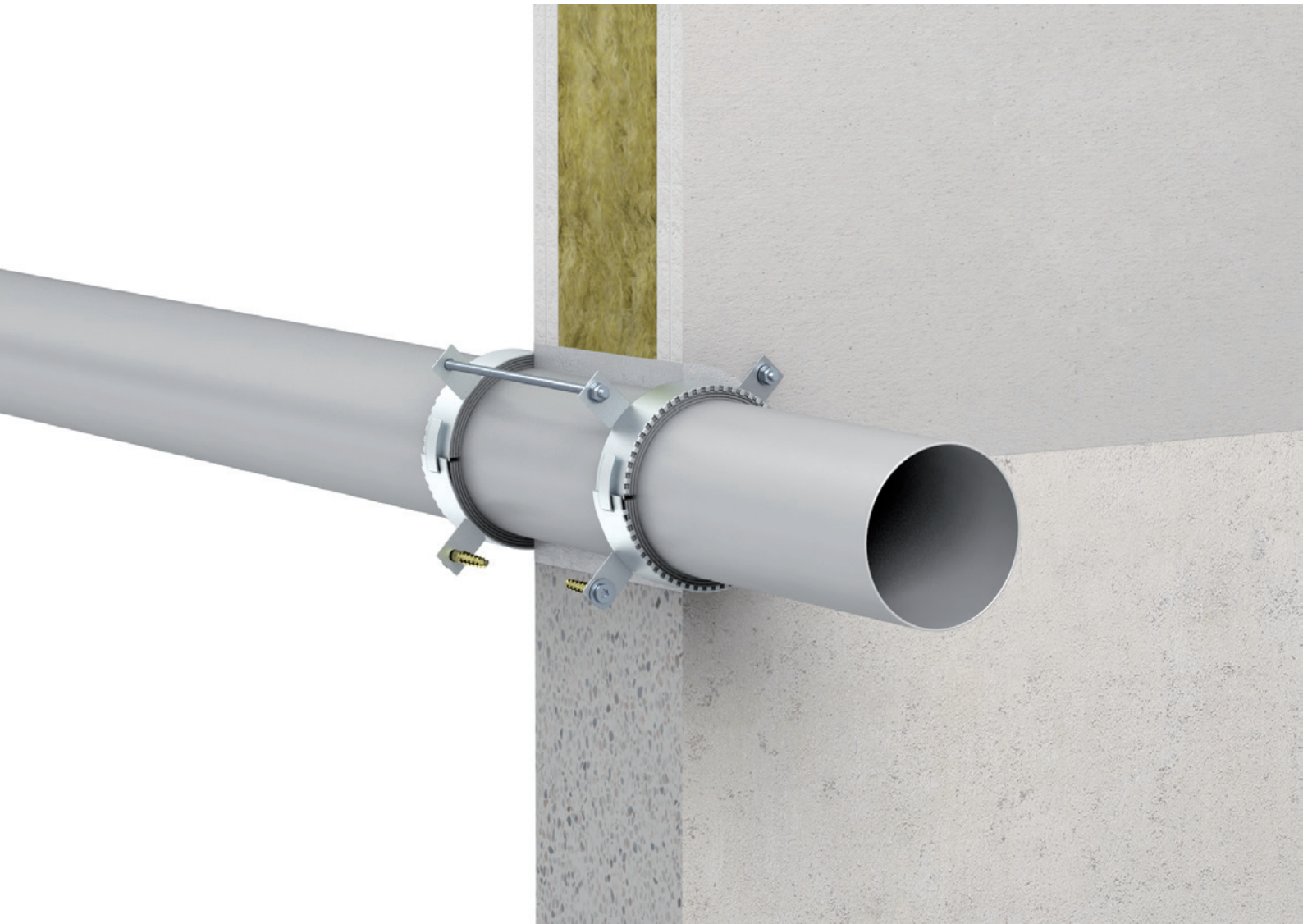


## System FSC 4

---

### Penetration sealing system for pipes

Fire resistant penetration sealing system for plastic pipes up to medium diameters in accordance with ETA-15/0907.  
Maximum fire resistance class EI 240 U/C in accordance with EN 13501-2.



# System FSC 4

---

## Table of contents

	Topic	Page
<b>1.</b>	<b>Preliminary remarks / Overview.....</b>	<b>3</b>
1.1	Target group.....	3
1.2	Use of the instructions.....	3
1.3	Safety instructions.....	3
1.4	Field of application.....	4
1.5	Building elements.....	5
1.6	Thicknesses / penetration seal distances.....	6
<b>2.</b>	<b>Fire resistance classes.....</b>	<b>7</b>
2.1	Walls.....	7
2.2	Floors.....	8
<b>3.</b>	<b>Products used.....</b>	<b>9</b>
3.1	Declarations of Performance.....	9
<b>4.</b>	<b>Design variants.....</b>	<b>10</b>
4.1	Initial brackets (supports).....	10
<b>5.</b>	<b>Installation steps.....</b>	<b>11</b>

# System FSC 4

---

## 1. Preliminary remarks / Overview

### 1.1 Target group

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

### 1.2 Use of the instructions

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

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

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

Unless stated otherwise, all lengths are specified in mm.

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

Upon request, Flamro will be pleased to provide the relevant legal and technical framework and manufacturer specifications for each individual case.

### 1.3 Safety instructions

Consult the respective safety information for the individual penetration seal components.

Personal protective equipment:



Wear protective clothing and non-slip shoes.



Use safety goggles or safety glasses.

### Safety instructions for the installation of floor penetration seals



The area below the floor penetration seal must be cordoned off against entry during penetration seal work (barrier tape and warning sign: warning of possible falling objects, do not enter the area, penetration seal work in floor component openings).



The contractor for the production of floor penetration seals must inform the client in writing (for forwarding to the client or appointed representative) that fire protection seals installed in floors must be secured on site against loads – in particular against being walked on – by suitable measures (e.g. by fencing them off or by covering them with grating).

## System FSC 4

---

### 1.4 Field of application

The usability of the pipe penetration sealing system FSC 4 has been assessed in accordance with ETA 15/0907 in terms of the „Reaction to fire“, „Resistance to fire“, „Release of dangerous substances“ and „Durability and serviceability“ product characteristics.

Reaction to fire		
Product	Reaction to fire class	in accordance with
ROKU® Strip EM	E	ETA 15/0907
Metal casing	A1	

#### Resistance to fire

System FSC 4 maximally meets the requirements of class EI 240 U/C in accordance with EN 13501-2.

When installed in walls or floors with a lower fire resistance duration, the fire resistance duration of the penetration seal is also reduced to that of the fire resistance class of the wall or floor.

#### Release of dangerous substances

All components of System FSC 4 do not contain any substances identified as dangerous in the list of the European Commission.

#### Durability and serviceability

System FSC 4 meets the requirements of type Y<sub>1</sub>, provided that the metal casing is sufficiently protected from corrosion.

## System FSC 4

---

### 1.5 Building elements

#### Plasterboard walls

Plasterboard walls must have a minimum thickness of  $\geq 94$  mm and consist of steel studs (U and C profiles; 0.5–1.5 mm thickness) clad on both sides with at least two layers of 12.5 mm thick panels of classification A2-s1, d0 or A1 in accordance with EN 13501-1.

Additionally, wood studs can be used instead of steel studs. In this context, it should be noted that there must be a minimum distance of 100 mm between the wood studs and the penetration seal. The insulation in between those stands must at least comply with the building material class A1 or A2 (in accordance with EN 13501-1) and have a raw density of 5–115 kg/m<sup>3</sup> (in accordance with EN 1363-1). The reveal cladding must be made of steel studs with a minimum thickness of 0.6 mm and panels of the same specifications as of the wall.

The supporting structure must be classified for the necessary fire resistance duration in accordance with EN 13501-2.

#### Solid walls

The wall must have a minimum thickness of  $\geq 100$  mm and be made of concrete, reinforced concrete, aerated concrete or masonry. Its resistance to fire must be assessed in accordance with EN 13501-2.

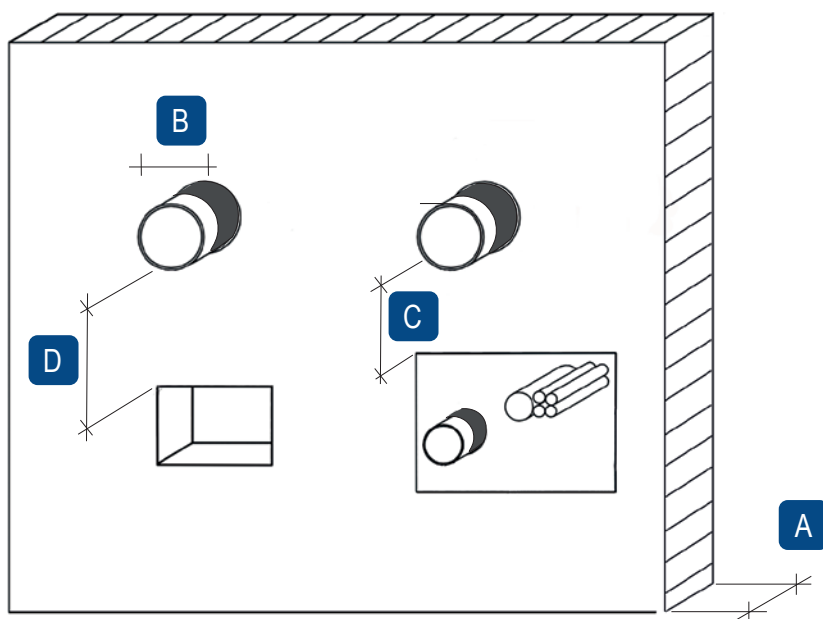
#### Solid floors

The floor must have a minimum thickness of  $\geq 150$  mm and be made of concrete, reinforced concrete or aerated concrete. Its resistance to fire must be assessed in accordance with EN 13501-2.

## System FSC 4

### 1.6 Thicknesses / penetration seal distances

Dimensions				
Pos.	Name	Plasterboard wall [mm]	Solid wall [mm]	Solid floor [mm]
A	Thickness of building element	≥ 94	≥ 100	≥ 150
B	Maximum dimensions of combustible pipes to be sealed	≥ 160	≥ 160	≥ 160
C	Distance to other openings or installations	≥ 100	≥ 100	≥ 100
D	Distance to other openings or installations, if the opening to be sealed is not larger than 200 mm × 200 mm	≥ 100	≥ 100	≥ 100



## System FSC 4

### 2. Fire resistance classes

#### 2.1 Walls

Type of pipe	Pipe outer Ø (max.) [mm]	Pipe wall thickness [mm]	FSC 4 – layers [n]	Fire resistance class
PVC-U*	≤ 50	1.8–5.6	2 × 2	EI 120 U/C
	> 50 – ≤ 75	1.8–8.4	2 × 3	
	> 75 – ≤ 110	1.8–12.3	2 × 4	
	> 110 – ≤ 125	2.2–12.2	2 × 5	
	≤ 160	3.2–11.9	2 × 6	
PE-HD**	≤ 50	1.8–4.6	2 × 2	EI 120 U/C
	> 50 – ≤ 75	1.8–8.4	2 × 3	
	> 75 – ≤ 110	2.7–10.0	2 × 4	
PP***	≤ 50	1.8–4.6	2 × 2	EI 120 U/C
	> 50 – ≤ 75	1.8–8.4	2 × 3	
	> 75 – ≤ 110	2.7–10.0	2 × 4	
	≤ 125	3.9–12.2	2 × 5	EI 90 U/C
	≤ 160	> 4.0–14.6	2 × 6	
Blue Power	≤ 50	1.8	2 × 2	EI 120 U/C
	≤ 75	2.5	2 × 3	
	≤ 110	3.4	2 × 4	
Wavin SiTech	≤ 50	2.0	2 × 2	EI 120 U/C EI 90 U/C, E 120 U/C
	≤ 75	2.6	2 × 3	
	≤ 110	3.6	2 × 4	
aquatherm green pipe MS	≤ 16	2.2	2 × 2	EI 120 U/C
	≤ 50	6.9	2 × 2	
	≤ 75	10.4	2 × 3	
	≤ 110	15.2	2 × 4	
Geberit Silent-PP	≤ 50	2.0	2 × 2	EI 120 U/C EI 90 U/C, E 120 U/C
	≤ 75	2.6	2 × 3	
	≤ 110	3.6	2 × 4	
POLO-KAL NG	≤ 50	2.0	2 × 2	EI 120 U/C EI 90 U/C, E 120 U/C
	≤ 75	2.6	2 × 3	
	≤ 110	3.4	2 × 4	
	≤ 125	3.9	2 × 5	EI 120 U/C
	≤ 160	4.9	2 × 6	
REHAU RAUPIANO PLUS	≤ 50	1.8	2 × 2	EI 120 U/C
	≤ 75	1.9	2 × 3	
	≤ 110	2.7	2 × 4	
	≤ 125	3.1	2 × 5	
	≤ 160	3.6	2 × 6	

\* As per EN 1452-1. The classification of PVC-U pipes in acc. with EN 1453-1, EN 1329-1 or EN 1452-1 also applies to PVC-C pipes in acc. with EN 1566-1.

\*\* As per EN 1452-1. The classification of PE-HD pipes in acc. with EN 1519-1 and EN 12666-1 also applies to PE pipes in acc. with EN 12201-2, EN 1519-1 and EN 12666-1 and to ABS pipes in acc. with EN 1455-1 and SAN+PVC-Rohre in acc. with EN 1565-1.

\*\*\*As per EN 1452-1.

## System FSC 4

Type of pipe	Pipe outer Ø (max.) [mm]	Pipe wall thickness [mm]	FSC 4 – layers [n]	Fire resistance class
Valsir Triplus®	≤ 50	1.8	2 × 2	EI 120 U/C
	≤ 75	2.5	2 × 3	
	≤ 90	3.1	2 × 4	

### 2.2 Floors

Type of pipe	Pipe outer Ø (max.) [mm]	Pipe wall thickness [mm]	FSC 4 – layers [n]	Fire resistance class
PVC-U*	≤ 50	1.8–5.6	2	EI 240 U/C
	> 50 – ≤ 75	1.8–8.4	3	
	> 75 – ≤ 110	1.8–12.3	4	
	> 110 – ≤ 125	2.2–12.1	5	EI 120 U/C
	≤ 125	12.1	5	EI 240 U/C
	≤ 160	3.2–11.9	6	EI 120 U/C
	≤ 160	11.9	6	EI 240 U/C
PE-HD**	≤ 50	1.8–4.6	2	EI 240 U/C
	> 50 – ≤ 75	1.8–8.4	3	
	> 75 – ≤ 110	2.7	4	
	> 75 – ≤ 110	> 2.7–10.0	4	EI 180 U/C, E 240 U/C
	≤ 125	3.1	5	EI 240 U/C
	≤ 125	> 3.1–11.4	5	EI 120 U/C, E 240 U/C
	≤ 160	4.0	6	EI 240 U/C
≤ 160	> 4.0–14.6	6	EI 120 U/C, E 240 U/C	
REHAU RAUPIANO PLUS	≤ 50	1.8–4.6	2	EI 240 U/C
	> 50 – ≤ 75	1.8–8.4	3	
	> 75 – ≤ 110	2.7	4	
	> 75 – ≤ 110	> 2.7–10.0	4	EI 180 U/C
Uponor MLC pipes white	≤ 50	4.5	2	EI 120 U/C
	≤ 75	7.5	3	EI 90 U/C
	≤ 110	10.0	4	
aquatherm green pipe	≤ 16	2.2	2	EI 120 U/C
	≤ 50	6.9	2	
	≤ 75	10.4	3	
	≤ 110	15.2	4	
Wavin SiTech	≤ 50	2.0	2	EI 120 U/C
	≤ 75	2.6	3	
	≤ 110	3.6	4	
	≤ 125	4.2	5	EI 60 U/C
	≤ 160	5.3	6	

\*\*\* As per EN 1452-1. The classification of PVC-U pipes in acc. with EN 1453-1, EN 1329-1 or EN 1452-1 also applies to PVC-C pipes in acc. with EN 1566-1.

\*\*\* As per EN 1452-1. The classification of PE-HD pipes in acc. with EN 1519-1 and EN 12666-1 also applies to PE pipes in acc. with EN 12201-2, EN 1519-1 and EN 12666-1 and to ABS pipes in acc. with EN 1455-1 and SAN+PVC-Rohre in acc. with EN 1565-1.


\*\*\* As per EN 1452-1.

## System FSC 4

Type of pipe	Pipe outer Ø (max.) [mm]	Pipe wall thickness [mm]	FSC 4 – layers [n]	Fire resistance class
Geberit Silent-PP	≤ 50	2.0	2	EI 120 U/C
	≤ 75	2.6	3	
	≤ 110	3.6	4	
POLO-KAL NG	≤ 50	2.0	2	EI 90 U/C, E 120 U/C
	≤ 75	2.6	3	
	≤ 110	3.6	4	EI 120 U/C

### 3. Products used

 <b>FSC 4 Fire protection collar</b>	
Dimensions [mm]	Art. no.
50	01148050
63	01148063
75	01148075
90	01148090
110	01148110
125	01148125
140	01148140
160	01148160

 <b>Fasteners</b>	
Dimensions [mm]	Art. no.
Ø 32–50 mm	01146050
Ø 63–125 mm	01146125
Ø 140–160 mm	01146160



**GFM  
Fire protection mortar**  
25 kg bag – Art. no. 01167000



#### General sealing material

Dimensionally stable, non-combustible (class A1 or A2-s1,d0 in acc. with EN 13501-1) material such as concrete, cement mortar, gypsum mortar

### 3.1 Declarations of Performance

The Declarations of Performance for featured Flamro products are available for download on our website:  
<https://svt-global.com/downloads>

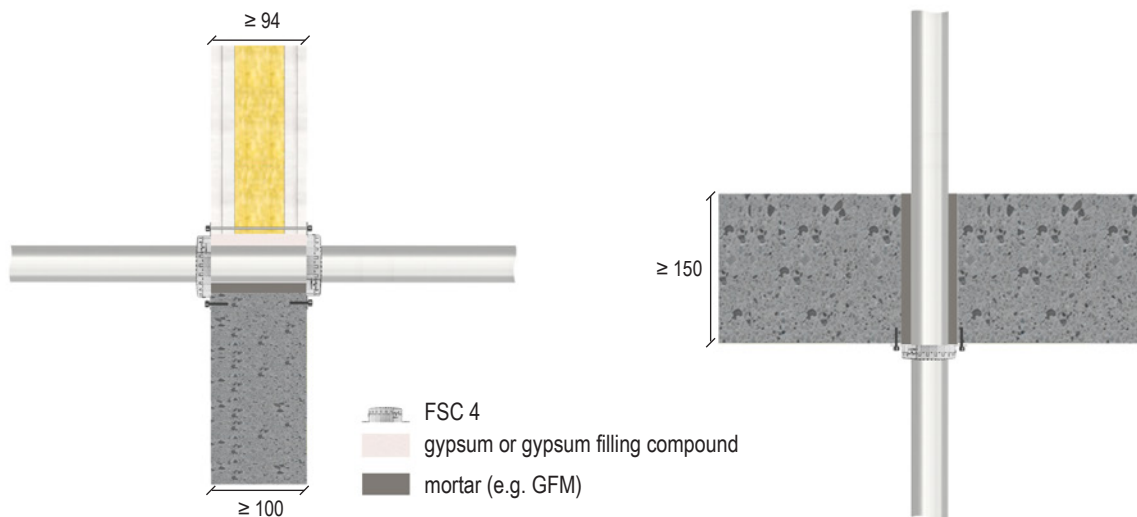
## System FSC 4

### 4. Design variants

The penetration sealing system may be applied to straight pipes which are arranged vertically to the wall or floor surface. The pipes must be intended for non-combustible liquids or gases, for pneumatic conveying systems or vacuum lines only. Additional measures must be taken to switch off pneumatic conveying systems, compressed air lines and similar appliances in case of fire.

In plasterboard walls, pipe collars must be fastened with continuous threaded rods (M8), in solid walls with steel dowels, steel screw anchors or steel dry-wall screws and washers.

The annular gap between the plastic pipes and the wall or floor must be complete filled with mineral sealing material (annular gap width: wall 10–30 mm, floor 10–50 mm).



All specifications in mm

#### 4.1 Initial brackets (supports)

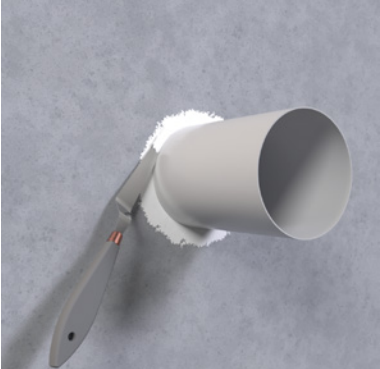
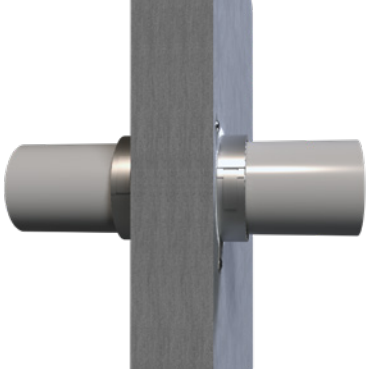
Essential parts of the brackets/supports for combustible pipes in wall and floor must be non-combustible and must be configured with a spacing as per the overview on both sides.

In case of fire the sealing system may not be subjected to additional mechanical stress.

Services	Wall	Floor
Combustible pipes	≤ 650 mm	≤ 470 mm

## System FSC 4

### 5. Installation steps

<p>1. Fill the annular gap completely with general sealing material and seal it (annular gap size: wall 10–30 mm, floor 10–50 mm).</p>	<p>2. Place the fire protection collar FSC 4 around the pipe and close it – on both sides when installing in walls, on the lower side when installing in floors. Always use the smallest fitting collar.</p>
	

<p>3. Fasten the pipe collar – using continuous threaded rods (M8) in plasterboard walls, steel dowels, steel screw anchors or steel dry-wall screws and washers in solid walls and floors. Use all available fastening points.</p>	
