



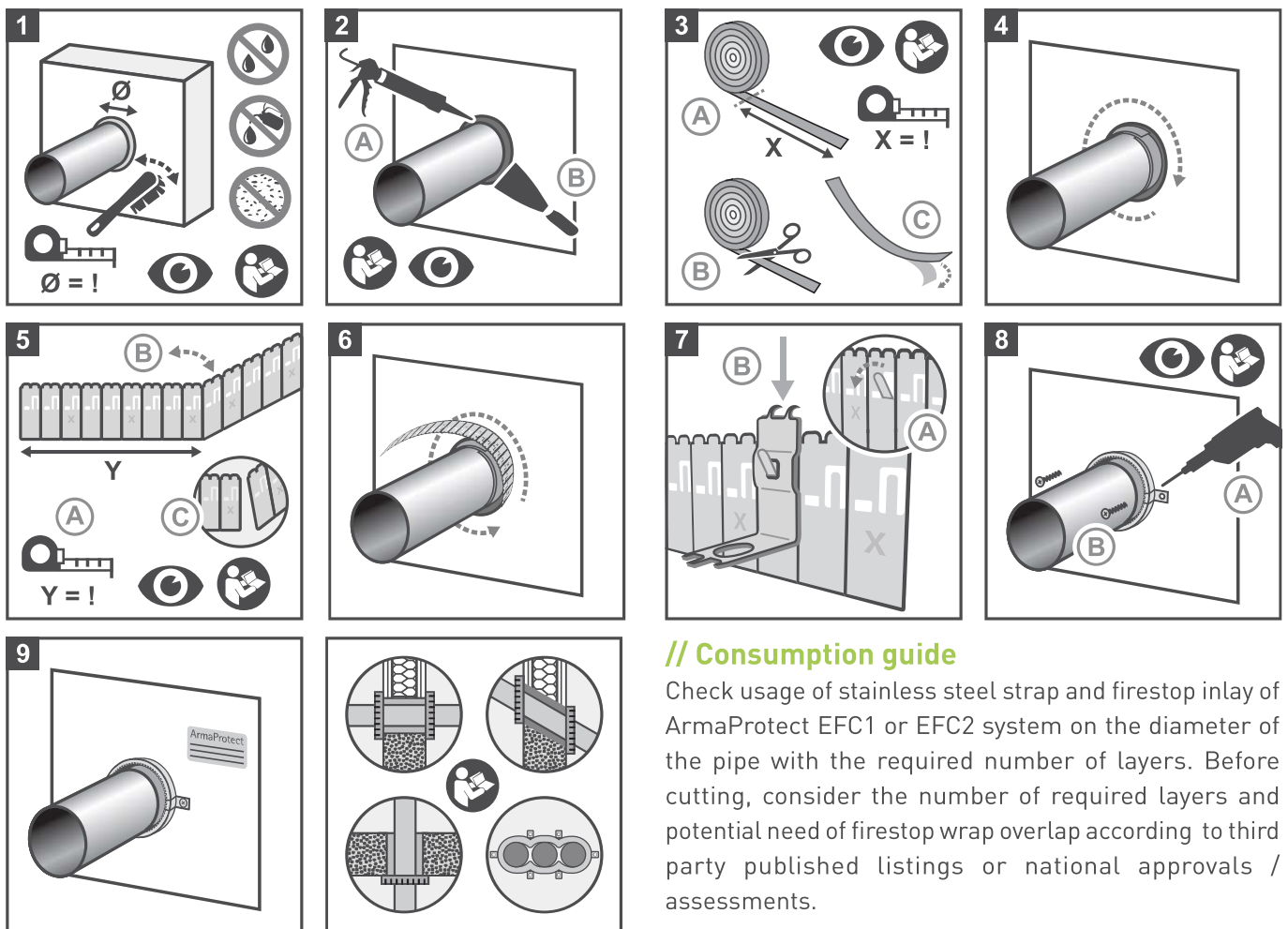
# ArmaProtect

## EFC1 and EFC2

### Endless firestop collar

## INSTRUCTIONS FOR USE

Ensure that surfaces are dry and free of dust and grease.



### // Consumption guide

Check usage of stainless steel strap and firestop inlay of ArmaProtect EFC1 or EFC2 system on the diameter of the pipe with the required number of layers. Before cutting, consider the number of required layers and potential need of firestop wrap overlap according to third party published listings or national approvals / assessments.


**Exemplary estimation based on pipe diameter**

Pipe Ø [mm]	32	32	40	40	50	50	63	63	75	75
Insulation thickness [mm]	-	4	-	4	-	4	-	4	-	4
Number of layers	2	2	2	2	2	2	3	3	3	3
Required length for inlay	250	320	320	360	375	440	685	780	800	895
Number of steel strap elements	12	14	14	15	16	17	18	20	21	23
Number of hooks	2	2	2	2	2	2	3	3	3	3
Pipe Ø [mm]	90	90	110	110	125	125	140	140	160	160
Insulation thickness [mm]	-	4	-	4	-	4	-	4	-	4
Number of layers	4	4	4	4	5	5	6	6	6	6
Required length for inlay	1290	1400	1545	1660	2190	2425	2860	3050	3365	3530
Number of steel strap elements	25	27	29	31	32	34	36	38	40	42
Number of hooks	3	3	3	3	4	4	4	4	4	4

Take note of potential material loss during application at the job site.



# MAIN APPLICATIONS



## In drywalls, solid walls and concrete floors<sup>1</sup>

Base material	Drywall, concrete wall, aerated concrete wall, masonry wall, shaft wall, concrete floor
Base material thickness	≥ 100 mm (wall) ≥ 40 mm (shaft wall) ≥ 150 mm (floor)
Seal thickness	≥ 100 mm (wall) ≥ 40 mm (shaft wall) ≥ 150 mm (floor)
Penetrants <ul style="list-style-type: none"> <li>• Combustible pipes <math>\varnothing \leq 160</math> mm (with &amp; without sound insulation)<sup>1</sup></li> <li>• Combustible pipes <math>\varnothing \leq 110</math> mm (with combustible insulation)<sup>1</sup></li> <li>• Non-combustible pipes <math>\varnothing \leq 108</math> mm (with combustible insulation)<sup>1</sup></li> <li>• Multi-layer composite pipes <math>\varnothing \leq 110</math> mm<sup>1</sup></li> </ul>	up to EI 120 U/C resp. EI 120 U/U <sup>1</sup>

<sup>1</sup> Further applications tested also tested up to EI-240-U/C. See ETA 22/0061 for further installation details.



## // Field of application and installation details<sup>1</sup>

### Installation details

#### Base material thickness

Flexible wall (drywall) or rigid wall (concrete, aerated concrete, masonry)	≥ 100mm (for flexible wall: ≥ 94mm)
Rigid floor (concrete, aerated concrete) (density ≥550 kg/m <sup>3</sup> )	≥ 150mm

#### Annular gap

Wall: ≤ 30mm  
 Floor: ≤ 50mm

Between plastic pipes (including insulation) "Wavin SiTech+", "Geberit Silent-PP", "POLO-KAL NG" or "RAUPIANO PLUS":  
 ≤ 50mm

#### Gap filler

Mineral construction material (class A1 or A2), eg. cement, mortar or gypsum

#### Fixing of firestop collar

Steel dowels / steel screw anchors / steel flexible wall anchors with steel screws and washers

#### First support of the services both-sided of the separating element

≤ 650mm (metal and plastic pipes in walls)  
 ≤ 550mm (metal pipes in floors)  
 ≤ 400mm (plastic pipes in floors)

#### Distances

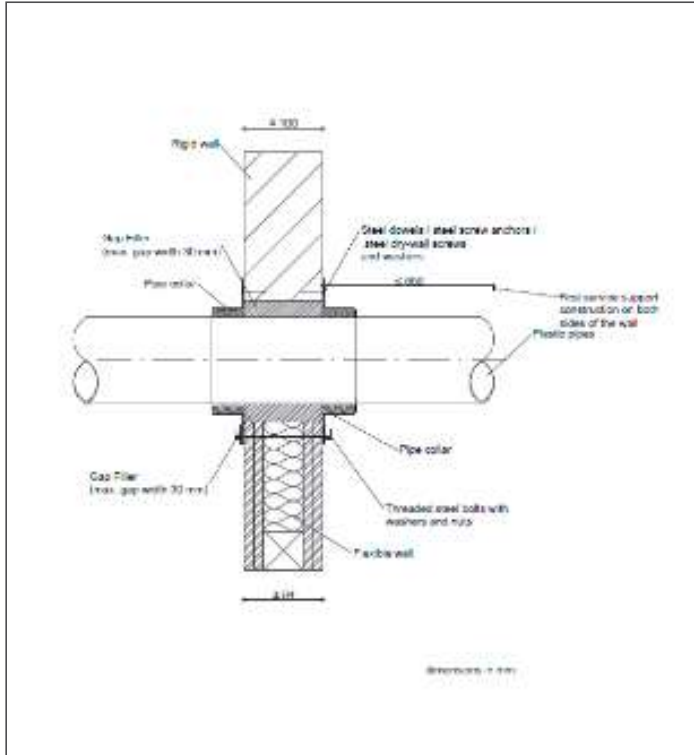
≥ 100mm between two single penetration seals of insulated (from the insulation) / non-insulated (from the pipe wall) pipes

<sup>1</sup> Please see further installation detail in the ETA-22/0061

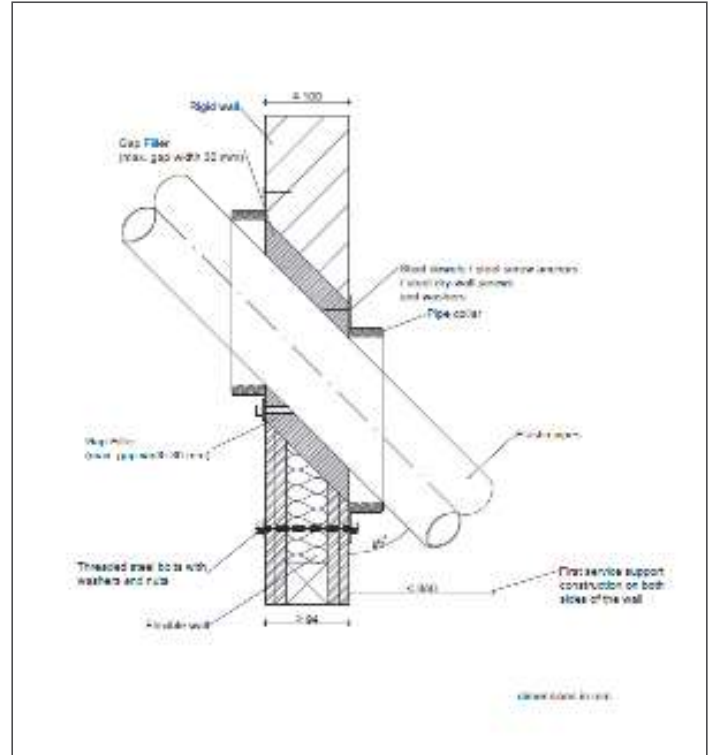


## Applications

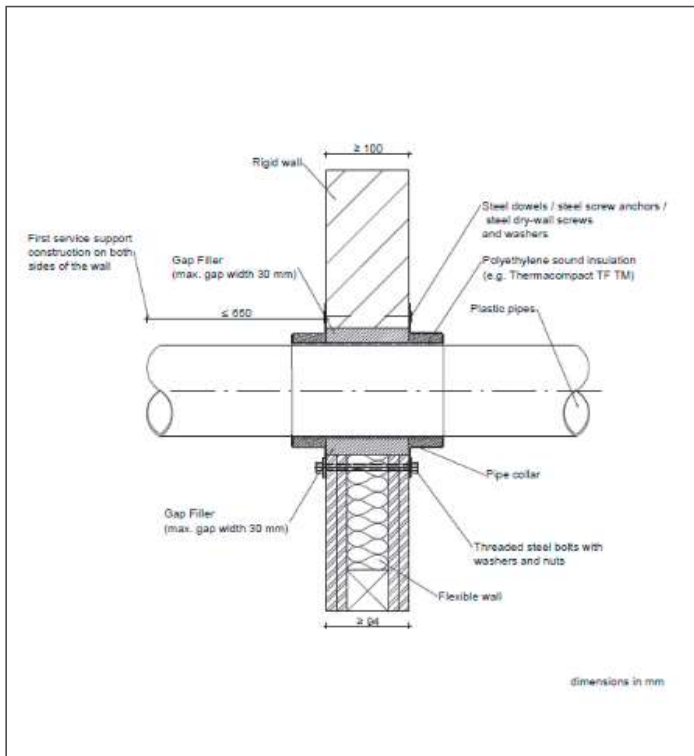
Application of combustible pipe without insulation in flexible wall and rigid wall



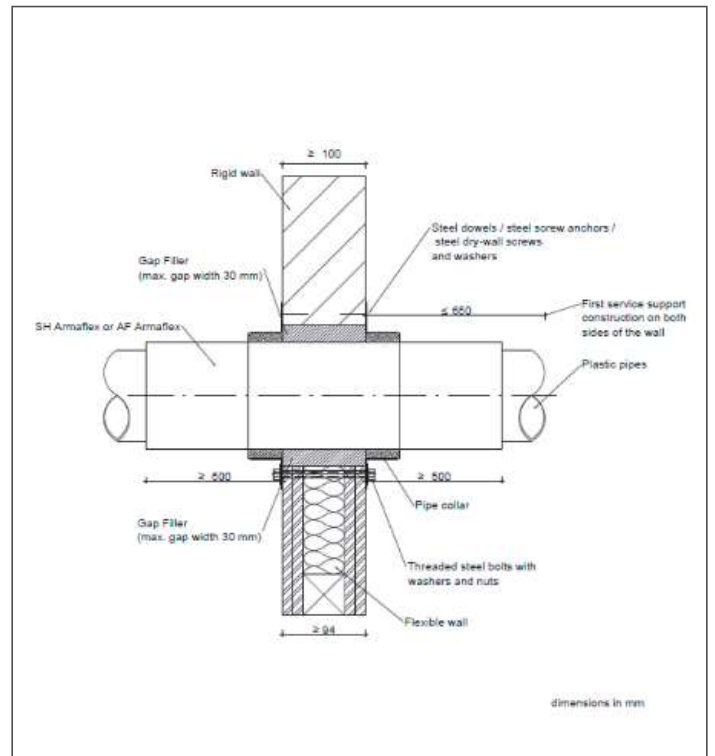
Application of combustible pipe without insulation with angle between 45° and 90° in flexible wall and rigid wall



Application of combustible pipe with sound insulation in flexible wall and rigid wall

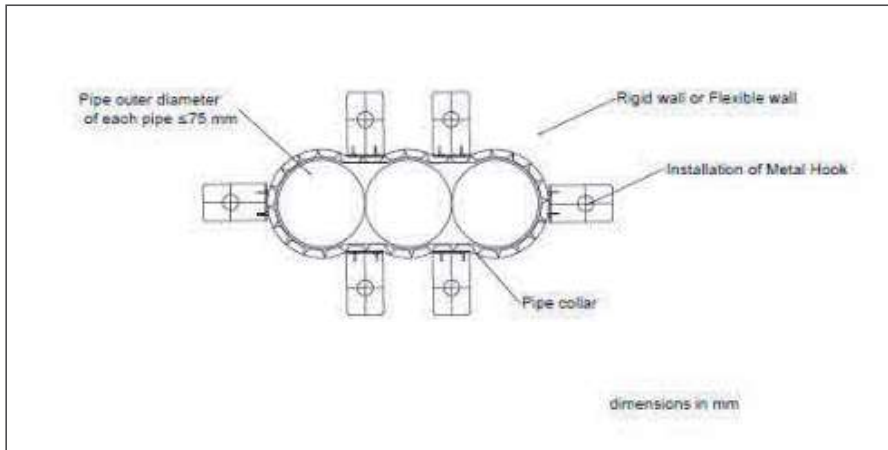


Application of combustible pipe with FEF (flexible elastomeric foam) insulation in flexible wall and rigid wall

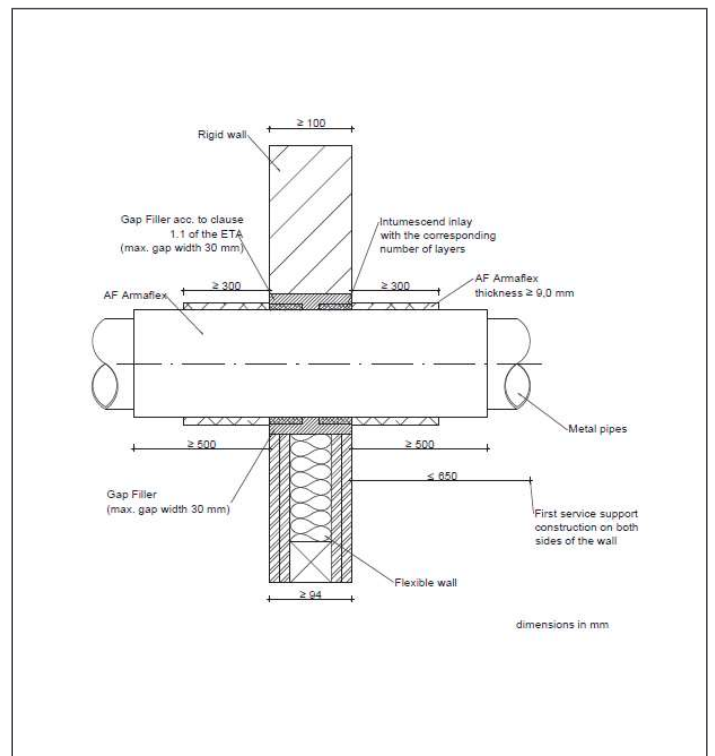
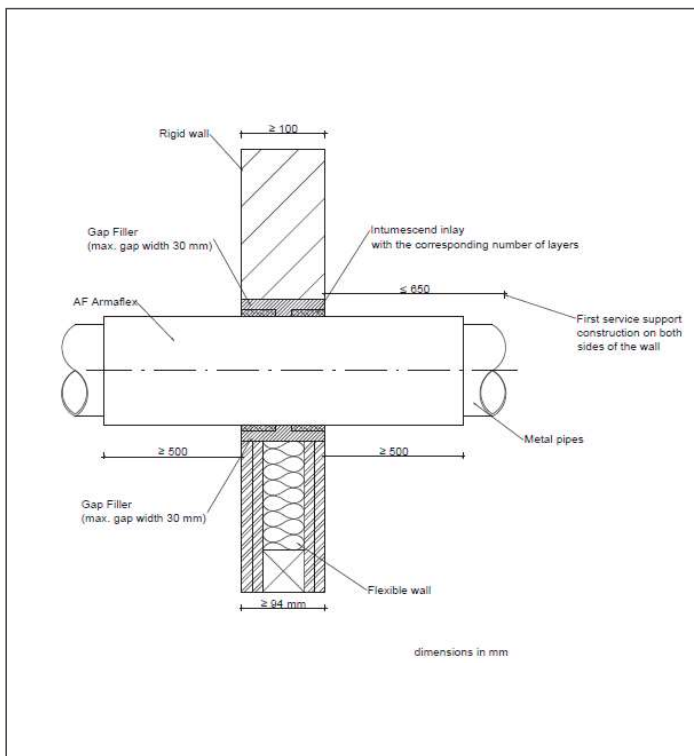




**Application of combustible pipes in flexible wall and rigid wall (up to three pipes with zero distance)**

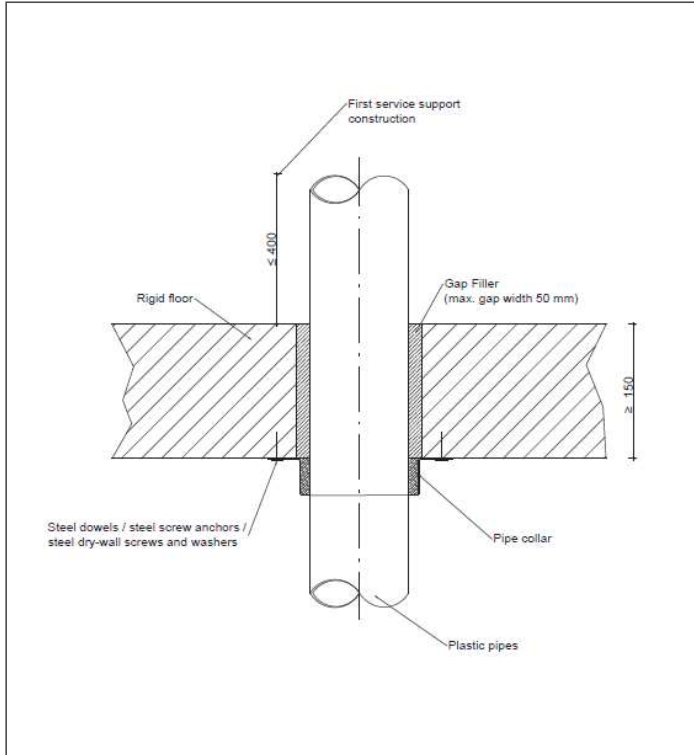


**Application of non-combustible pipe with FEF (flexible elastomeric foam) insulation in flexible wall and rigid wall**

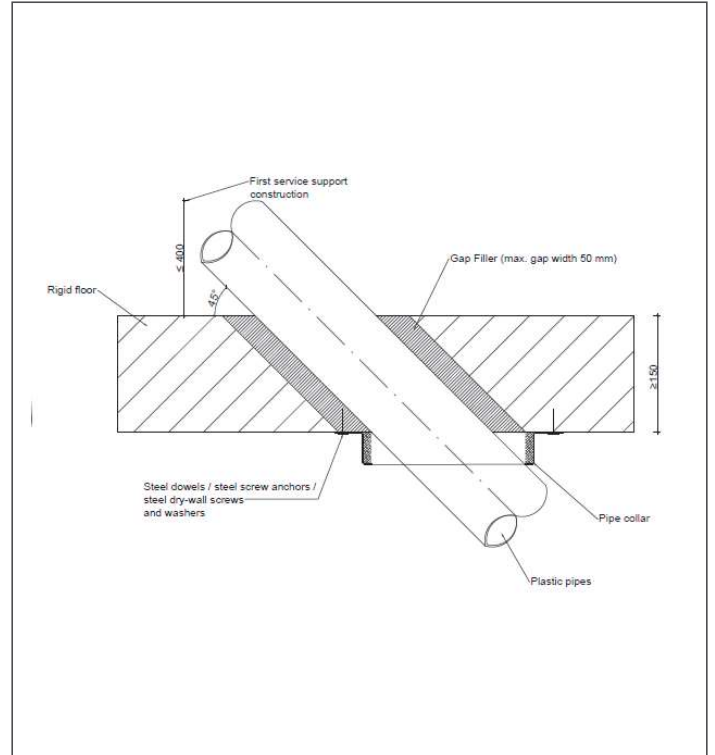




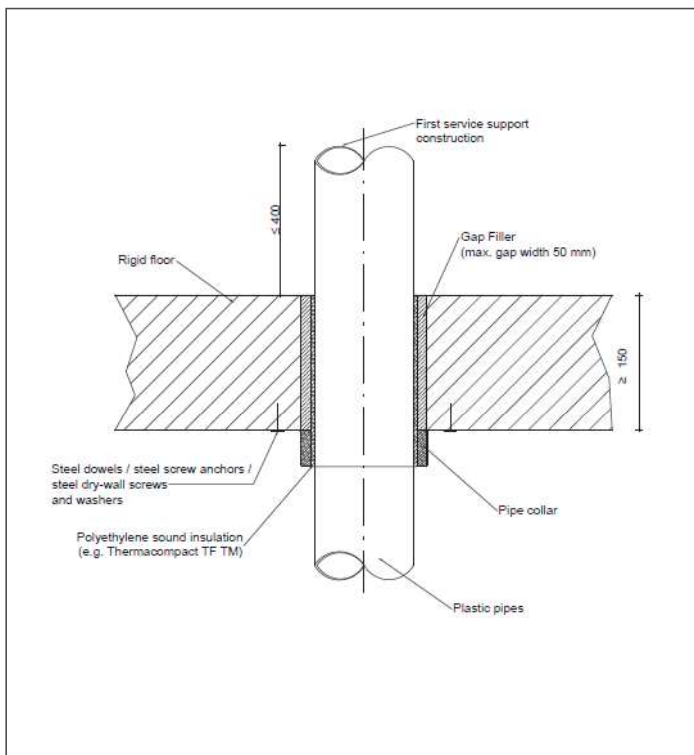
**Application of combustible pipe without insulation in rigid floor**



**Application of combustible pipe without insulation with angle between  $45^\circ$  and  $90^\circ$  in rigid floor**

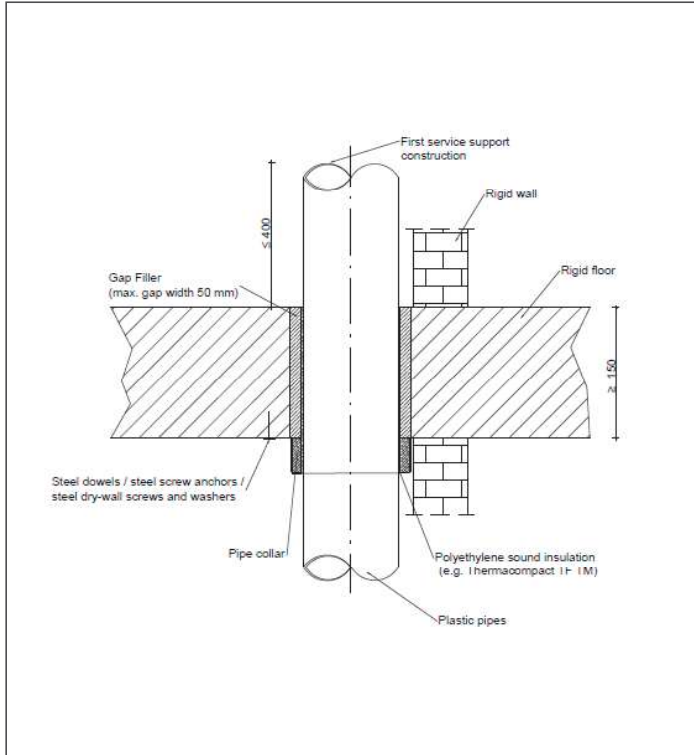


**Application of combustible pipe with sound insulation in rigid floor**

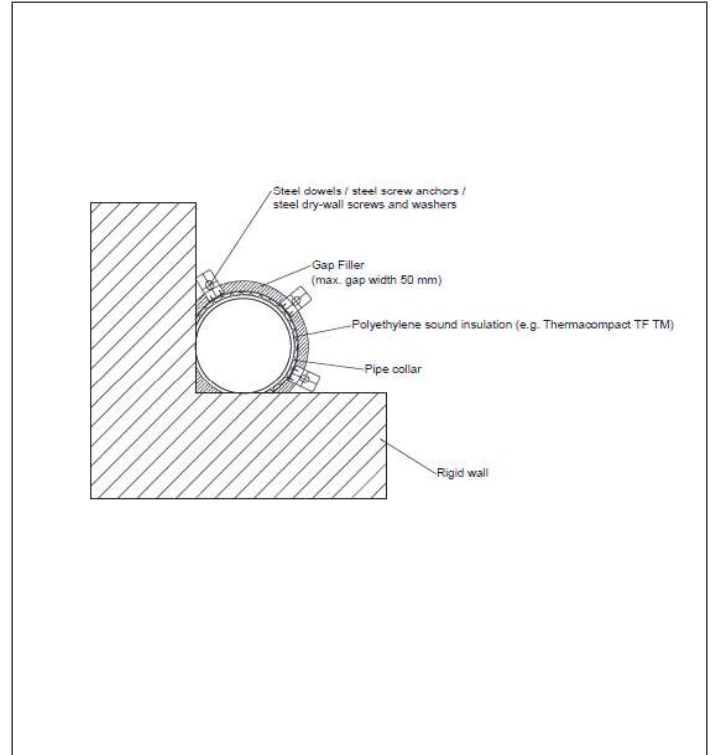




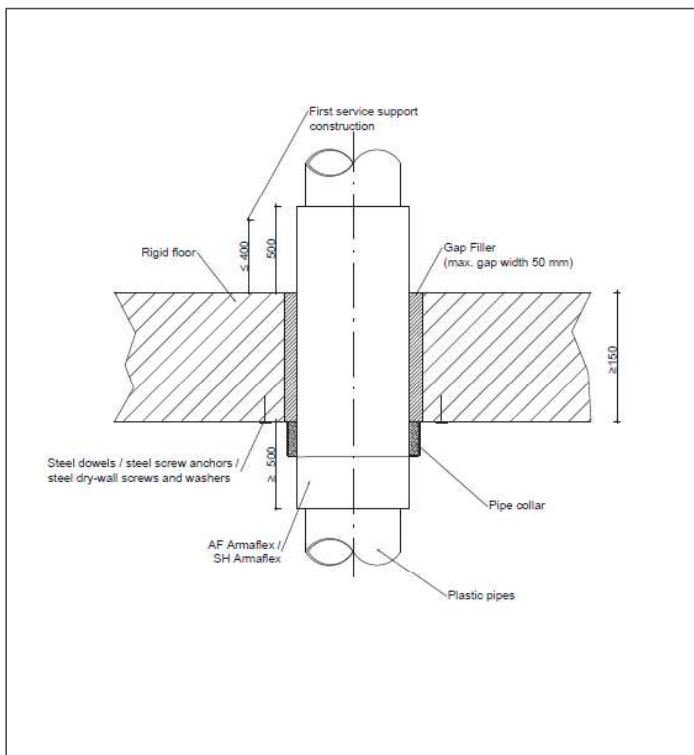
**Application of combustible pipe with sound insulation in rigid floor (corner application)**



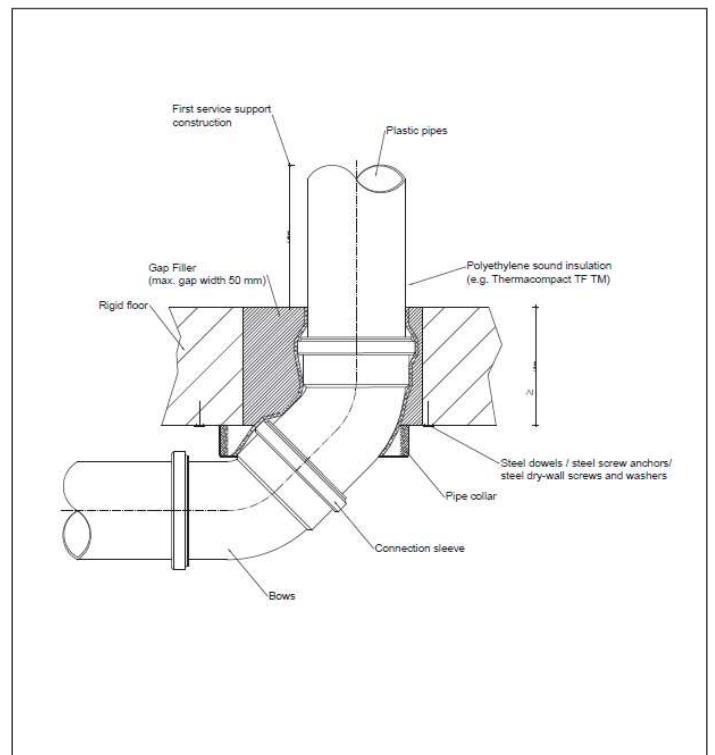
**Application of combustible pipe without insulation with angle between  $45^\circ$  and  $90^\circ$  in flexible wall and rigid wall**



**Application of combustible pipe with FEF (flexible elastomeric foam) insulation in rigid floor**

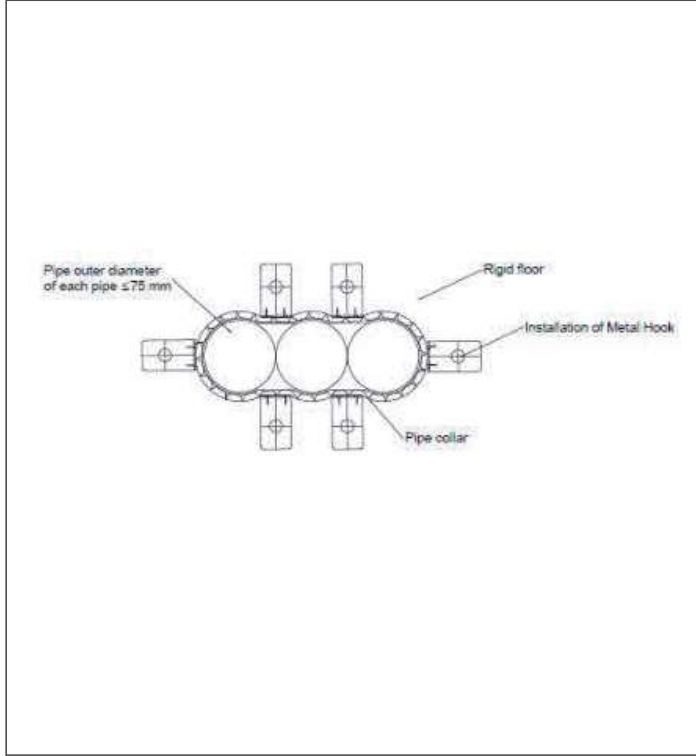


**Application of combustible pipe with bow on the bottom side of the rigid floor and connection sleeve within the floor**

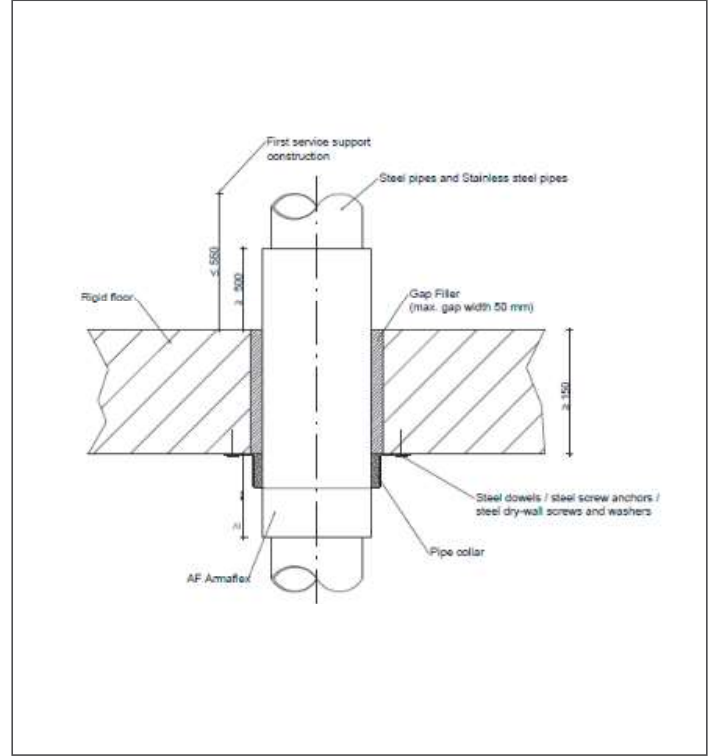




**Application of combustible pipes in rigid floor (up to three pipes with zero distance)**



**Application of non-combustible pipes with FEF (flexible elastomeric foam) insulation in rigid floor**







Pipe ø (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			
<b>PE-HD pipes without insulation</b>								
≤ 50	1,8 - 4,6	-	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
> 50 - ≤ 75	1,8 - 8,4				3			
> 75 - ≤ 110	2,7 - 10				4			
> 110 - ≤ 160	4				8			
	> 4 - 14,6							EI 60-U/C
<b>PE-HD pipes without insulation in an angle between 90° and 45°</b>								
≤ 50	1,8	-	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
> 50 - ≤ 75					4			EI 90-U/C
> 75 - ≤ 110					5			
> 110 - ≤ 125					7			
> 125 - ≤ 160					8			
<b>PE-HD pipes with Polyethylene sound insulation</b>								
≤ 50	1,8 - 4,6	≤ 40 (PE)	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
> 50 - ≤ 75	1,8 - 6,8				3			
> 75 - ≤ 110	1,8 - 10				4			
> 110 - ≤ 160	4				6			
	>4,0 -14,6							EI 90-U/C (E 120-U/C)
≤ 50	1,8 - 4,6				-			-
> 50 - ≤ 75	2,7	3						
> 75 - ≤ 110		4						



Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			
<b>PP pipes without insulation</b>								
$\leq 50$	1,8 - 4,6	-	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C
$> 50 - \leq 75$	1,8 - 8,4				3			
$> 75 - \leq 110$	2,7 - 10				4			
$> 110 - \leq 160$	4				8			
	$> 4 - 14,6$				6			EI 90-U/C
<b>PE-HD pipes without insulation in an angle between 90° and 45°</b>								
$\leq 50$	1,8	-	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C
$50 - \leq 75$					3			
$> 75 - \leq 110$					4			
<b>PP pipes with Polyethylene sound insulation</b>								
$\leq 50$	1,8 - 4,6	5,4 (PE)	-	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/U
$50 - \leq 75$	1,8 - 2,7				3			
$> 75 - \leq 110$	2,7				4			



Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			

**alpex F50 PROFI pipes without insulation**

$\leq 16$	2	-	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C
-----------	---	---	---	---	---	----------------------------	--	------------

**alpex F50 PROFI and alpex L pipes with SH/ArmaFlex insulation (length  $\geq 500$ mm - on both sides of the separating element, local-sustained LS or continued- sustained CS)**

$\leq 16$	2	9	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C
$\leq 50$	4	10			3			EI 60-U/C (E 120-U/C)
$\leq 75$	5	9			4			EI 90-U/C (E 120-U/C)
		> 9 - 20			5			EI 90-U/C (E 120-U/C)
		> 20 - 30	6	EI 90-U/C (E 120-U/C)				
>30 - 44	EI 90-U/C (E 120-U/C)							

**alpex F50 PROFI and alpex L pipes with AF/ArmaFlex insulation (length  $\geq 500$ mm - on both sides of the separating element, local-sustained LS or continued- sustained CS)**

$\leq 75$	5,0	9,5	x	x	4	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C
		9,5 - 20			5			
		20 - 30			6			



Pipe ø (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			

**aquatherm green pipes MS pipes without insulation**

≤ 16	2,2	-	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
≤ 50	6,9				3			
≤ 75					4			
≤ 110	15,2							

**aquatherm green pipes MS pipes with SH/ArmaFlex insulation (length ≥ 500 mm - on both sides of the separating element, local-sustained LS or continued- sustained CS)**

≤ 16	2,2	9,0	x	x	3	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
≤ 50	6,9	10						

**aquatherm green pipes MS pipes with AF/ArmaFlex insulation (length ≥ 500mm - on both sides of the separating element, local-sustained LS or continued-sustained CS)**

≤ 110	15,2	31	x	x	6	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/U
-------	------	----	---	---	---	----------------------------	--	------------

**BluePower pipes with Polyethylene sound insulation**

≤ 50	1,8	≤ 4 (PE)	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
≤ 75	2,5				3			
≤ 110	3,4				4			



Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			

**Geberit Silent-PP pipes with Polyethylene sound insulation**

$\leq 50$	2	$\leq 4$ (PE)	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C			
$\leq 75$	2,6				3			EI 90-U/C (E 120-U/C)			
$\leq 110$	3,6				4			EI 120-U/C			
$\leq 125$	4,2				5			EI 90-U/C (E 120-U/C)			
$\leq 160$	5,2				6			EI 120-U/C			
$\leq 50$	2		-		-			8	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/U
$\leq 75$	2,6							2			
$\leq 110$	3,6							3			
$\leq 125$	4,2							4			
$\leq 160$	5,2							5			
		6									

**POLO-KAL NG pipes with Polyethylene sound insulation**

$\leq 50$	2	$\leq 4$ (PE)	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C			
$\leq 75$	2,6				3			EI 90-U/C (E 120-U/C)			
$\leq 110$	3,4				4			EI 120-U/C			
$\leq 125$	3,9				5			EI 120-U/C			
$\leq 160$	4,9				6			EI 120-U/C			
$\leq 50$	2		-		-			2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/U
$\leq 75$	2,6							3			
$\leq 110$	3,4							4			
$\leq 125$	3,9							5			
$\leq 160$	4,9							6			



Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			
<b>RAUPIANO PLUS pipes with Polyethylene sound insulation</b>								
$\leq 50$	1,8	$\leq 4$ (PE)	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C
$\leq 75$	1,9				3			
$\leq 110$	2,7				4			
$\leq 125$	3,1				5			
$\leq 160$	3,6		6					
$\leq 50$	1,8		-		2			
$\leq 75$	1,9				3			
$\leq 110$	2,7				4			
<b>Triplus pipes with Polyethylene sound insulation</b>								
$\leq 40$	1,8	$\leq 4$ (PE)	x	x	2	flexible wall & rigid wall	flexible wall: $\geq 94$ rigid wall: $\geq 100$	EI 120-U/C (E 120-U/C)
$\leq 75$	2,5				3			
$\leq 90$	3,1				4			
$\leq 110$	3,4				5			
$\leq 125$	3,9				6			
$\leq 160$	4,9				8			



Pipe ø (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			

**Uponor Unipipe MLC multi-layer composite pipes without insulation**

≤ 16	2	-	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
------	---	---	---	---	---	----------------------------	--	------------

**Uponor Unipipe MLC multi-layer composite pipes with SH/ArmaFlex insulation (length ≥ 500mm - on both sides of the separating element, local-sustained LS or continued-sustained CS)**

≤ 16	2	9	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
≤ 50	4,5	10			3			EI 60-U/C (E 120-U/C)
≤ 110	10	9			6			EI 120-U/C
		≤ 9 - 20	EI 90-U/C (E 120-U/C)					

**Uponor Unipipe MLC multi-layer composite pipes with AF/ArmaFlex insulation (length ≥ 500mm - on both sides of the separating element, local-sustained LS or continued-sustained CS)**

≤ 50	4,5	27,5	x	x	4	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
≤ 110	10	9,5			6			EI 90-U/C (E 120-U/C)
		19						EI 120-U/C
		30						

**Wavin SiTech+ pipes with Polyethylene sound insulation**

≤ 50	2	≤ 4 (PE)	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
≤ 110	3,6				4			EI 90-U/C (E 120-U/C)
					5			
≤ 160	5,3		8	EI 120-U/C				
≤ 50	2		2					
≤ 75	2,6		3					
≤ 110	3,6	4	EI 120-U/U					



Pipe ø (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			

**Multiple penetration of maximum three plastic pipes made from PVC-U, PE-HD or PP without insulation through one concerted pipe collar ArmaProtect EFC1 / EFC2 (clearance between pipes maximum 15mm; linear arrangement, no clusters)**

≤ 75	1,8 - 8,4	-	x	x	4	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-U/C
------	-----------	---	---	---	---	----------------------------	--	------------

**Metal pipes (copper pipes, steel pipes, stainless steel pipes) with AF/ArmaFlex insulation (length 500mm - on both sides of the separating element, local-sustained LS or continued-sustained CS)\***

≤ 28	1,0 - 14,2	6 - 35	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 120-C/U
≤ 54	1,5 - 14,2	9 - 35						EI 60-C/U (E 120-C/U)
		35						EI 120-C/U

**Metal pipes (copper pipes, steel pipes, stainless steel pipes) with AF/ArmaFlex insulation (length ≥ 500 mm - on both sides of the separating element, local-sustained LS or continued-sustained CS) and an additional layer of AF/ArmaFlex (length 300 mm, thickness ≥ 9,0 mm - on both sides of the separating element, local-interrupted LI)\***

≤ 54	1,5 - 14,2	9 - 35	x	x	2	flexible wall & rigid wall	flexible wall: ≥ 94 rigid wall: ≥ 100	EI 90-C/U (E 120-C/U)
------	------------	--------	---	---	---	----------------------------	--	--------------------------

\* the intumescent inlay has to be installed on both sides flushed within the separating element (without metal strap)



## Floor Applications

Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			
<b>PVC-U pipes without insulation</b>								
$\leq 50$	1,8 - 5,6	-	x	x	2	rigid floor	$\geq 150$	EI 240-U/C
50 - $\leq 75$	1,8 - 8,4				3			
75 - $\leq 110$	1,8 - 12,3				4			
> 110 - $\leq 125$	2,2 - 12,1				5			
125 - $\leq 160$	3,2 - 11,9				6			EI 120-U/C
<b>PVC-U pipes without insulation in an angle between 90° and 45°</b>								
$\leq 50$	1,8	-	x	x	2	rigid floor	$\geq 150$	EI 120-U/C
> 50 - $\leq 75$	12,3				4			
> 75 - $\leq 110$	12,1				5			
> 110 - $\leq 125$	11,9				6			
> 125 - $\leq 160$	3,2				8			
<b>PE-HD pipes without insulation</b>								
$\leq 50$	1,8 - 4,6	-	x	x	2	rigid floor	$\geq 150$	EI 240-U/C
> 50 - $\leq 75$	1,8 - 8,4				3			
> 75 - $\leq 110$	> 2,7 - 10				4			EI 180-U/C (E 240-U/C)
> 110 - $\leq 160$	> 4,0 - 14,6				6			EI 120-U/C (E 240-U/C)
<b>PE-HD pipes without insulation in an angle between 90° and 45°</b>								
$\leq 50$	4,6	-	x	x	2	rigid floor	$\geq 150$	EI 120-U/C
> 50 - $\leq 110$	2,7 - 10				4			
<b>PE-HD pipes with Polyethylene insulation</b>								
$\leq 50$	1,8	$\leq 4$ (PE)	x	x	2	rigid floor	$\geq 150$	EI 120-U/C
> 50 - $\leq 75$	2,2				3			
> 75 - $\leq 110$	2,7 - 10				4			
<b>PE-HD pipes with Polyethylene insulation, positioned vertically directly in the corner of the wall (clearance between pipe and wall maximum 10mm)</b>								
$\leq 110$	10	$\leq 4$ (PE)	x	x	4	rigid floor	$\geq 150$	EI 120-U/C



Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification	
			EFC1	EFC2	No. of layers				
<b>PP pipes without insulation</b>									
$\leq 50$	1,8 - 4,6	-	x	x	2	rigid floor	$\geq 150$	EI 240-U/C	
$> 50 - \leq 75$	1,8 - 8,4				3				
$> 75 - \leq 110$	$> 2,7 - 10$				4			EI 180-U/C	
$> 110 - \leq 125$	$> 3,1 - 11,4$				6				
$> 125 - \leq 160$	$> 4,0 - 14,6$				8				EI 120-U/C
<b>PP pipes without insulation in an angle between 90° and 45°</b>									
$\leq 110$	2,7 - 10	-	x	x	4	rigid floor	$\geq 150$	EI 120-U/C	
$> 110 - \leq 125$	3,2 - 12				6				
$> 125 - \leq 160$	4 - 14,6				8				
<b>PP pipes with Polyethylene insulation, positioned vertically directly in the corner of the wall (clearance between pipe and wall maximum 10mm)</b>									
$\leq 110$	2,7	$\leq 4$ (PE)	x	x	4	rigid floor	$\geq 150$	EI 120-U/C	
<b>alpex F50 PROFi and alpex L pipes without insulation</b>									
$\leq 16$	2	-	x	x	2	rigid floor	$\geq 150$	EI 120-U/C	
$\leq 50$	4	-			2				
$\leq 75$	5	-			4				
<b>alpex F50 PROFi and alpex L pipes with SH/ArmaFlex insulation (length <math>\geq 500</math>mm - on both sides of the separating element, local-sustained LS or continued- sustained CS)</b>									
$\leq 16$	2	9	x	x	2	rigid floor	$\geq 150$	EI 120-U/C	
$\leq 75$	5				4				
					9 - 20				5
					20 - 30				6
<b>alpex F50 PROFi and alpex L pipes with AF/ArmaFlex insulation (length <math>\geq 500</math>mm - on both sides of the separating element, local-sustained LS or continued- sustained CS)</b>									
$\leq 75$	5	9,5	x	x	4	rigid floor	$\geq 150$	EI 120-U/C	



Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			
<b>aquatherm green pipes MS pipes without insulation</b>								
$\leq 16$	2,2	-	x	x	2	rigid floor	$\geq 150$	EI 120-U/C
$\leq 50$	7,9				3			
$\leq 75$	11,8				4			
$\leq 110$	17,2							
<b>aquatherm green pipes MS pipes with SH/ArmaFlex insulation (length <math>\geq 500</math>mm - on both sides of the separating element, local-sustained LS or continued- sustained CS)</b>								
$\leq 50$	6,9	10	x	x	3	rigid floor	$\geq 150$	EI 120-U/C
<b>aquatherm green pipes MS pipes with AF/ArmaFlex insulation (length <math>\geq 500</math>mm - on both sides of the separating element, local-sustained LS or continued-sustained CS)</b>								
$\leq 110$	15,2	31	x	x	6	rigid floor	$\geq 150$	EI 120-U/C
<b>aquatherm SDR 11 pipes without insulation</b>								
$\leq 315$	28,6	-	x	x	20	floor	$\geq 150$	EI 120-U/C
<b>BluePower pipes with Polyethylene sound insulation</b>								
$\leq 50$	1,8	-	x	x	2	rigid floor	$\geq 150$	EI 120-U/C
$\leq 75$	2,5				4			EI 90-U/C
$\leq 110$	3,4				5			
<b>Geberit Silent-PP pipes with Polyethylene sound insulation</b>								
$\leq 50$	2	$\leq 4$ (PE)	x	x	2	rigid floor	$\geq 150$	EI 120-U/C
$\leq 75$	2,6				3			
$\leq 110$	3,6				4			
$\leq 50$	2,0		-		2			EI 120-U/U
$\leq 75$	2,6				3			
$\leq 110$	3,6				4			
$\leq 125$	4,2				5			
$\leq 160$	5,2				6			



Pipe ø (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			

**Geberit Silent-PP pipes with Polyethylene sound insulation, positioned vertically directly in the corner of the wall (clearance between pipe and wall maximum 10mm)**

≤ 110	3,6	≤ 4 (PE)	-	x	5	rigid floor	≥ 150	EI 120-U/U
-------	-----	----------	---	---	---	-------------	-------	------------

**Geberit Silent-PP pipes with Polyethylene sound insulation, bows on the bottom side of the floor and a connection sleeve within the floor**

≤ 50	2	≤ 4 (PE)	-	x	3	rigid floor	≥ 150	EI 120-U/U
≤ 75	2,6				4			
≤ 110	3,6				5			

**POLO-KAL NG pipes with Polyethylene sound insulation**

≤ 50	2	≤ 4 (PE)	x	x	2	rigid floor	≥ 150	EI 90-U/C (E 120-U/C)
≤ 75	2,6				3			EI 120-U/C
≤ 110	3,4				4			
≤ 50	2	≤ 4 (PE)	-	x	2	rigid floor	≥ 150	EI 120-U/U
≤ 75	2,6				3			
≤ 110	3,4				4			
≤ 125	3,9				5			
≤ 160	4,9				6			

**POLO-KAL NG pipes with Polyethylene sound insulation, vertically directly in the corner of the wall (clearance between pipe and wall maximum 10mm)**

≤ 110	3,4	≤ 4 (PE)	-	x	5	rigid floor	≥ 150	EI 120-U/U
-------	-----	----------	---	---	---	-------------	-------	------------

**POLO-KAL NG pipes with Polyethylene sound insulation, with bows on the bottom side of the floor and a connection sleeve within the floor**

≤ 50	2	≤ 4 (PE)	-	x	3	rigid floor	≥ 150	EI 120-U/U
≤ 75	2,6				4			
≤ 110	3,4				5			



Pipe ø (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			

**RAUPIANO PLUS pipes with Polyethylene sound insulation**

≤ 50	1,8	≤ 4 (PE)	-	x	2	rigid floor	≥ 150	EI 120-U/U
≤ 75	1,9				3			
≤ 110	2,7				4			
≤ 125	3,1				5			
≤ 160	3,6				6			

**RAUPIANO PLUS pipes with Polyethylene sound insulation, positioned vertically directly in the corner of the wall (clearance between pipe and wall maximum 10mm)**

≤ 110	2,7	≤ 4 (PE)	-	x	5	rigid floor	≥ 150	EI 120-U/U
-------	-----	----------	---	---	---	-------------	-------	------------

**RAUPIANO PLUS pipes with Polyethylene sound insulation, with bows on the bottom side of the floor and a connection sleeve within the floor**

≤ 50	2	≤ 4 (PE)	-	x	3	rigid floor	≥ 150	EI 120-U/U
≤ 75	2,6				4			
≤ 110	2,7				5			

**Uponor Unipipe MLC multi-layer composite pipes without insulation**

≤ 50	4,5	-	x	x	2	rigid floor	≥ 150	EI 120-U/C
≤ 75	7,5				3			EI 90-U/C
≤ 110	10				4			

**RAUPIANO PLUS pipes with Polyethylene sound insulation, positioned vertically directly in the corner of the wall (clearance between pipe and wall maximum 10mm)**

≤ 50	4,5	10	x	x	3	rigid floor	≥ 150	EI 120-U/C
≤ 63	6	9			4			
≤ 90	8,5				5			
≤ 110	10	> 9 - 20			6			

**Uponor Unipipe MLC multi-layer composite pipes with AF/ArmaFlex insulation (length ≥ 500mm - on both sides of the separating element, local-sustained LS or continued-sustained CS)**

≤ 50	4,5	10	x	x	3	rigid floor	≥ 150	EI 120-U/C
≤ 63	6	9			4			
≤ 90	8,5				5			
≤ 110	10	> 9 - 20			6			



Pipe $\varnothing$ (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification	
			EFC1	EFC2	No. of layers				
<b>Wavin SiTech+ pipes with Polyethylene sound insulation</b>									
$\leq 50$	2	$\leq 4$ (PE)	x	x	2	flexible wall & rigid wall	$\geq 150$	EI 120-U/C	
$\leq 75$	2,6				3				
$\leq 110$	3,6				4				
$\leq 125$	4,2				5				
$\leq 160$	5,3				6				
$\leq 50$	2				-				-
$\leq 75$	2,6		3						
$\leq 110$	3,6		4						
$\leq 125$	4,2		5						
$\leq 160$	5,3		6						
<b>Wavin SiTech+ pipes with Polyethylene sound insulation, positioned vertically directly in the corner of the wall (clearance between pipe and wall maximum 10mm)</b>									
$\leq 110$	3,6	$\leq 4$ (PE)	-	x	5	rigid floor	$\geq 150$	EI 120-U/U	
<b>Wavin SiTech+ pipes with Polyethylene sound insulation, with bows on the bottom side of the floor and a connection sleeve within the floor</b>									
$\leq 50$	2	$\leq 4$ (PE)	-	x	3	rigid floor	$\geq 150$	EI 120-U/U	
$\leq 75$	2,6				4				
$\leq 110$	3,6				5				
<b>Multiple penetration of maximum three plastic pipes made from PVC-U, PE-HD or PP without insulation through one concerted pipe collar ArmaProtect EFC1 / EFC2 (clearance between pipes maximum 15mm; linear arrangement, no clusters)</b>									
$\leq 75$	1,8 - 8,4	-	x	x	4	rigid floor	$\geq 150$	EI 120-U/C	



Pipe Ø (mm)	Pipe wall thickness (mm)	Insulation (mm)	Intumescent inlay			Base material	Base material thickness (mm)	Classification
			EFC1	EFC2	No. of layers			
<b>Metal pipes (copper pipes, steel pipes, stainless steel pipes) with AF/ArmaFlex insulation (length ≥ 500mm - on both sides of the separating element, local-sustained LS or continued-sustained CS)*</b>								
≤ 28	1 - 14,2	6	x	x	2	rigid floor	≥ 150	EI 120-C/U
		6 - < 20			3			
		> 20 - 35			4			
≤ 54	1,5 - 14,2	9	x	x	2	rigid floor	≥ 150	EI 120-C/U
		> 9 - 22			3			
		> 22 - 35			4			
≤ 89	2 - 14,2	13	x	x	2	rigid floor	≥ 150	EI 120-C/U
≤ 108		13 - 30						

\* the intumescent inlay has to be installed on both sides flushed within the separating element (without metal strap)

**TECHNICAL DATA - ARMAPROTECT EFC1 AND EFC2**

Brief description	ArmaProtect EFC1 and EFC2 are endless firestop collars as solution for covering various pipe diameters and design variants.
Material type	Stainless steel strap with self-adhesive flexible intumescent strip on blowing graphite technology.
Product colour range	Stainless steel (strap) and anthrazite (intumescent strip).
Special features	Easy visual inspection.
Product range	Self-adhesive firestop wrap: 10 m x 40 mm x 2 mm, stainless steel strap: 3 m (including 18 hooks).
Applications	Endless Firestop collar for fire seals in walls and floors for combustible pipes (with and without insulation) and non-combustible pipes (with combustible insulation).
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.
Declaration of Performance (DoP)	ArmaProtect EFC1 and ArmaProtect EFC2

**Approvals and compliance**

Specification compliance	<ul style="list-style-type: none"> <li>ETA 22/0061 acc. EN 1366-3</li> </ul>
--------------------------	--

Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-40°C to 70°C (40°F to 158°F)	
Application temperature	5°C to 25°C (41°F to 77°F)	
Storage and transportation temperature	5°C to 30°C (41°F to 77°F)	
<b>Thermal conductivity</b>		
Declared thermal conductivity	θm	0°C
	λd [W/(m·K)]	0.403
<b>Mechanical properties</b>		
Density	1200 ± 10 kg/m <sup>3</sup>	
Start of intumescent reaction	> 190°C	
Expansion ratio	18 to 34 fold	
Blowing pressure	> 0.8 N/mm <sup>2</sup>	
<b>Fire performance</b>		
Reaction to fire	Class A1 (stainless steel collar) / Class E (intumescent strip)	EN 13501-1
Resistance to fire	See Annex	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETA 22/0061
<b>Other technical features</b>		
Durability and serviceability	Use category type $\checkmark_1$	EOTA TR 024
Safety information	Please refer to the safety data sheet available on our website.	
Shelf life	No shelf life.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost and sunlight.	