seal gaps in the soft penetration sealing system FLAMMOTECT.

FLAMMOTECT-A consists of the following components:

FLAMMOTECT-A Paint	→ for coating the rock wool panels
FLAMMOTECT-A Solid emulsion	→ for coating the rock wool panels
FLAMMOTECT-A Filler	→ for sealing of joints and annular gaps
FLAMMOTECT-A Kitt	→ for sealing of joints and annular gaps

FLAMMOTECT Pre-coated mineral fibre boards
→ 1-sided pre-coated mineral fibre board 50mm thick

2.1.3. CT Cable Tube

The building product CT Cable Tube is defined as a fire protection cable box. The construction product CT Cable Tube is used to seal cables, cable conduits and climate-split cable combinations.

2.1.4. Variant N II A / AWM II

The construction products N II A und AWM II are defined as dimensional fire protection collars. The products N II A und AWM II are used to seal combustible pipes.

2.1.5. NBR-plus / DG-CR pro

The construction products NBR-plus and DG-CR pro are defined as fire protection wraps and are used to seal non-combustible pipes with combustible insulation, electrical installation conduits and clima split bundles.

2.1.6. KSL-W

The construction product KSL-W is defined as a firestop wrap. The product is used to seal combustible pipes.

2.1.7. DG-SC

The construction product DG-SC is defined as an intumescent filler and is used to seal combustible pipes and annular gaps.

2.2. Descriptions

The installation situations of “FLAMRO Products in CLT floors” are fully described in the test reports referred to in section 3 of this Classification Report.

2.2.1. Pipes

2.2.1.1. Non-regulated plastic pipes:

CONEL DRAIN REHAU Raupiano light	Application:	Building drainage
	Material:	Polyolefin
	Product standard:	Informative
POLO-KAL XS / NG Poloplast	Application:	Building drainage
	Material:	Polyolefin
	Product standard:	Informative
RAUPIANO PLUS REHAU	Application:	Building drainage
	Material:	Polyolefin
	Product standard:	Informative
Geberit Silent dB20	Application:	Building drainage
	Material:	Polyolefin
	Product standard:	Informative
Geberit Silent-Pro	Application:	Building drainage
	Material:	Polyolefin
	Product standard:	Informative
Geberit Silent-PP	Application:	Building drainage
	Material:	Polyolefin
	Product standard:	Informative

2.2.1.2. Multilayer composite pipes:

Viega Raxofix	Application:	Hot & cold water
	Material:	PE / aluminium / PE
	Product standard:	Informative
REHAU Rautitan stabil	Application:	Hot & cold water
	Material:	PE / aluminium / PE
	Product standard:	Informative
Geberit Mepla	Application:	Hot & cold water
	Material:	PE / aluminium / PE
	Product standard:	Informative

2.2.2. Test specimen description

2.2.2.1. Table legend

Test report No. – Seal type – Test Specimen - Number of current page																	
No.	Material	Dimensions (mm) Cable load	Orientation	Pipe-end config.	Insulation Acc. to EN 1366-3:2009; Table 1				Mixed penetration seal / dimensions l x w x h [mm]	Pipe sealing system, as per EN 1366-3 3.12							
					Type	Case	Length [mm]	Insulation thickness [mm]		Type	Inside di-ameter [mm]	Active components			Installation	Joint and gap sealing, Depth [mm]	Fastening
												Layers	Thick-ness [mm]	Length [mm]			
Test specimen no.	Plastic or metal type Manufacturer type designation Cable group acc. to EN 1366-3:2009 Table A.1/2	Amount x outside diameter / wall thickness Cable designation acc. to EN 1366-3:2009 Table A.1/2 Spec. designation of cables / coaxial cables or wave-guides deviating from EN 1366-3:2009 Deviating cables /coaxial cables or waveguides	Angle between test specimen and supporting structure	Pipe-end configuration acc. to EN 1366-3:2009 Table 2	Manufacturer type designation	Pipe insulation acc. to EN 1366-3:2009 Table 1	Length of insulation on both sides of penetration seal	Insulation thickness	Type designation / dimensions	Type designation of pipe sealing system	Inside diameter of pipe sealing system	Amount of active layers	Total thickness of active layers	Length of the active layers according to EN 1366-3:2009 Illustration H.3	E - Fire Exposed side U - Unexposed side 2S - both sides CEN - Centred - I – inside - O - outside	Type designation, filling depth	Type designation and dimensions

2.2.2.2. Test Report No. 321100703-1

Tested in:	CLT floor - Manufacturer: STORA ENSO - Type designation: CLT 140 L5S NVI WW C24 SAN - Thickness 140 mm - 5 layers: 40/20/20/20/40

TR 321100703-1 - single seal

No.	Material	Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
					Type	Case	Length[1] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components: Layers	Active components: Thickness [mm]	Active components: Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
AW-1	Geberit Silent Pro	1 x ∅110 / t4.5	90°	U/U	Flexen[2]	LS	50	5	AWM II	120	-	19.2	25.4	E-O	FLAMMOTECT-A[3], 1	4 x timber screw 100x6
AW-2	Geberit Silent PP	1 x ∅110 / t3.6	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		
X1	Geberit Silent PP	1 x ∅75 / t2.4	90°	U/U		LS	50	5	AWM II	85	-	12.8	25.4	E-O		
X2	Geberit Silent dB20	1 x ∅63 / t3.2	90°	U/U		LS	50	5	AWM II	73	-	12.8	25.4	E-O		
AW-3	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		
AW-3A	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		
AW-3B	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		
AW-4	REHAU Raupiano plus	1 x ∅110 / t2.7	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		
AW-5	CONEL Drain	1 x ∅110 / t3.6	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		

1 Protruding out of seal on both sides
2 PEF insulation
3 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).

TR 321100703-1 - single seal																
					Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
											Active components					
No.	Material	Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Type	Case	Length[1] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Layers	Thickness [mm]	Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
AW-6	Poloplast POLO-KAL NG	1 x ∅110 / t4.9	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		
AW-7	Geberit Mepla	1 x ∅16 / t2.25	90°	U/C	AF/Armaflex	LS	350	17	AWM II	54	-	6.4	25.4	E-O	FLAMMOTECT-A[4], 1	4 x timber screw 100x6
AW-8	Geberit Mepla	1 x ∅20 / t2.5	90°	U/C		LS	350	17.5	AWM II	54	-	6.4	25.4	E-O		
AW-9	Geberit Mepla	1 x ∅26 / t3.0	90°	U/C		LS	350	18.5	AWM II	67	-	12.8	75.4	E-O		
AW-10	Geberit Mepla	1 x ∅32 / t3.0	90°	U/C		LS	350	19	AWM II	67	-	12.8	75.4	E-O		
AW-11	Geberit Mepla	1 x ∅40 / t3.5	90°	U/C		LS	350	20.5	AWM II	79	-	12.8	75.4	E-O		
AW-12	Geberit Mepla	1 x ∅50 / t4.0	90°	U/C		LS	350	21	AWM II	94	-	17.1	25.4	E-O		
AW-13	VIEGA Raxofix	1 x ∅16 / t2.2	90°	U/C		LS	350	17	AWM II	54	-	6.4	25.4	E-O		
AW-14	VIEGA Raxofix	1 x ∅20 / t2.5	90°	U/U		LS	350	17.5	AWM II	54	-	6.4	25.4	E-O		
AW-15	VIEGA Raxofix	1 x ∅25 / t2.7	90°	C/U		LS	350	18.5	AWM II	67	-	12.8	75.4	E-O		
AW-16	VIEGA Raxofix	1 x ∅32 / t3.2	90°	C/U		LS	350	19	AWM II	67	-	12.8	75.4	E-O		
AW-17	VIEGA Raxofix	1 x ∅40 / t3.5	90°	U/C		LS	350	20.5	AWM II	79	-	12.8	75.4	E-O		
AW-18	VIEGA Raxofix	1 x ∅50 / t4.0	90°	U/C		LS	350	21	AWM II	94	-	17.1	25.4	E-O		

4 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).

TR 321100703-1 - single seal

No.	Material	Dimensions Ø / d [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
					Type	Case	Length[5] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components: Layers	Active components: Thickness [mm]	Active components: Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
K-4	Copper	1 x ∅54 / t1.0	90°	U/C	AF/Armaflex	LS	350	9	NBR-plus	72	1	1.5	125	E-I[6]	FLAMMOTECT-A[7], 1	secured by wire
E-1	Stainless steel	1 x ∅110 / t1.0	90°	C/U		LS	350	9.5	NBR-plus	129	1	1.5	125	E-I[8]		secured by wire
K-8	Copper	1 x ∅54 / t1.0	90°	U/C		LS	350	21	NBR-plus	96	2	3	125	E-I[9]		secured by wire
E-2	Stainless steel	1 x ∅110 / t1.0	90°	C/U		LS	350	23	NBR-plus	156	2	3	125	E-I[10]		secured by wire
K-12	Copper	1 x ∅54 / t1.0	90°	U/C	RS800	LS	430	20	-	-	-	-	-	-		-
E-3	Stainless steel	1 x ∅110 / t1.0	90°	C/U		LS	430	30	-	-	-	-	-	-		-
K-15	Copper	1 x ∅28 / t1.0	90°	U/C	Hvac	LS	430	20	-	-	-	-	-	-		-
K-16	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		-
DB-1	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U	Flexen[11]	LS	50	5	AWM II	120	-	19.2	25.4	E-O		4 x timber screw 100x6

5 Protruding out of seal on both sides
6 NBR-plus protruding 50 mm out of seal soffit
7 Mineral wool backfilling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).
8 NBR-plus protruding 50 mm out of seal soffit
9 NBR-plus protruding 50 mm out of seal soffit
10 NBR-plus protruding 50 mm out of seal soffit
11 PEF insulation

TR 321100703-1 - single seal																	
					Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12								
											Active components						
No.	Material	Dimensions Ø / d [mm]	Orientation	Pipe-end configuration	Type	Case	Length[5] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Layers	Thickness [mm]	Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
K-17	Copper	1 x ∅28 / t1.0	90°	U/C	Hvac	LS	430	20	-	-	-	-	-	-		
K-18	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		
S-9	Steel	1 x ∅48 / t1.5	90°	C/U		LS	430	20	-	-	-	-	-	-		
S-10	Steel	1 x ∅28 / t1.0	90°	C/U		LS	430	20	-	-	-	-	-	-		
DB-2	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U	Flexen[12]	LS	50	5	AWM II	120	-	19.2	25.4	E-O		4 x timber screw 100x6

PB 321100703-1 - Mixed penetration seal				
No.	**Type**	**Dimensions l x w x h [mm x mm x mm]**	**Installation**	**Remarks**
Seal 1	FLAMMOTECT-A	600 x 600 x 140	E-I	flush with floor top surface and soffit
Seal 3	BSB	600 x 600 x 230	E-I	Floor top support made of squared timber 60x50 mm (hxw) flush with the soffit

12 PEF insulation

PB 321100703-1 - Mixed penetration seal																
					Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
											Active components					
No.	Material	Dimensions Ø / d [mm]	Orientation	Pipe-end configuration	Type	Case	Length[13] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Layers	Thickness [mm]	Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
Seal 1-1	Copper	1 x ∅28 / t1.0	90°	U/C	Hvac[14]	LS	430	20	-	-	-	-	-	-	FLAMMOTECT-A[15], 1	Secured by wire
Seal 1-2	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		Secured by wire
Seal 1-3	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U	Flexen[16]	LS	50	5	AWM II	120	-	-	-	E-O		4x threaded rod M6
Seal 1-4	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U		LS	50	5	AWM II	120	-	-	-	E-O		4 x threaded rod M6
Seal 1-6	Copper	1 x ∅28 / t1.0	90°	U/C	Hvac[17]	LS	430	20	-	-	-	-	-	-		secured by wire
Seal 1-5	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		-
Seal 1-11	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U	Flexen[18]	LS	50	5	AWM II	120	-	-	-	E-O		4 x threaded rod M6

13 Protruding out of seal on both sides
14 Lamella mat 35 kg/m³
15 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).
16 PEF insulation
17 Lamella mat 35 kg/m³
18 PEF insulation

PB 321100703-1 - Mixed penetration seal

No.	Material	Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
					Type	Case	Length[19] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components: Layers	Active components: Thickness [mm]	Active components: Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
Seal 1-7	Steel	1 x ∅28 / t1.0	90°	C/U	AF/Armaflex	LS	350	19	NBR-plus	66	2	3	125	E-I[20]	FLAMMOTECT-A[21], 1	Secured by wire
Seal 1-8	Steel	1 x ∅50 / t2.0	90°	C/U		LS	350	19	NBR-plus	92	2	3	125	E-I[22]		Secured by wire
Seal 1-9	Copper	1 x ∅28 / t1.0	90°	U/C	Hvac[23]	LS	430	20	-	-	-	-	-	-		Secured by wire
Seal 1-10	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		Secured by wire
Seal 3-1	Copper	1 x ∅28 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-	DG-SC[24], 25	Secured by wire
Seal 3-2	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		Secured by wire
Seal 3-3	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U	-	-	-	-	KSL-W	110	2	3	50	E-I	DG - SC	Secured by tape

19 Protruding out of seal on both sides
20 NBR-plus protruding 75 mm out of seal soffit
21 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).
22 NBR-plus protruding 75 mm out of seal soffit
23 Lamella mat 35 kg/m³
24 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).

PB 321100703-1 - Mixed penetration seal																
					Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
											Active components					
No.	Material	Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Type	Case	Length[19] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Layers	Thickness [mm]	Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
Seal 3-4	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U		-	-	-	KSL-W	110	2	3	50	E-I		Secured by tape
Seal 3-6	Copper	1 x ∅28 / t1.0	90°	U/C	Hvac[25]	LS	430	20	-	-	-	-	-	-		Secured by wire
Seal 3-5	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		Secured by wire
Seal 3-11	Geberit Silent dB20	1 x ∅110 / t6.0	90°	U/U	-	-	-	-	KSL-W	110	2	3	50	E-I		Secured by tape
Seal 3-7	Steel	1 x ∅28 / t1.0	90°	C/U	AF/Armaflex	LS	350	19	-	-	-	-	-	-	DG-SC[26], 25	Secured by wire
Seal 3-8	Steel	1 x ∅50 / t2.0	90°	C/U		LS	350	19	-	-	-	-	-	-		Secured by wire
Seal 3-9	Copper	1 x ∅28 / t1.0	90°	U/C	Hvac[27]	LS	430	20	-	-	-	-	-	-		Secured by wire
Seal 3-10	Copper	1 x ∅54 / t1.0	90°	U/C		LS	430	20	-	-	-	-	-	-		Secured by wire

25 Lamella mat 35 kg/m³
26 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).
27 Lamella mat 35 kg/m³

PB 321100703-1 - Penetration seals				
No.	**Type**	**Dimensions l x w x h [mm x mm x mm]**	**Installation**	**Remarks**
Seal 2	FLAMMOTECT-A	600 x 600 x 140	E-I	flush with floor top surface and soffit

PB 321100703-1 - Penetration seals						
No.	**Type**		**Amount**	**Material**	**Coating Case L x t [mm, mm)]**	**Fastening or joint and sealing Type, depth [mm]**
Seal 2	Cable ladder [28]	D1	1	FLAMMOTECT-A	FLAMMOTECT-A LS 200 x 0.75	FLAMMOTECT-A[29], 1 Annular gap width 0 - 5 mm
		E	2			
		D2	1			
	Cable ladder [30]	D3	1			
	Cable tray[31]	A1	10			
		A2	10			
		A3	10			
		U	2			
		C1	1			
		C2	1			
		C3	1			
	Cable tray[32]	H_{Fe}	3			
		I	3			
		F	∅100			

28 Cable ladder 300x45 mm; sheet hthickness 1.25 mm
29 Both-sided mineral wool filling as thick as penetration seal ($\rho \geq 40$ kg/m³, $\Theta \geq 1000$°C).
30 Cable ladder 200x45 mm; sheet thickness 1.0 mm
31 Perforated cable tray 500x60 mm; sheet thickness 0.8 mm
32 Non-perforated cable tray 500x60 mm; sheet thickness 1.5 mm

PB 321100703-1 - cable boxes																	
					Insulation Acc. to EN1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12								
No.	Material		Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Type	Case	Length[33] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Active components			Installation	Joint and gap sealing, depth [mm]	Joint and gap sealing Cable box / occupation
												Layers	Thickness [mm]	Length [mm]			
CT 1	empty		-	90°	-	-	-	-	-	Cable Tube	107	1	1.5	150	E-I	FLAMMOTECT-A[34], 1	BASOTECT-H plug sealed with FLAMMOTECT-A / 1
CT 2	Cable group 1		3 x A1 3 x A2 3 x A3 1 x B	90°	-	-	-	-	-	Cable Tube	107	1	1.5	150	E-I		
CT 3	Cable group 4		1 x F - Ø100	90°	-	-	-	-	-	Cable Tube	107	1	1.5	150	E-I		
CT 4	Fränkische FFKu-EL-F-LS0H		3 x ∅32 / WH3.75 occupied	90°	U/U	-	-	-	-	Cable Tube	107	1	1.5	150	E-I		
CT 5	Fränkische FFKu-EL-F-LS0H		3 x ∅32 / WH3.75 empty	90°	U/U	-	-	-	-	Cable Tube	107	1	1.5	150	E-I		
CT 6	Clima split	Copper	2 x ∅18 / t1.0	90°	U/C	Flexen[35]	CS	∞		Cable Tube	107	1	1.5	150	E-I		
		PVC-U	1 x Ø25 / t4.5	90°	U/U		-	-		Cable Tube	107	1	1.5	150	E-I		
		Cable	1 x A3	90°	-		-	-		Cable Tube	107	1	1.5	150	E-I		

33 Protruding out of seal on both sides
34 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).
35 PEF insulation

2.2.2.3. Test Report No. 321100703-2

Tested in:	CLT floor - Manufacturer: STORA ENSO - Type designation: CLT 140 L5S NVI WW C24 SAN - Thickness 140 mm - 5 layers: 40/20/20/20/40

TR 321100703-2 - single seal

No.	Material	Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
					Type	Case	Length[36] [mm]	Insulation thick-ness [mm]	Type	Inside diameter [mm]	Active components			Installation	Joint and gap sealing, depth [mm]	Fastening
											Layers	Thickness [mm]	Length [mm]			
AW-19	REHAU Rautitan stabil	1 x ∅16 / t2.6	90°	U/C	AF/Armaflex	LS	350	17	AWM II	120	-	19.2	25.4	E-O	FLAMMOTECT-A[37], 1	2-4x timber screw 100x6
AW-20	REHAU Rautitan stabil	1 x ∅20 / t2.9	90°	U/U		LS	350	17.5	AWM II	120	-	19.2	25.4	E-O		
AW-21	REHAU Rautitan stabil	1 x ∅25 / t3.7	90°	C/U		LS	350	18.5	AWM II	85	-	12.8	25.4	E-O		
AW-22	REHAU Rautitan stabil	1 x ∅32 / t4.7	90°	C/U		LS	350	19	AWM II	73	-	12.8	25.4	E-O		
AW-23	REHAU Rautitan stabil	1 x ∅40 / t6.0	90°	U/C		LS	350	20.5	AWM II	120	-	19.2	25.4	E-O		
AW-24	REHAU Rautitan stabil	1 x ∅50 / t6.0	90°	U/C		LS	350	21	AWM II	120	-	19.2	25.4	E-O		
K-14	Copper	1 x ∅54 / t1.0	90°	U/C	RS800	LS	430	50	AWM II	120	-	19.2	25.4	E-O		
E-4	Stainless steel	1 x ∅110 / t1.0	90°	C/U		LS	430	100	AWM II	120	-	19.2	25.4	E-O		
AW-25	Geberit Silent Pro	1 x ∅90 / t4.3	90°	U/U	Flexen[38]	LS	50	5	AWM II	120	-	19.2	25.4	E-O		
AW-26	Geberit Silent PP	1 x ∅90 / t2.8	90°	U/U		LS	50	5	AWM II	120	-	19.2	25.4	E-O		

36 Protruding out of seal on both sides
37 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).
38 PEF insulation

TR 321100703-2 - single seal																
					Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
											Active components					
No.	Material	Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Type	Case	Length[39] [mm]	Insulation thickness [mm]	Type	Inside diameter [mm]	Layers	Thickness [mm]	Length [mm]	Installation	Joint and gap sealing, depth [mm]	Fastening
AW-27	Geberit Silent dB 20	1 x ∅90 / t5.5	90°	U/U	Flexen[40]	LS	50	5	AWM II	100	-	17.1	25.4	E-O	FLAMMOTECT-A[41], 1	2-4x timber screw 100x6
AW-28	Rehau Raupiano Plus	1 x ∅90 / t2.2	90°	U/U		LS	50	5	AWM II	100	-	17.1	25.4	E-O		
AW-29	Conel Drain	1 x ∅90 / t2.2	90°	U/U		LS	50	5	AWM II	100	-	17.1	25.4	E-O		
AW-30	POLO-KAL NG	1 x ∅90 / t3.0	90°	U/U		LS	50	5	AWM II	100	-	17.1	25.4	E-O		
AW-31	Geberit Silent Pro	1 x ∅75 / t3.4	90°	U/U		LS	50	5	AWM II	85	-	12.8	25.4	E-O		
ÂW-32	Geberit Silent PP	1 x ∅75 / t2.6	90°	U/U		LS	50	5	AWM II	85	-	12.8	25.4	E-O		
AW-33	Geberit Silent dB 20	1 x ∅75 / t3.6	90°	U/U		LS	50	5	AWM II	85	-	12.8	25.4	E-O		
AW-34	Rehau Raupiano Plus	1 x ∅75 / t2.0	90°	U/U		LS	50	5	AWM II	85	-	12.8	25.4	E-O		
AW-35	Conel Drain	1 x ∅75 / t1.9	90°	U/U		LS	50	5	AWM II	85	-	12.8	25.4	E-O		
AW-36	POLO-KAL NG	1 x ∅75 / t2.6	90°	U/U		LS	50	5	AWM II	85	-	12.8	25.4	E-O		
AW-37	Geberit Silent Pro	1 x ∅50 / t3.0	90°	U/U		LS	50	5	AWM II	60	-	6.4	25.4	E-O		
AW-38	Geberit Silent PP	1 x ∅50 / t1.8	90°	U/U		LS	50	5	AWM II	60	-	6.4	25.4	E-O		

39 Protruding out of seal on both sides
40 PEF insulation
41 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).

TR 321100703-2 - single seal																
No.	Material	Dimensions Ø / t [mm]	Orientation	Pipe-end configuration	Insulation Acc. to EN 1366-3:2009; Table 1				Pipe sealing system as per EN1366-3: 3.12							
					Type	Case	Length[42] [mm]	Insulation thick-ness [mm]	Type	Inside diameter [mm]	Active components			Installation	Joint and gap sealing, depth [mm]	Fastening
											Layers	Thickness [mm]	Length [mm]			
AW-39	Geberit Silent dB 20	1 x ∅56 / t3.2	90°	U/U	Flexen[43]	LS	50	5	AWM II	67	-	12.8	25.4	E-O	FLAMMOTECT-A[44], 1	2-4 x timber screw 100x6
AW-40	Rehau Raupiano Plus	1 x ∅50 / t1.8	90°	U/U		LS	50	5	AWM II	60	-	6.4	25.4	E-O		
AW-41	Conel Drain	1 x ∅50 / t1.8	90°	U/U		LS	50	5	AWM II	60	-	6.4	25.4	E-O		
AW-42	POLO-KAL NG	1 x ∅50 / t2.0	90°	U/U		LS	50	5	AWM II	60	-	6.4	25.4	E-O		
P-1	Geberit Silent Pro	1 x ∅110 / t4.1	90°	U/C		LS	50	5	AWM II	120	-	19.2	25.4	E-O		
K-19	Copper	1 x ∅28 / t1.0	90°	U/C	RS800	LS	430	20	-	-	-	-	-	-		-
K-20	Copper	1 x ∅42 / t1.2	90°	U/C		LS	430	20	-	-	-	-	-	-		-
NG-1	POLO-KAL NG	1 x ∅110 / t3.4	90°	U/U	Flexen[45]	LS	50	5	AWM II	120	-	19.2	25.4	E-O		4 x timber screw 100x6
K-21	Copper	1 x ∅28 / t1.0	90°	U/C	RS800	LS	430	20	-	-	-	-	-	-		-
K-22	Copper	1 x ∅42 / t1.2	90°	U/C		LS	430	20	-	-	-	-	-	-		-

42 Protruding out of seal on both sides
43 PEF insulation
44 Mineral wool filling as thick as penetration seal (r ≥ 40 kg/m³, Q ≥ 1000°C).
45 PEF insulation

PB 321100703-2 - Empty penetration seals				
No.	**Type**	**Dimensions l x w x h [mm x mm x mm]**	**Installation**	**Remarks**
Seal 1	FLAMMOTECT-A	1000 x 600 x 140	E-I	flush with floor top surface and soffit
Seal 3	BSB	600 x 600 x 230	E-I	flush with the soffit

PB 321100703-2 - Penetration seals				
No.	**Type**	**Dimensions l x w x h [mm x mm x mm]**	**Installation**	**Remarks**
Seal 2	FLAMMOTECT-A	600 x 600 x 140	E-I	flush with floor top surface and soffit

PB 321100703-2 - Penetration seals						
No.	**Type**		**Amount**	**Material**	**Coating Case L x t [mm, mm)]**	**Fastening or joint and sealing Type, depth [mm]**
Seal 2	Cable ladder [46]	D1	1	FLAMMOTECT-A	FLAMMOTECT-A LS 200 x 1	FLAMMOTECT-A[47], 1 Annular gap width 0 – 5 mm
		E	2			
		D2	1			
	Cable ladder [48]	D3	1			
	Cable tray[49]	A1	10			
		A2	10			
		A3	10			
		U	2			
		C1	1			
		C2	1			
		C3	1			
	Cable tray[50]	H_{Fe}	3			
		I	3			
		F[51]	∅100			

46 Cable ladder 300x45 mm; sheet thickness 1.25 mm
47 Both-sided mineral wool filling as thick as penetration seal ($\rho \geq 40$ kg/m³, $\Theta \geq 1000$°C).
48 Cable ladder 200x45 mm; sheet thickness 1.0 mm
49 Perforated cable tray 500x60 mm; sheet thickness 0.8 mm
50 Non-perforated cable tray 500x60 mm; sheet thickness 1.5 mm
51 Retrofitted

3. Test reports and results

3.1. Test reports

Name of testing laboratory	Customer	Test Report No.	Test method
IBS GmbH Petzoldstr. 45, A-4020 Linz	**svt Brandschutz-Vertriebsgesellschaft mbH International** Glüsinger Str. 86 D-21217 Seevetal	321100703-1 of 14.04.2022 (CLT 140mm)	EN 1363-1: 1999 EN 1366-3: 2009 prEN1366-3:2021
IBS GmbH Petzoldstr. 45, A-4020 Linz	**svt Brandschutz-Vertriebsgesellschaft mbH International** Glüsinger Str. 86 D-21217 Seevetal	321100703-2 of 14.04.2022 (CLT 140mm)	EN 1363-1: 1999 EN 1366-3: 2009 prEN1366-3:2021

3.2. Resistance to fire performance

Table 1: Terms of loading

Temperature-time curve:	Standard temperature-time curve (STTC) as specified in EN 1363-1. 1999.
Fire load:	Horizontal penetration seal (floor) Vertical penetration seal (wall)

Table 2: Test results

3.2.1. Test report 321100703-1

of 14.04.2022 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Fire integrity**			**I - Thermal insulation**
		Time until cotton-wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise on the unexposed exceeds 180 K
		[min]			
E-1	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 60**
E-2	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 60**
E-3	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
S-9	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
S-10	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**

of 14.04.2022 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Fire integrity**			**I - Thermal insulation**
		Time until cotton-wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise on the unexposed exceeds 180 K
		[min]			
K-4	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-8	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-12	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-15	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-16	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-17	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-18	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
DB-1	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
DB-2	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-1	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-2	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
x2	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
x1	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-3	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-3A	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-3B	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-4	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-5	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-6	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-7	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-8	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-9	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-10	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-11	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-12	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-13	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-14	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-15	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-16	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-17	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-18	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
CT-1	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
CT-2	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
CT-3	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
CT-4	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**

of 14.04.2022 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Fire integrity**			**I - Thermal insulation**
		Time until cotton-wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise on the unexposed exceeds 180 K
		[min]			
CT-5	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
CT-6	C/U U/U -	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-1	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-2	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-3	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-4	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-5	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-6	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-7	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-8	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-9	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-10	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1-11	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-1	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-2	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-3	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-4	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-5	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-6	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-7	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-8	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-9	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-10	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3-11	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2	--	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Trays and ladders	--	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Cable group 1	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Cable group 2	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Cable group 3	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 60**

of 14.04.2022 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Fire integrity**			**I - Thermal insulation**
		Time until cotton-wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise on the unexposed exceeds 180 K
		[min]			
Seal 2 - Cable group 4	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Service group 6 - H	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Service group 6 - I	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Specific supporting structure in accordance with the specifications of EN 1366-3:2009 floor construction made of cross laminated timber with a total thickness of 140 mm					

3.2.2. Test report 321100703-2

of 14.04.2022 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Fire integrity**			**I - Thermal insulation**
		Time until cotton-wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise on the unexposed exceeds 180 K
		[min]			
AW-19	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-20	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-21	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-22	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-23	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-24	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-25	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-26	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-27	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-28	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-29	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-30	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-31	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-32	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-33	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-34	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-35	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-36	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-37	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-38	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-39	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-40	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-41	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
AW-42	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
NG-1	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
E-4	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
P-1	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-14	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-19	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-20	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-21	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
K-22	U/C	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**

of 14.04.2022 EN 1366-3: 2009 in connection with EN 1363-1: 1999					
No.	**Pipe-end configuration**	**E - Fire integrity**			**I - Thermal insulation**
		Time until cotton-wool pad ignition	Time until failure of gap gauge criteria	Time until occurrence of sustained flaming	Time until the maximum temperature rise on the unexposed exceeds 180 K
		[min]			
Seal 1 - Empty penetration seal	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 3 - Empty penetration seal	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 1 - Trays and ladders	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Cable group 1	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Cable group 2	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Cable group 3	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Cable group 4	-	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Service group 6 - H	C/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Seal 2 - Service group 6 - I	U/U	**≥ 90**	**≥ 90**	**≥ 90**	**≥ 90**
Specific supporting structure in accordance with the specifications of EN 1366-3:2009 floor construction made of cross laminated timber with a total thickness of 140 mm					

4. Classification and field of application

4.1. Reference for classification

This Classification is based on the normative reference EN 13501-2: 2016, section 7.

4.2. Reference for field of application

The field of direct application is based on the normative reference EN 1366-3:2009.

4.3. Definitions

4.3.1. Pipe orientation

4.3.1.1. Metal pipes

If a pipe has been tested perpendicular to the supporting structure, all angles between 90° and 45° are approved in accordance with subsection E.1.5.6.8 of EN 1366-3:2009.

4.3.1.2. Plastic pipes

When a pipe is tested vertically or sloping to the supporting structure, all angles between 90° and the tested angle shall be admissible in accordance with EN 1366-3:2009 E.2.7.6.

4.3.2. Suspension

Pipes and cables must be supported on at the top surface of the floor construction. The maximum distance of the first suspension to the supporting structure is given in the respective sections.

4.3.3. Pipe-end configuration

4.3.3.1. Plastic pipes, composite pipes and metal pipes (lmp)

Tests performed with pipe-end configuration U/U cover the configurations C/U, U/C and C/C as well.

Tests performed with pipe-end configuration C/U cover the configurations U/C and C/C as well.

Tests performed with pipe-end configuration U/C cover the configuration C/C as well.

4.3.3.2. Metal pipes (hmp)

Tests performed with pipe-end configuration U/C cover the configurations C/U and C/C as well.

Tests performed with pipe-end configuration C/U cover the configurations C/C as well.

4.3.4. Insulation thickness

The thickness of Euroclass A1 insulation may be increased in the CS case, but not reduced.

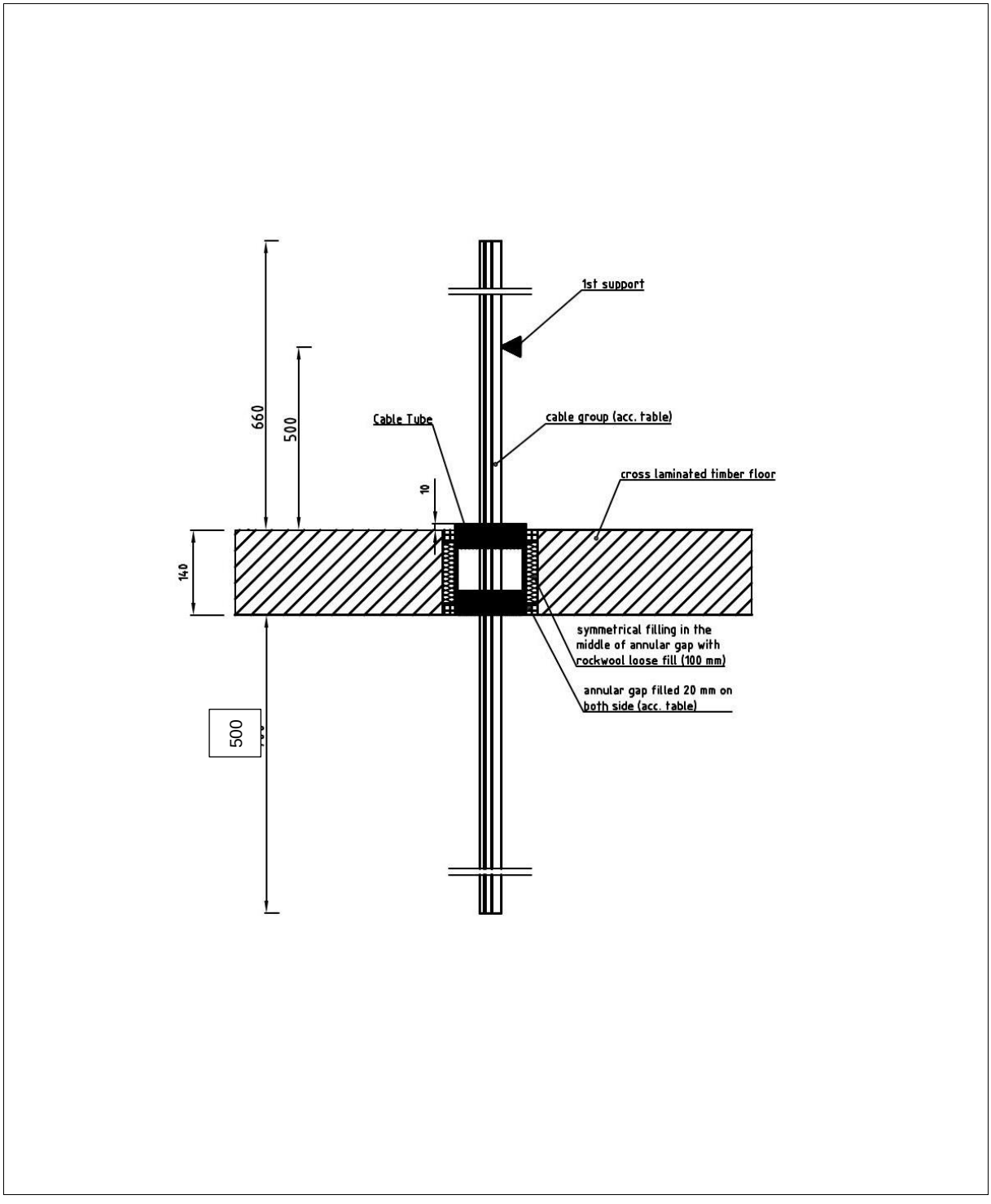
4.3.5. Supporting structure (floor)

Test results that include a specific supporting structure apply to separating building components made of the same material and composition and of at least the same thickness and density as the tested ones.

Building components (supporting structures) shall be classified in relation to their fire resistance in compliance with EN 13501-2.

4.4. Cable Tube CT 150 mm

4.4.1.1. Detail drawing



4.4.1.2. Suspension

Pipes must be supported on the top surface of the floor construction at a distance of $d_1 \leq 500$ mm to each other.

4.4.1.3. Annular gaps within CT

Annular gap width	0 – 5 mm
Filling	Basotect -H / 40 mm
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	1 mm

4.4.1.4. Annular gaps CT to supporting construction

Annular gap width	> 5 – 25 mm
Filling	Mineral wool ($\rho \geq 40$ kg/m³)
Joint filler	FLAMMOTECT®-A Kitt
Filling depth on both sides	≥ 20 mm

4.4.1.5. Minimum distance (linear)

All other distances	≥ 100 mm

4.4.1.6. Classification and field of application

Cable and electrical installation conduits

Cable[52]	∅ ≤ 21 mm	EI 90	321100703-1 CT-1, CT-2, CT-3, CT-4, CT-5
Cable bundle	∅ ≤ 100 mm		
Electrical installation pipe [53] (ECP) occupied or blank	∅ ≤ 32 mm	EI 90	
ECP bundle[54] occupied or blank	∅ ≤ 3x32 mm		

Clima Split cable bundle

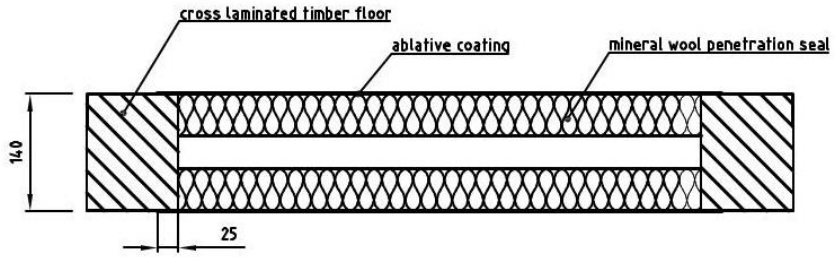
Copper pipe	∅ ≤ 2x18 mm	EI 90– C/U	321100703-1 CT6
Condensate pipe PVC-U	∅ ≤ 25/t4.5 mm	EI 90 – U/U	
Single cable	∅ ≤ 14 mm	EI 90	

52 Single or multi-core services with individual cable core insulation and an additional protection of the core bundles
53 EIR made of PE complying with DIN EN 61386-22 and VDE 0605-22
54 Consisting of electrical installation conduits 2 ∅ ≤ 40 mm

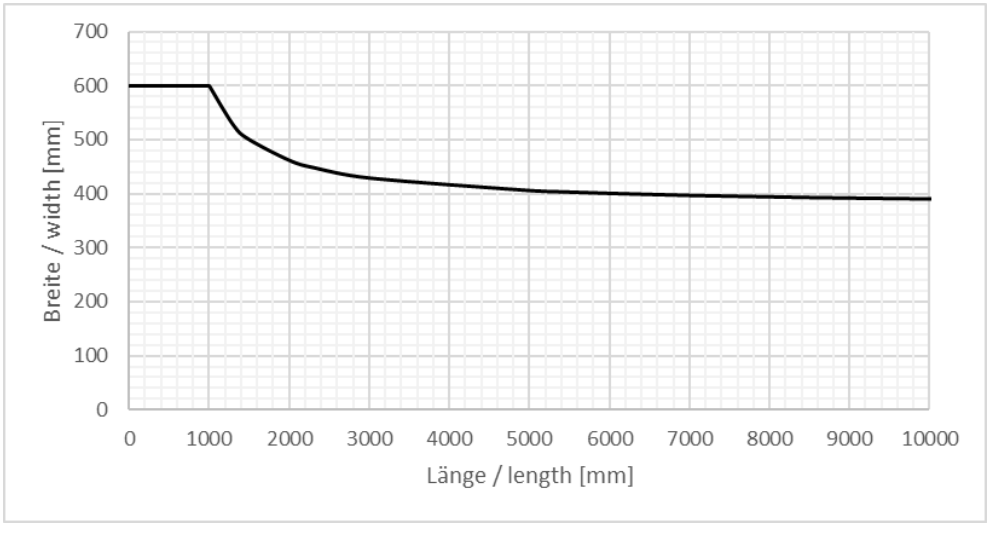
4.5. Panel seal FLAMMOTECT-A

4.5.1. Maximum penetration seal size

4.5.1.1. Detail drawing

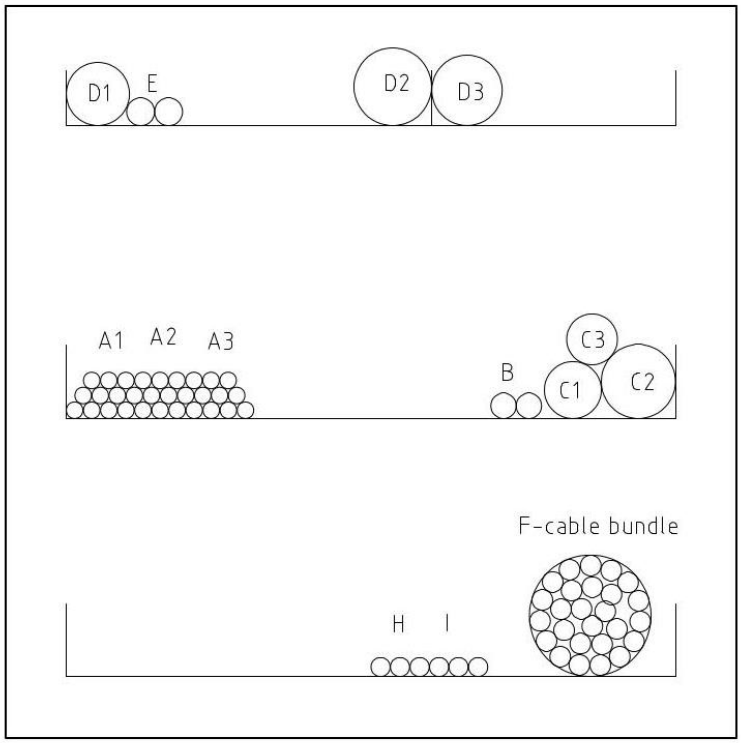


4.5.1.2. Classification and field of application

Maximum penetration seal size	Classification
	**EI 90**
	321100703-2 Seal I

4.5.2. Cabel penetration seal (FLAMMOTECT-A)

4.5.2.1. Detail drawing



4.5.2.2. Suspension

Cables and their supporting structures (cable trays or ladders) must be supported at a distance of $d_1 \leq 500$ mm on top of the floor construction.

4.5.2.3. Annular gaps

Annular gap width	0 – 5 mm
Filling	none
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	50 mm / panel thickness

Annular gap width	> 5 – 25 mm
Filling	Mineral wool ($\rho \geq 40$ kg/m³)
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	≥ 1 mm

4.5.2.4. Minimum distance (linear) – floor

Reveal	≥ 34 mm
Cable trays / ladders facing each other (horizontal)	≥ 0 mm
Cable trays / ladders facing each other (vertically)	≥ 100 mm
All other distances	≥ 100 mm

4.5.2.5. Coating lengths

Cable types			Coating length on both sides Coating thickness [mm]
Single cable[55] (Sheated cables)		∅ ≤ 21 mm	≥ 200, ≥ 1
		∅ ≤ 50 mm	≥ 200, ≥ 1
		∅ ≤ 80 mm	≥ 200, ≥ 1
Cable bundle[56]		∅ ≤ 100 mm	≥ 200, ≥ 1
Conduits / pipes	Steel	≥ 200, ≥ 1	≥ 200, ≥ 1
	Plastic	≥ 200, ≥ 1	≥ 200, ≥ 1

55 Single or multi-core services with individual cable core insulation and an additional protection of the core bundles. Optical fibre cables are covered.

56 Laced cable bundle consisting of single cables of∅ ≤ 21 mm

4.5.2.6. Classification and field of application

Orientation			**CLT ceiling**	**Test report TS No.**
Depth of building component			**≥ 140 mm**	
Single cable[57] (Sheated cables)		∅ ≤ 21 mm	**EI 90**	321100703-2 Cable group 1
		∅ ≤ 50 mm	**EI 90**	321100703-2 Cable group 2
		∅ ≤ 80 mm	**EI 90**	321100703-2 Cable group 3
Cable bundle[58]		∅ ≤ 100 mm	**EI 90**	321100703-2 Cable group 4
Conduits / pipes	Steel	∅ ≤ 16 mm	**EI 90 – U/C**	321100703-2 Service group 6 / H_{Fe}
	Plastic	∅ ≤ 16 mm	**EI 90 – U/U**	321100703-2 Service group 6 / I

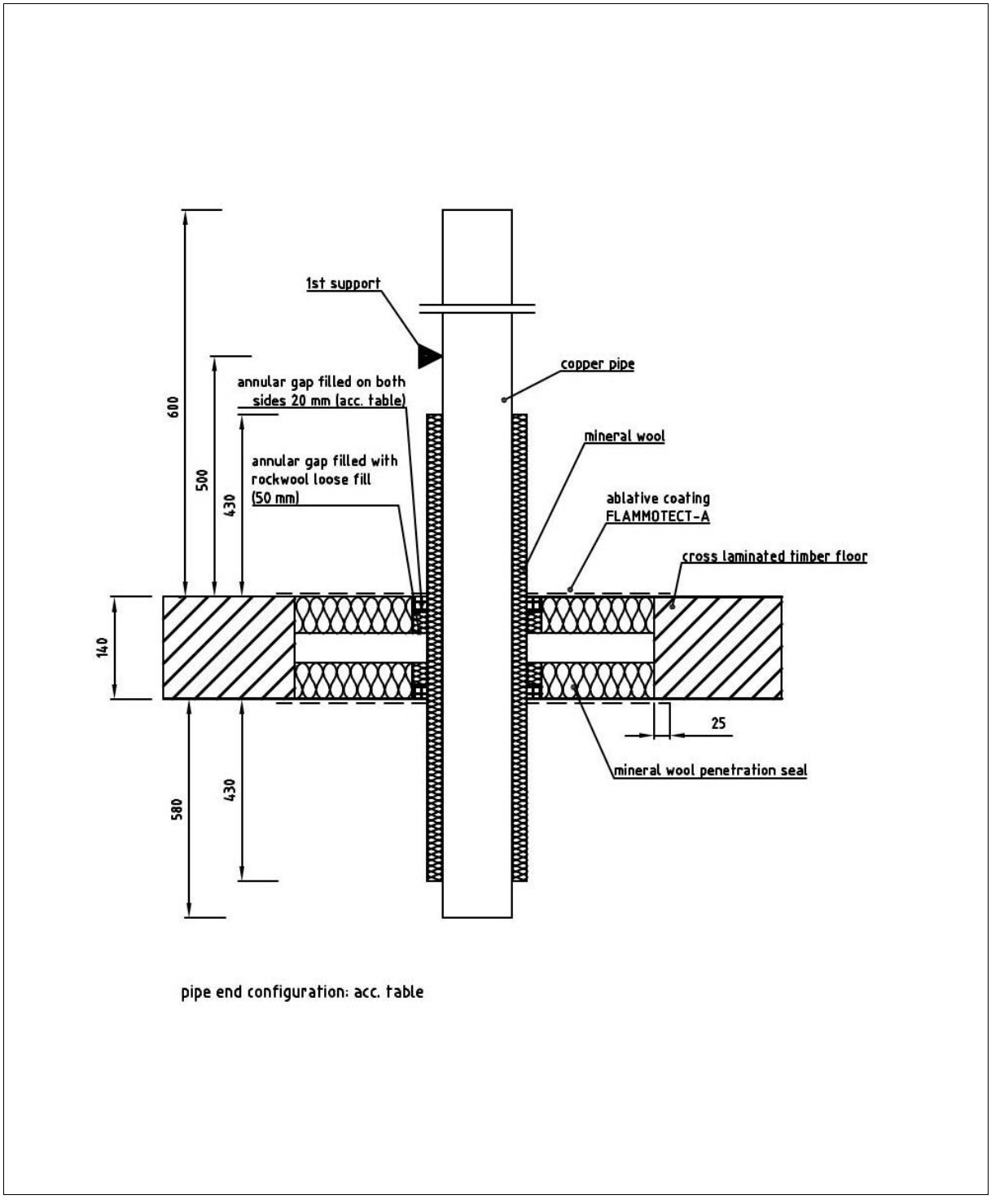
Cable support system
The classified cables may be used on all cable ladders and trays with a melting point Θ ≥ 1000°C, (FprEN1366-3;2021, A.4.4.1), e.g. stainless steel, galvanised steel of any width and steel thickness.

Post-occupancy options
Post-occupancy was not proven.

57 Single or multi-core services with individual cable core insulation and an additional protection of the core bundles. Optical fibre cables are covered.
58 Laced cable bundle consisting of single cables of∅ ≤ 21 mm.

4.5.3. Single metal pipes with non-combustible sectional insulation

4.5.3.1. Detail drawing



4.5.3.2. Pipe orientation

All angles between 45° and 90° are approved.

4.5.3.3. Suspension

Pipes must be supported on the top surface of the floor construction at a distance of $d_1 \leq 500$ mm to each other.

The suspension system may be designed without adhering to any fire protection requirements.

4.5.3.4. Annular gaps

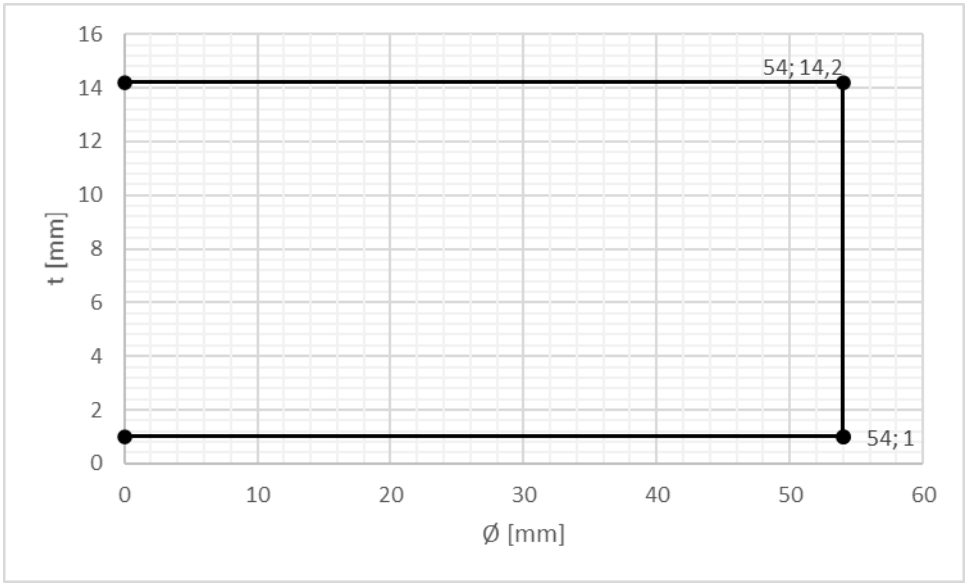
Annular gap width	0 – 5 mm
Filling	none
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	50 mm / panel thickness

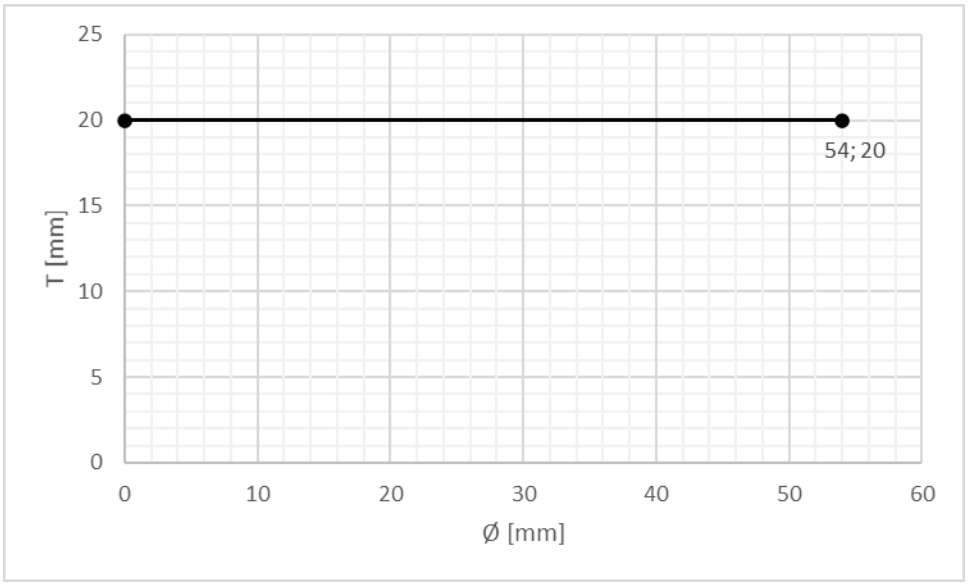
Annular gap width	> 5 – 25 mm
Filling	Mineral wool ($\rho \geq 40$ kg/m³)
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	≥ 1 mm

4.5.3.5. Minimum distance (linear)

Reveal	≥ 20 mm
Metal pipes with non-combustible insulation	≥ 0 mm
Geberit Silent dB20 Ø110/ t6	≥ 25 mm
All other distances	≥ 100 mm

4.5.3.6. Classification and field of application

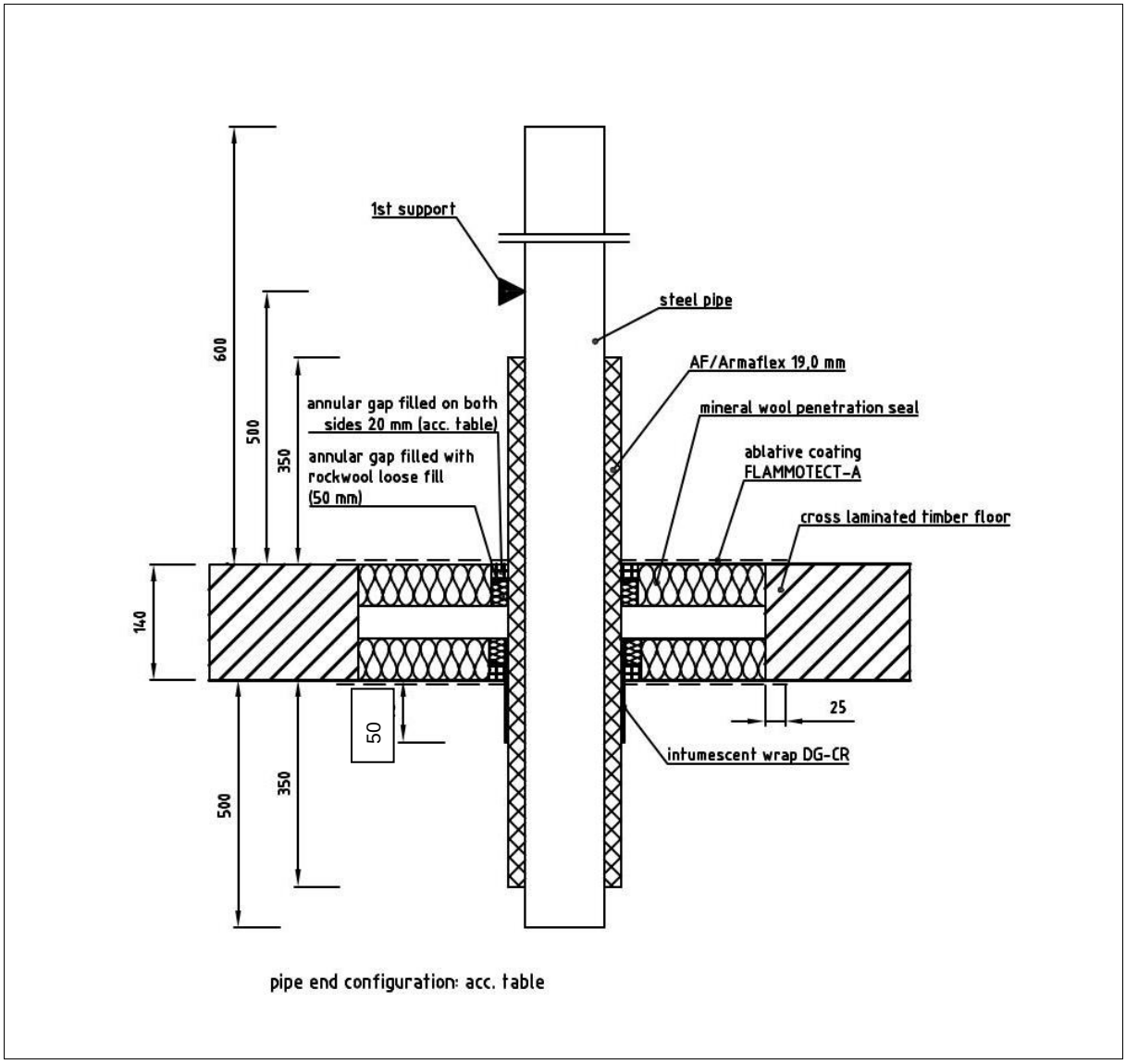
<table>
<tr><td rowspan="2">Copper pipe [59], λ ≤ 380 W/mK</td><td>∅ = 0 - 54 mm</td><td colspan="2" rowspan="2">EI 90 – U/C</td></tr>
<tr><td>t = 0.6 – 14.2 mm</td></tr>
<tr><td>Insulation - LS/CS</td><td>Mineral wool[60]</td></tr>
<tr><td colspan="2">Protruding ≥ 430 mm out of the penetration seal
(total length symmetrical ≥ 1000 mm)</td><td>∅ = 0-54 mm</td><td>T = 20 mm</td></tr>
<tr><td colspan="2"> 


</td><td colspan="2">321100703-1
Seal 1-1,
Seal 1-2,
Seal 1-5,
Seal 1-6,
Seal 1-9,
Seal 1-10</td></tr>
</table>

59 Results on copper pipes also apply to cast iron, steel and stainless steel pipes.
60 Mineral wool of Euroclass A1 or A2 (density ρ ≥ 35 kg/m³; melting point Θ ≥ 1000 °C)

4.5.4. Single metal pipes with combustible sectional insulation (FEF)

4.5.4.1. Detail drawing



4.5.4.2. Pipe orientation

Only pipes with an angle of 90° are permissible.

4.5.4.3. Suspension

Plastic pipes must be supported on the topside of the floor construction at a distance of $d_1 \leq 500$ mm.

The suspension system may be designed without adhering to any fire protection requirements.

4.5.4.4. Annular gaps

Annular gap width	0 – 5 mm
Filling	none
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	50 mm / panel thickness

Annular gap width	> 5 – 25 mm
Filling	Mineral wool ($\rho \geq 40$ kg/m³)
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	≥ 1 mm

4.5.4.5. Minimum distance (linear)

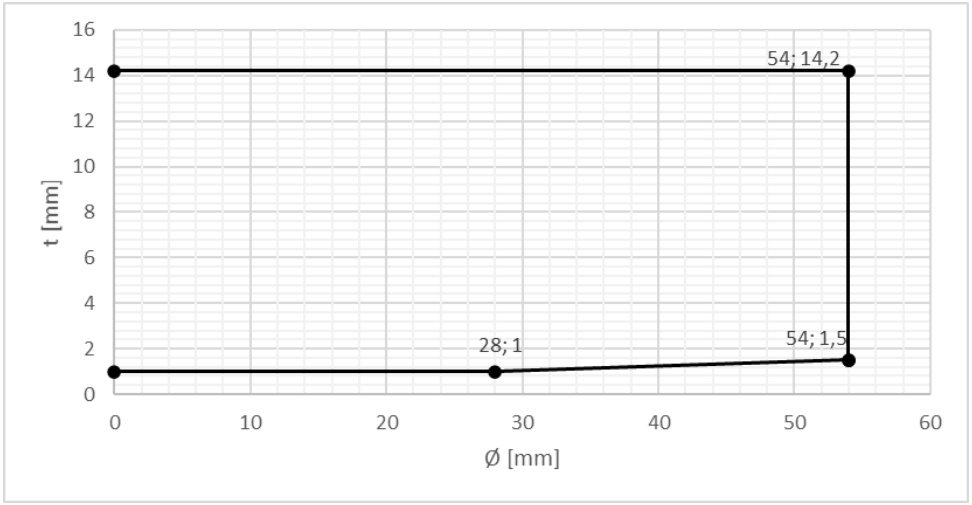
Reveal	≥ 100 mm
All other distances	≥ 100 mm

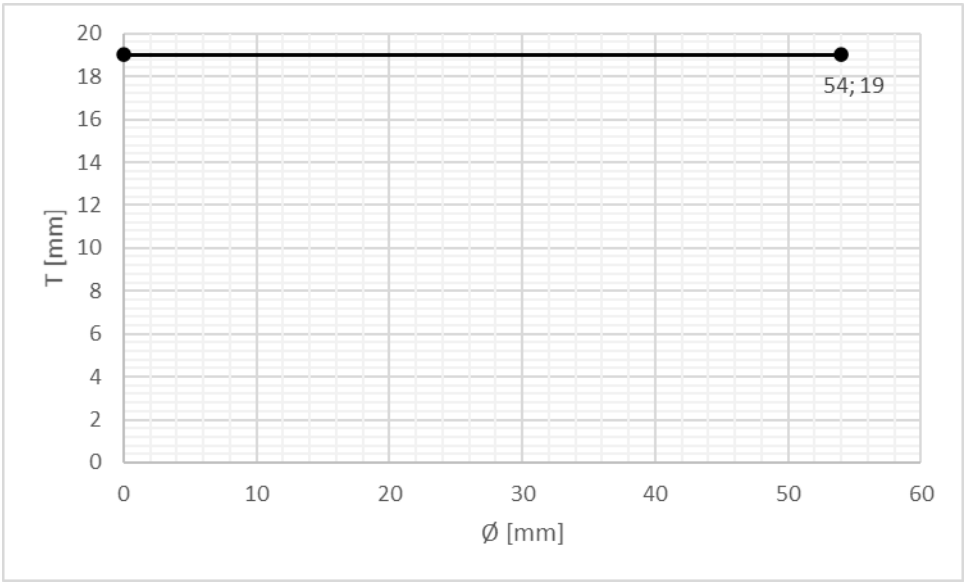
4.5.4.6. Construction group (DG-CR pro / NBR-plus)

$Ø_{pipe}$	$T_{insulation}$	Number of layers
0 - 54	19	2

4.5.4.7. Classification and field of application

Steel pipe[61], λ ≤ 58 W/mK	∅ = 0 - 54 mm t = 1.0 – 14.2 mm	**EI 90 – U/C**	
Insulation - CS	Butyl rubber[62]		
2 layers DG-CR pro		∅ = 0-54 mm	T = 19 mm



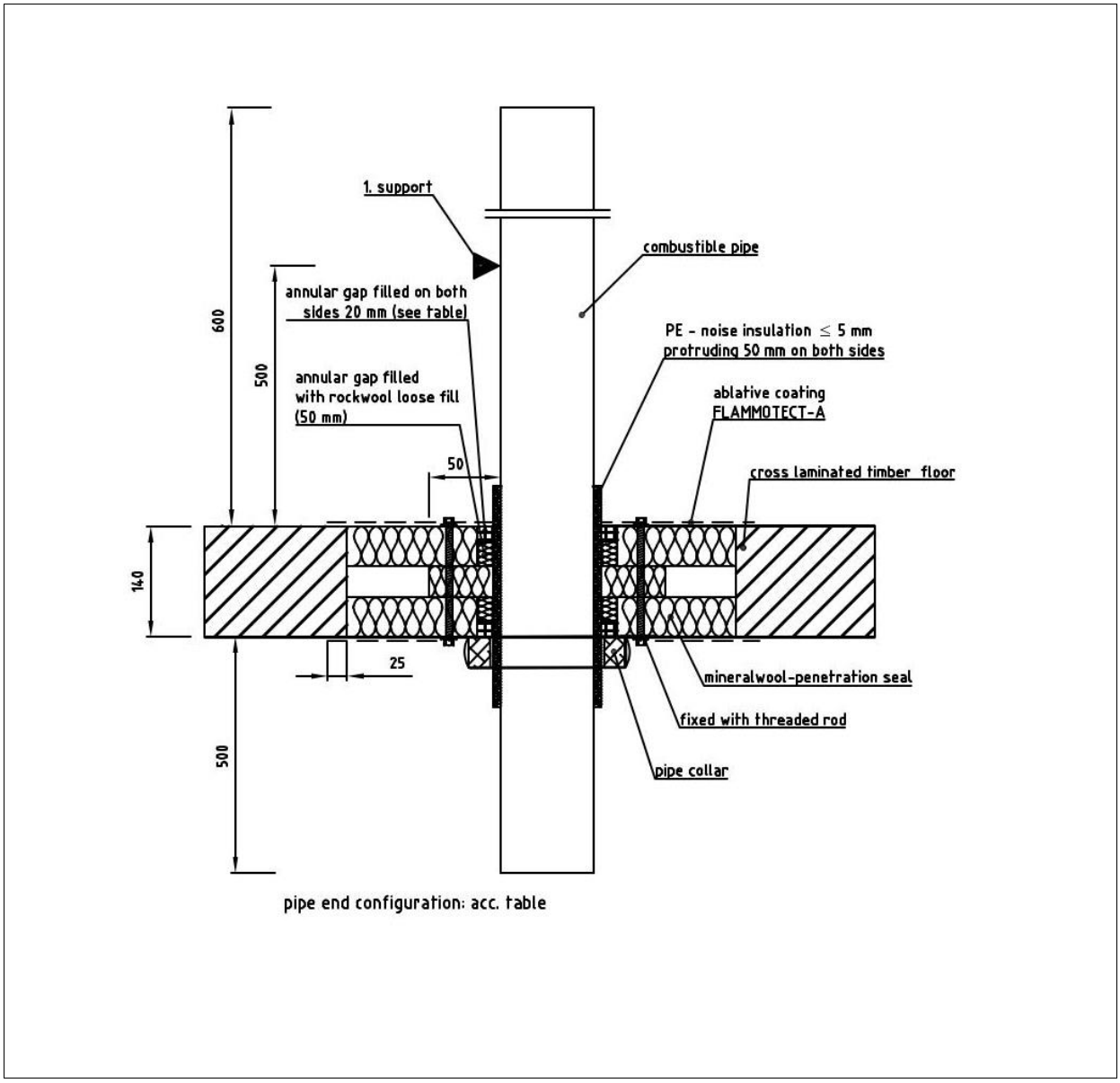


321100703-1
Seal 1-7,
Seal 1-8

61 Results on steel pipes also apply to cast iron and stainless steel pipes.
62 Butyl rubber of Euroclass B-s3, d0 (e.g. AF/Armaflex)

4.5.5. Non-regulated plastic pipes (Variant N II A)

4.5.5.1. Detail drawing



NOTE: Variant N II A is identical with AWM II.

4.5.5.2. Suspension

Plastic pipes must be supported on the topside of the floor construction at a distance of d_1 ≤ 500 mm.

4.5.5.3. Annular gaps

Annular gap width	0 – 5 mm
Filling	none
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	50 mm / panel thickness

Annular gap width	> 5 – 25 mm
Filling	Mineral wool (ρ ≥ 40 kg/m³)
Joint filler	FLAMMOTECT®-A
Filling depth on both sides	≥ 1 mm

4.5.5.4. Minimum distance (linear)

Reveal	≥ 20 mm
Geberit Silent dB20 Ø110/ t6	≥ 0 mm
Metal pipes with non-combustible insulation	≥ 0 mm
All other distances	≥ 100 mm

4.5.5.5. Insulation

Noise control strips made of PE soft foam are permissible up to a thickness of T = 5 mm.

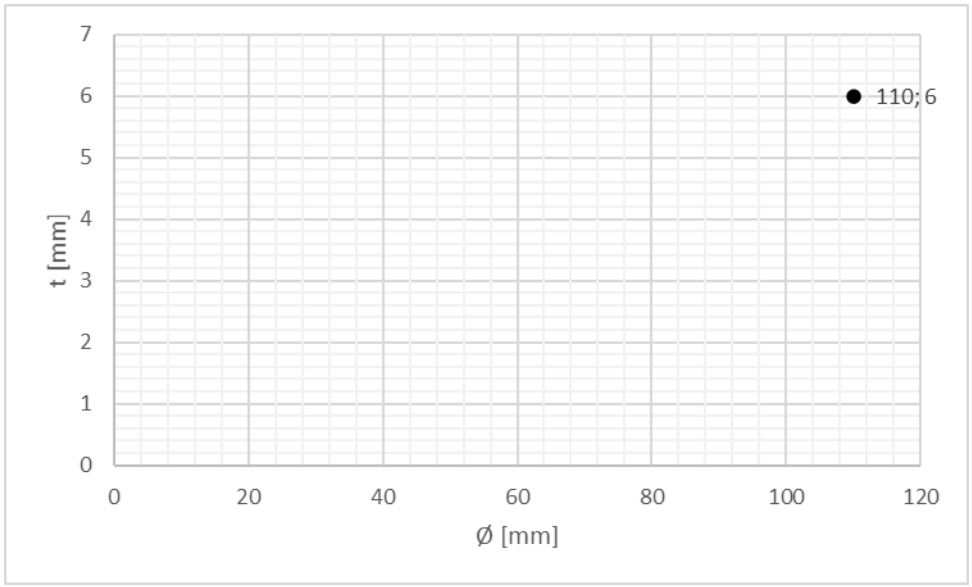
4.5.5.6. Construction groups

Pipe diameter [mm]	32 - 50	63 - 75	90	110
Total thickness of active inlay [mm]	6.4	12.8	17.1	19.2
Length of active inlay [mm]	25.4			

4.5.5.7. Fixing of variant N II A

The fire protection collar Variant N II A must be attached to the penetration sealing system FLAMMOTECT-A with threaded rods of Ø M6 – M8.

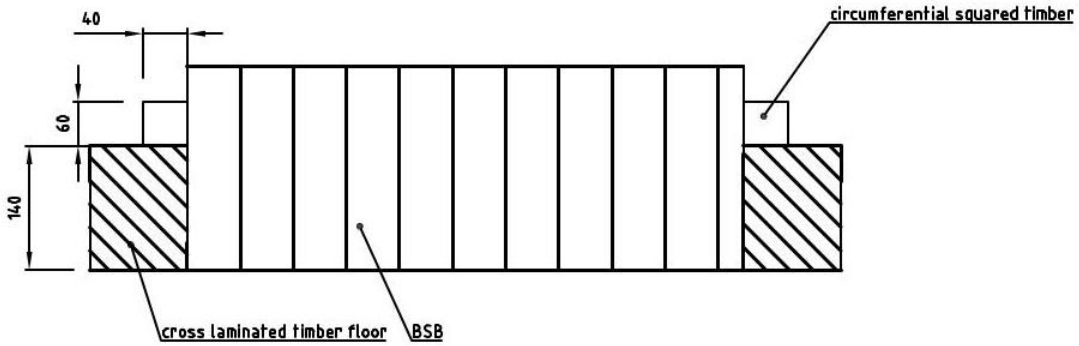
4.5.5.8. Classification and field of application

Geberit Silent dB20	Ø = 110 mm t = 6.0 mm	**EI 90-U/U**
		321100703-1 Seal 1-3 Seal 1-4 Seal 1-11

4.6. Firestop brick BSB

4.6.1. Maximum penetration seal size

4.6.1.1. Detail drawing

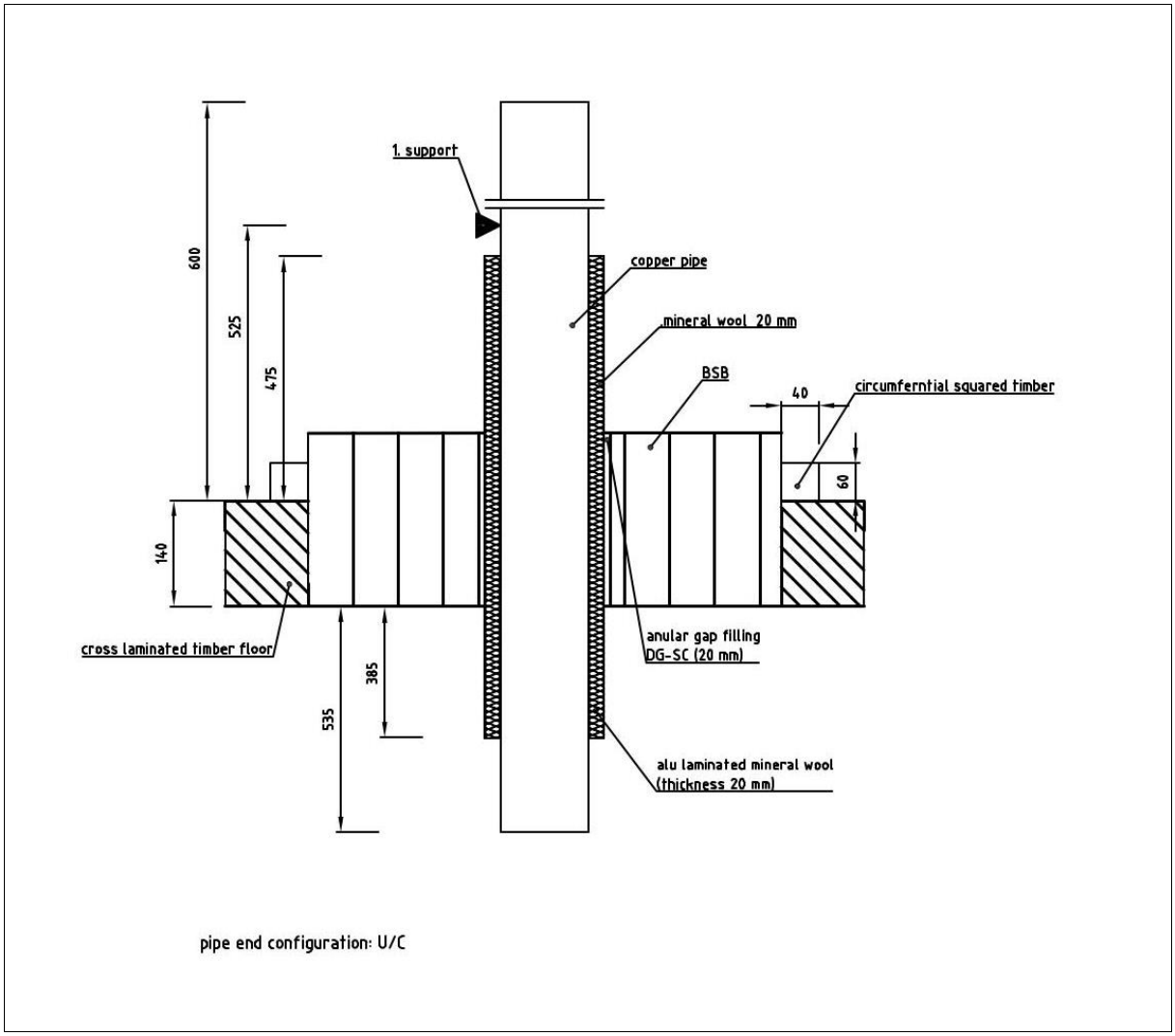


4.6.1.2. Classification and field of application

Maximum penetration seal size	Classification	Test report
600 x 600	**EI 90**	321100703-2 Seal III

4.6.2. Single metal pipes with non-combustible sectional insulation

4.6.2.1. Detail drawing



4.6.2.2. Pipe orientation

All angles between 45° and 90° are approved.

4.6.2.3. Suspension

Pipes must be supported on the top surface of the floor construction at a distance of $d_1 \leq 500$ mm to each other.

The suspension system may be designed without adhering to any fire protection requirements.

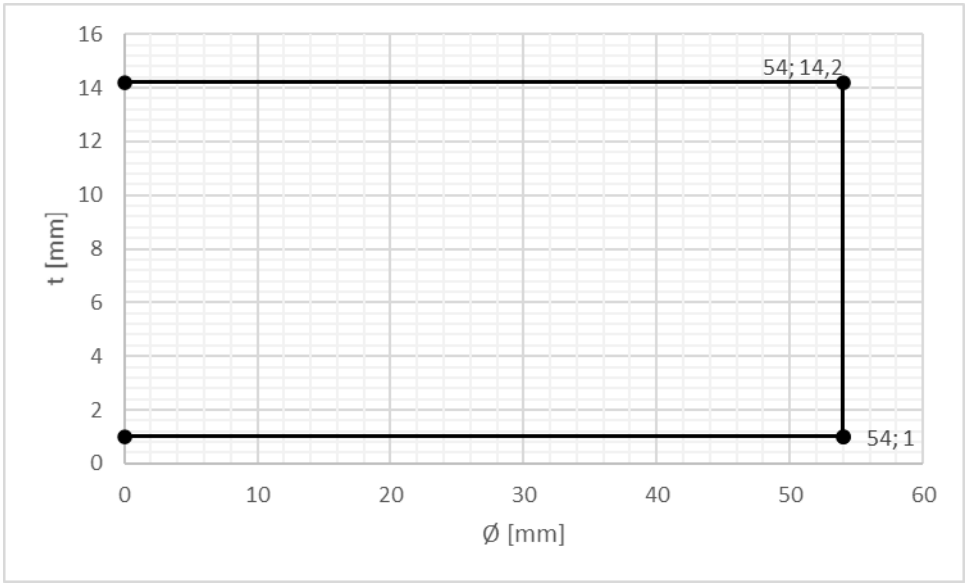
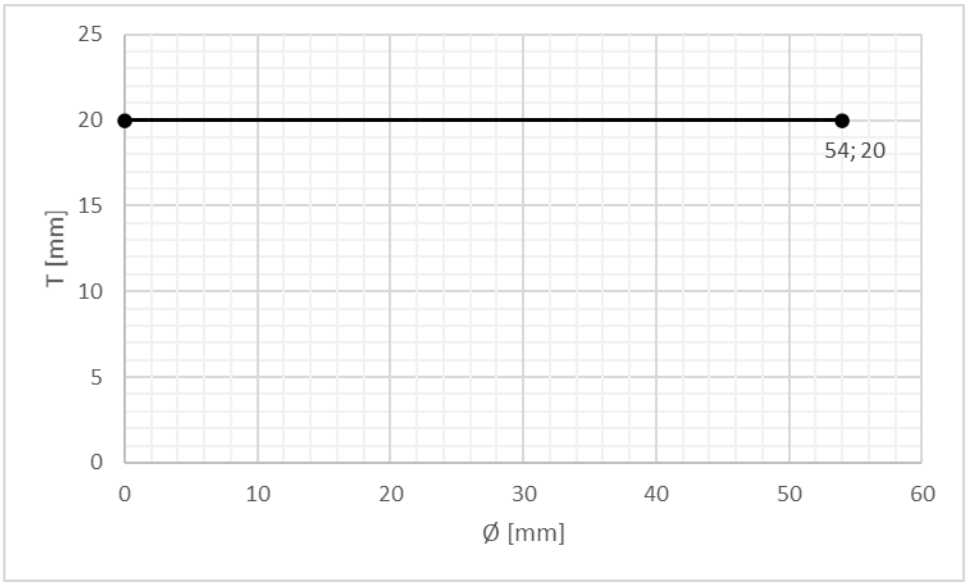
4.6.2.4. Annular gaps

Annular gap width	0 – 5 mm
Filling	none
Joint filler	DG-SC
Filling depth on both sides	20 mm

4.6.2.5. Minimum distance (linear)

Reveal	≥ 25 mm
Metal pipes with non-combustible insulation	≥ 0 mm
Geberit Silent dB20 Ø110/ t6	≥ 0 mm
All other distances	≥ 100 mm

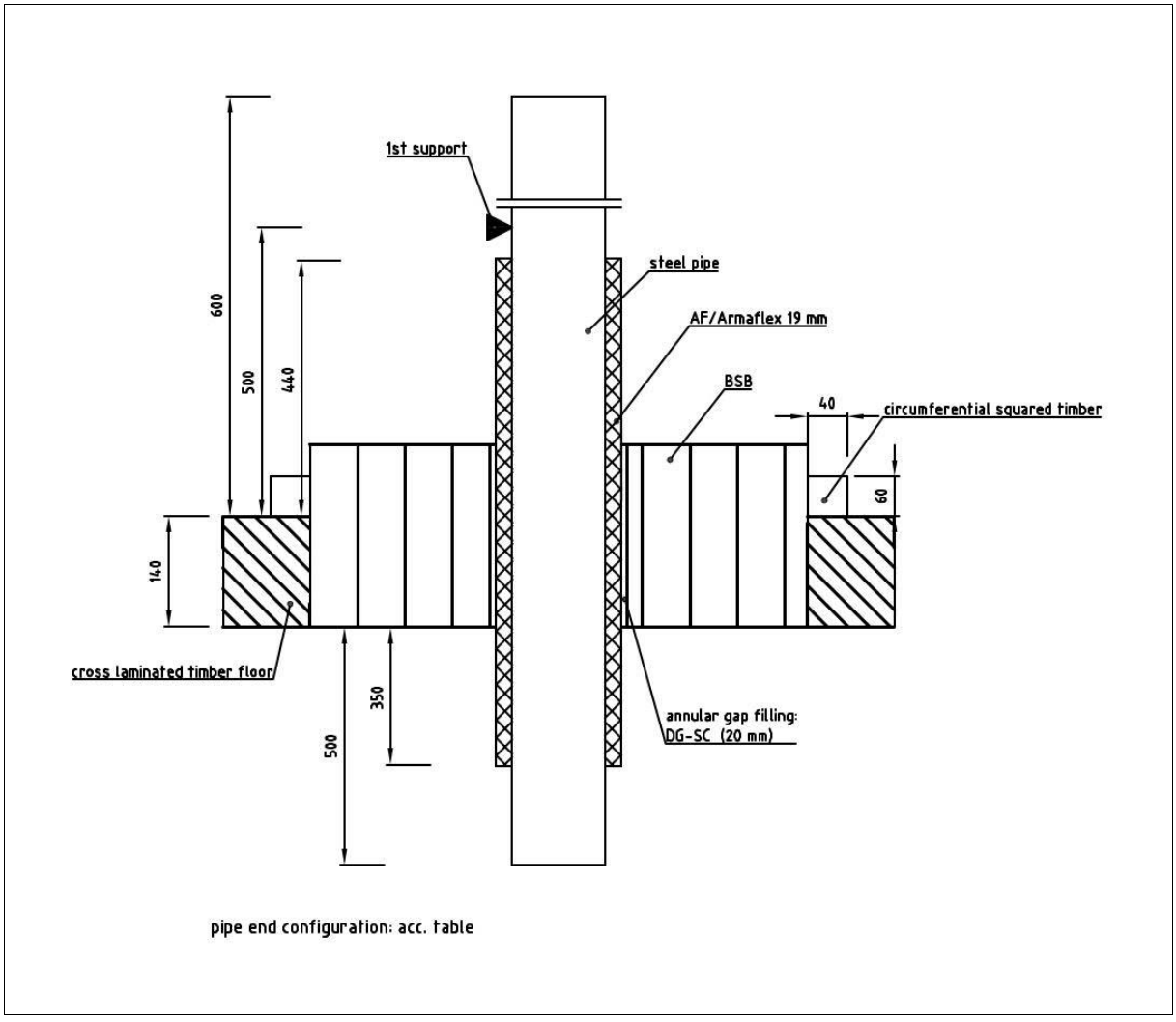
4.6.2.6. Classification and field of application

Copper pipe [63], λ ≤ 380 W/mK	∅ = 0 - 54 mm t = 0.6 – 14.2 mm	**EI 90 – U/C**	
Insulation - LS/CS	Mineral wool[64]		
Protruding ≥ 385 mm out of the penetration seal (total length symmetrical ≥ 1000 mm)		∅ = 0-54 mm	T = 20 mm
 			321100703-1 Seal 3-1, Seal 3-2, Seal 3-5, Seal 3-6, Seal 3-9, Seal 3-10

63 Results on copper pipes also apply to cast iron, steel and stainless steel pipes.
64 Mineral wool of Euroclass A1 or A2 (density ρ ≥ 35 kg/m³; melting point Θ ≥ 1000 °C)

4.6.3. Single metal pipes with combustible sectional insulation (FEF)

4.6.3.1. Detail drawing



4.6.3.2. Pipe orientation

Only pipes with an angle of 90° are permissible.

4.6.3.3. Suspension

Pipes must be supported on the top surface of the floor construction at a distance of $d_1 \leq 500$ mm to each other.

The suspension system may be designed without adhering to any fire protection requirements.

4.6.3.4. Annular gaps

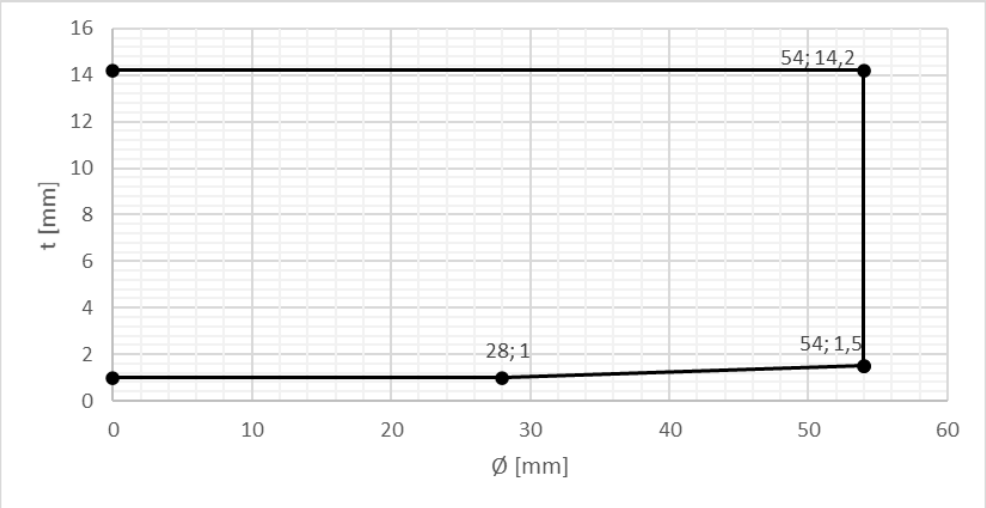
Annular gap width	0 – 5 mm
Filling	none
Joint filler	DG-SC
Filling depth on both sides	50 mm

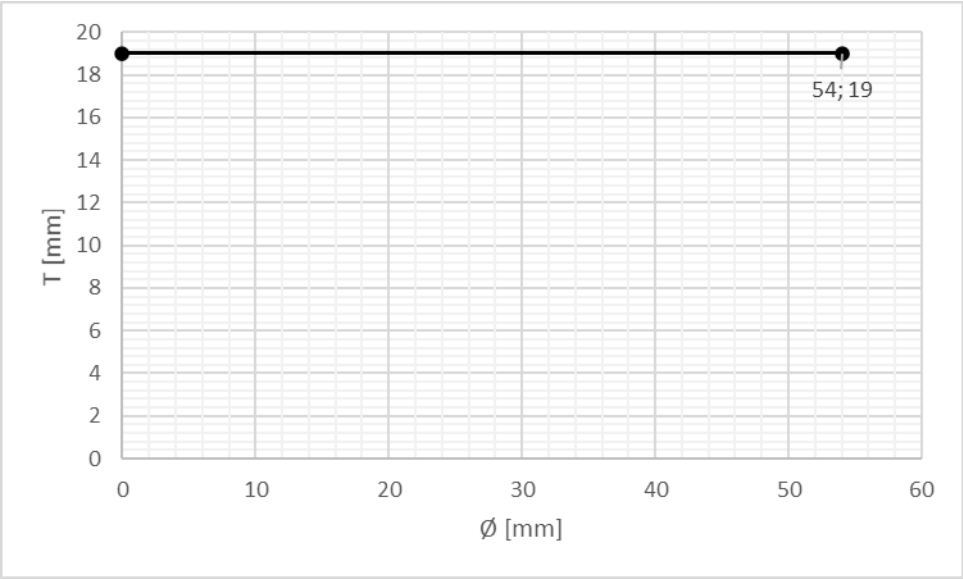
4.6.3.5. Minimum distance (linear)

Reveal	≥ 100 mm
All other distances	≥ 100 mm

4.6.3.6. Classification and field of application

Steel pipe[65], λ ≤ 58 W/mK	∅ = 0 - 54 mm t = 1.0 – 14.2 mm	**EI 90 – U/C**
Insulation - CS	Butyl rubber[66]	



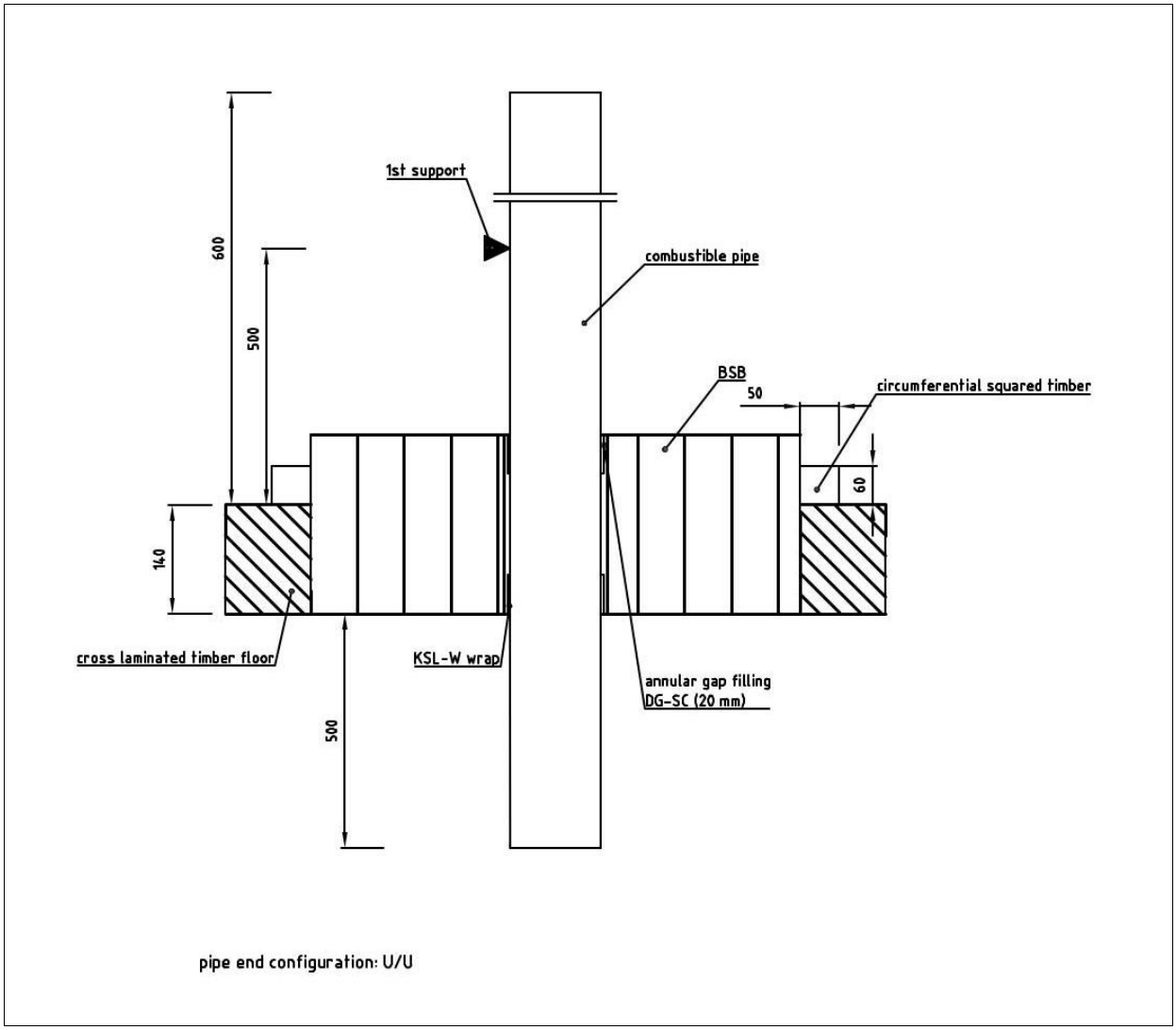


321100703-1
Seal 3-7
Seal 3-8

65 Results on steel pipes also apply to cast iron and stainless steel pipes.
66 Butyl rubber of Euroclass B-s3, d0 (e.g. AF/Armaflex)

4.6.4. Non-regulated plastic pipes (KSL-W)

4.6.4.1. Detail drawing



4.6.4.2. Suspension

Plastic pipes must be supported on the topside of the floor construction at a distance of d_1 ≤ 500 mm.

4.6.4.3. Annular gaps

Annular gap width	0 – 5 mm
Filling	none
Joint filler	DG-SC
Filling depth on both sides	50 mm / panel thickness

4.6.4.4. Minimum distance (linear)

Reveal	≥ 25 mm
Geberit Silent dB20 Ø110/ t6	≥ 6 mm
Metal pipes with non-combustible insulation	≥ 3 mm
All other distances	≥ 100 mm

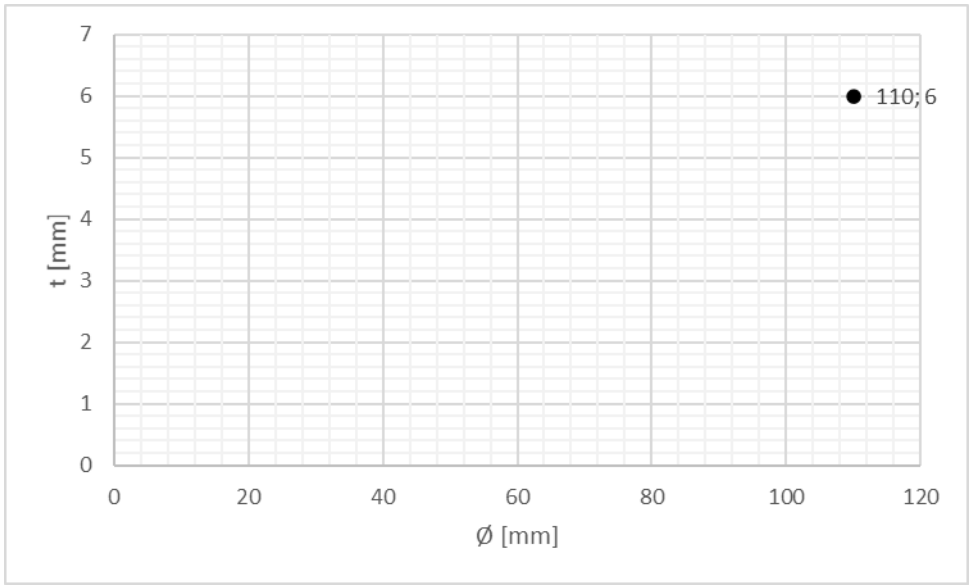
4.6.4.5. Construction groups

Pipe diameter [mm]	32 - 50	63 - 75	90 - 110
Total thickness of active inlay [mm]	0	1.5	3
Length of active inlay [mm]	50		

4.6.4.6. Installation KSL-W

The KSL-W fire protection wrap must be installed at least flush with the penetration seal surface and must not protrude more than 5 mm from the seal surface.

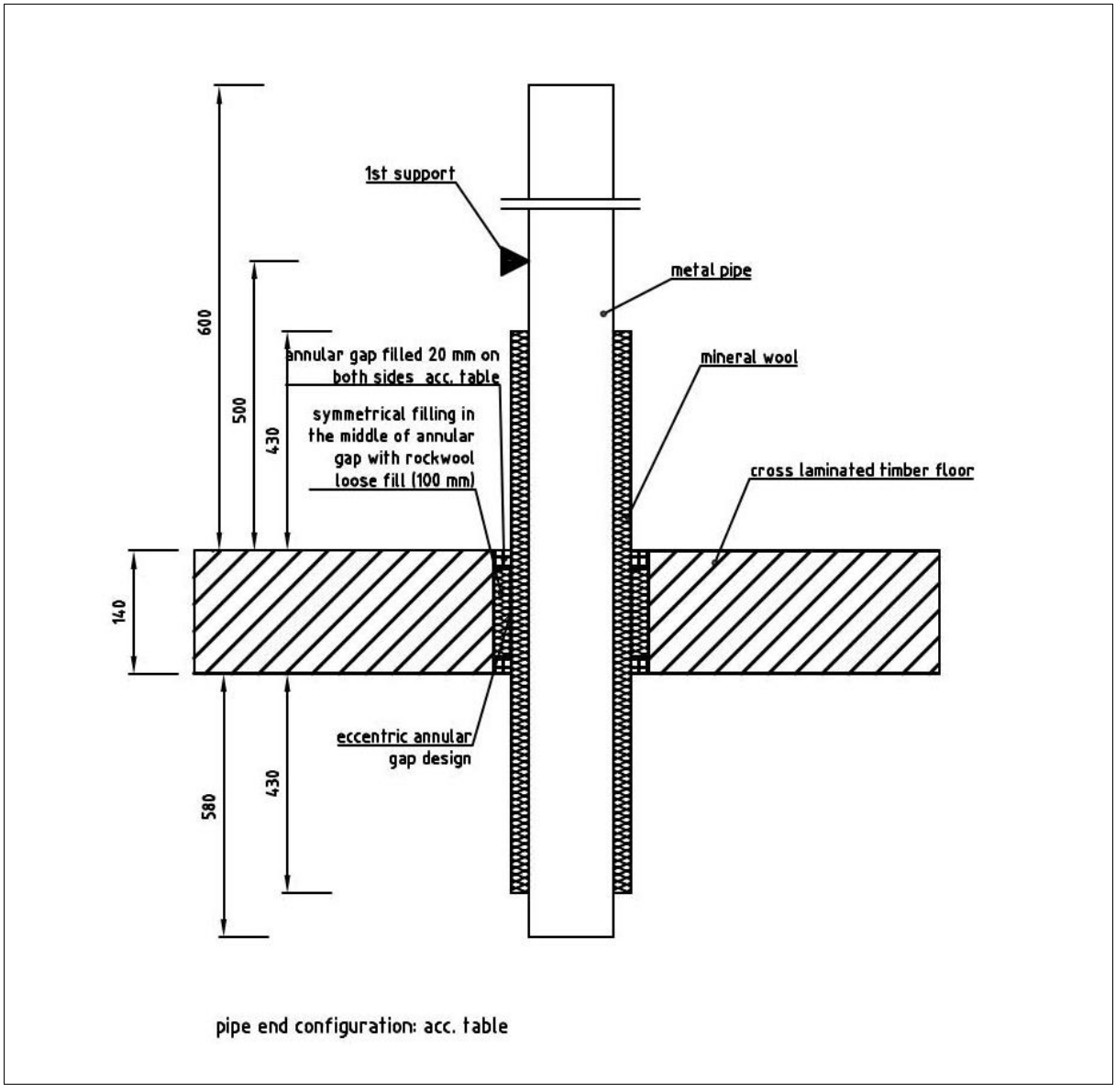
4.6.4.7. Classification and field of application

Geberit Silent dB20	Ø = 110 mm t = 6.0 mm	**EI 90-U/U**
		321100703-1 Seal 3-3 Seal 3-4 Seal 3-11

4.7. Joint closure FLAMMOTECT-A

4.7.1. Single metal pipes with non-combustible sectional insulation

4.7.1.1. Detail drawing



4.7.1.2. Pipe orientation

All angles between 45° and 90° are approved.

4.7.1.3. Suspension

Plastic pipes must be supported on the topside of the floor construction at a distance of $d_1 \leq 500$ mm.

The suspension system may be designed without adhering to any fire protection requirements.

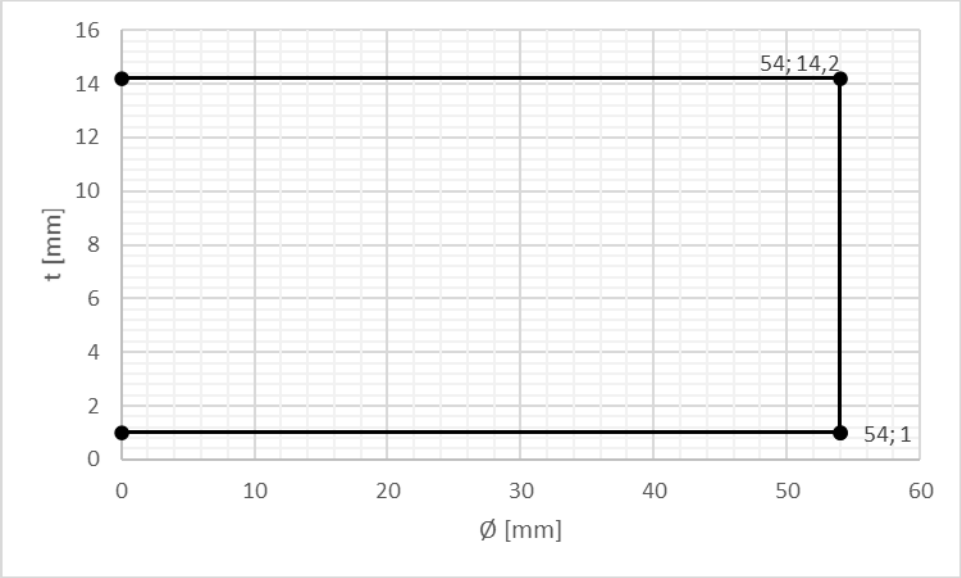
4.7.1.4. Annular gaps

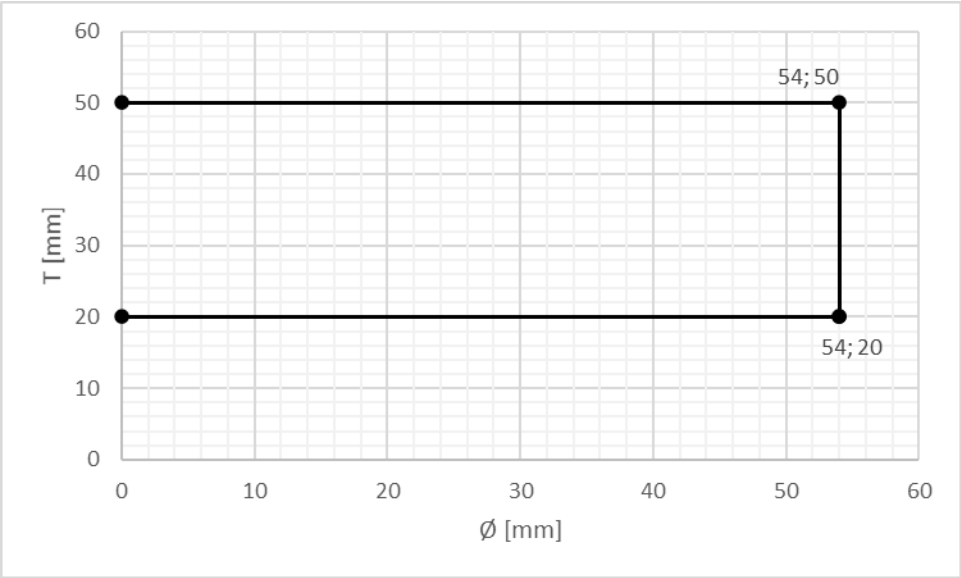
Annular gap width	> 10 – 25 mm
Filling	Mineral wool ($\rho \geq 40$ kg/m³)
Joint filler	FLAMMOTECT-A
Filling depth on both sides	≥ 20 mm

4.7.1.5. Minimum distance (linear)

Metal pipe with non-combustible insulation, $\rho \geq 80$kg/m³	≥ 0 mm
All other distances	≥ 100 mm

4.7.1.6. Classification and field of application

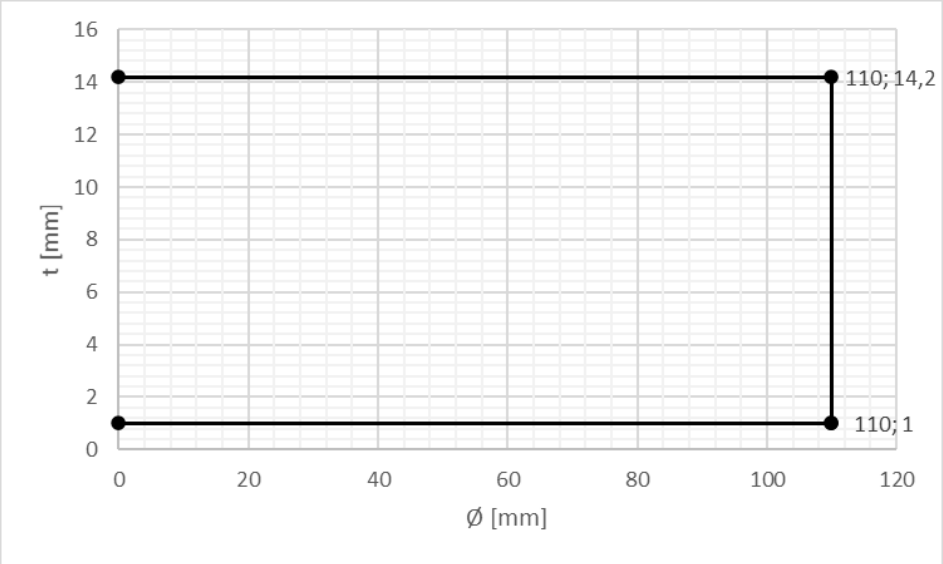
<table>
<tr><td rowspan="2">Copper pipe [67], λ ≤ 380 W/mK</td><td>∅ = 0 - 54 mm</td><td colspan="2" rowspan="2">EI 90 – U/C</td></tr>
<tr><td>t = 0.6 – 14.2 mm</td></tr>
<tr><td>Insulation - LS/CS – LI/CI</td><td>Mineral wool[68]</td></tr>
<tr><td colspan="2">Projecting ≥430 mm from both sides of the floor
(Total length symmetrical ≥ 1000 mm)</td><td>∅ = 0-54 mm</td><td>T = 20 - 50 mm</td></tr>
<tr><td colspan="2"> 


</td><td colspan="2">321100703-1
K-12

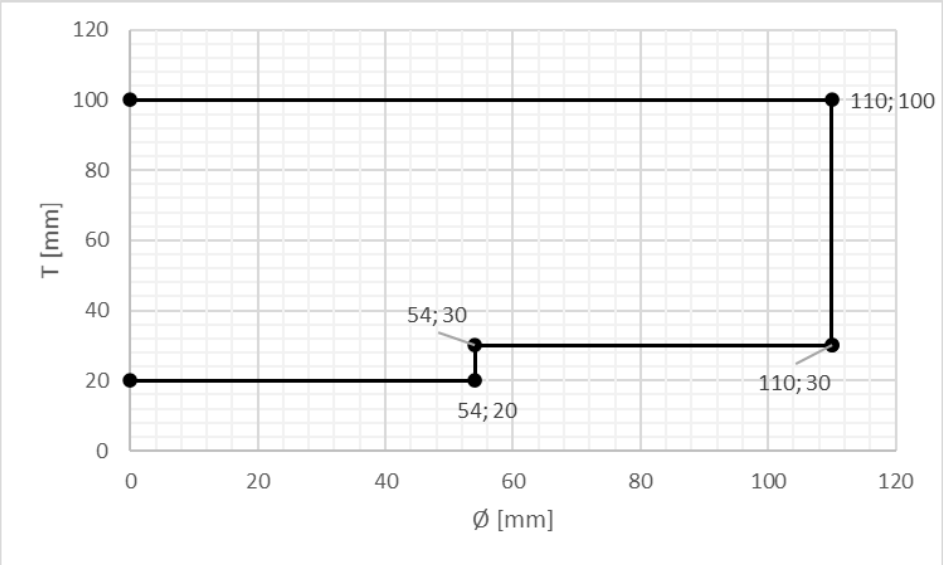
321100703-2
K-14, K-19,
K-20, K-21,
K-22</td></tr>
</table>

67 Results on copper pipes also apply to cast iron, steel and stainless steel pipes.
68 Mineral wool of Euroclass A1 or A2 (density ρ ≥ 35 - ≥ 80 kg/m³; melting point Θ ≥ 1000 °C)

Stainless steel pipe, $\lambda \leq 18$ W/mK	∅ = 0 - 110 mm t = 0.6 – 14.2 mm	**EI 90 – U/C**	
Insulation - LS/CS – LI/CI	Mineral wool[69]		
Projecting ≥430 mm from both sides of the floor (Total length symmetrical ≥ 1000 mm)		∅ = 0-110 mm	T = 20 - 100 mm



321100703-1
K-12, E-3



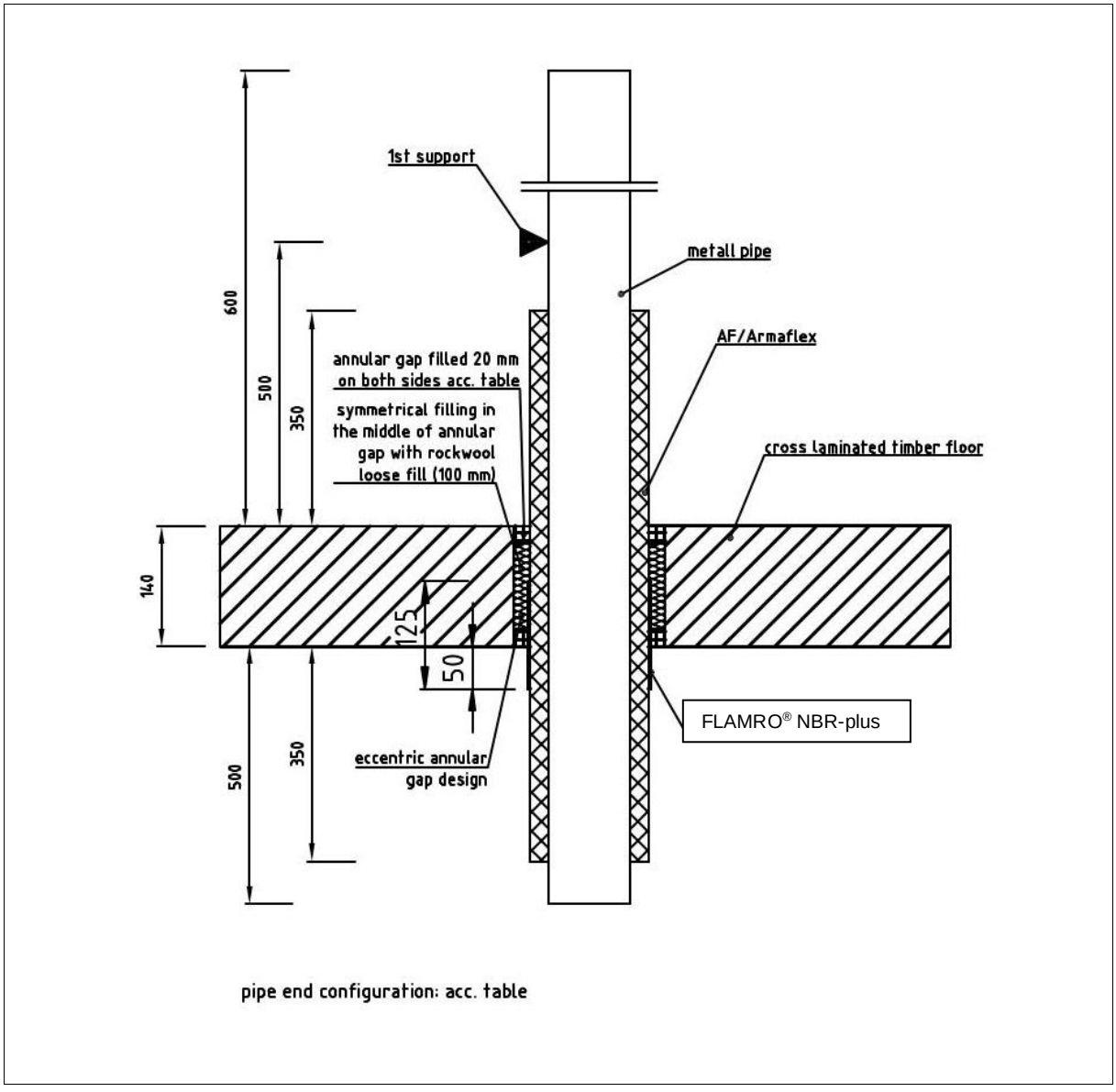
321100703-2
K-14, K-19,
K-20, K-21,
K-22, E-4

69 Mineral wool of Euroclass A1 or A2 (density $\rho \geq 80$ kg/m³; melting point $\Theta \geq 1000$ °C)

4.8. Pipe closure DG-CR pro / NBR-plus

4.8.1. Single metal pipes with combustible sectional insulation (FEF)

4.8.1.1. Detail drawing



4.8.1.2. Pipe orientation

Only pipes with an angle of 90° are permissible.

4.8.1.3. Suspension

Metal pipes must be supported on both sides at the top of the floor construction at a distance of d1 ≤ 500 mm.

The suspension system may be designed without adhering to any fire protection requirements.

4.8.1.4. Annular gaps

Annular gap width	> 10 – 25 mm
Filling	Mineral wool ($\rho \geq 40$ kg/m³)
Joint filler	FLAMMOTECT-A
Filling depth on both sides	≥ 20 mm

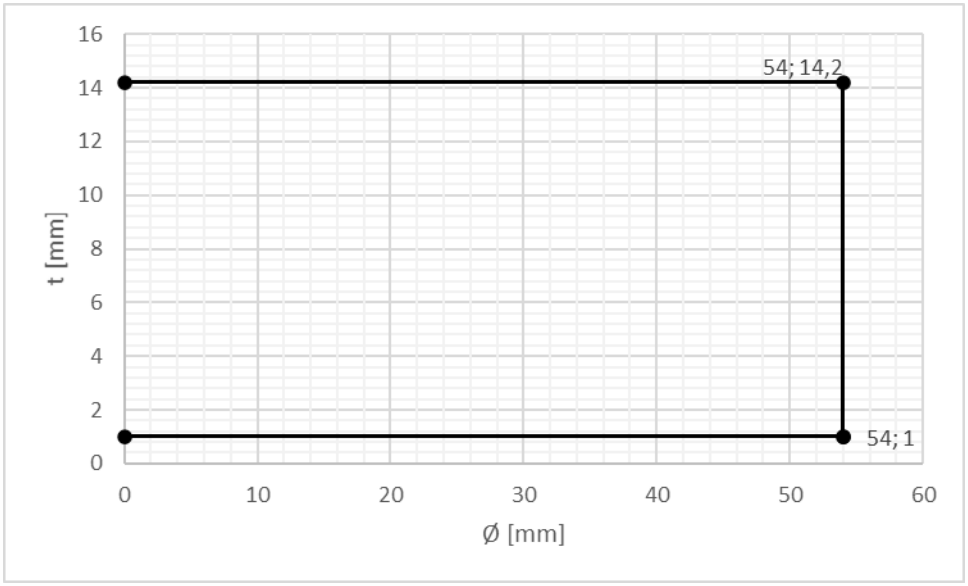
4.8.1.5. Minimum distance (linear)

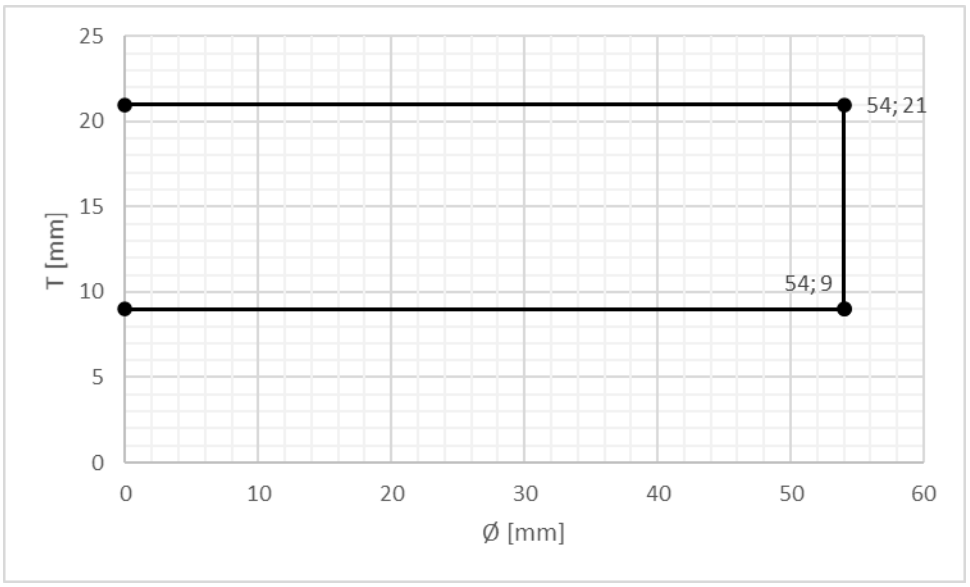
All other distances	≥ 100 mm

4.8.1.6. Construction groups

Pipe diameter [mm]	0 - 110	0 - 110
Insulation thickness T [mm]	9	> 9 -21
Total thickness of active inlay [mm]	1.5	3
Length of active inlay [mm]	125	125

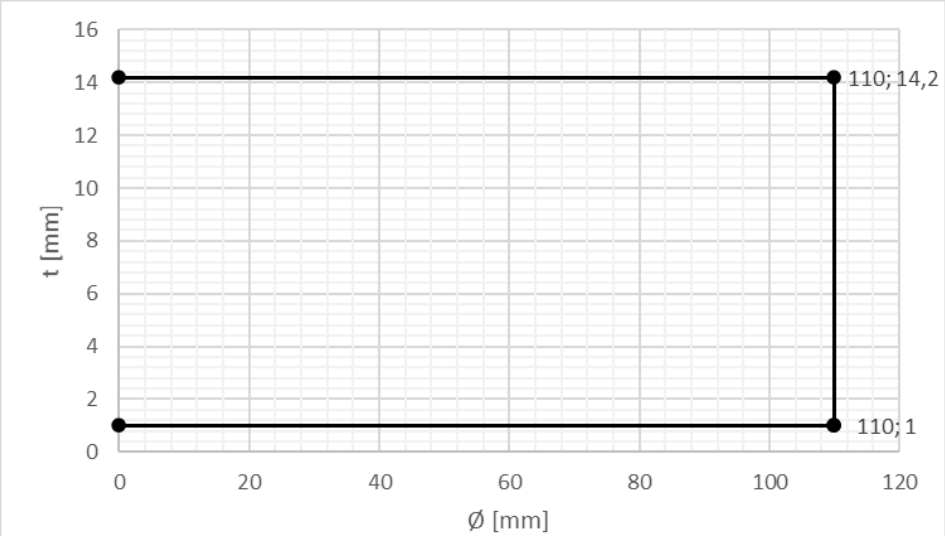
4.8.1.7. Classification and field of application

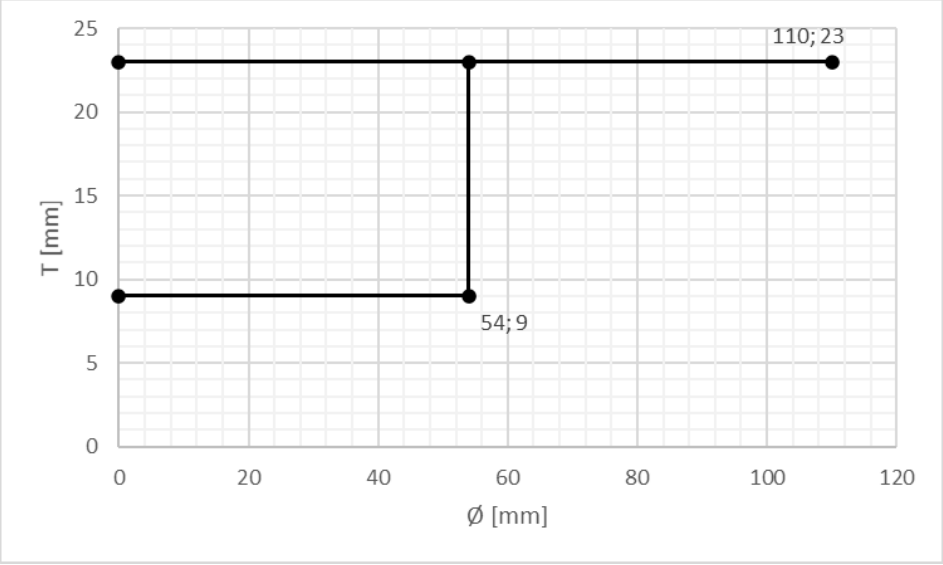
<table>
<tr><td rowspan="2">Copper pipe [70], λ ≤ 380 W/mK</td><td>∅ = 0 - 54 mm</td><td colspan="2" rowspan="2">EI 90 – U/C</td></tr>
<tr><td>t = 1.0 – 14.2 mm</td></tr>
<tr><td>Insulation - LS/CS – LI/CI</td><td>Butyl rubber[71]</td></tr>
<tr><td colspan="2">Projecting ≥350 mm from both sides of the floor
(Total length symmetrical ≥ 1000 mm)</td><td>∅ = 0-54 mm</td><td>T = 9 - 21 mm</td></tr>
<tr><td colspan="2"> 


</td><td colspan="2">321100703-1
K-4, K-8</td></tr>
</table>

70 Results on copper pipes also apply to cast iron, steel and stainless steel pipes.
71 Butyl rubber of Euroclass B-s3,d0 (e.g. AF/Armaflex)

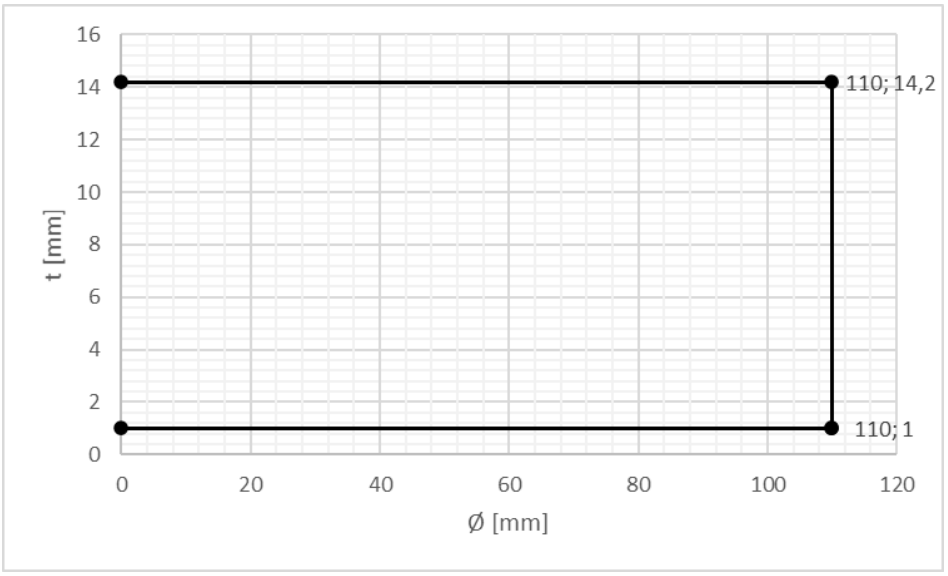
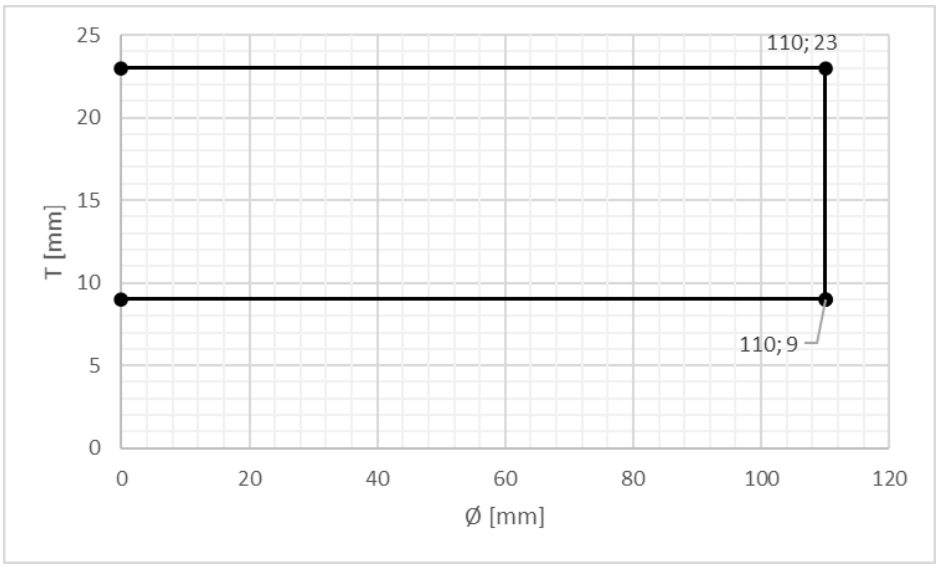
Stainless steel pipe, $\lambda \leq 18$ W/mK	∅ = 0 - 110 mm t = 1.0 – 14.2 mm	**EI 90 – U/C**	
Insulation – CS – CI	Butyl rubber[72]		
Covering the entire pipe on both sides		∅ = 0-110 mm	T = 9 - 23 mm





321100703-1
K-4, K-8, E-2

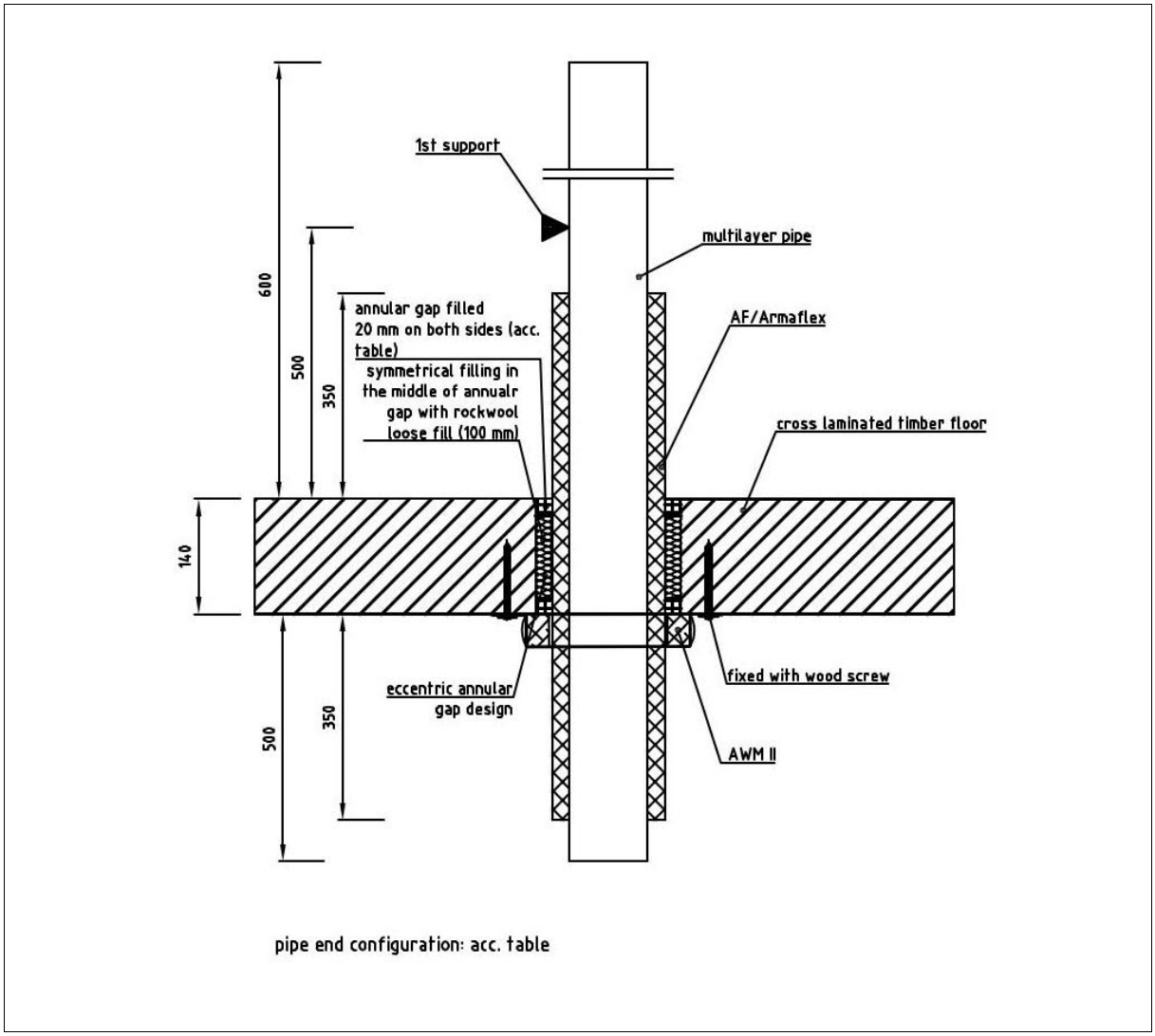
72 Butyl rubber of Euroclass B-s3,d0 (e.g. AF/Armaflex)

Stainless steel pipe, λ ≤ 18 W/mK	∅ = 0 - 110 mm t = 0.6 – 14.2 mm	**EI 60 – U/C**	
Insulation – LS / CS – LI / CI	Butyl rubber[73]		
Projecting ≥350 mm from both sides of the floor (Total length symmetrical ≥ 1000 mm)		∅ = 0-110 mm	T = 9 - 23 mm
		321100703-1 K-4, K-8, E-2, E-1	
			

73 Butyl rubber of Euroclass B-s3,d0 (e.g. AF/Armaflex)

4.9. Multilayer composite pipes with synthetic rubber insulation (Variant N II A)

4.9.1. Detail drawing



NOTE: Variant N II A is identical with AWM II.

4.9.2. Suspension

Multilayer composite pipes must be supported on the topside of the floor construction at a distance of $d_1 \leq 500$ mm.

4.9.3. Annular gaps

Annular gap width	> 10 – 25 mm
Filling	Mineral wool (ρ ≥ 40 kg/m³)
Joint filler	FLAMMOTECT-A
Filling depth on both sides	≥ 20 mm

4.9.4. Minimum distance (linear)

All other distances	≥ 100 mm

4.9.5. Construction groups

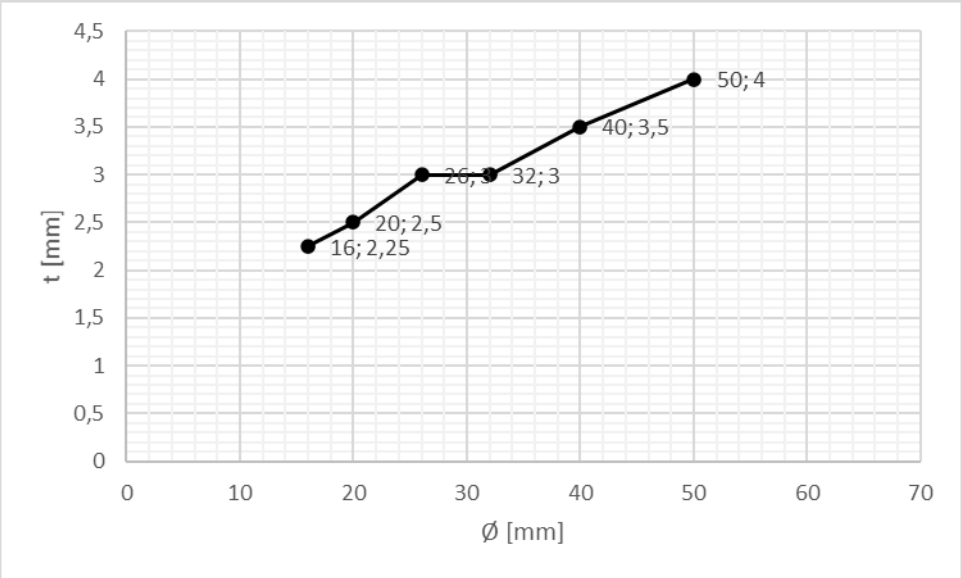
Pipe diameter [mm]	32 - 50	63 - 75	90	110	125	140 – 160
Total thickness of active inlay [mm]	6.4	12.8	17.1	19.2	19.2	25.6
Length of active inlay [mm]	25.4				38.1	

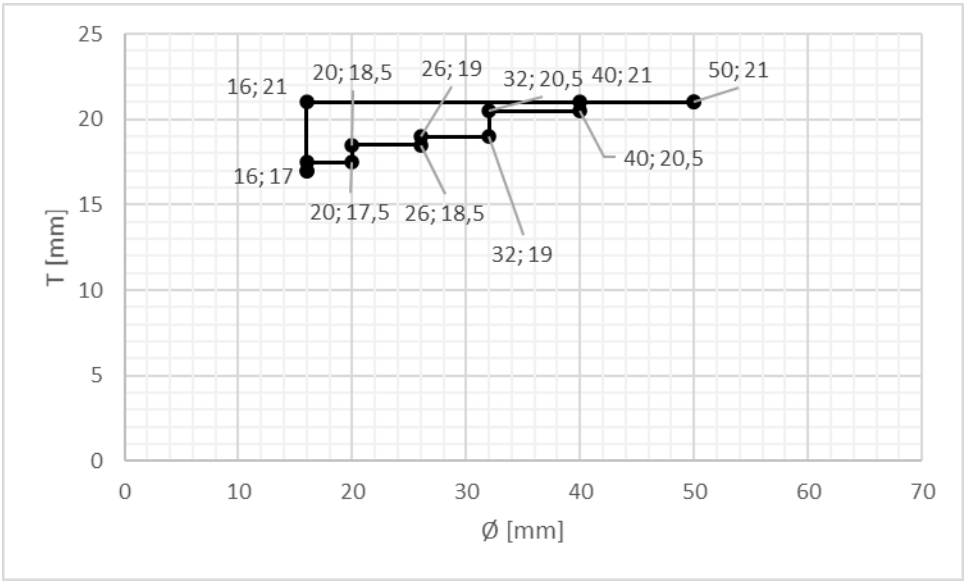
4.9.6. Fastening Variant N II A / AWM II

The fire protection collar Variant N II A / AWM II must be fixed to the supporting structure with timber construction screws of length L = 100 mm and at a minimum diameter of 6 mm.

4.9.7. Classification and field of application (FLOOR)

Geberit Mepla Insulation - LS / CS Projecting ≥350 mm from both sides of the floor	∅ = 16 - 50 mm t = 2.25 – 4.0 mm Synthetic rubber[74] T = 17 – 21 mm	**EI 90 – U/C**

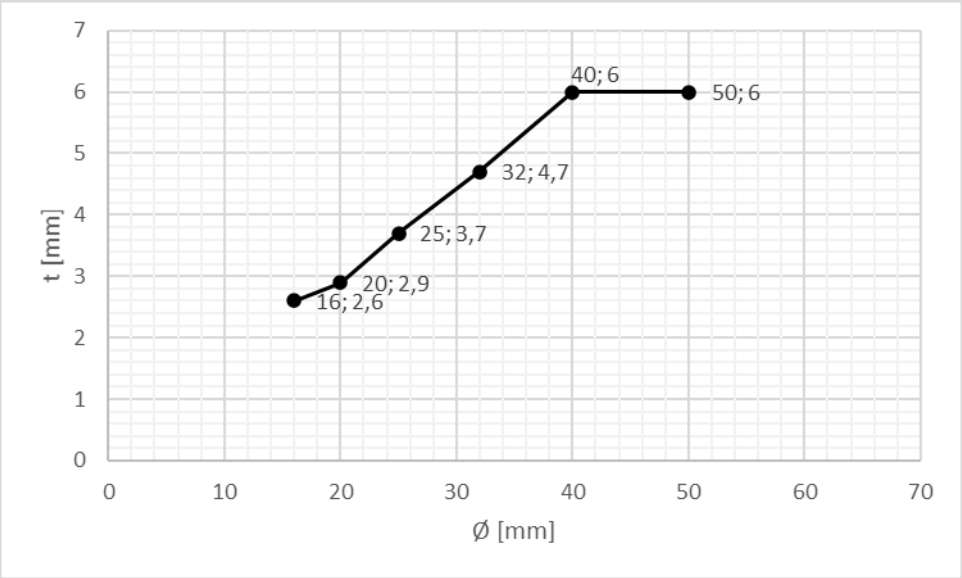


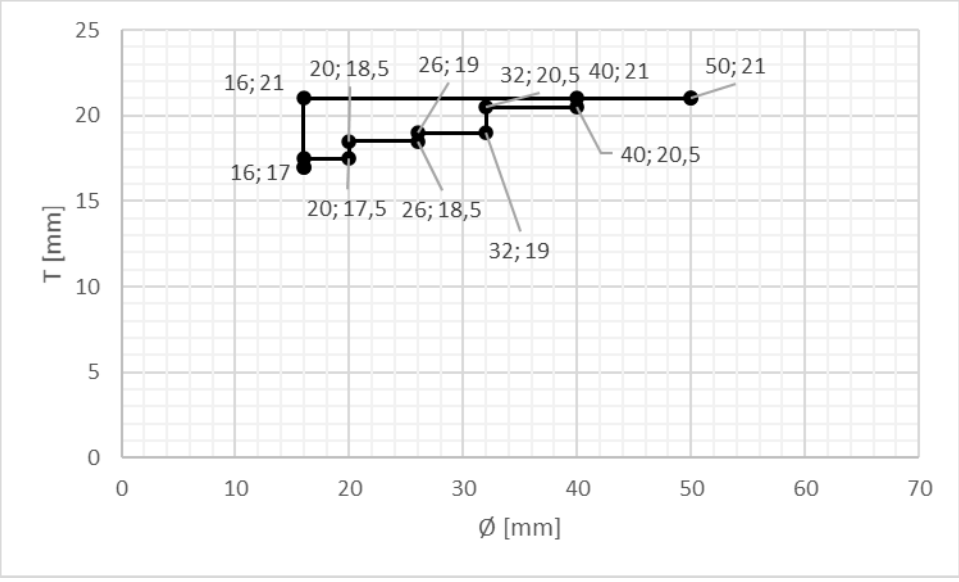


321100703-1
AW-7, AW-8,
AW-9, AW-10,
AW-11, AW-12

74 Elastomeric foam based on synthetic rubber (FEF) according to EN 14304

REHAU Rautitan stabil Insulation - LS / CS Projecting ≥350 mm from both sides of the floor	∅ = 16 - 50 mm t = 2.6 – 6.0 mm Synthetic rubber[75] T = 17 – 21 mm	**EI 90 – U/C**

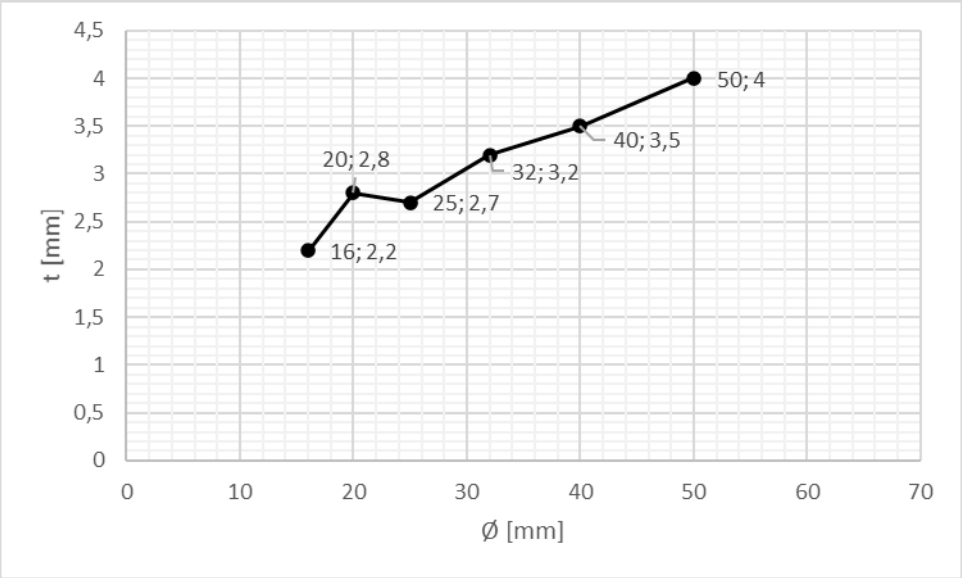


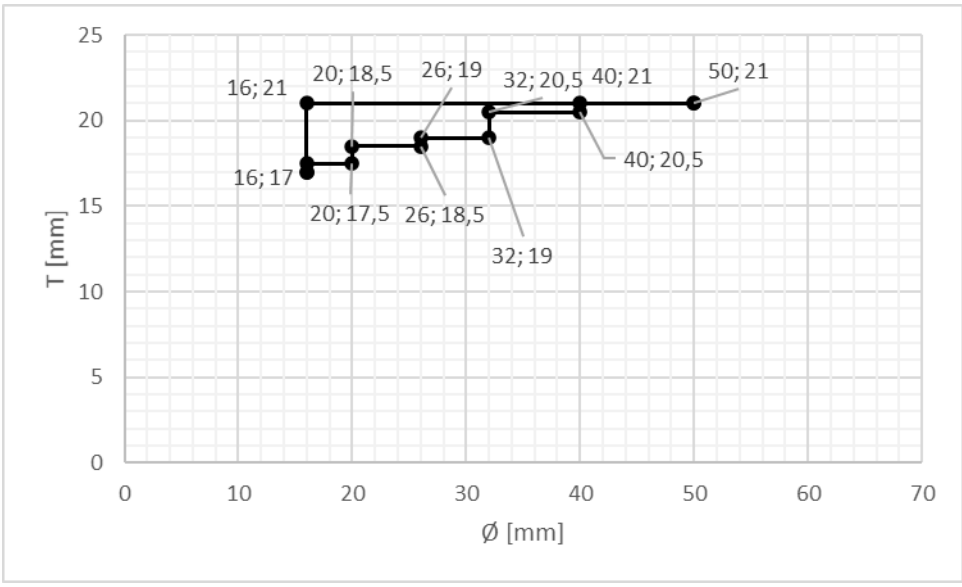


321100703-2
AW-19, AW-20, AW-21, AW-22, AW-23, AW-24

75 Elastomeric foam based on synthetic rubber (FEF) according to EN 14304

Viega RAXOFIX Insulation - LS / CS Projecting ≥350 mm from both sides of the floor	∅ = 16 - 50 mm t = 2.2 – 4.0 mm Synthetic rubber[76] T = 17 – 21 mm	**EI 90 – U/C**



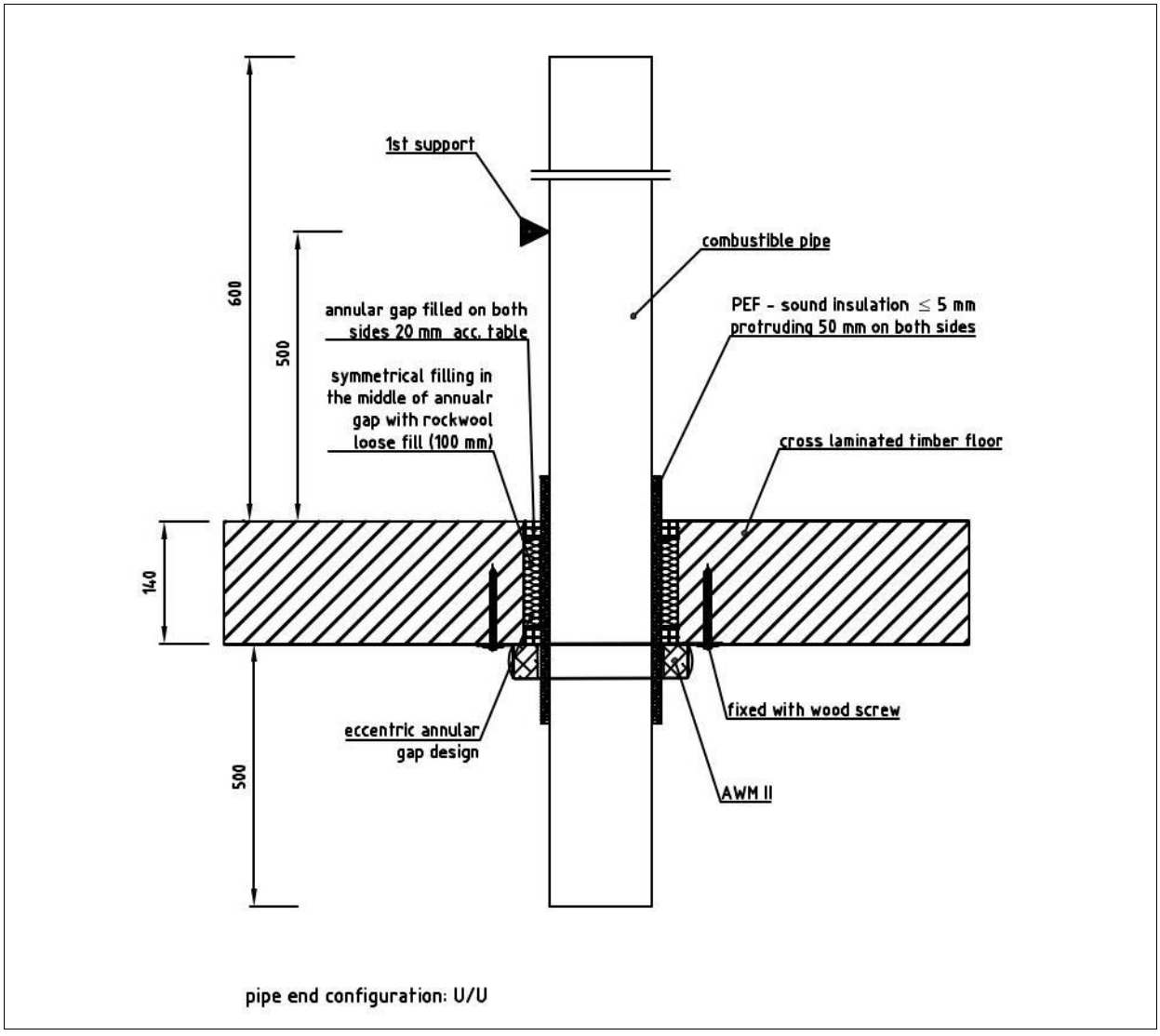


321100703-1
AW-13, AW-14, AW-15, AW-16, AW-17, AW-18

76 Elastomeric foam based on synthetic rubber (FEF) according to EN 14304

4.10. Non-regulated plastic pipes (Variant N II A)

4.10.1.1. Detail drawing



NOTE: Variant N II A is identical with AWM II.

4.10.1.2. Suspension

Plastic pipes must be supported on the topside of the floor construction at a distance of d_1 ≤ 500 mm.

4.10.1.3. Annular gaps

Annular gap width	> 5 – 35 mm
Filling	Mineral wool (ρ ≥ 40 kg/m³)
Joint filler	FLAMMOTECT-A
Filling depth on both sides	≥ 20 mm

4.10.1.4. Minimum distance (linear)

Geberit Silent dB20 Ø110 /t6	≥ 50 mm
Metal pipe with non-combustible insulation, ρ ≥ 80 kg/m³	≥ 25 mm
All other distances	≥ 100 mm

4.10.1.5. Insulation

Noise control strips made of PE soft foam are permissible up to a thickness of T = 5 mm.

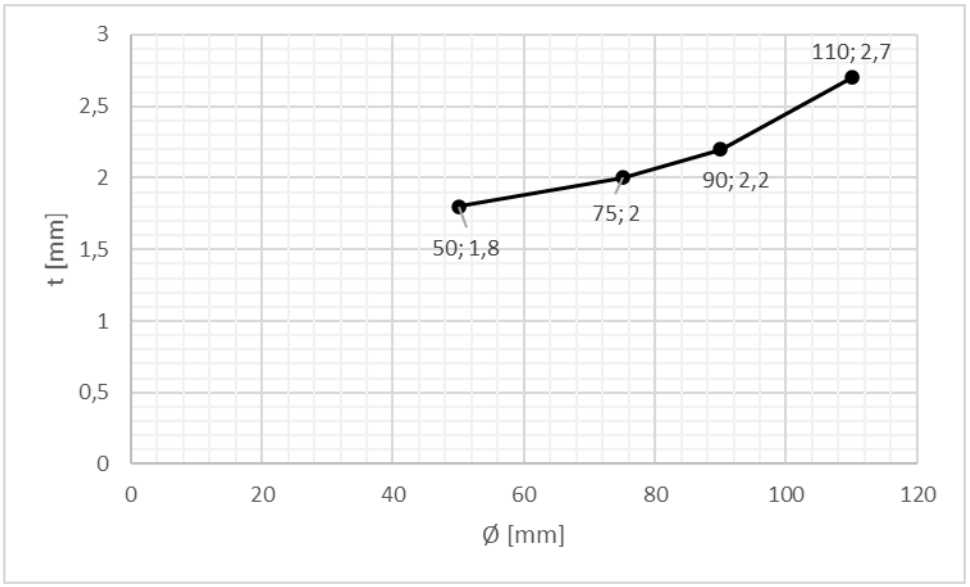
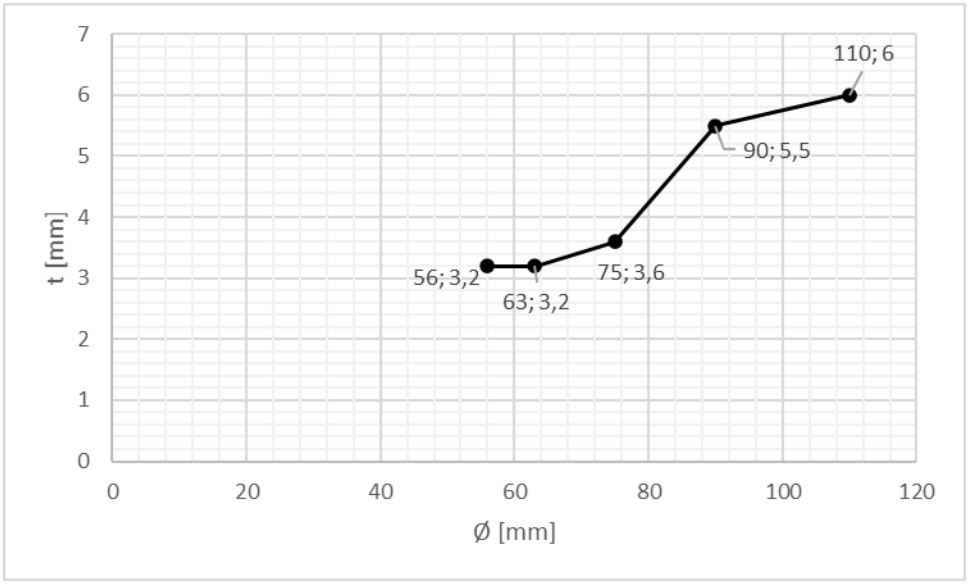
4.10.1.6. Construction groups

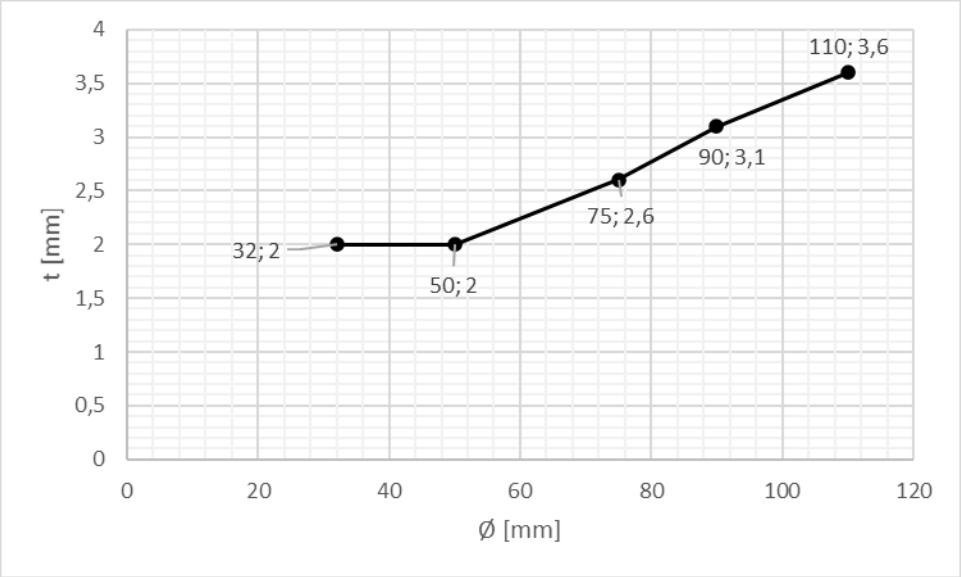
Pipe diameter [mm]	32 - 50	63 - 75	90	110	125	140 – 160
Total thickness of active inlay [mm]	6.4	12.8	17.1	19.2	19.2	25.6
Length of active inlay [mm]	25.4				38.1	

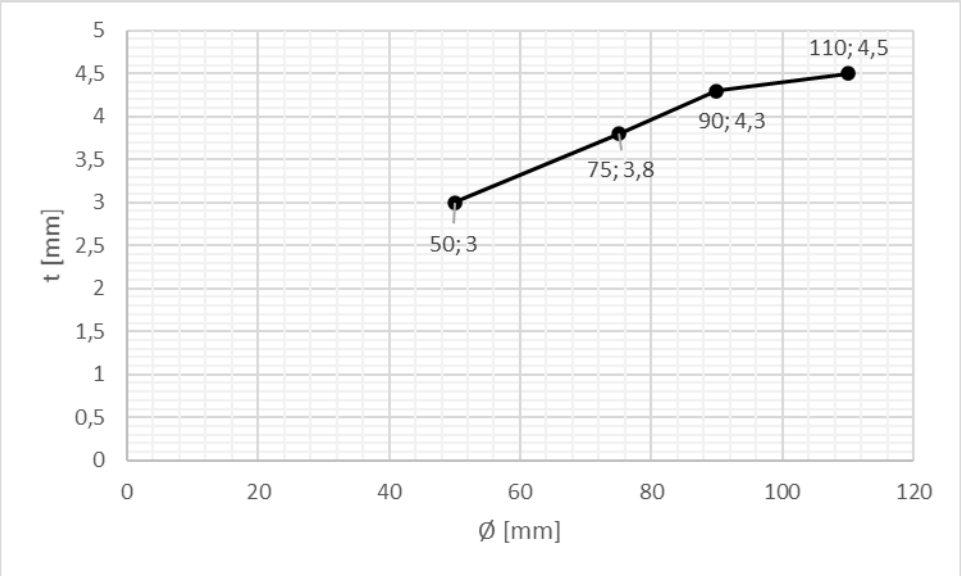
4.10.1.7. Fastening Variant N II A / AWM II

The fire protection collar Variant N II A / AWM II must be fixed to the supporting structure with timber construction screws of length L = 100 mm and at a minimum diameter of 6 mm.

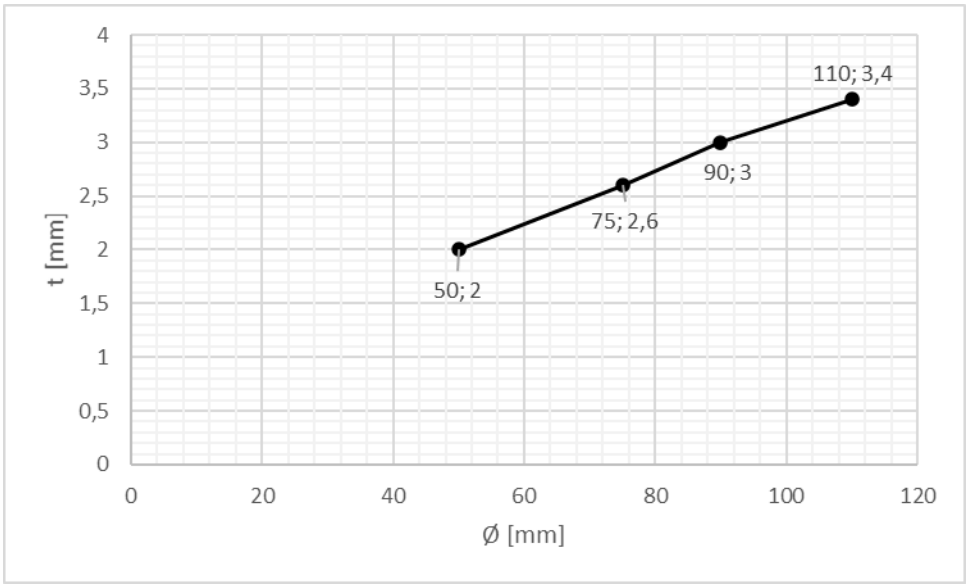
4.10.1.8. Classification and field of application

Rehau Raupiano light Conel DRAIN	Ø = 40 - 110 mm t = 1.8 – 2.7 mm	**EI 90-U/U**
		321100703-1 AW-5 321100703-2 AW-29, AW-35, AW-41
Geberit Silent dB20	∅ = 56 - 110 mm t = 3.2 – 6.0 mm	**EI 90-U/U**
		321100703-1 AW-3, AW-3A, AW-3B, DB-1, DB-2 321100703-2 AW-27, AW33, AW-39

Geberit Silent PP	Ø = 40 - 110 mm t = 1.8 – 2.7 mm	**EI 90-U/U**
		321100703-1 AW-2 321100703-2 AW-26, AW-32, AW-38

Geberit Silent Pro	∅ = 50 - 110 mm t = 3.0 – 4.5 mm	**EI 90-U/U**
		321100703-1 AW-1 321100703-2 AW-25, AW-31, AW-37

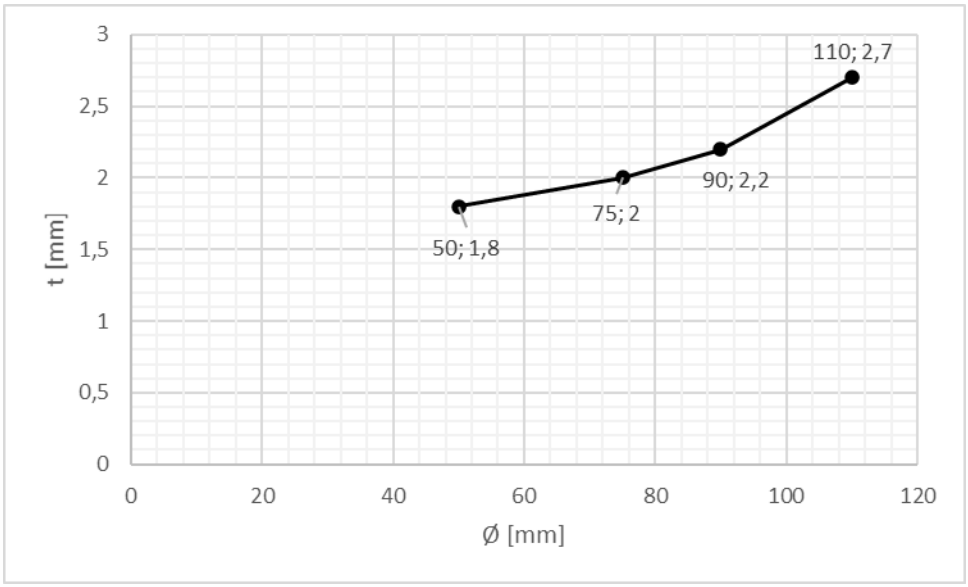
Poloplast POLO-KAL NG Poloplast POLO-KAL XS	Ø = 40 - 110 mm t = 1.8 – 2.7 mm	**EI 90-U/U**



321100703-1
AW-6

321100703-2
AW-30, AW-36, AW-42

Rehau Raupiano Plus	∅ = 50 - 110 mm t = 1.8 – 2.7 mm	**EI 90-U/U**



321100703-1
AW-4

321100703-2
AW-28, AW-34, AW-40

5. Limitations

The above classifications are valid for “FLAMRO Products in CLT floors” for the direct field of application according to EN 1366-3:2009-05 and EN 1366-3:2022.

5.1. Legal notice

This report does not constitute any type approval or certification of the tested product.

IBS-INSTITUT FÜR BRANDSCHUTZTECHNIK UND SICHERHEITSFORSCHUNG GESELLSCHAFT M.B.H.
Akkreditierte Prüf-, Inspektions- und Zertifizierungsstelle

SIGNATURINFORMATION	**Unterzeichner**	Manfred Eglauer
	Datum/Zeit-UTC	2023-07-20T11:00:35+02:00
	Prüfung	Siehe http://www.signaturpruefung.gv.at
Hinweis	Diese Unterschrift ist gemäß EU Verordnung Nr. 910/2014 (eIDAS) der handschriftlichen Unterschrift grundsätzlich rechtlich gleichgestellt.	

Mr Manfred EGLAUER
Engineer

SIGNATURINFORMATION	**Unterzeichner**	DI Ulrich Stöckl
	Datum/Zeit-UTC	2023-07-20T16:29:15+02:00
	Prüfung	Siehe http://www.signaturpruefung.gv.at
Hinweis	Diese Unterschrift ist gemäß EU Verordnung Nr. 910/2014 (eIDAS) der handschriftlichen Unterschrift grundsätzlich rechtlich gleichgestellt.	

Mr Ulrich STÖCKL
Monitoring