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

European Technical Assessment ETA-17/0238 of 24/04/2017

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:	“System FS-M R1” – “System SKM” – “System SKC”
Product family to which the above construction product belongs:	Pipe penetration seal
Manufacturer:	Dr. Schwarzkopf & Krug GmbH & Co. KG Industriestr. 43-57 D-28876 Oyten DEUTSCHLAND www.sk-industrieservice.de
Manufacturing plant:	Dr. Schwarzkopf & Krug GmbH & Co. KG, plant Oyten Industriestraße 43- 57 D - 28876 Oyten DEUTSCHLAND www.sk-industrieservice.de
This European Technical Assessment contains:	35 pages including 29 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	Guideline for European technical approval of "Fire Stopping and Fire Sealing Products", ETAG 026 Part 2: "Penetration Seals", used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.
This version replaces:	-

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product
The construction product pipe penetration seal called "System FS-M R1" – "System SKM" – "System SKC" is installed in accordance with the ETA-holder's design and installation instructions. The pipe penetration seal "System FS-M R1" – "System SKM" – "System SKC" manly comprise of pipe collars and a gap filling material. The products are factory-produced by the ETA-holder or a supplier. The ETA-holder is ultimately responsible for the pipe penetration seal "System FS-M R1" – "System SKM" – "System SKC".

The systems called "System FS-M R1" – "System SKM" – "System SKC" of Dr. Schwarzkopf & Krug GmbH & Co. KG, 28876 Oyten, Germany consists of a housing and an inlay. The housing shall consist of steel sheet and shall be sufficiently protected against corrosion. The inlay shall consist of the intumescent material "lntusit pro" according to the ETA-16/0894 and shall be loosely inserted into the sheet steel housing.

The dimensions of the pipe collar, the housing and the inlay shall comply with the information given in Annexs 1-6.

Gap filling material for closing joints a non-combustible material (class A1 or A2-s1,d0 according to EN 13501-1) shall be used which is dimensionally stable, as e.g. concrete, cementitious or gypsum mortar.

Specification of the intended use in accordance with the applicable European Assessment Document
The construction product pipe penetration seal called "System FS-M R1" – "System SKM" – "System SKC" is used to seal off openings in accordance with fire-resistant walls and floors and serves to preserve the fire resistance of the wall or the floor in the vicinity of the penetrations. The fire resistant capability prevents heat transmission and fire spreading in the event of fire.

The provisions in this European Technical Assesments are based on verification and assessment methods that lead to an assumed working life of 10 years for the pipe penetration seal "System FS-M R1" – "System SKM" – "System SKC" provided the conditions laid down in sections 4 and 5 relating to manufacturing are met.

The information provided on the working life cannot be interpreted as a guarantee given by the manufacturer, but should be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the construction.

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

Characteristic	Assessment of characteristic
3.2 Safety in case of fire (BWR 2)	
Reaction to fire	*"Intusit pro"* intumescent material used for inlay is classified as **Euroclass E** in accordance with EN 13501-1. The housing consists of 0,6 mm, 0,8 mm or 1 mm thick steel sheet. The material for the metal housing is classified according to Commission Decision 96/603/EC (as amended): **Euroclass A1**
Resistance to fire	The pipe penetration seal was tested in accordance with EN 1366-3:07/2007 and EN 1366-3: 2009-07. As a maximum, the penetration seal fulfils the requirements of: • **Euroclass EI 90- EI 120 U/U** • **Euroclass EI 90 – EI 120 U/C** according to EN 13501-2 depending on the pipe dimensions, the pipe material, the installation conditions and the type of the building element.
3.3 Hygiene, health and the environment (BWR 3)	
Influence on air quality	The inlay made from the intumescent material "lntusit pro" does not contain substances registered as dangerous substances in the list of the European Commission. According to the ETA-16/0894. Note: ln addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). ln order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.
3.7 Sustainable use of natural resources (BWR 7)	No Performance Determined

*) See additional information in section 3.9 – 3.12.

In addition to the specific clauses relating to dangerous substances contained in this European technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.9 General aspects

The verification of durability and serviceability is part of testing the essential characteristics. The construction product pipe penetration seal called “System FS-M R1” – “System SKM” – “System SKC”. The inlays in the system made from the intumescent material "lntusit pro" fulfils the requirements according to ETAG 026-Part 2 clause for **use category: $Y_{2\ (0\ to\ 70)°C}$** without expecting significant changes in fire protection characteristics. That means the material can exposed to indoor conditions without restriction in relative humidity at temperatures of 0 [°C] to +70[°C] in accordance with EOTA TR 024 according to ETA-16/0894 for *“Flexible intumescent pre-shaped element/mat”*

Although a penetration seal is intended for indoor applications only, the construction process may result in it being subjected to more exposed conditions for a period before the building envelope is closed. For this case provisions shall be made to protect temporarily exposed penetration seals.

4 Assessment and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 1999/454/EC of the European Commission, as amended by 2001/596/EC, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

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

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

Issued in Copenhagen on 2017-04-24 by

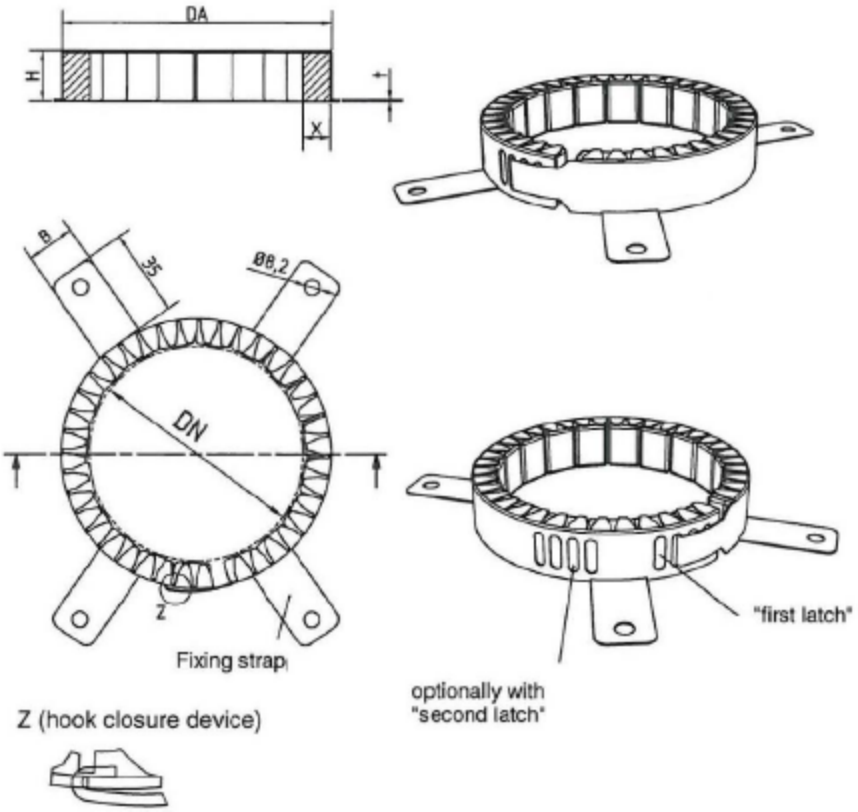
Thomas Bruun
Managing Director, ETA-Danmark

<table>
<tr><th>Name/Manufacturer</th><th>Description</th></tr>
<tr><td>Penetration Seal
“System FS-M R1”, “System SKM”, “System SKC”
Dr. Schwarzkopf & Krug GmbH & Co. KG,
28876 Oyten
Germany</td><td>Pipe collar
The pipe collar consists of a sheet steel housing and an inlay made from the intumescent material "lntusit pro". The housing has a hook closure device (hook-shaped straps and cut-outs) and up to six fixing straps.
dimensions: according to Annexes 3-6.

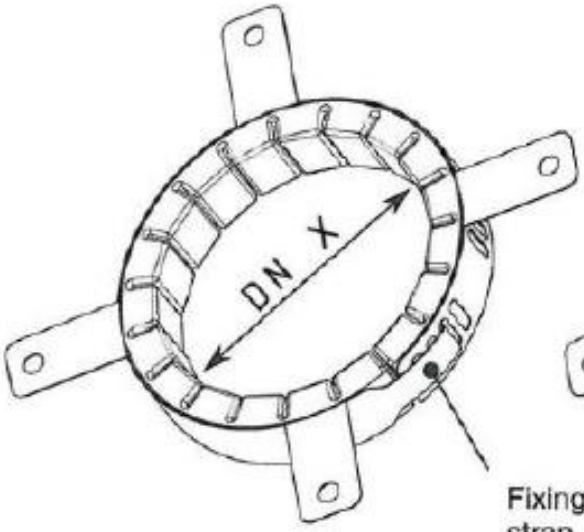
Inlay
The inlay consists of the intumescent material "lntusit pro" according to ETA-16/0894 dimensions: according to Annexes 3-6
<table>
<tr><td>Description</td><td>Tested according to ETAG 026-2 (also see TR 024)</td><td>Values</td></tr>
<tr><td>Density</td><td>EOTA TR 024 clause 3.1.4</td><td>1250 kg/m^3 ± 10 %</td></tr>
<tr><td>Expansion ratio*</td><td>EOTA TR 024 clause 3.1.11</td><td>10 to 18 (tested on samples 3 mm thick)</td></tr>
<tr><td>Expansion pressure*</td><td>EOTA TR 024 clause 3.1.12</td><td>0,6 N/mm^2 to 1,2 N/mm^2</td></tr>
</table>
Housing
The housing consists of 0,6 mm, 0,8 mm or 1 mm thick steel sheet. The housing shall be sufficiently protected against corrosion. The material for the metal housing is classified according to Commission Decision 96/603/EC (as amended): Class A 1
dimensions: according to Annexes 3-6</td></tr>
<tr><td>Gap filling material
manufacturer-independent</td><td>The filling shall consist of a non-combustible material (class A1 or A2-s1,d0 according to EN 13501-1) which is dimensionally stable, as e.g. concrete, cementitious or gypsum mortar.</td></tr>
<tr><td>PE-foam strip
manufacturer-independent</td><td>• thickness ≤ 5 mm
Test method according to EN ISO 11925-2
Class E according to EN 13501-1</td></tr>
</table>

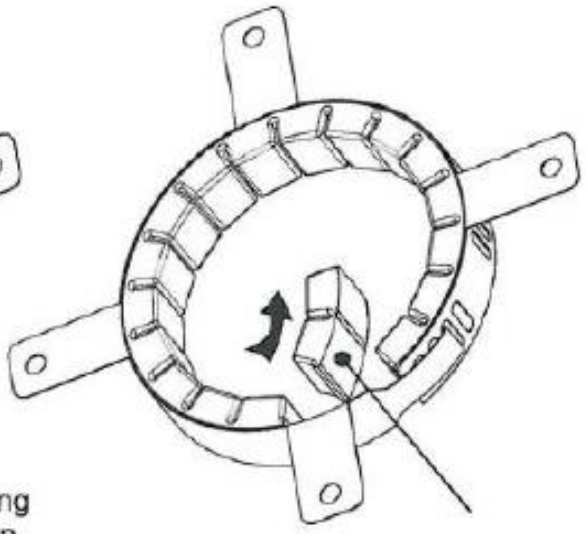
Name/Manufacturer	Description
Rigid wall manufacturer-independent	**Rigid wall** • of masonry, concrete, reinforced concrete or aerated concrete • density ≥630 kg/ms • thickness ≥100 mm • The walls shall be classified according to EN 13501-2 (maximum EI 120) corresponding to the required fire resistance period.
Flexible wall manufacturer-independent	**Flexible wall** • flexible walls with a steel stud substructure and a lining on both sides made from min. 2 layers of 12,5 mm thick cementitious or gypsum based slabs with a fire reaction class A 1 or A2 according to EN 13501-1 • flexible walls with a wood stud substructure and a lining on both sides made from min. 2 layers of 12,5 mm thick cementitious or gypsum based slabs with a fire reaction class A 1 or A2 according to EN 13501-1 • The distance between the wood substructure and the seal shall be ≥100 mm and the cavity between the linings of the wall, the wood substructure and the seal shall be tightly clogged with mineral wool of fire reaction class A 1 or A2 according to EN 13501 -1 in a depth of minimum 100 mm. • thickness ≥100 mm • The walls shall be classified according to EN 13501-2 (maximum EI 120) corresponding to the required fire resistance period
Rigid floor manufacturer-independent	**Rigid floor** • of masonry, concrete, reinforced concrete or aerated concrete • density ≥630 kg/ms • thickness ≥150 mm • The floors shall be classified according to EN 13501-2 (maximum EI 90) corresponding to the required fire resistance period.

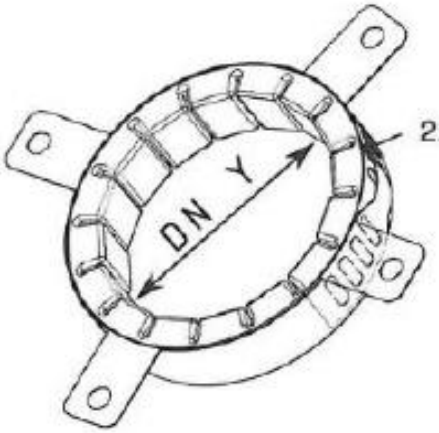
Dimensions of the collars DN 32 – 200

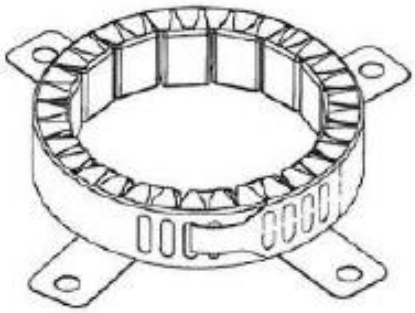


DN [mm]	H [mm]	B [mm]	t [mm]	Number of strap	X [mm]
32	30	15	0,6	3	6
40	30	15	0,6	3	7,8
50	30	15	0,6	3	9,6
63	30	15	0,6	4	10,4
75	30	15	0,6	4	12
90	30	25	0,6	4	12,8
110	30	25	0,8	4	14,5
125	50	20	1	4	13,2
140	50	20	1	4	18
160	50	20	1	5	20
180	50	20	1	5	24
200	50	20	1	6	28









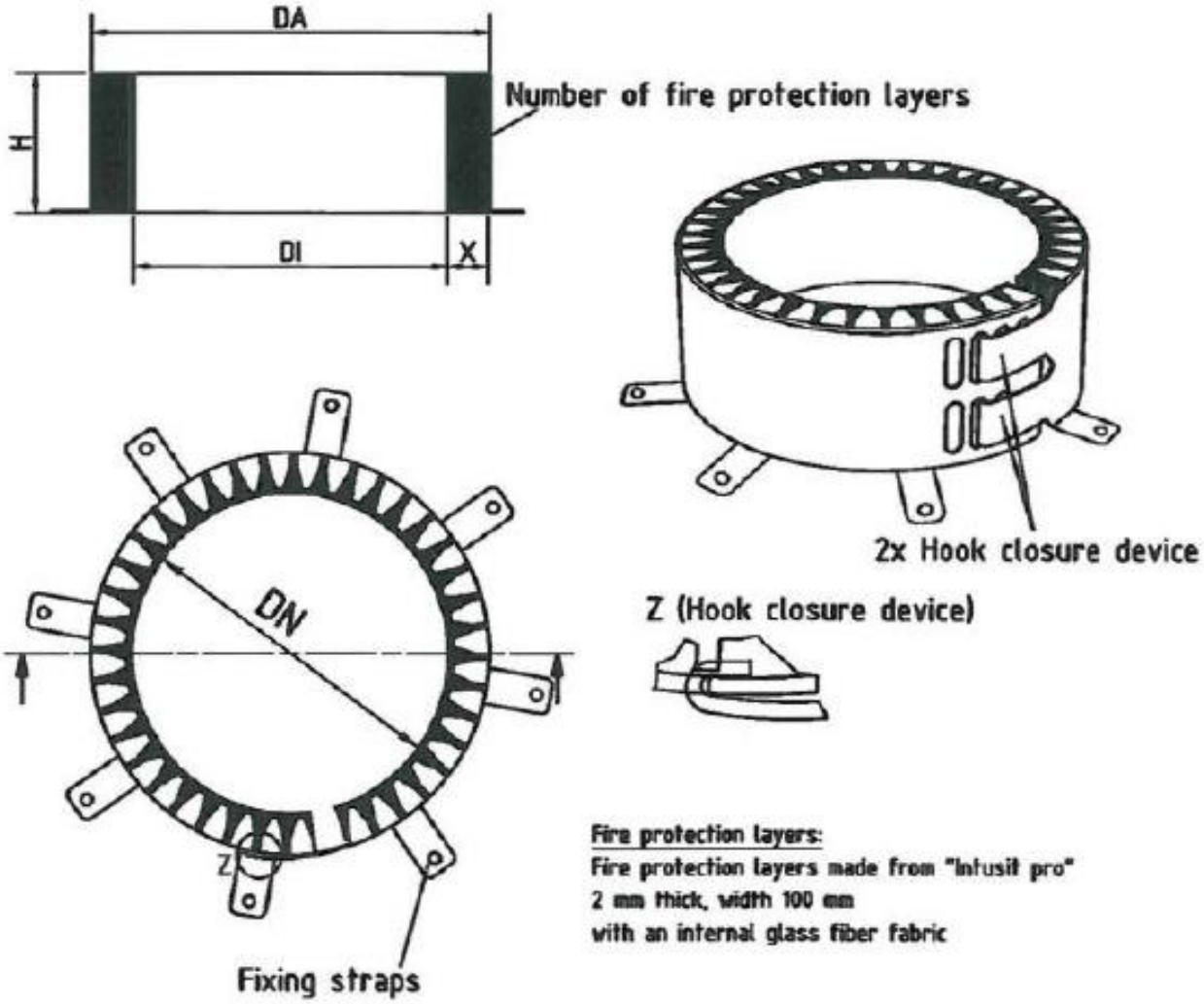
Oridinal collar DN X	Number of broken out segments	New collar DN Y
DN 40	4	DN 32
DN 50	3	DN 40
DN 63	4	DN 50
DN 75	3	DN 63
DN 90	3	DN 75
DN 110	3	DN 90
DN 125	2	DN 110
DN 140	4	DN 125
DN 160	3	DN 140
DN 180	3	DN 160
DN 200	4	DN 180

Penetration Seal "System FS-M R1", "System SKM", System SKC"

DESCRIPTION OF THE PRODUCT
Description of the components of the pipe penetration seal - resize of variable collars

ANNEX 4

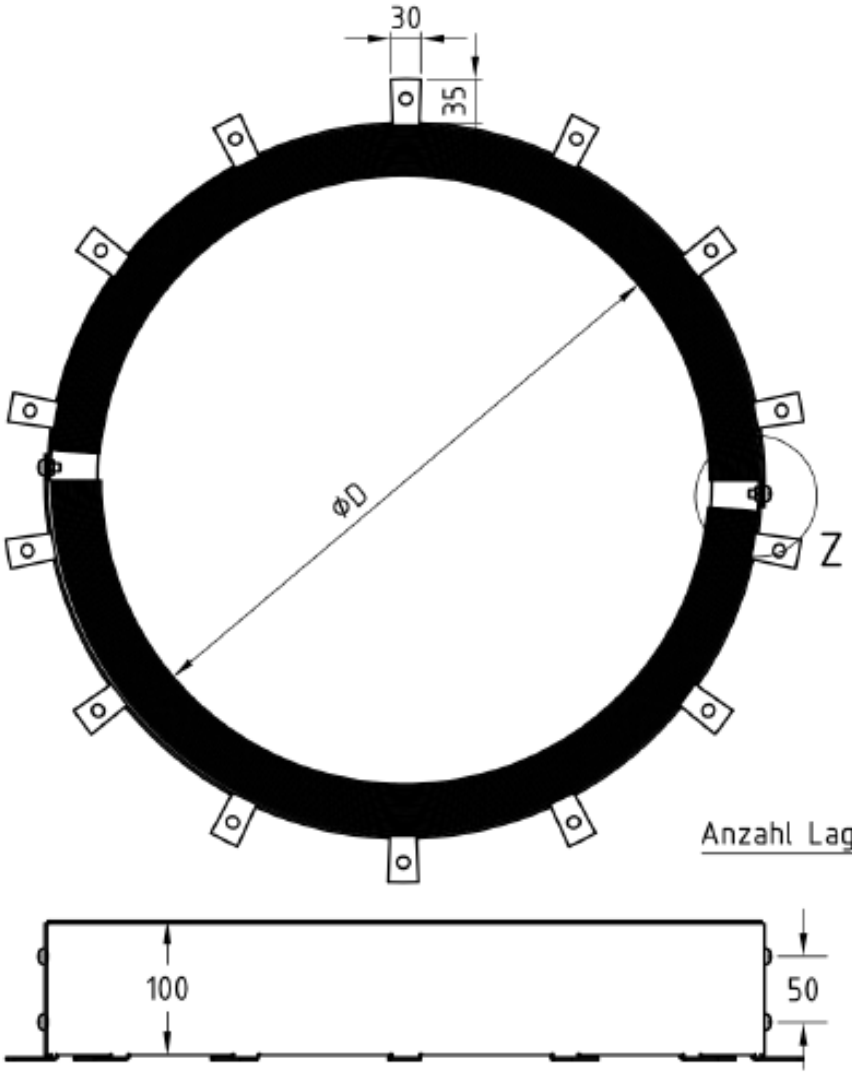
Dimensions of the collars DN 225 - 315

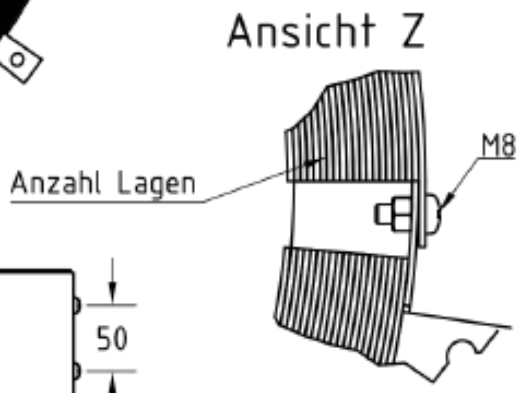


Fire protection layers:
Fire protection layers made from "Infusil pro"
2 mm thick, width 100 mm
with an internal glass fiber fabric

DN [mm]	DI [mm]	H [mm]	Number of fire protection layers	Number of strap	X [mm]
225	240	100	16	8	30
250	265	100	17	8	32
280	295	100	18	10	36
315	330	100	18	10	36

Dimensions of the collars DN 355 - 450





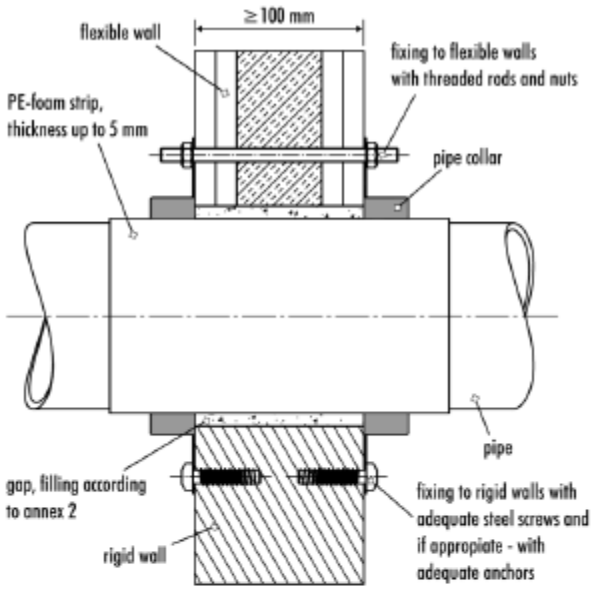
DN [mm]	D [mm]	Number of fire protection layers	Number of strap
355	370	19	10
400	415	19	12
450	465	19	14

Fire protection layers:
Fire protection layers made from "Intusit pro" 2 mm thick, width 100 mm with an internal glass fiber fabric

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
DESCRIPTION OF THE PRODUCT Dimensions of the collars DN 335 – 450	ANNEX 6

PVC-U

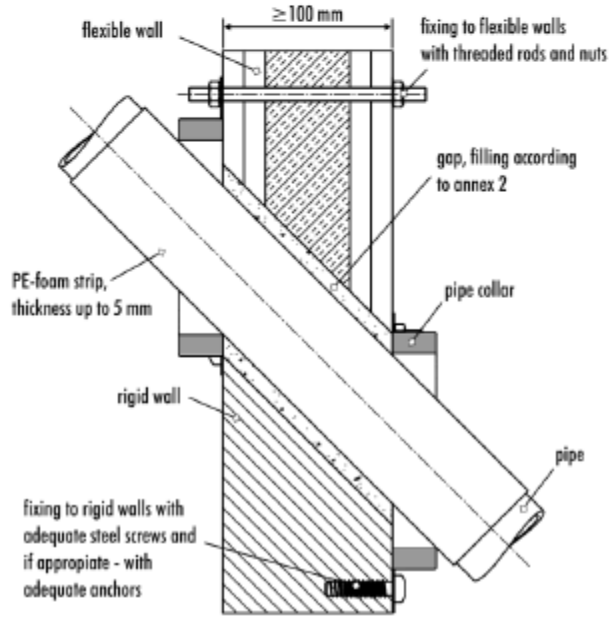
Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
32	1,9	EI 90
110	12,3	EI 90
160	3,2 – 7,7	EI 90[1)]
Pipe	**Pipe wall thickness**	**Class …-U/C**
32	1,9	EI 90
110	2,2 – 12,3	EI 90
125	1,8	EI 90[1)]
140	2,8	EI 90[1)]
160	3,2 – 7,7	EI 90
180	8,6	EI 90[1)]
200	9,6	EI 90[1)]

[1)] only allowed without PE-foam strip

Installation on inclined pipe



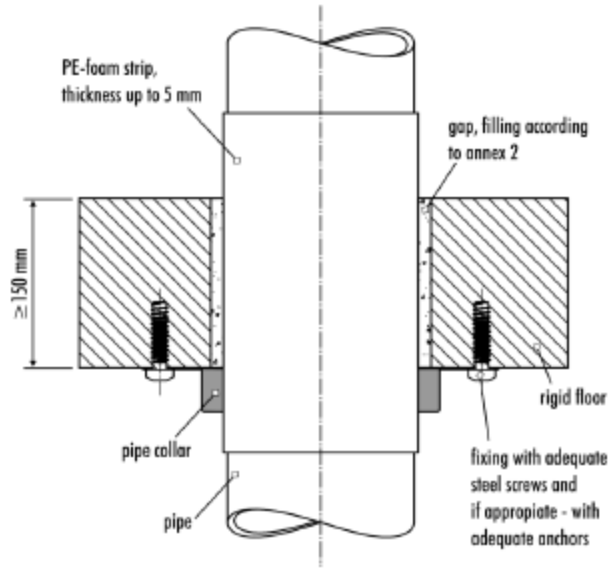
Pipe	Pipe wall thickness	Class …-U/C
160	4,7 – 7,7	EI 90[1)]

[1)] only allowed without PE-foam strip

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: PVC Installation in: Wall	ANNEX 7

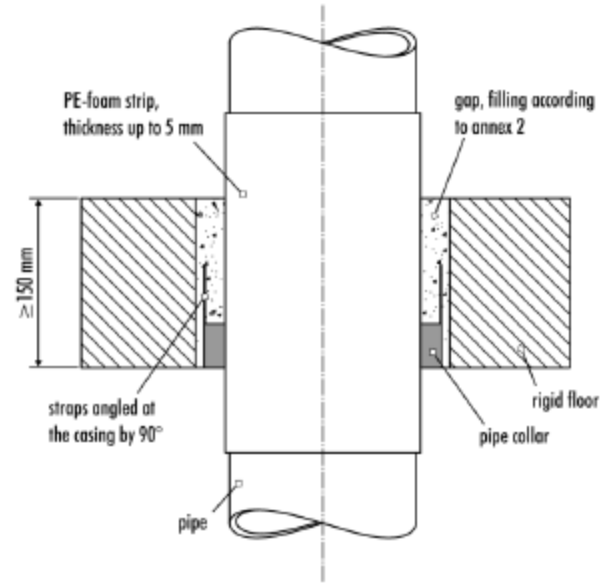
PVC-U

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
32	1,9	EI 90
110	2,2	EI 90
125	1,8	EI 90
140	2,8	EI 90
160	3,2 – 11,8	EI 90
Pipe	**Pipe wall thickness**	**Class …-U/C**
32	1,9	EI 90
110	2,2 – 8,2	EI 90
125	1,8	EI 90
140	2,8	EI 90
160	3,2 – 11,8	EI 90

Installation with mortared pipe collars



Pipe	Pipe wall thickness	Class …-U/C
32	1,8	EI 90
110	2,2 – 8,2	EI 90
125	1,8 – 2,5	EI 90
200	9,6	EI 90

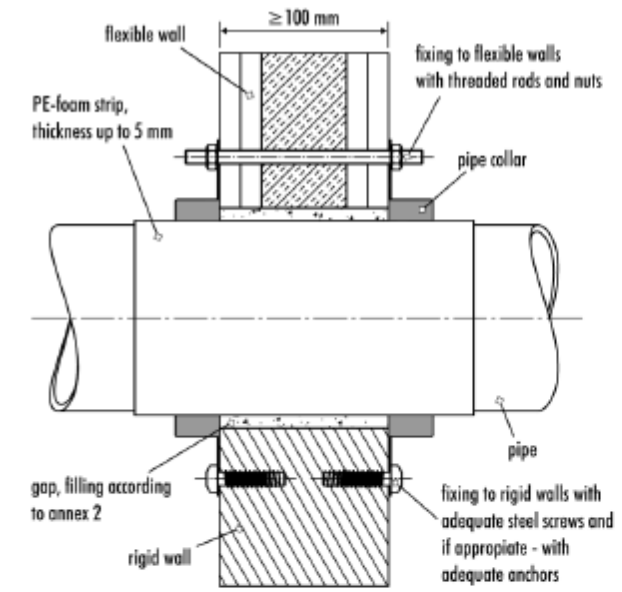
Penetration Seal “System FS-M R1”, “System SKM”, System SKC”

FIELD OF APPLICATION
Pipes: PVC
Installation in: Wall

ANNEX 8

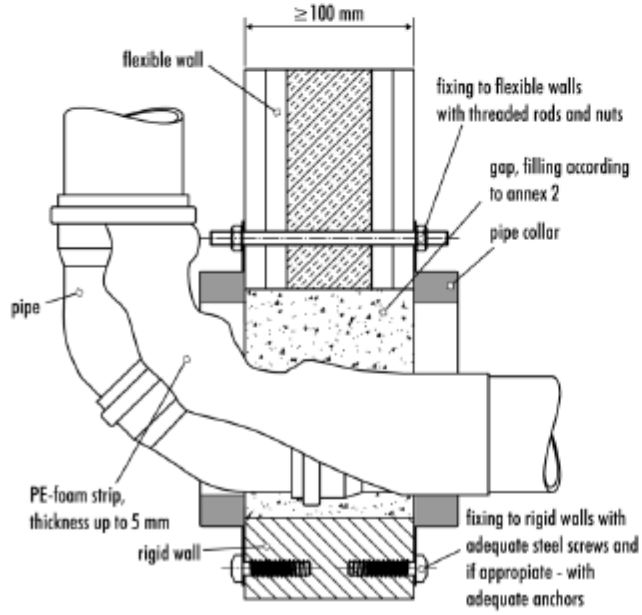
PP

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class ...-U/U
40	1,8	EI 90
160	3,9	EI 90
Pipe	**Pipe wall thickness**	**Class ...-U/C**
40	1,8	EI 90
50	1,8	EI 90
63	1,8	EI 90
75	1,9	EI 90
80	2,0	EI 90
90	2,2	EI 90
100	2,5	EI 90
110	2,7	EI 90
110	18,1	EI 120
160	3,9	EI 90

Installation on 2x45°-Situation



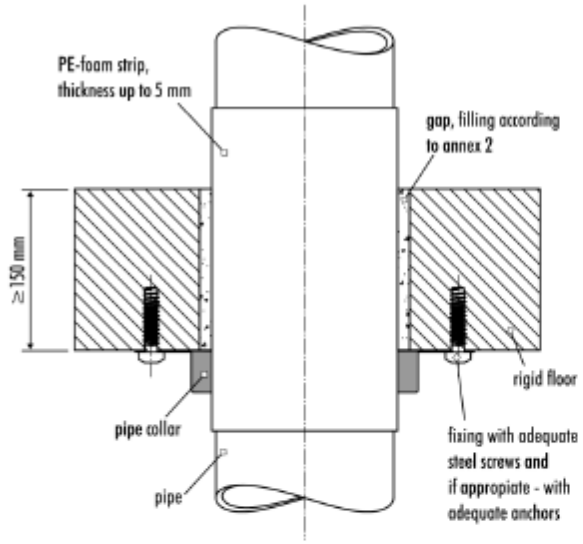
Pipe	Pipe wall thickness	Class ...-U/C
75	1,9	EI 90[1)]
160	3,9	EI 90[1)]

[1)] only allowed without PE-foam strip

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: PP Installation in: Wall	ANNEX 9

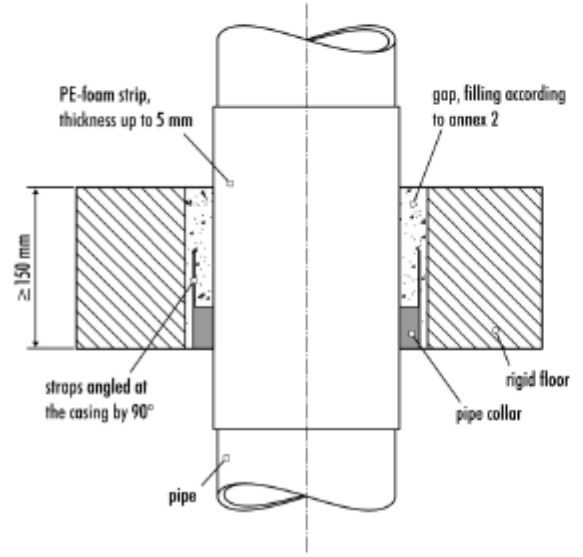
PP

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/C
110	2,7	EI 120

Installation with mortared pipe collars

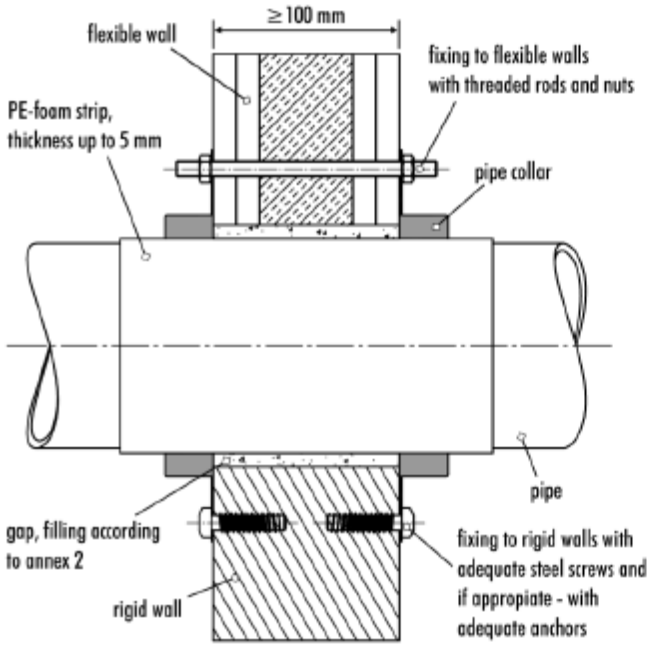


Pipe	Pipe wall thickness	Class …-U/C
110	18,1	EI 120

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: PP Installation in: Floor	ANNEX 10

PE

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
32	1,8	EI 90
110	2,7	EI 90
140	6,4	EI 90[1]
Pipe	**Pipe wall thickness**	**Class …-U/C**
32	1,8	EI 90
63	5,8	EI 90[1]
75	6,8	EI 90[1]
90	8,2	EI 90[1]
110	2,7 - 10	EI 90
125	3,9	EI 90[1]
140	6,4	EI 90[1]
200	7,7	EI 90
225	6,9	EI 90[2]
250	7,7 – 11,9	EI 90[2]
280	8,6 – 20,6	EI 90[2]
315	7,7 – 28,6	EI 90[2]
355	13,8 – 40,9	EI 90[3]
400	15,3 – 36,3	EI 90[3]
450	13,8 – 40,9	EI 90[3]

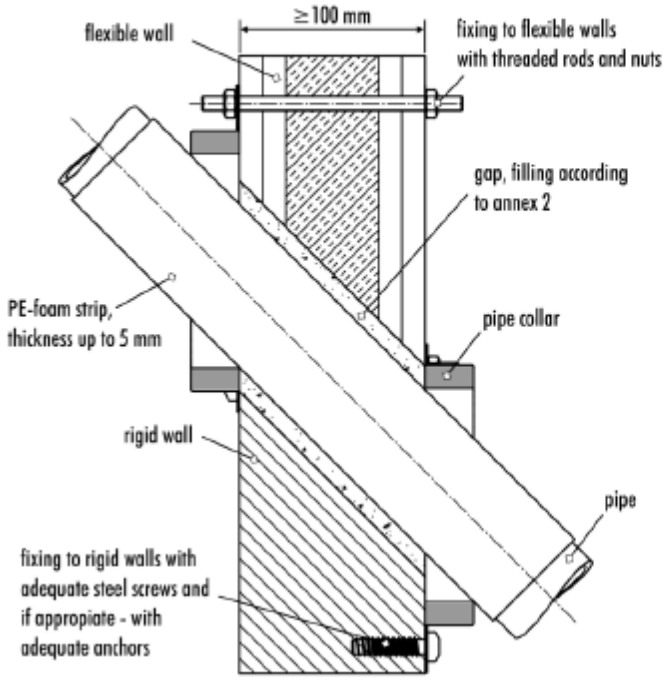
[1] only allowed without PE-foam strip
[2] only allowed in rigid walls ≥100 mm
[3] only allowed in rigid walls ≥150 mm

Dimensions in mm

Penetration Seal “System FS-M R1”, “System SKM”, System SKC”	
FIELD OF APPLICATION Pipes: PE Installation in: Wall (I)	ANNEX 11

PE

Installation on inclined pipe



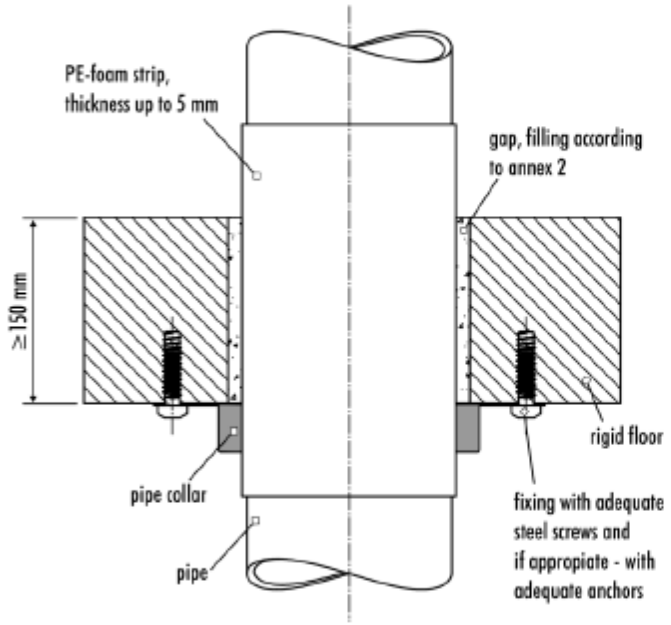
Pipe	Pipe wall thickness	Class ...-U/C
160	3,1	EI 90[1)]

[1)] only allowed without PE-foam strip

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: PE Installation in: Wall (II)	ANNEX 12

PE

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
32	1,8	EI 90
125	3,9	EI 90
160	9,5	EI 90
Pipe	**Pipe wall thickness**	**Class …-U/C**
32	1,8	EI 90
110	2,7 - 10	EI 90
125	3,9	EI 90
140	3,5 – 6,4	EI 90
160	3,2 – 9,5	EI 90
225	6,9	EI 90
250	7,7 – 11,9	EI 90
280	8,6 – 20,6	EI 90
315	9,7 – 28,6	EI 90
355	40,9	EI 90
450	40,9	EI 90

Dimensions in mm

Penetration Seal “System FS-M R1”, “System SKM”, System SKC”

FIELD OF APPLICATION

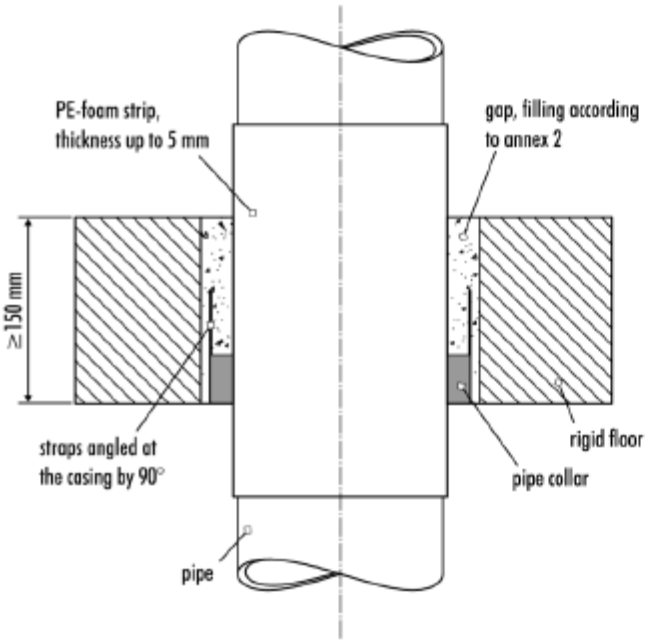
Pipes: PE

Installation in: Floor (I)

ANNEX 13

PE

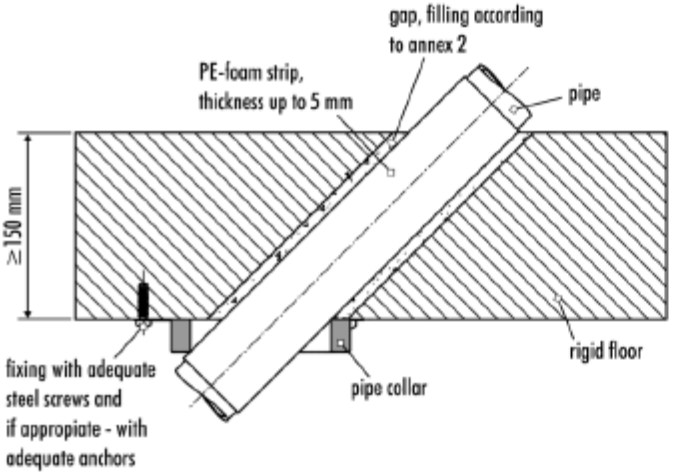
Installation with mortared pipe collars



Pipe	Pipe wall thickness	Class …-U/U
32	2,9	EI 90
160	14,6	EI 90
Pipe	**Pipe wall thickness**	**Class …-U/C**
32	2,9	EI 90
50	1,8	EI 90[1)]
110	2,7	EI 90
160	14,6	EI 90
200	9,1	EI 90[1)]

[1)] only allowed without PE-foam strip

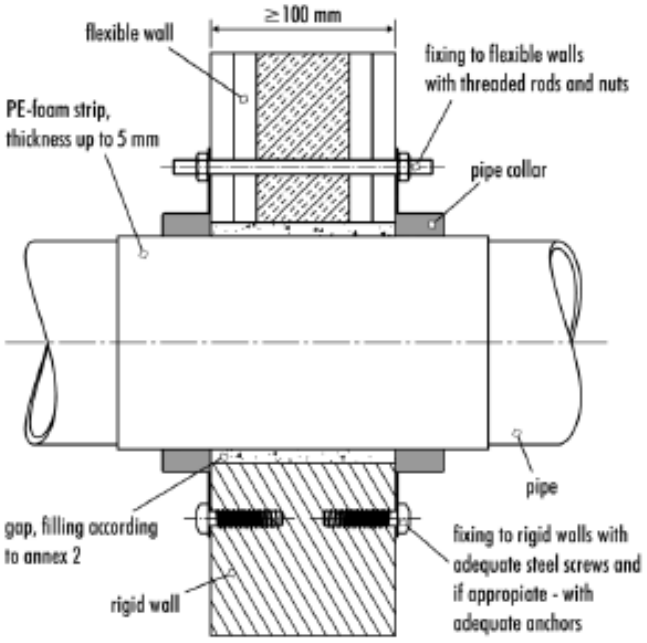
Installation on inclined pipe



Pipe	Pipe wall thickness	Class …-U/C
110	10	EI 90

REHAU RAUPIANO LIGHT and CONEL DRAIN

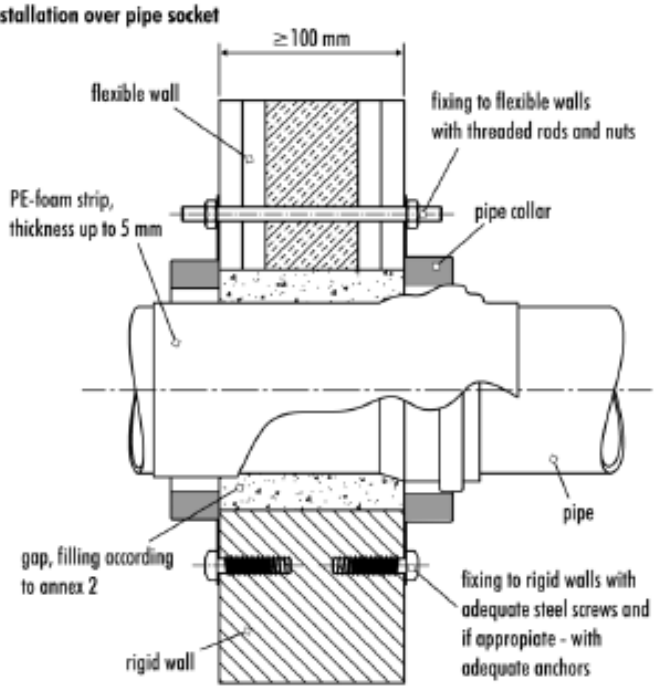
Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120[1)]
75	1,9	EI 120[1)]
90	2,2	EI 120[1)]
110	2,7	EI 120[1)]
125	3,1	EI 120
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120
125	3,1	EI 120
160	3,9	EI 120

[1)] only allowed with PE-foam strip with thickness up to 3 mm or in walls ≥119 mm

Installation over pipe socket



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

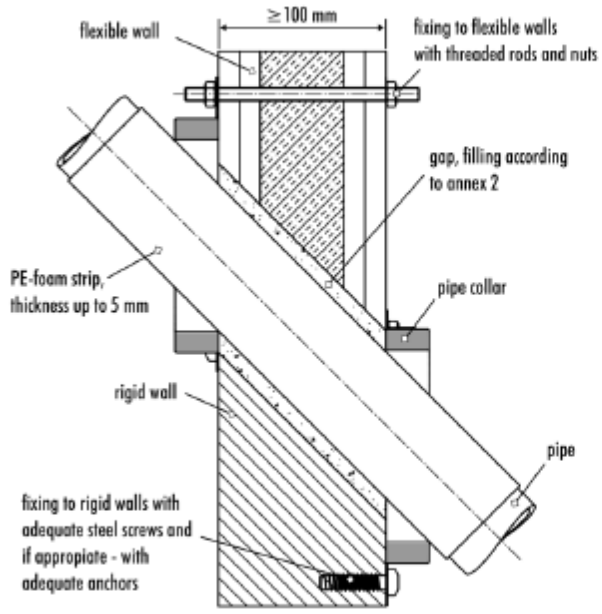
Pipes: Rehau Raupiano light and Conel Drain

Installation in: Wall (I)

ANNEX 15

REHAU RAUPIANO LIGHT and CONEL DRAIN

Installation on inclined pipe



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

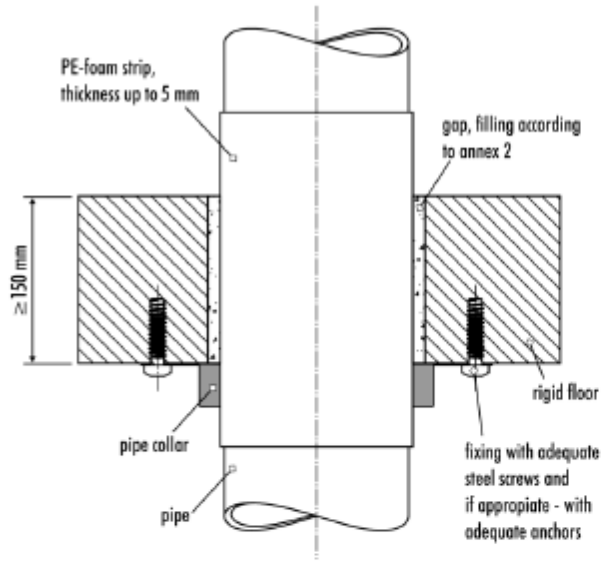
Pipes: Rehau Raupiano light and Conel Drain

Installation in: Wall (II)

ANNEX 16

REHAU RAUPIANO LIGHT and CONEL DRAIN

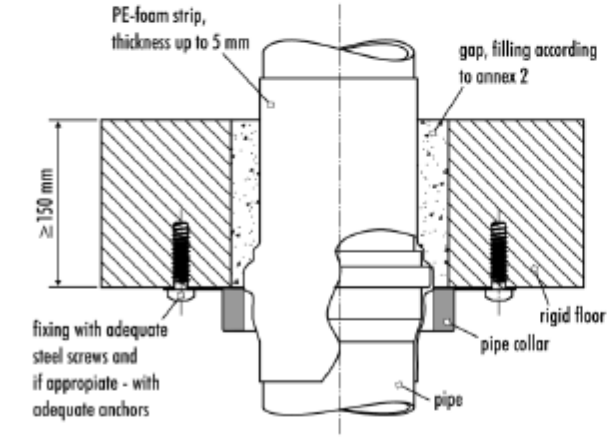
Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120
125	3,1	EI 120
160	3,9	EI 120[1)]
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120
125	3,1	EI 120
160	3,9	EI 120[1)]

[1)] only allowed with PE-foam strip with thickness up to 3 mm or in floors ≥ 200 mm

Installation over pipe socket



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120[1)]
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120

[1)] only allowed in floors ≥ 200 mm

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

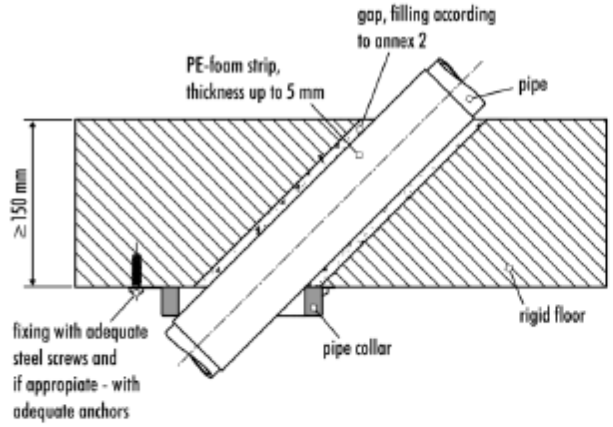
Pipes: Rehau Raupiano light and Conel Drain

Installation in: Floor (I)

ANNEX 17

REHAU RAUPIANO LIGHT and CONEL DRAIN

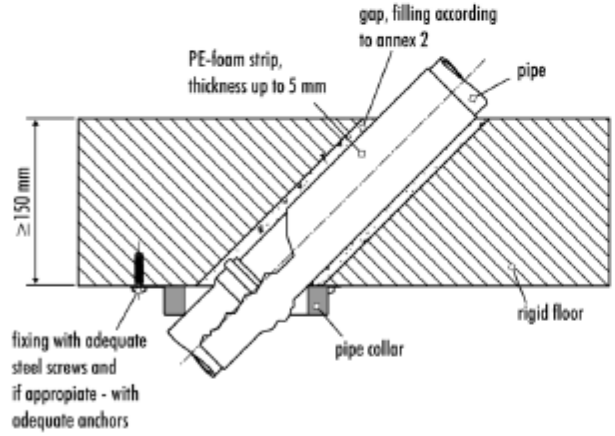
Installation on inclined pipe



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120[1)]
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120

[1)] only allowed in floors ≥200 mm

Installation on inclined pipe over pipe socket



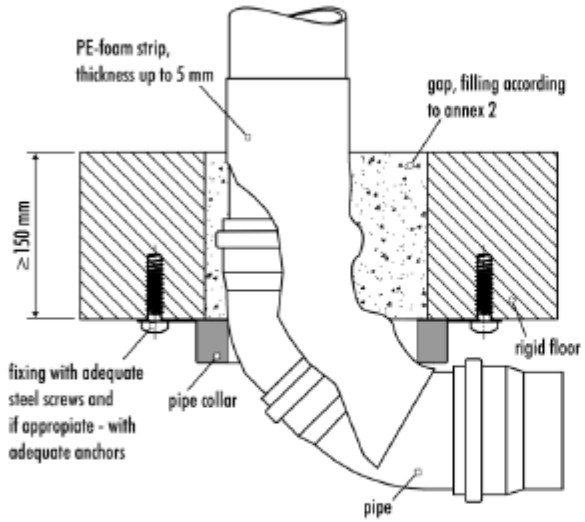
Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: Rehau Raupiano light and Conel Drain Installation in: Floor (II)	ANNEX 18

REHAU RAUPIANO LIGHT and CONEL DRAIN

Installation on inclined pipe over pipe socket



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120[1)]
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	1,8	EI 120
75	1,9	EI 120
90	2,2	EI 120
110	2,7	EI 120

[1)] only allowed in floors ≥200 mm

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

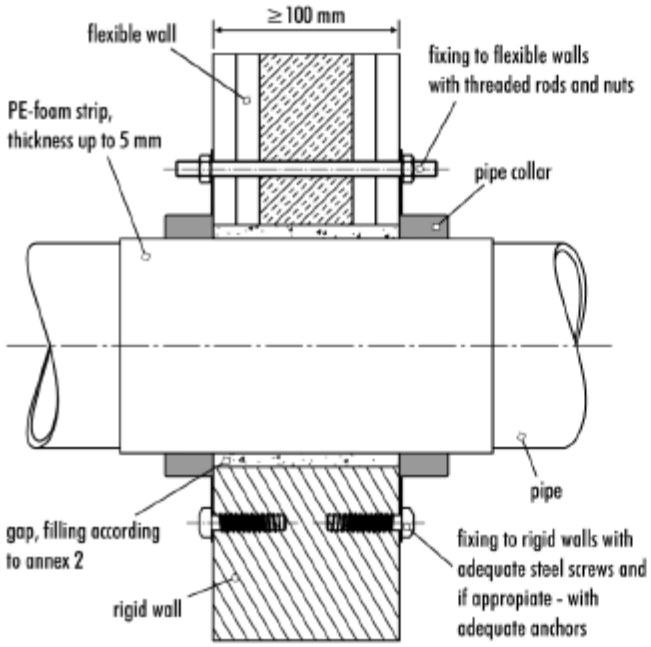
Pipes: Rehau Raupiano light and Conel Drain

Installation in: Floor (III)

ANNEX 19

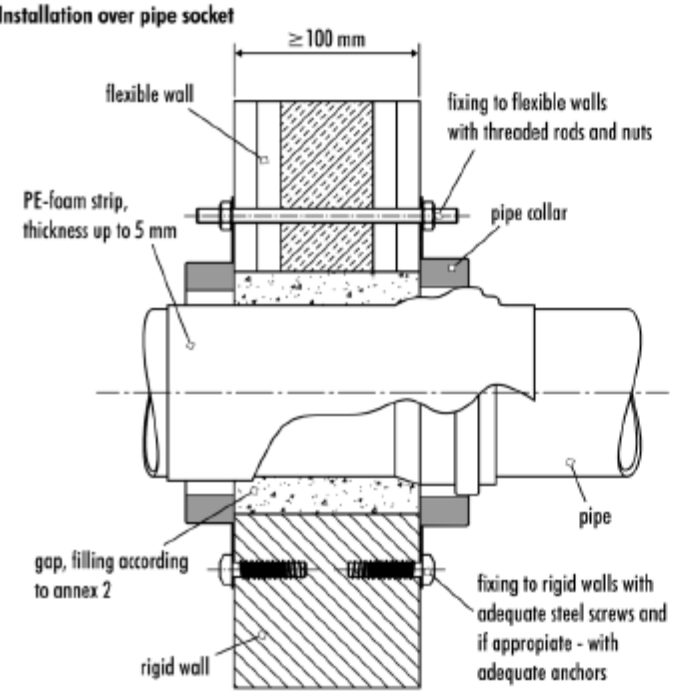
POLO-KAL 3S

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
75	3,8	EI 120
90	4,5	EI 120
110	4,8	EI 120
160	7,5	EI 90
Pipe	**Pipe wall thickness**	**Class …-U/C**
75	3,8	EI 120
90	4,5	EI 120
110	4,8	EI 120
160	7,5	EI 90

Installation over pipe socket



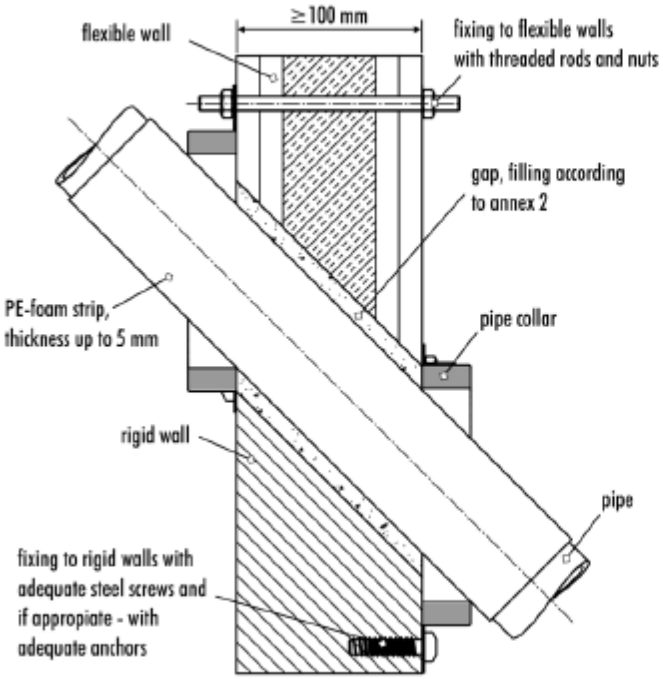
Pipe	Pipe wall thickness	Class …-U/C
160	7,5	EI 90

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: POLO-KAL 3S Installation in: Wall (I)	ANNEX 20

POLO-KAL 3S

Installation on inclined pipe



Pipe	Pipe wall thickness	Class ...-U/C
160	7,5	EI 90[1)]

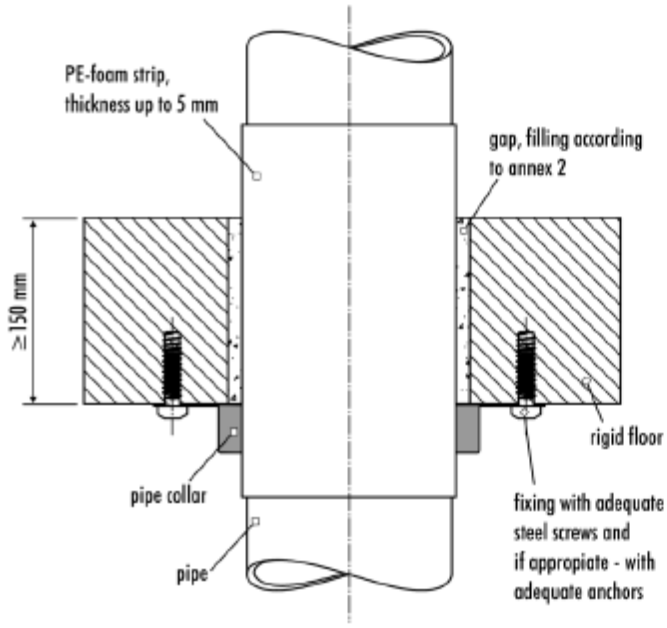
[1)] only allowed in walls ≥125 mm

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: POLO-KAL 3S Installation in: Wall (II)	ANNEX 21

POLO-KAL 3S

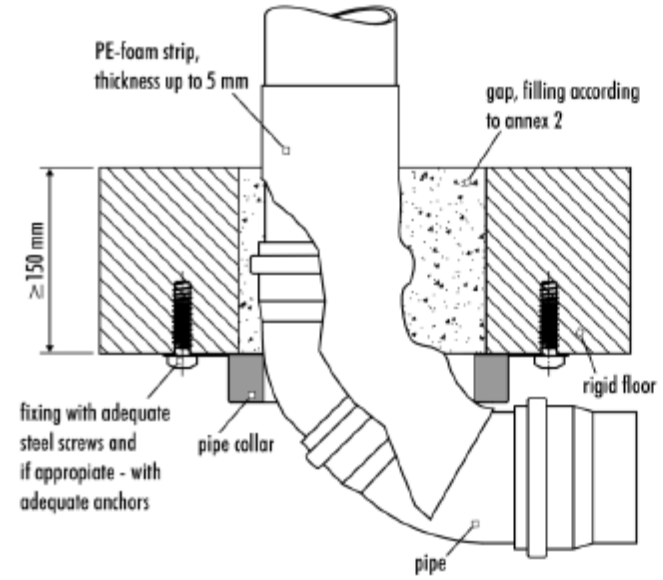
Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class ...-U/U
110	4,8	EI 90[1)]
125	5,3	EI 90[1)]
160	7,5	EI 90
Pipe	**Pipe wall thickness**	**Class ...-U/C**
110	4,8	EI 120
125	5,3	EI 120[1)]
160	7,5	EI 120

[1)] only allowed with PE-foam strip with thickness up to 3 mm

Installation on inclined pipe over pipe socket



Pipe	Pipe wall thickness	Class ...-U/U
75	3,8	EI 90
110	4,8	EI 90
Pipe	**Pipe wall thickness**	**Class ...-U/C**
75	3,8	EI 90
110	4,8	EI 90

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

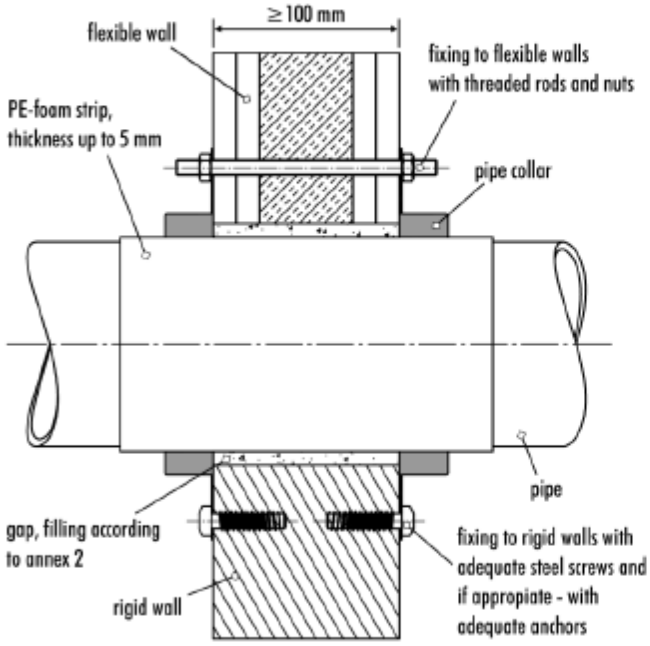
Pipes: POLO-KAL 3S

Installation in: Floor (I)

ANNEX 22

POLO-KAL NG

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
32	1,8	EI 120
Pipe	**Pipe wall thickness**	**Class …-U/C**
32	1,8	EI 90
110	3,4	EI 90
250	8,6	EI 90[1)]

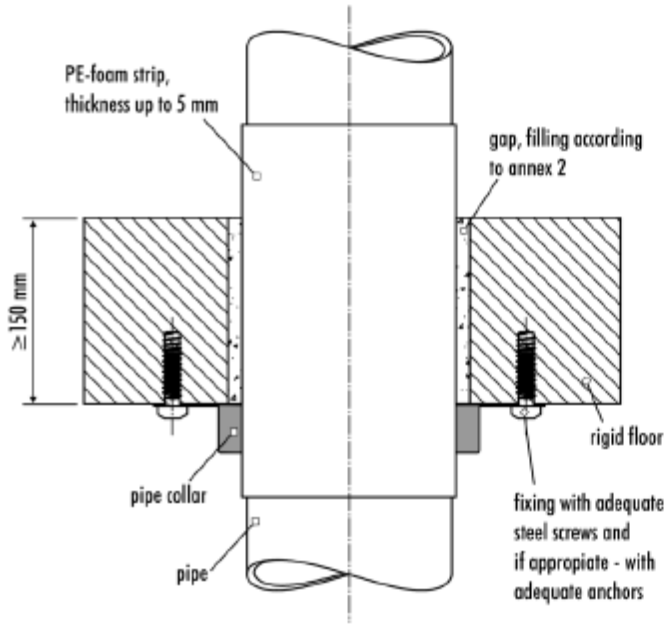
[1)] only allowed in rigid walls

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: POLO-KAL NG Installation in: Wall	ANNEX 23

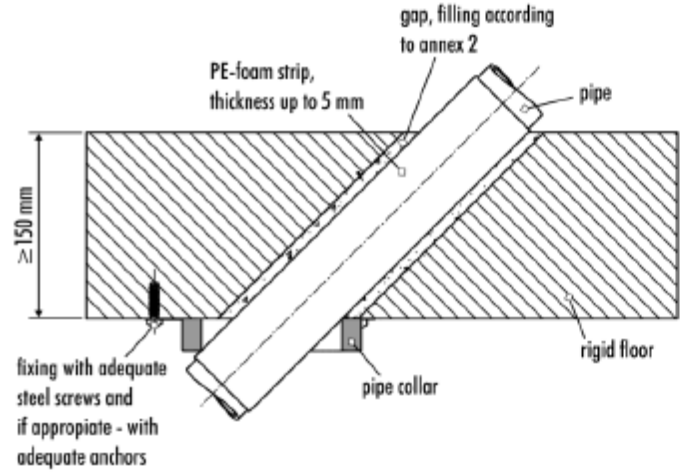
POLO-KAL NG

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class …-U/U
32	1,8	EI 90
110	3,4	EI 90
125	3,9	EI 90
Pipe	**Pipe wall thickness**	**Class …-U/C**
32	1,8	EI 90
110	3,4	EI 90
125	3,9	EI 90
250	8,6	EI 90

Installation on inclined pipe



Pipe	Pipe wall thickness	Class …-U/C
160	4,9	EI 90

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

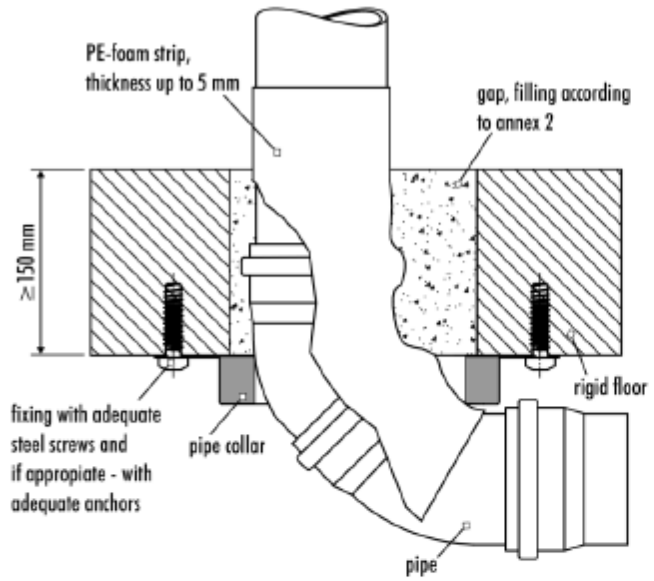
Pipes: POLO-KAL NG

Installation in: Floor (I)

ANNEX 24

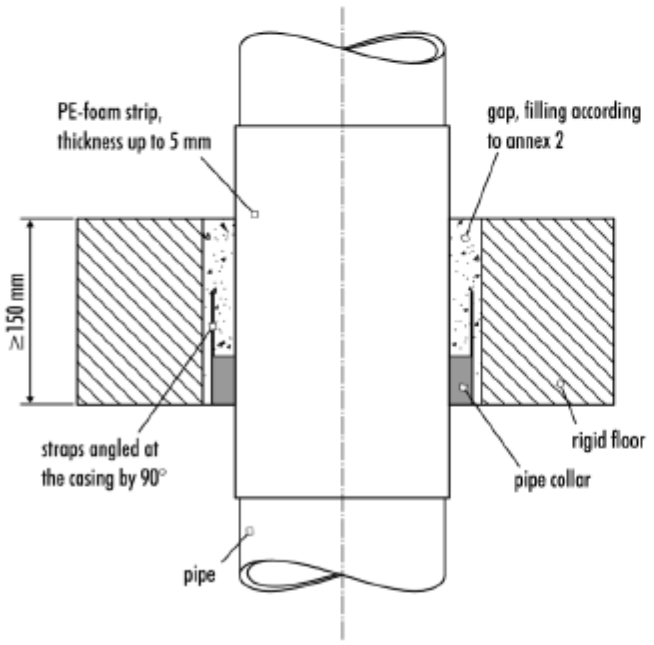
POLO-KAL NG

Installation on inclined pipe over pipe socket



Pipe	Pipe wall thickness	Class …-U/U
75	2,6	EI 90
110	3,4	EI 90
Pipe	**Pipe wall thickness**	**Class …-U/C**
75	2,6	EI 90
110	3,4	EI 90

Installation with mortared pipe collars



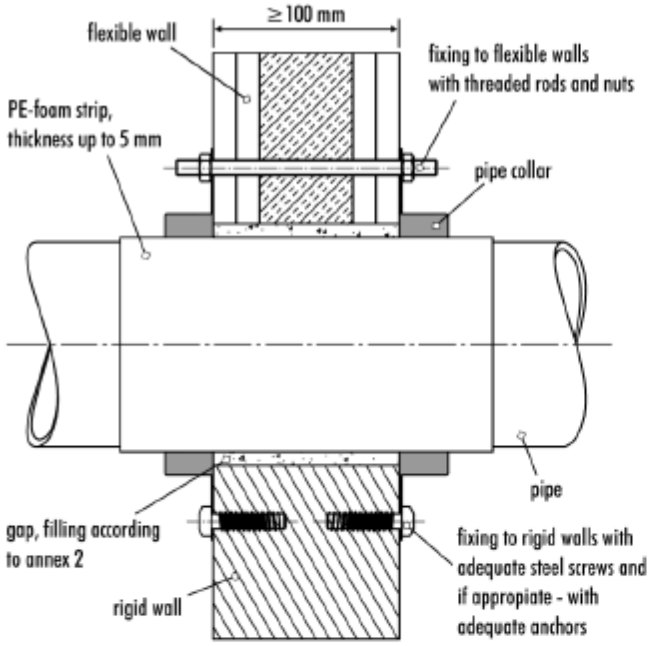
Pipe	Pipe wall thickness	Class …-U/C
125	3,9	EI 90

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"	
FIELD OF APPLICATION Pipes: POLO-KAL NG Installation in: Floor (II)	ANNEX 25

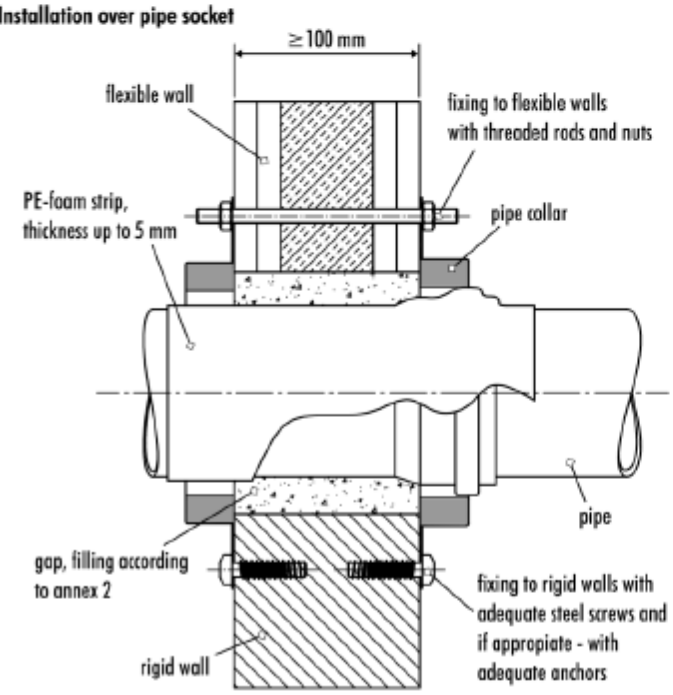
POLO-KAL XS

Installation on pipes perpendicular to the surface



Pipe	Pipe wall thickness	Class ...-U/U
110	3,4	EI 120

Installation over pipe socket



Pipe	Pipe wall thickness	Class ...-U/C
90	3,0	EI 120

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

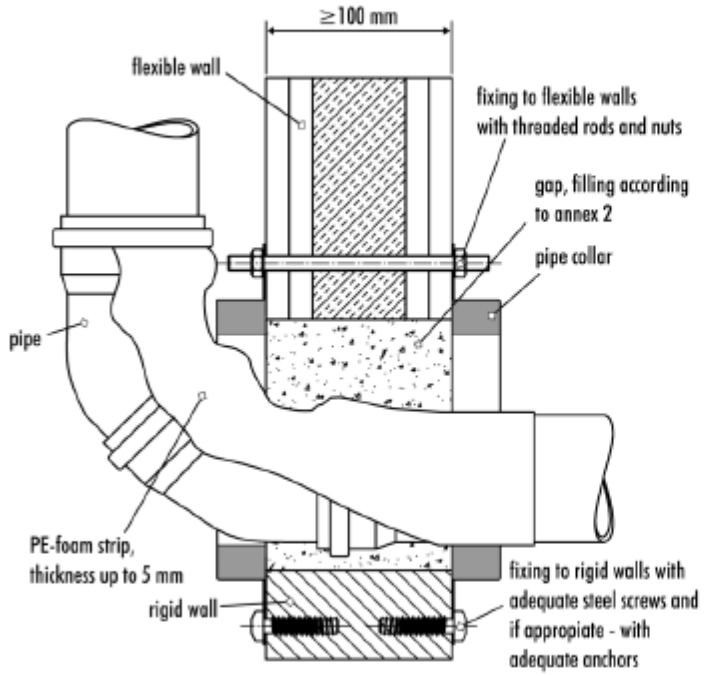
Pipes: POLO-KAL XS

Installation in: Wall (I)

ANNEX 26

POLO-KAL XS

Installation on 2x45°-Situation



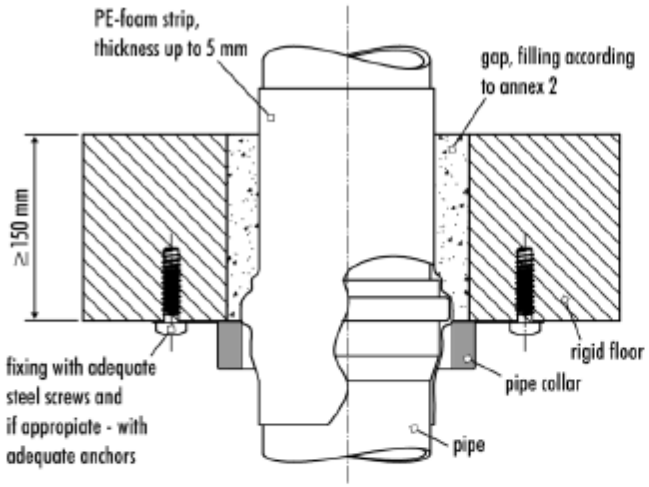
Pipe	Pipe wall thickness	Class …-U/C
75	2,6	EI 120
110	3,4	EI 120

Dimensions in mm

Penetration Seal “System FS-M R1”, “System SKM”, System SKC”	
FIELD OF APPLICATION Pipes: POLO-KAL XS Installation in: Wall (II)	ANNEX 27

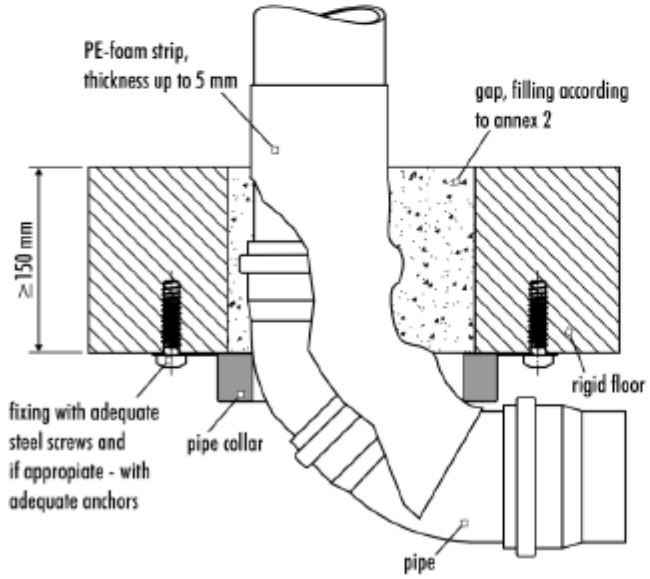
POLO-KAL XS

Installation over pipe socket



Pipe	Pipe wall thickness	Class …-U/U
40	1,8	EI 120
110	3,4	EI 120
Pipe	**Pipe wall thickness**	**Class …-U/C**
40	1,8	EI 120
50	2,0	EI 120
75	2,6	EI 120
90	3,0	EI 120
110	3,4	EI 120

Installation on inclined pipe over pipe socket



Pipe	Pipe wall thickness	Class …-U/C
75	2,6	EI 120
110	3,4	EI 120

Dimensions in mm

Penetration Seal "System FS-M R1", "System SKM", System SKC"

FIELD OF APPLICATION

Pipes: POLO-KAL XS

Installation in: Floor (I)

ANNEX 28

Openings (in the building elements)
The pipe collars may be used to close openings, if the size of the opening allows the collar to be fixed to the building element.

The pipe collars may be used to close openings, if the distance between the opening to be sealed off and other openings or components is at least 200 mm.

Services (Installations)
The pipe penetration seal may be used on pipes which are fixed perpendicular or, where applicable, oblique to the wall or floor surface (see Annexes 7 to 28). The pipes shall consist of the pipe materials listed in Annexes 7 to 28 (depending on the fire resistance class required) and shall have dimensions according to Annexes 7 to 28 (depending on the installation conditions and the fire resistance class required).

Where applicable, the pipes may be insulated with an expanded closed cell polyethylene strip of up to 5 mm thickness with a reaction to fire class E according to EN 13501-1 (see Annexes 7 to 28). Where applicable, the pipes may have sockets in the area of the penetration (see Annexes 12 to 28).

For wall applications, the first support of the pipes shall be at a distance of ~ 500 mm on both sides of the wall. The supports shall be non-combustible in their essential parts.

The pipes, for which the collars according to this ETA may be used, shall have a distance of at least 100 mm between each other.

Penetration Seal “System FS-M R1”, “System SKM”, System SKC”	ANNEX 29
FIELD OF APPLICATION	