



Zulassung

ISITHERM Rohrmanschette BBR II  
ISITHERM Leitungsbandage BBR II  
ETA- 17/0866





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## European Technical Assessment

**ETA-17/0866  
of 13/10/2017**

### General Part

**Technical Assessment Body issuing the European Technical Assessment**

Instytut Techniki Budowlanej

**Trade name of the construction product**

ISITHERM-Rohrmanschette BBR II  
ISITHERM-Leitungsbandage BBR II

**Product family to which the construction product belongs**

Fire Stopping and Fire Sealing Products.  
Penetration Seals

**Manufacturer**

HBT Hochbau-Brandschutz-Technik GmbH  
Neue Bahnhofstraße 46  
34621 Frielendorf  
Germany

**Manufacturing plant**

Plant no. 1

**This European Technical Assessment contains**

48 pages including 3 Annexes which form an integral part of this Assessment

**This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of**

Guideline for European Technical Approval "Fire Stopping and Fire Sealing Products – Part 2: Penetration Seals" ETAG 026-2, edition August 2011, used as European Assessment Document (EAD)

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## Specific Part

### 1 Technical description of the product

ISITHERM-Rohrmanschette BBR II is a collar pipe closure device used to form penetration seals where combustible pipes penetrate walls and floors.

ISITHERM-Rohrmanschette BBR II includes one or more layers of an intumescent, graphite based liner with a nominal thickness of 2,5 mm and width 30 or 60 mm, inserted into a steel case.

The housing of the collar can be made of galvanized steel sheet with a thickness of 0,7 mm or stainless steel sheet with a thickness of 0,5 mm. The housing is equipped with a buckle (used to fasten the collar and stabilize it on the service) and with fixing brackets, through which the collar is fixed to the separating element. The number of brackets depends on the size of the collar.

The collar is supplied in assembled form, without fasteners. If necessary, the intumescent liner may be cut to a required length, equal or greater than external circumference of the pipe. The collar is wrapped around the service, closed and then fixed to the separating element with the specified type and number of fasteners.

Types of ISITHERM-Rohrmanschette BBR II, type of fasteners and required number of fixing brackets are presented in Annex A.

ISITHERM-Leitungsbandage BBR II is an intumescent wrap pipe closure device used to form penetration seals where combustible pipes penetrate walls and floors.

The ISITHERM-Leitungsbandage BBR II is supplied in roll form in 60 mm width and 2,5 mm thick. The length of rolls is 30 m. The wrap shall be wrapped around the pipe and may be cut to a required length, if necessary and then pushed into the aperture in the separating element.

The description of the installation procedure of ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II is given in Annex A.

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

#### 2.1 Intended use

The intended use of ISITHERM-Rohrmanschette BBR II is to reinstate the fire resistance performance of flexible wall, rigid wall or rigid floor constructions where they are penetrated by combustible pipes.

The specific elements of construction that the ISITHERM-Rohrmanschette BBR II may be used to provide a penetration seal in, are as follows:

Rigid walls: The wall must have a minimum thickness of 100 mm and comprise concrete, reinforced concrete, aerated concrete, ceramic brick, cavity brick or checker brick, with a minimum density of 600 kg/m<sup>3</sup>.

**Flexible walls:** The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with at least two layers (with overall board layer thickness equal to or greater than 25 mm) of 'Type F' or 'Type DF' gypsum plasterboards according to EN 520. In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seal and the stud and minimum 100 mm of insulation of reaction to fire class A1 or A2, according to EN 13501-1, is provided within the cavity between the penetration seal and the stud.

**Rigid floors:** The floor must have a minimum thickness of 150 mm and comprise aerated concrete, concrete or reinforced concrete with a minimum density of 600 kg/m<sup>3</sup>.

The intended use of ISITHERM-Leitungsbandage BBR II is to reinstate the fire resistance performance of rigid wall or rigid floor constructions where they are penetrated by combustible pipes.

The specific elements of construction that the ISITHERM-Leitungsbandage BBR II may be used to provide a penetration seal in, are as follows:

**Rigid walls:** The wall must have a minimum thickness of 100 mm and comprise concrete, reinforced concrete, aerated concrete, ceramic brick, cavity brick or checker brick, with a minimum density of 600 kg/m<sup>3</sup>.

**Rigid floors:** The floor must have a minimum thickness of 150 mm and comprise aerated concrete, concrete or reinforced concrete with a minimum density of 600 kg/m<sup>3</sup>.

The supporting construction shall be classified in accordance with EN 13501-2 for the required fire resistance period (equal or greater than specified in Annex C).

ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II may be used to provide a penetration seal with specific combustible pipes (according to Annex C).

Pipes shall be supported at maximum 200 mm away from both faces of the wall constructions and from the upper face of floor constructions.

The performances given in this European Technical Assessment are based on an assumed working life of the ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II of 10 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 2.2 Use category

Type Z<sub>1</sub>: intended for use in internal conditions with humidity equal to or higher than 85% RH, excluding temperatures below 0°C, without exposure to rain or UV.

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

#### 3.1 Performance of the product

##### 3.1.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class E
Resistance to fire	Annex C

##### 3.1.2 Hygiene, health and the environment (BWR 3)

The applicant has submitted a written declaration that the products and/or constituents of the products contains no substances which have been classified as dangerous according to EOTA TR 034.

Regarding the dangerous substances, there may be 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.

##### 3.1.3 Safety and accessibility in use (BWR 4)

No performance assessed.

##### 3.1.4 Protection against noise (BWR 5)

No performance assessed.

##### 3.1.5 Energy economy and heat retention (BWR 6)

No performance assessed.

##### 3.1.6 General aspects relating to fitness for use

Essential characteristic	Performance
Durability and serviceability	Use category: Type Z <sub>1</sub>

##### 3.1.7 Sustainable use of natural resources (BWR 7)

No performance assessed.

### **3.2 Methods used for the assessment**

The assessment of fitness of the collar and wrap for the declared intended use in relation to the requirements for safety in case of fire and general aspects relating to fitness for use has been made in accordance with the ETAG 026-2 "Fire Stopping and Fire Sealing Products – Part 2: Penetration Seals", edition August 2011.

### **4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

According to Decision 99/454/EC of the European Commission, as amended by Decision 2001/596/EC of the European Commission the system 1 of assessment and verification of constancy of performance applies (see Annex V to Regulation (EU) No 305/2011).

### **5 Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 13/10/2017 by Instytut Techniki Budowlanej



Krzysztof Kuczyński, PhD  
Deputy Director of ITB

**Additional provisions**

- The ISITHERM-Rohrmanschette BBR II shall be either fixed on both sides of the wall or fixed at the bottom of the floor (for details see Annex C).
- The ISITHERM-Leitungsbandage BBR II shall be placed in the separating element: in the centre of the wall thickness or on the bottom of the floor (single wrap) or symmetrically on both sides of the axis of the wall (two wraps) (for details see Annex C).
- The minimum distance between the penetration seals in supporting construction shall be 100 mm.
- The ISITHERM-Rohrmanschette BBR II shall be fixed to the wall or the floor by steel fasteners (M6x90 mm in case of walls and M6x60 mm in case of floors). Minimal number of fixing brackets and type of fastener is given in Table A.1. Types of ISITHERM-Rohrmanschette BBR II (different housings) are presented in Annex B.

**Table A.1**

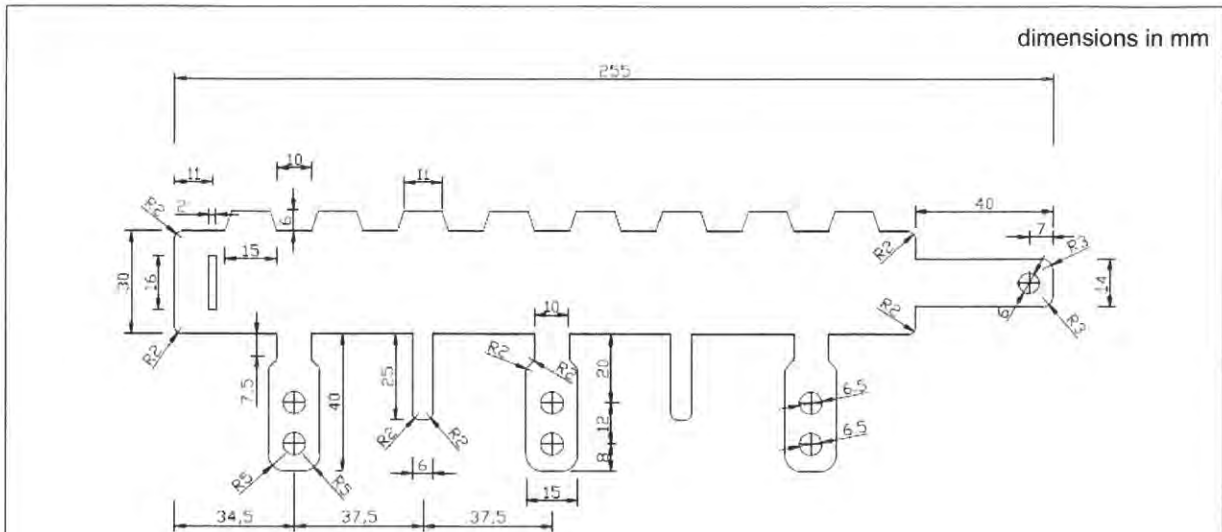
Separating Element / Type of fastener	ISITHERM-Rohrmanschette BBR II type acc. to Annex B <sup>1)</sup>	Minimal number of fixing brackets
Wall / M6x90	DN50 / DN63	3
	DN75 / DN125	4
	DN90 / DN200	5
	DN110 / DN225 / DN250	6
	DN160	8
Floor / M6x60	DN50 / DN63	3
	DN75 / DN125	4
	DN90 / DN200	5
	DN110 / DN225 / DN250	6
	DN160	8

<sup>1)</sup> the number in collar type indicates maximum outer diameter of pipe or pipe bundle in millimeters

- Classifications given in Annex C are valid for specific pipes made of:
  - PVC-U according to EN 1329-1, EN 1453-1 or EN 1452-1,
  - PVC-C according to EN 1566-1,
  - PE-HD according to EN 1519-1 or EN 12666-1,
  - PE according to EN 12201-2, EN 1519-1 and EN 12666-1,
  - ABS according to EN 1455-1,
  - SAN + PVC according to EN 1565-1 or
  - PP-R according to EN ISO 15874,  
according to tables in Annex C.
- The width of the gap around the pipe or pipe bundle should be less than or equal to 15 mm and should be filled with cement or gypsum mortar.
- Pipes are placed in angle 90° to the supporting construction, unless specified otherwise.

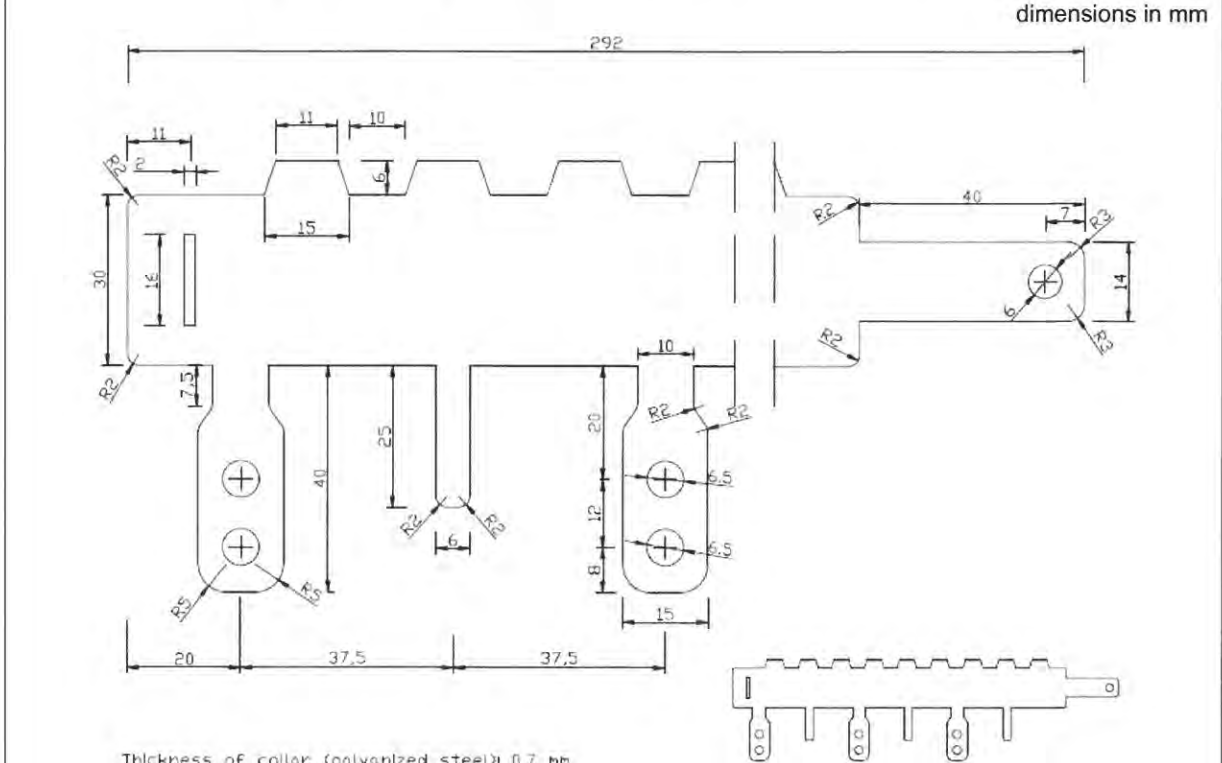
<b>ISITHERM-Rohrmanschette BBR II and ISITHERM- Leitungsbandage BBR II</b>	<b>Annex A</b>
<b>Additional provisions</b>	of European Technical Assessment ETA-17/0866





Thickness of collar (galvanized steel): 0,7 mm  
 Thickness of collar (stainless steel): 0,5 mm

**Fig. B1.** Housing of ISITHERM-Rohrmanschette BBR II DN50



Thickness of collar (galvanized steel): 0,7 mm  
 Thickness of collar (stainless steel): 0,5 mm

**Fig. B2.** Housing of ISITHERM-Rohrmanschette BBR II DN63

<p><b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b></p>	<p><b>Annex B</b></p>
<p><b>Housing types of ISITHERM-Rohrmanschette BBR II</b></p>	<p>of European Technical Assessment ETA-17/0866</p>

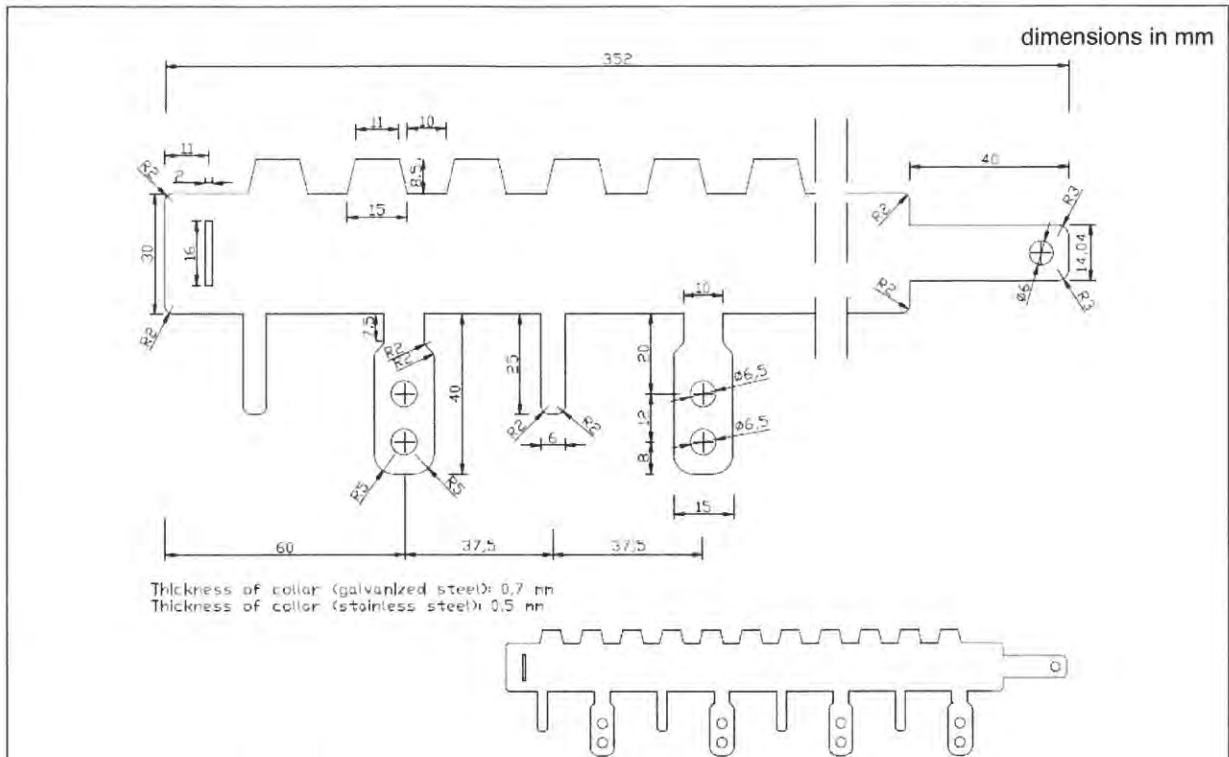


Fig. B3. Housing of ISITHERM-Rohrmanschette BBR II DN75

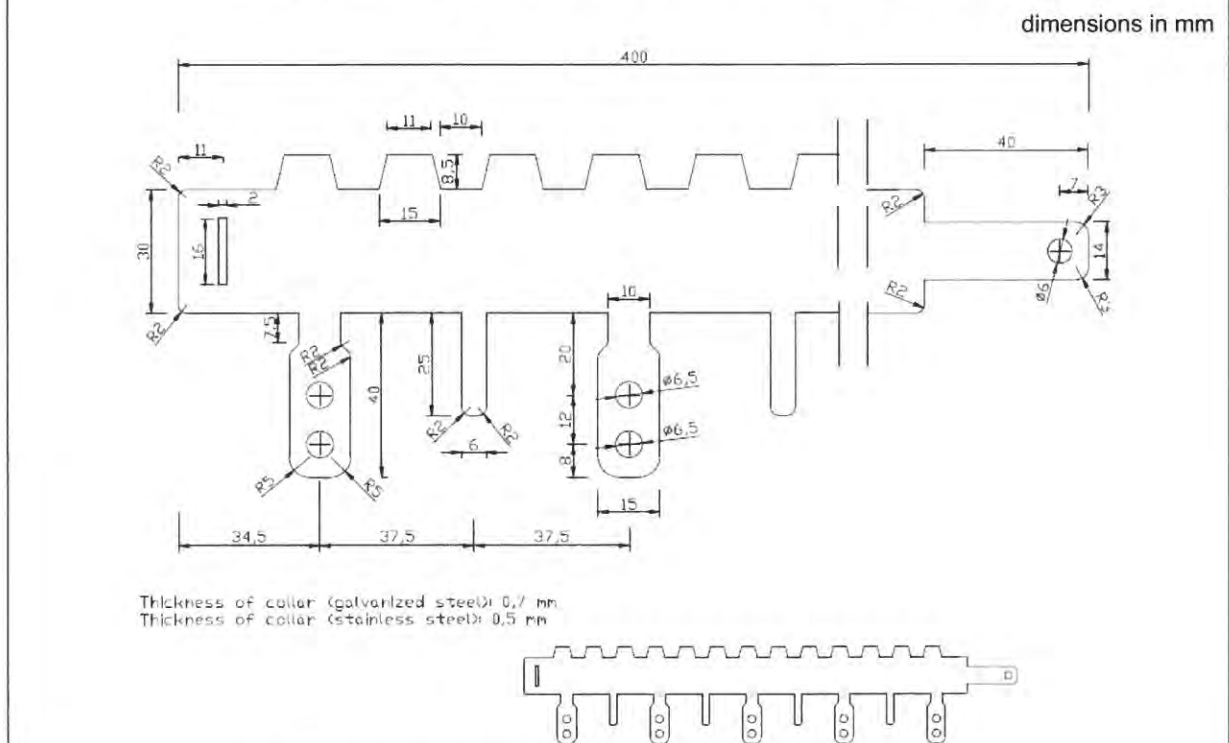
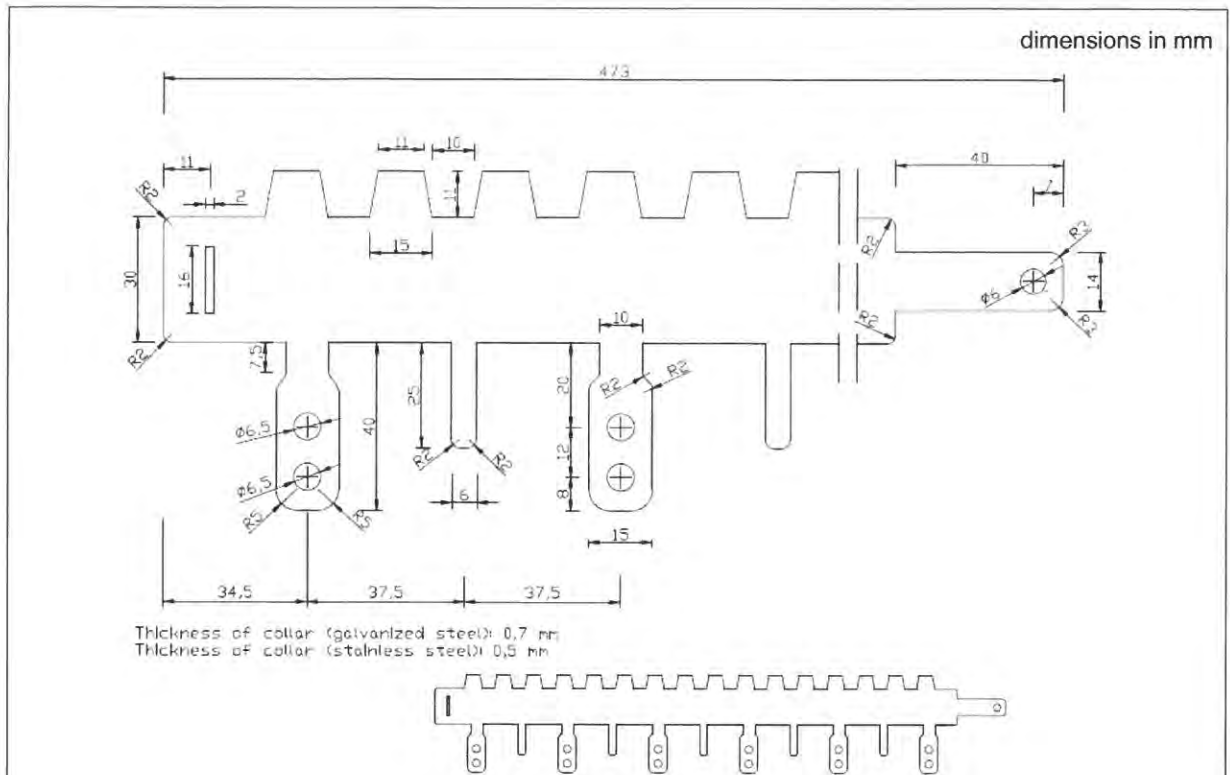
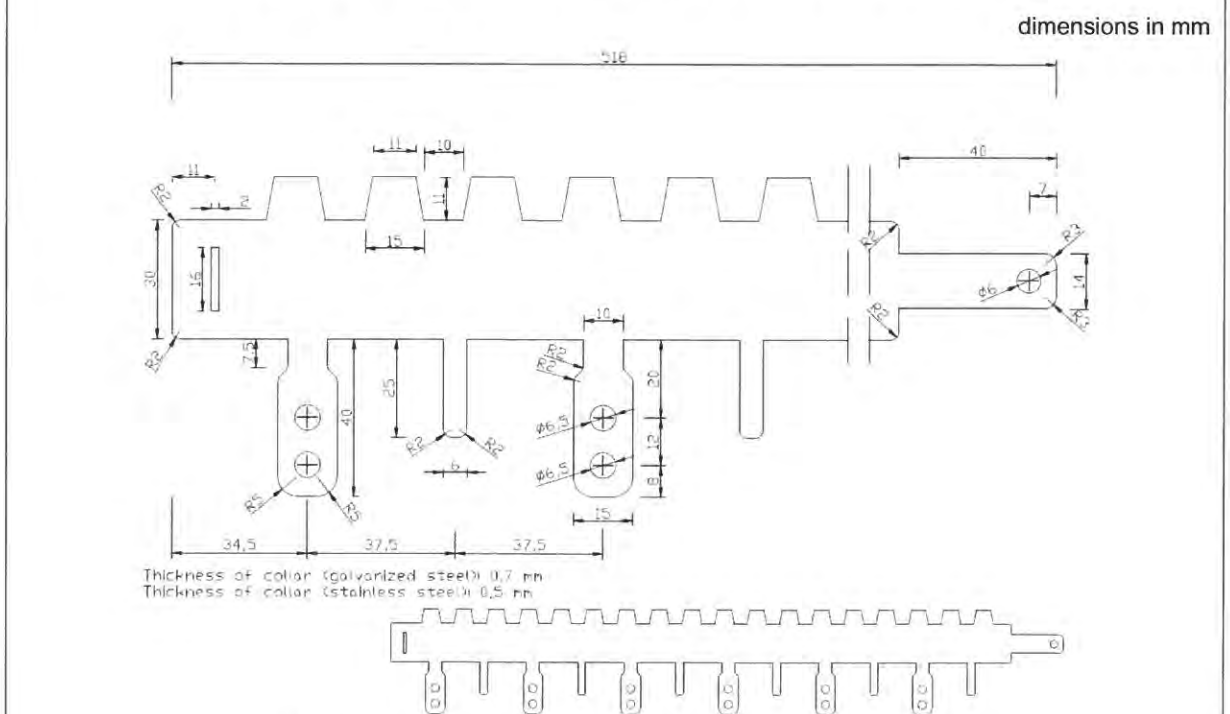


Fig. B4. Housing of ISITHERM-Rohrmanschette BBR II DN90

<p><b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b></p>	<p><b>Annex B</b></p>
<p><b>Housing types of ISITHERM-Rohrmanschette BBR II</b></p>	<p>of European Technical Assessment ETA-17/0866</p>

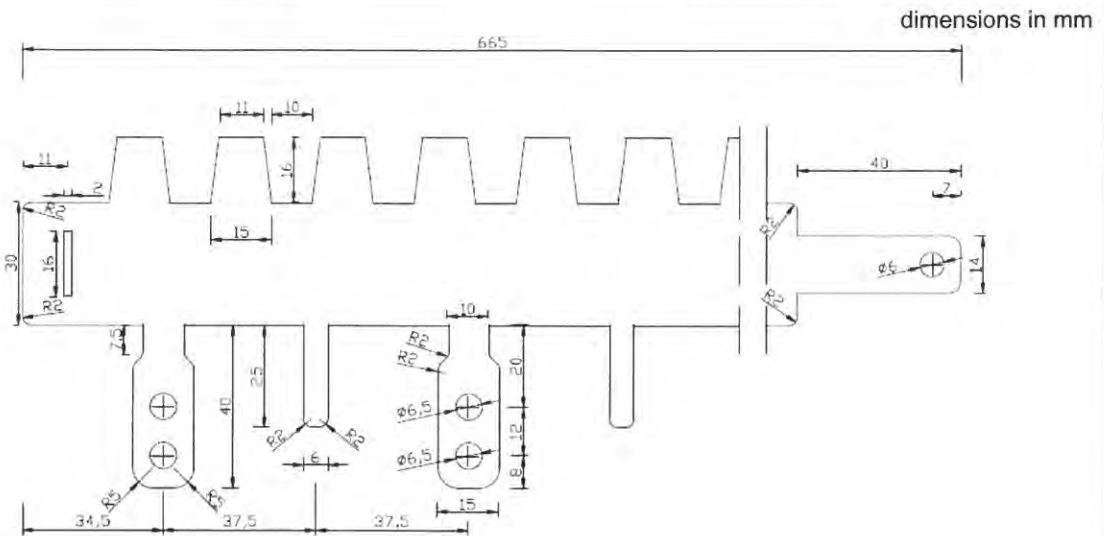


**Fig. B5.** Housing of ISITHERM-Rohrmanschette BBR II DN110



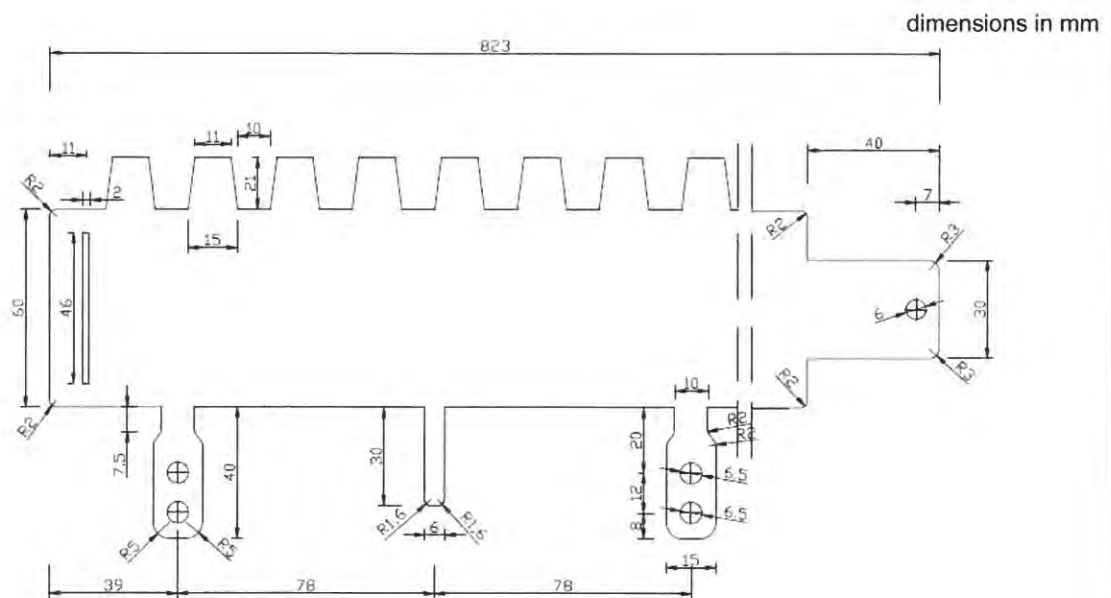
**Fig. B6.** Housing of ISITHERM-Rohrmanschette BBR II DN125

<p><b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b></p>	<p><b>Annex B</b></p>
<p><b>Housing types of ISITHERM-Rohrmanschette BBR II</b></p>	<p>of European Technical Assessment ETA-17/0866</p>



Thickness of collar (galvanized steel) 0,7 mm  
 Thickness of collar (stainless steel) 0,5 mm

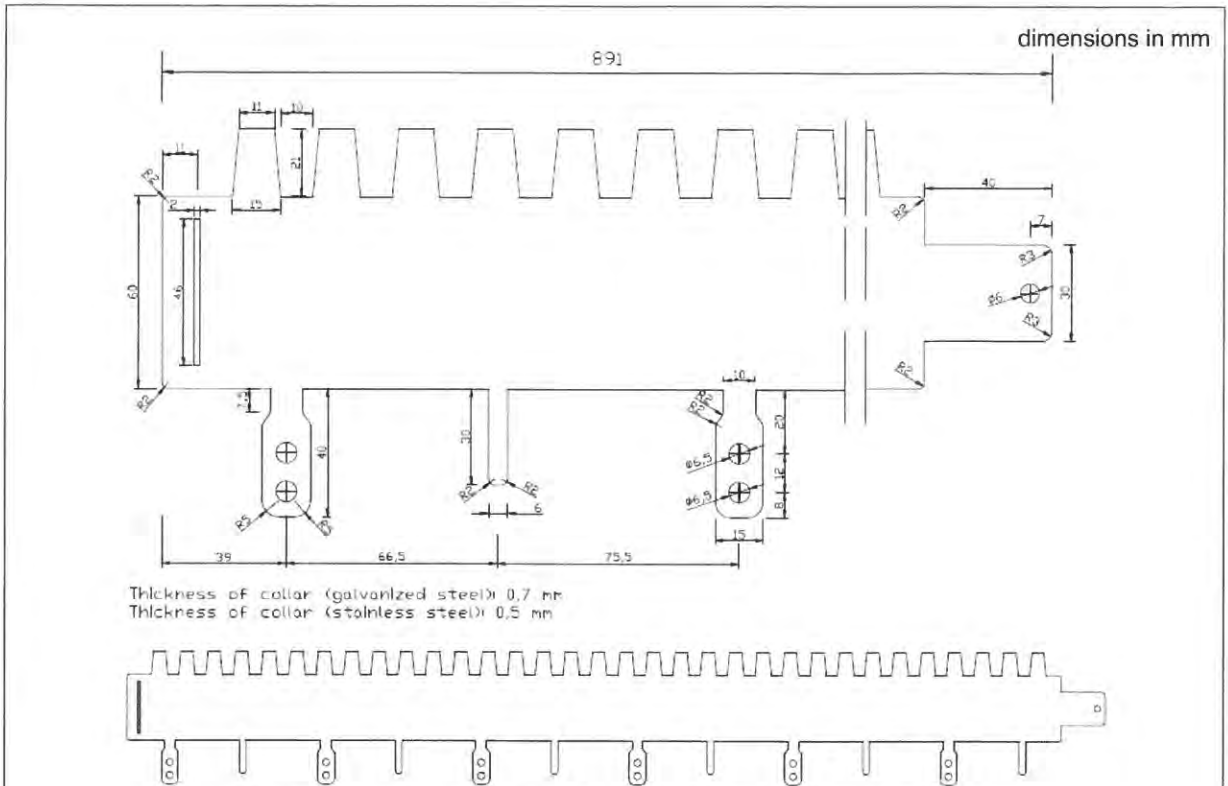
**Fig. B7.** Housing of ISITHERM-Rohrmanschette BBR II DN160



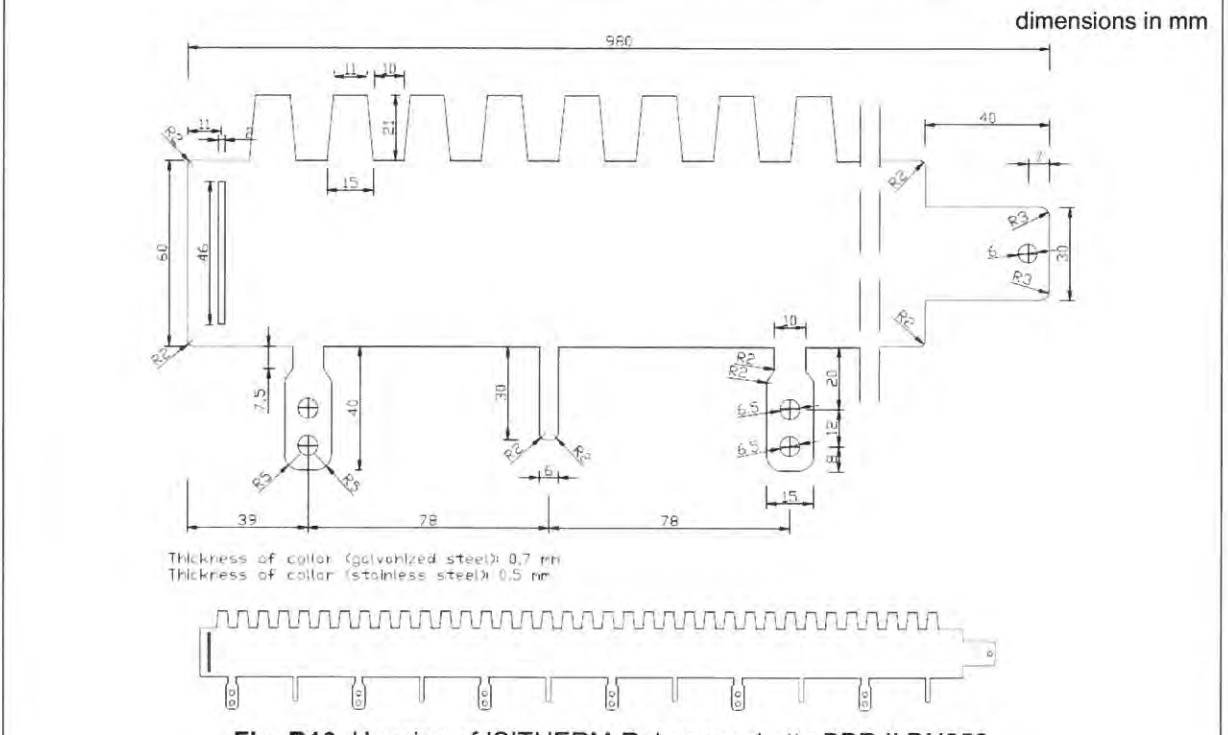
Thickness of collar (galvanized steel) 0,7 mm  
 Thickness of collar (stainless steel) 0,5 mm

**Fig. B8.** Housing of ISITHERM-Rohrmanschette BBR II DN200

<p align="center"><b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b></p>	<p align="center"><b>Annex B</b></p>
<p align="center"><b>Housing types of ISITHERM-Rohrmanschette BBR II</b></p>	<p align="center">of European Technical Assessment ETA-17/0866</p>



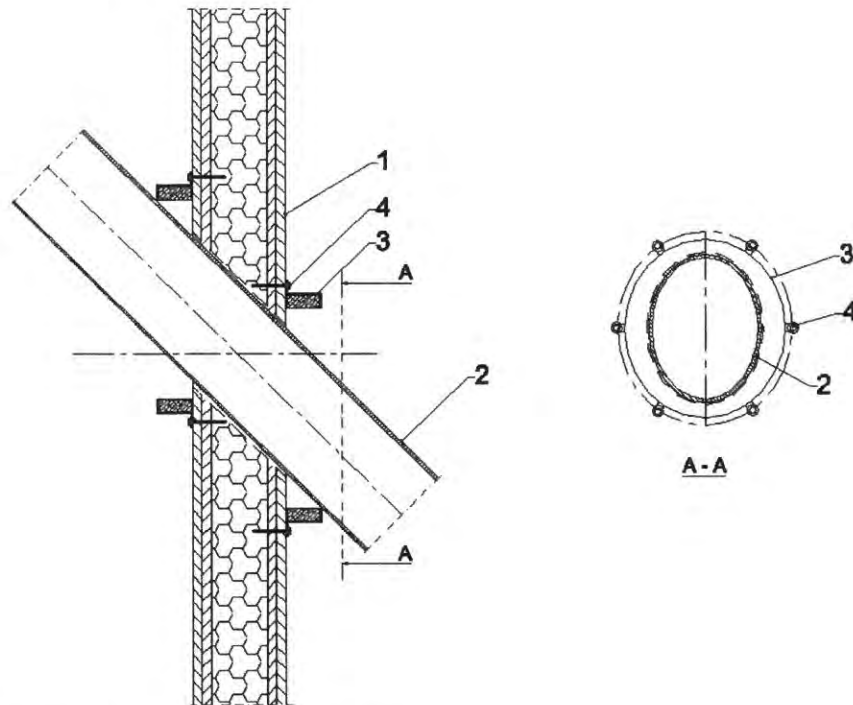
**Fig. B9.** Housing of ISITHERM-Rohrmanschette BBR II DN225



**Fig. B10.** Housing of ISITHERM-Rohrmanschette BBR II DN250

<p><b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b></p>	<p><b>Annex B</b></p>
<p><b>Housing types of ISITHERM-Rohrmanschette BBR II</b></p>	<p>of European Technical Assessment ETA-17/0866</p>

**Plastic pipe penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the wall.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

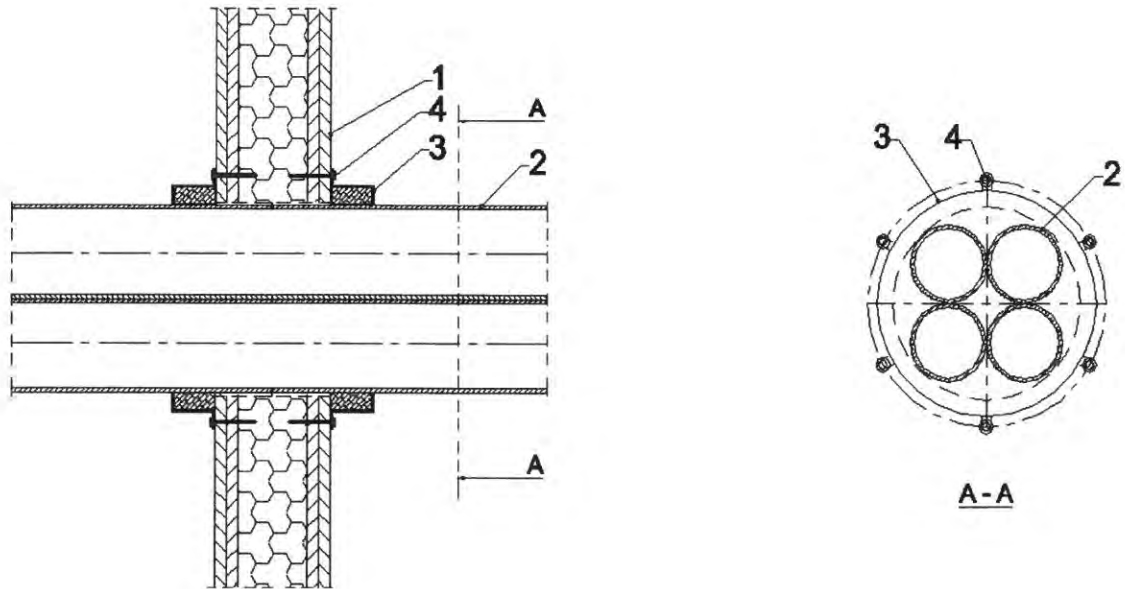
**Resistance to fire classification of plastic pipes penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the wall:**

**Table C1.1 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 32$	1,8 – 3,4	30	5,0	EI 60 – U/C EI 60 – C/C
	$32 < \varnothing \leq 51$	2,2 – 4,1	30	7,5	
	$51 < \varnothing \leq 71$	2,5 – 4,9	30	10,0	
	$71 < \varnothing \leq 90$	2,9 – 5,7	30	12,5	
	$90 < \varnothing \leq 110$	3,2 – 6,5	30	15,0	
	$110 < \varnothing \leq 135$	3,2 – 5,6	60	17,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	60	20,0	

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C1</b>  of European Technical Assessment ETA-17/0866
<b>Construction details and resistance to fire classification of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe penetration seal in flexible or rigid wall	

**Plastic pipes bundle penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe (maximum 4 pipes in bundle)
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

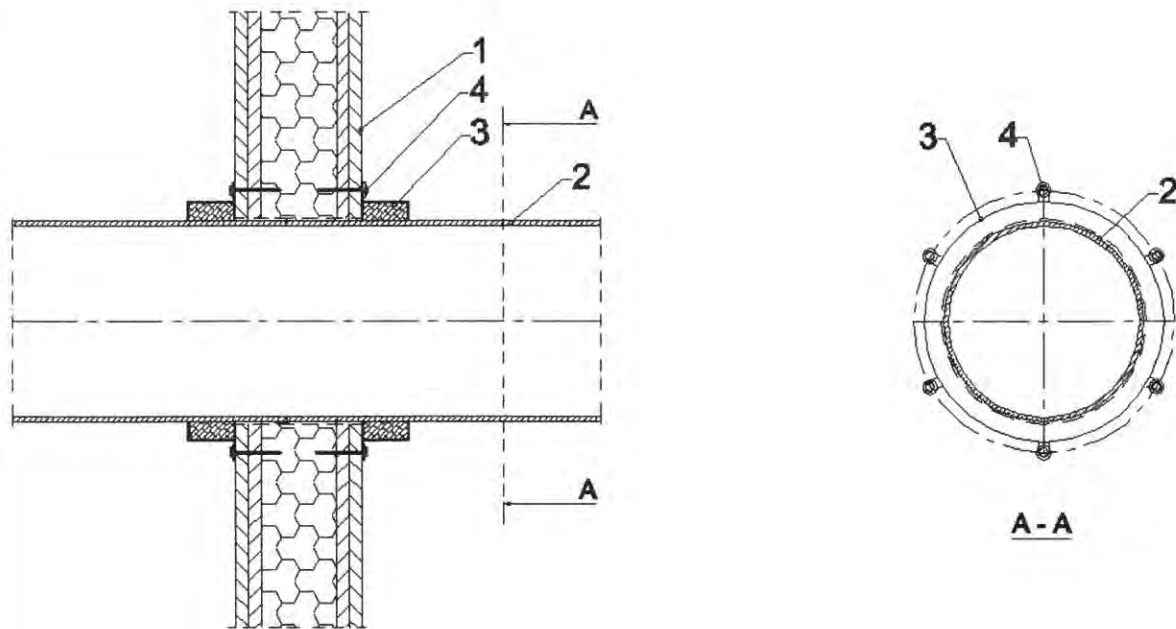
**Resistance to fire classification of plastic pipes bundle penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II:**

**Table C2.1 PP-R pipes (maximum 4 pipes in bundle)**

Pipe material	Single pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 32$	2,9 – 5,4	30	7,5	EI 60 – U/C EI 60 – C/C
	$32 < \varnothing \leq 40$	3,5 – 5,4	60	10,0	
	$40 < \varnothing \leq 49$	4,1 – 5,5	60	12,5	
	$49 < \varnothing \leq 57$	4,6 – 5,6	60	15,0	
	$57 < \varnothing \leq 66$	5,2 – 5,7	60	17,5	
	$66 < \varnothing \leq 75$	5,8	60	20,0	

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C2</b>  of European Technical Assessment ETA-17/0866
Construction details and resistance to fire classification of penetration seals made with use of <b>ISITHERM-Rohrmanschette BBR II</b> Plastic pipes bundle penetration seal in flexible or rigid wall	

**Plastic pipe penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C3</b>  of European Technical Assessment ETA-17/0866
<b>Construction details of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe penetration seal in flexible or rigid wall	



Resistance to fire classification of plastic pipes penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, in accordance with Annex C3:

Table C4.1 PE-HD pipes

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 63$	3,0 – 5,8	30	5,0	EI 60 – U/C EI 60 – C/C
	$63 < \varnothing \leq 87$	3,8 – 7,9	30	7,5	
	$87 < \varnothing \leq 111$	4,6 – 10,1	30	10,0	
	$111 < \varnothing \leq 135$	5,4 – 12,3	30	12,5	
	$135 < \varnothing \leq 160$	6,2 – 14,6	30	15,0	
	$160 < \varnothing \leq 205$	7,9 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	9,6 – 14,6	60	20,0	

Table C4.2 PP-R pipes

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 63$	5,8	30	5,0	EI 60 – U/C EI 60 – C/C
		5,9 – 7,9	30	7,5	
	$63 < \varnothing \leq 87$	5,8 – 7,9	30	7,5	
	$87 < \varnothing \leq 111$	5,8 – 10,1	30	10,0	
	$111 < \varnothing \leq 135$	5,7 – 12,3	30	12,5	
	$135 < \varnothing \leq 160$	5,6 – 14,6	30	15,0	

Table C4.3 PVC-U / PVC-C pipes

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 63$	2,0 – 5,1	30	5,0	EI 60 – U/C EI 60 – C/C
	$63 < \varnothing \leq 87$	2,3 – 5,0	30	7,5	
	$87 < \varnothing \leq 111$	2,6 – 4,9	30	10,0	
	$111 < \varnothing \leq 135$	2,9 – 4,8	30	12,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	30	15,0	
	$160 < \varnothing \leq 205$	4,7 – 8,5	60	17,5	
	$205 < \varnothing \leq 250$	6,2 – 9,6	60	20,0	

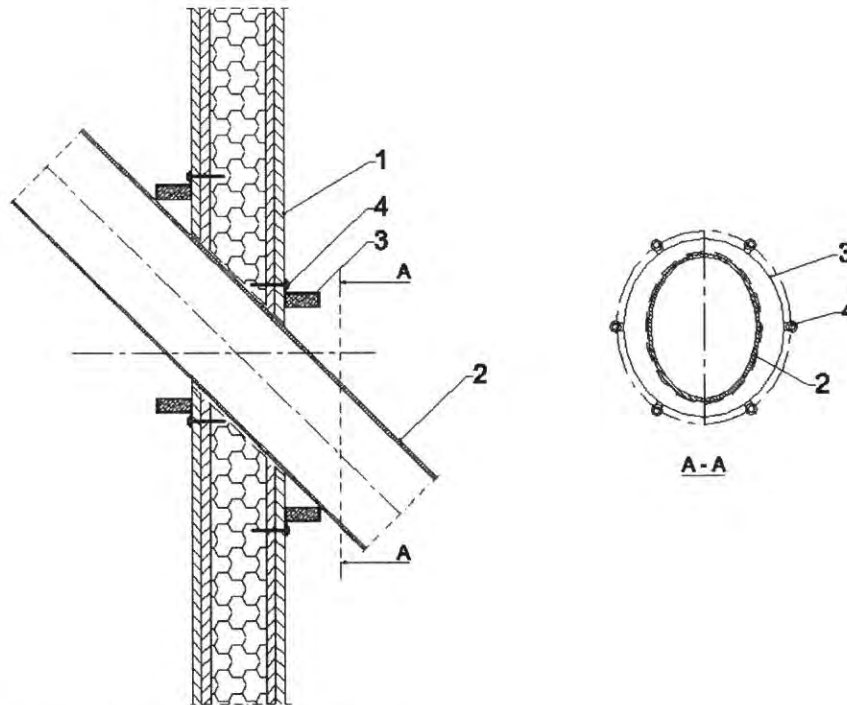
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

Resistance to fire classification of penetration seals  
made with use of ISITHERM-Rohrmanschette BBR II  
Plastic pipe penetration seal in flexible or rigid wall

**Annex C4**

of European  
Technical Assessment  
ETA-17/0866

**Plastic pipe penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the wall.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

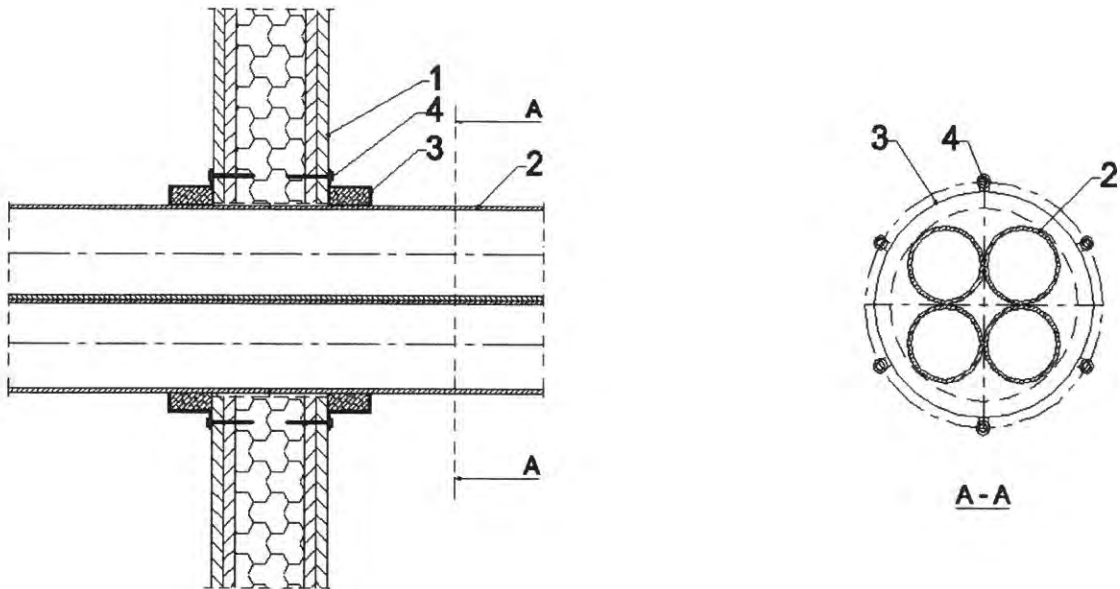
**Resistance to fire classification of plastic pipes penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the wall:**

**Table C5.1 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 32$	3,4	30	5,0	EI 90 – U/C EI 90 – C/C
	$32 < \varnothing \leq 51$	3,4 – 4,1	30	7,5	
	$51 < \varnothing \leq 71$	3,3 – 4,9	30	10,0	
	$71 < \varnothing \leq 90$	3,3 – 5,7	30	12,5	
	$90 < \varnothing \leq 110$	3,2 – 6,5	30	15,0	
	$110 < \varnothing \leq 135$	3,2 – 5,6	60	17,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	60	20,0	

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C5</b>  of European Technical Assessment ETA-17/0866
<b>Construction details and resistance to fire classification of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe penetration seal in flexible or rigid wall	

**Plastic pipes bundle penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe (maximum 4 pipes in bundle)
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

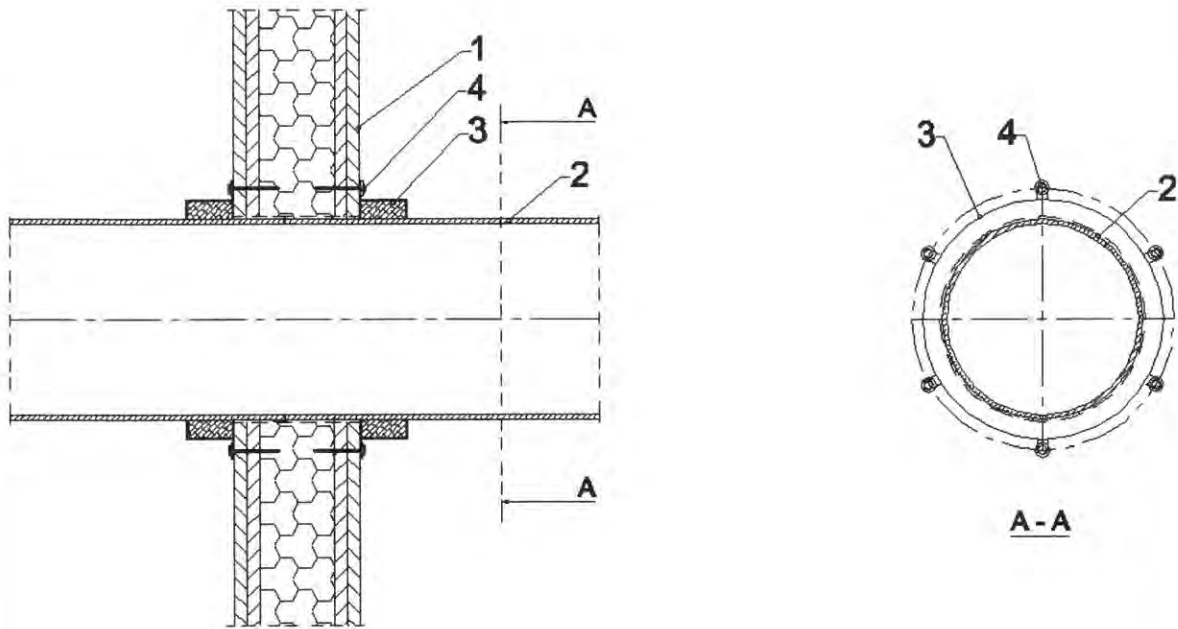
**Resistance to fire classification of plastic pipes bundle penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II:**

**Table C6.1 PP-R pipes (maximum 4 pipes in bundle)**

Pipe material	Single pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 32$	2,9 – 5,4	30	7,5	EI 90 – U/C EI 90 – C/C
	$32 < \varnothing \leq 40$	3,5 – 5,4	60	10,0	
	$40 < \varnothing \leq 49$	4,1 – 5,5	60	12,5	
	$49 < \varnothing \leq 57$	4,6 – 5,6	60	15,0	
	$57 < \varnothing \leq 66$	5,2 – 5,7	60	17,5	
	$66 < \varnothing \leq 75$	5,8	60	20,0	

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C6</b>
<b>Construction details and resistance to fire classification of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipes bundle penetration seal in flexible or rigid wall	of European Technical Assessment ETA-17/0866

**Plastic pipe penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details of penetration seals  
made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipe penetration seal in flexible or rigid wall

**Annex C7**

of European  
Technical Assessment  
ETA-17/0866

**Resistance to fire classification of plastic pipes penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, in accordance with Annex C7:**

**Table C8.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 63$	3,0 – 5,8	30	5,0	EI 90 – U/C EI 90 – C/C
	$63 < \varnothing \leq 87$	3,8 – 7,9	30	7,5	
	$87 < \varnothing \leq 111$	4,6 – 10,1	30	10,0	
	$111 < \varnothing \leq 135$	5,4 – 12,3	30	12,5	
	$135 < \varnothing \leq 160$	6,2 – 14,6	30	15,0	
	$160 < \varnothing \leq 205$	7,9 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	9,6 – 14,6	60	20,0	

**Table C8.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 63$	5,8	30	5,0	EI 90 – U/C EI 90 – C/C
		5,9 – 7,9	30	7,5	
	$63 < \varnothing \leq 87$	5,8 – 7,9	30	7,5	
	$87 < \varnothing \leq 111$	5,8 – 10,1	30	10,0	
	$111 < \varnothing \leq 135$	5,7 – 12,3	30	12,5	
	$135 < \varnothing \leq 160$	5,6 – 14,6	30	15,0	

**Table C8.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 63$	2,0 – 5,1	30	5,0	EI 90 – U/C EI 90 – C/C
	$63 < \varnothing \leq 87$	2,3 – 5,0	30	7,5	
	$87 < \varnothing \leq 111$	2,6 – 4,9	30	10,0	
	$111 < \varnothing \leq 135$	2,9 – 4,8	30	12,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	30	15,0	
	$160 < \varnothing \leq 205$	4,7 – 8,5	60	17,5	
	$205 < \varnothing \leq 250$	6,2 – 9,6	60	20,0	

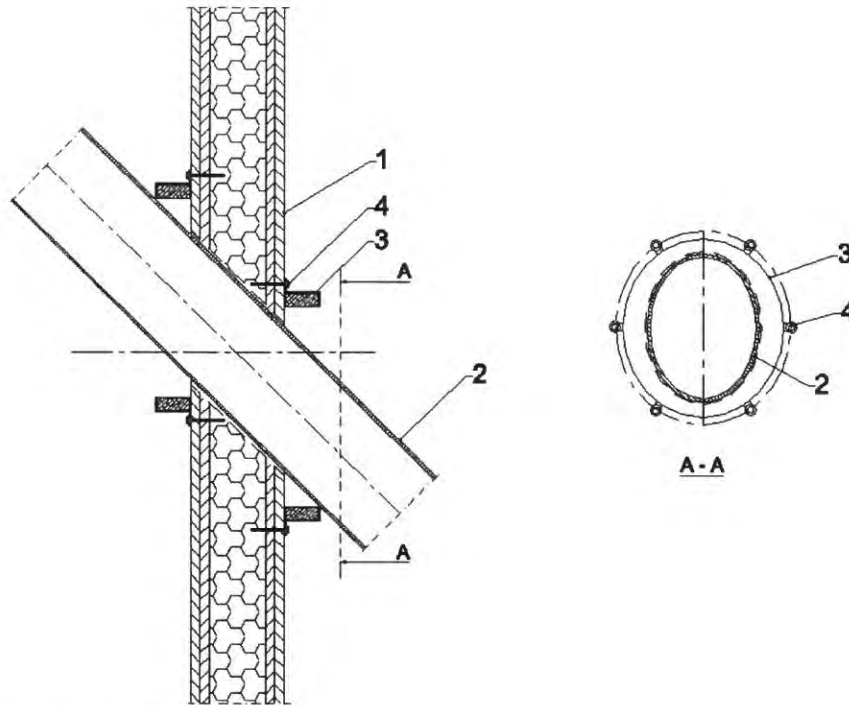
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipe penetration seal in flexible or rigid wall

**Annex C8**

of European  
Technical Assessment  
ETA-17/0866

**Plastic pipe penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the wall.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

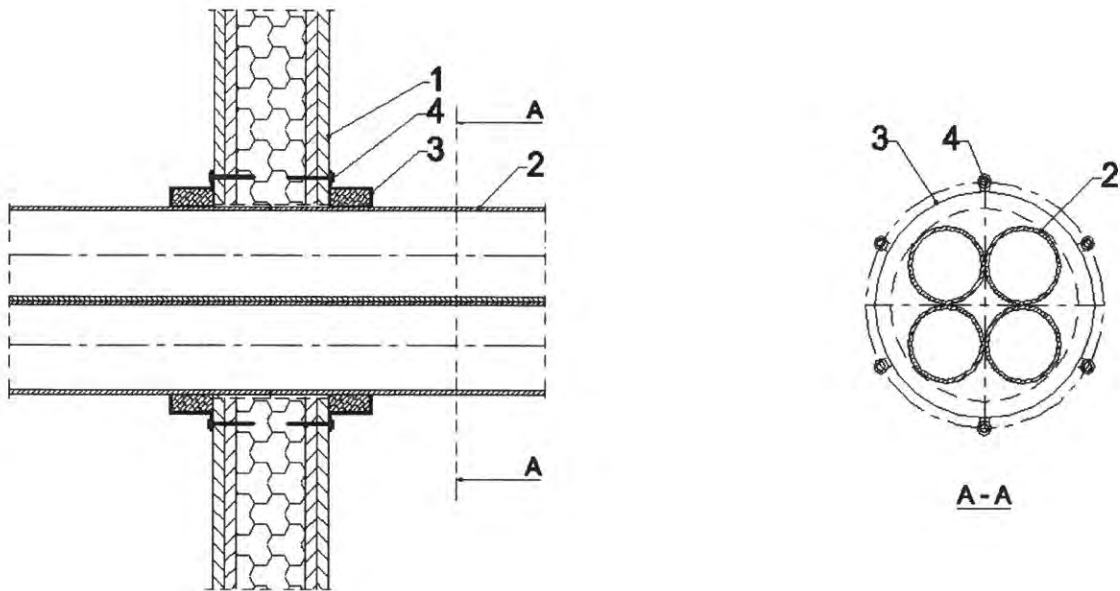
**Resistance to fire classification of plastic pipes penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the wall:**

**Table C9.1 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 32$	3,4	30	5,0	EI 120 – U/C EI 120 – C/C
	$32 < \varnothing \leq 51$	3,4 – 4,1	30	7,5	
	$51 < \varnothing \leq 71$	3,3 – 4,9	30	10,0	
	$71 < \varnothing \leq 90$	3,3 – 5,7	30	12,5	
	$90 < \varnothing \leq 110$	3,2 – 6,5	30	15,0	
	$110 < \varnothing \leq 135$	3,2 – 5,6	60	17,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	60	20,0	

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C9</b>  of European Technical Assessment ETA-17/0866
<b>Construction details and resistance to fire classification of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe penetration seal in flexible or rigid wall	

**Plastic pipes bundle penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe (maximum 4 pipes in bundle)
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

**Resistance to fire classification of plastic pipes bundle penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II:**

**Table C10.1 PP-R pipes (maximum 4 pipes in bundle)**

Pipe material	Single pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 32$	2,9 – 5,4	30	7,5	EI 120 – U/C EI 120 – C/C
	$32 < \varnothing \leq 40$	3,5 – 5,4	60	10,0	
	$40 < \varnothing \leq 49$	4,1 – 5,5	60	12,5	
	$49 < \varnothing \leq 57$	4,6 – 5,6	60	15,0	
	$57 < \varnothing \leq 66$	5,2 – 5,7	60	17,5	
	$66 < \varnothing \leq 75$	5,8	60	20,0	

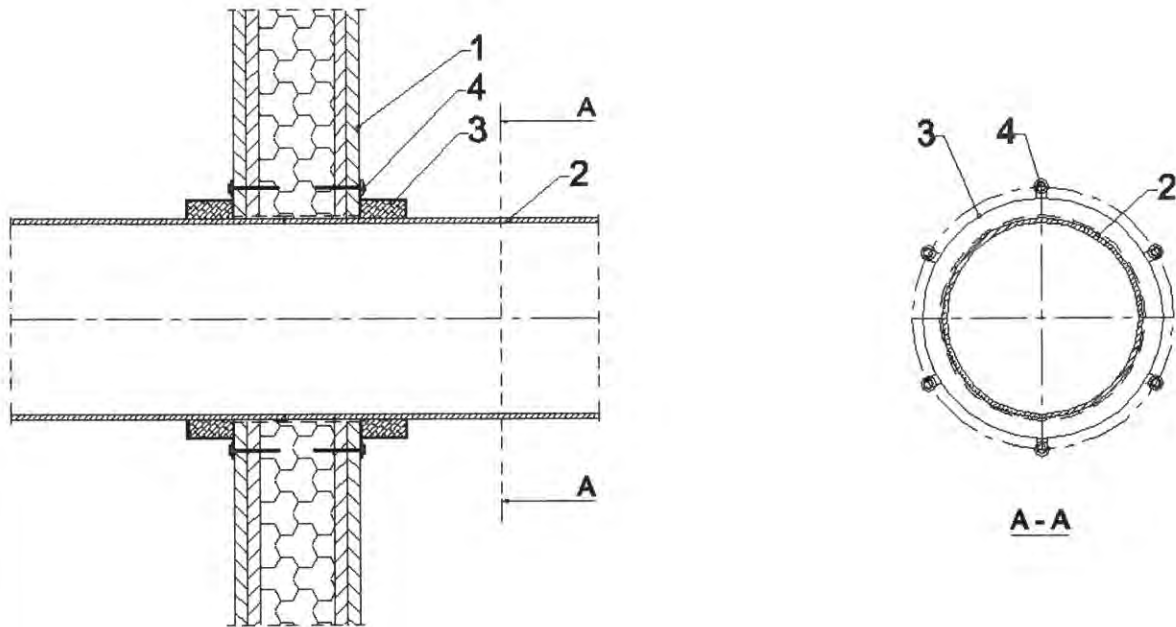
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details and resistance to fire classification of  
penetration seals made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipes bundle penetration seal in flexible or rigid wall

**Annex C10**

of European  
Technical Assessment  
ETA-17/0866

**Plastic pipe penetration seal in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Flexible or rigid wall with thickness  $\geq 100$  mm
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed on both sides of the wall
- 4 Fastener M6x90, number of fasteners in accordance with Annex A

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C11</b>  of European Technical Assessment ETA-17/0866
<b>Construction details of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe penetration seal in flexible or rigid wall	



**Resistance to fire classification of plastic pipes penetration seals in flexible or rigid wall, made with use of ISITHERM-Rohrmanschette BBR II, in accordance with Annex C11:**

**Table C12.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 63$	3,0 – 5,8	30	5,0	EI 120 – U/C EI 120 – C/C
	$63 < \varnothing \leq 87$	3,8 – 5,9	30	7,5	
	$87 < \varnothing \leq 111$	4,6 – 6,0	30	10,0	
	$111 < \varnothing \leq 135$	5,4 – 6,1	30	12,5	
	$135 < \varnothing \leq 160$	6,2	30	15,0	

**Table C12.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 63$	5,8	30	5,0	EI 120 – U/C EI 120 – C/C
		5,9 – 7,9	30	7,5	
	$63 < \varnothing \leq 87$	5,8 – 7,9	30	7,5	
	$87 < \varnothing \leq 111$	5,8 – 10,1	30	10,0	
	$111 < \varnothing \leq 135$	5,7 – 12,3	30	12,5	
	$135 < \varnothing \leq 160$	5,6 – 14,6	30	15,0	

**Table C12.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 63$	2,0 – 5,1	30	5,0	EI 120 – U/C EI 120 – C/C
	$63 < \varnothing \leq 87$	2,3 – 5,0	30	7,5	
	$87 < \varnothing \leq 111$	2,6 – 4,9	30	10,0	
	$111 < \varnothing \leq 135$	2,9 – 4,8	30	12,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	30	15,0	
	$160 < \varnothing \leq 205$	4,7 – 8,5	60	17,5	
	$205 < \varnothing \leq 250$	6,2 – 9,6	60	20,0	

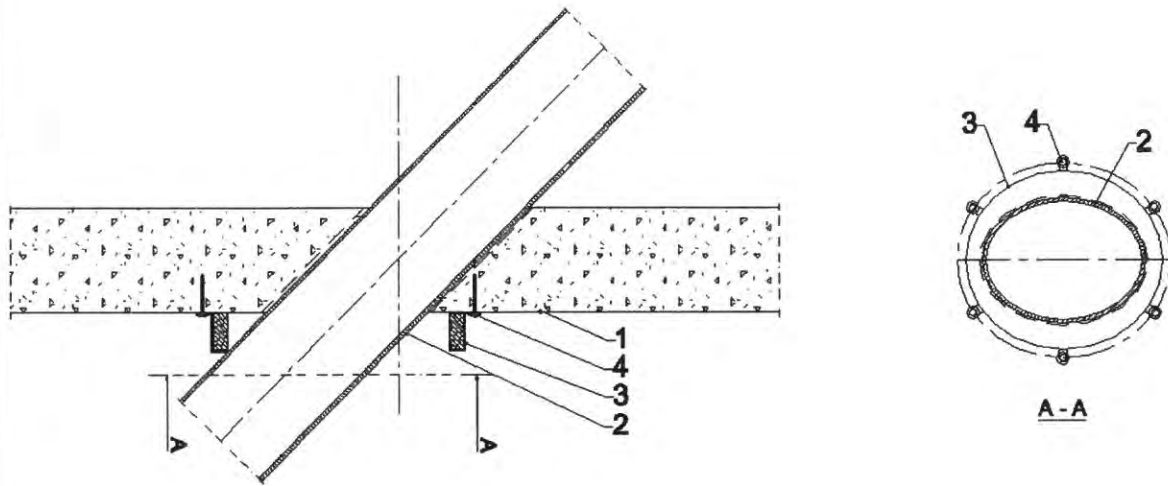
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipe penetration seal in flexible or rigid wall

**Annex C12**

of European  
Technical Assessment  
ETA-17/0866

**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the floor.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

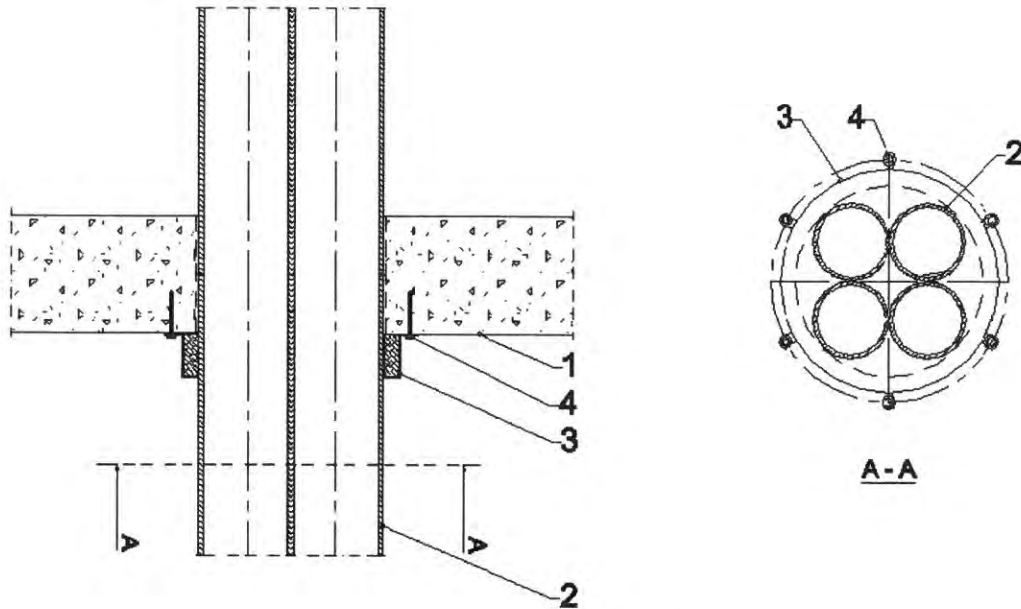
**Resistance to fire classification of plastic pipes penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the floor:**

**Table C13.1 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 32$	1,8 – 3,4	30	5,0	EI 90 – U/C EI 90 – C/C
	$32 < \varnothing \leq 51$	2,2 – 4,1	30	7,5	
	$51 < \varnothing \leq 71$	2,5 – 4,9	30	10,0	
	$71 < \varnothing \leq 90$	2,9 – 5,7	30	12,5	
	$90 < \varnothing \leq 110$	3,2 – 6,5	30	15,0	
	$110 < \varnothing \leq 135$	3,2 – 5,6	60	17,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	60	20,0	

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C13</b>
<b>Construction details and resistance to fire classification of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe penetration seal in rigid floor	of European Technical Assessment ETA-17/0866

**Plastic pipes bundle penetration seal in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe (maximum 4 pipes in bundle)
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

**Resistance to fire classification of plastic pipes bundle penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II:**

**Table C14.1 PP-R pipes (maximum 4 pipes in bundle)**

Pipe material	Single pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 32$	2,9 – 5,4	30	7,5	EI 90 – U/C EI 90 – C/C
	$32 < \varnothing \leq 40$	3,5 – 6,7	60	10,0	
	$40 < \varnothing \leq 49$	4,1 – 8,2	60	12,5	
	$49 < \varnothing \leq 57$	4,6 – 9,5	60	15,0	
	$57 < \varnothing \leq 66$	5,2 – 11,0	60	17,5	
	$66 < \varnothing \leq 75$	5,8 – 12,5	60	20,0	

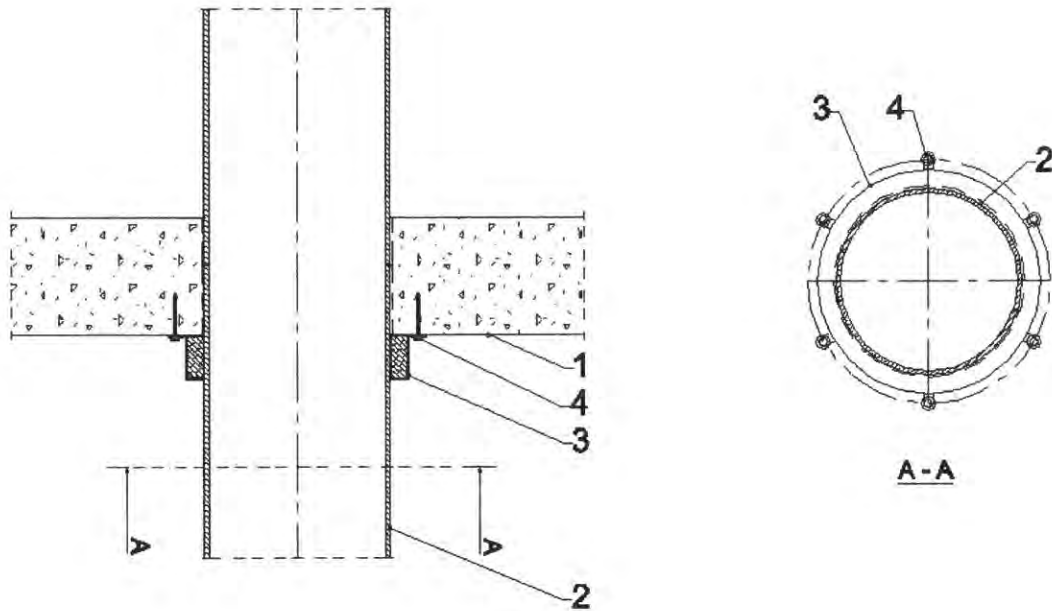
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details and resistance to fire classification of  
penetration seals made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipes bundle penetration seal in rigid floor

**Annex C14**

of European  
Technical Assessment  
ETA-17/0866

**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

<p align="center"><b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b></p>	<p align="center"><b>Annex C15</b></p>
<p align="center"><b>Construction details of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe penetration seal in rigid floor</p>	<p align="center">of European Technical Assessment ETA-17/0866</p>

**Resistance to fire classification of plastic pipes penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II, in accordance with Annex C15:**

**Table C16.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 63$	3,0 – 5,8	30	5,0	EI 90 – U/C EI 90 – C/C
	$63 < \varnothing \leq 87$	3,8 – 7,9	30	7,5	
	$87 < \varnothing \leq 111$	4,6 – 10,1	30	10,0	
	$111 < \varnothing \leq 135$	5,4 – 12,3	30	12,5	
	$135 < \varnothing \leq 160$	6,2 – 14,6	30	15,0	
	$160 < \varnothing \leq 205$	7,9 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	9,6 – 14,6	60	20,0	

**Table C16.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 63$	5,8 – 10,5	30	5,0	EI 90 – U/C EI 90 – C/C
	$63 < \varnothing \leq 87$	5,8 – 11,5	30	7,5	
	$87 < \varnothing \leq 111$	5,8 – 12,5	30	10,0	
	$111 < \varnothing \leq 135$	5,7 – 13,5	30	12,5	
	$135 < \varnothing \leq 160$	5,6 – 14,6	30	15,0	

**Table C16.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 63$	2,0 – 5,1	30	5,0	EI 90 – U/C EI 90 – C/C
	$63 < \varnothing \leq 87$	2,3 – 5,0	30	7,5	
	$87 < \varnothing \leq 111$	2,6 – 4,9	30	10,0	
	$111 < \varnothing \leq 135$	2,9 – 4,8	30	12,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	30	15,0	
	$160 < \varnothing \leq 205$	4,7 – 8,5	60	17,5	
	$205 < \varnothing \leq 250$	6,2 – 9,6	60	20,0	

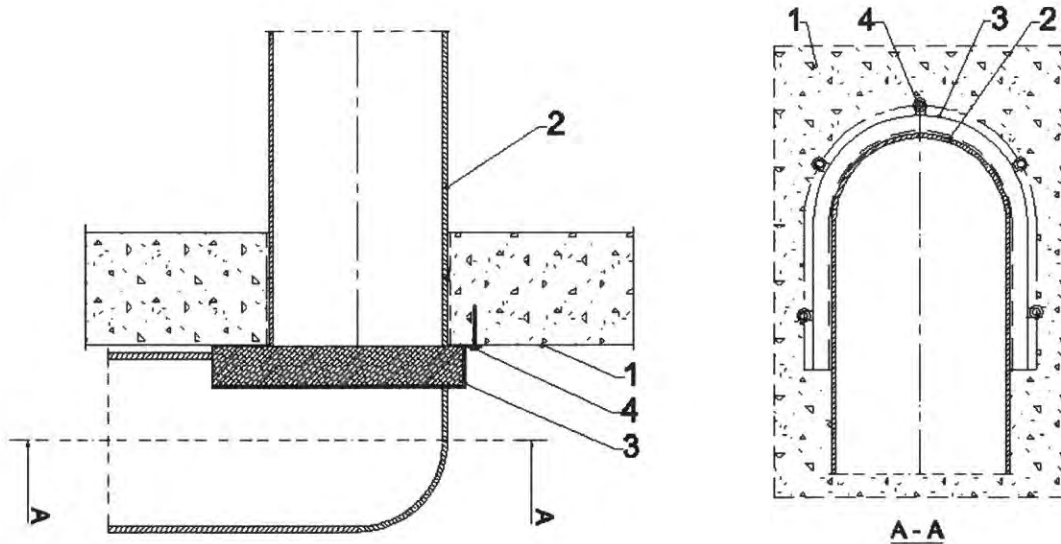
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipe penetration seal in rigid floor

**Annex C16**

of European  
Technical Assessment  
ETA-17/0866

**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II – pipe elbow on the bottom of the floor.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

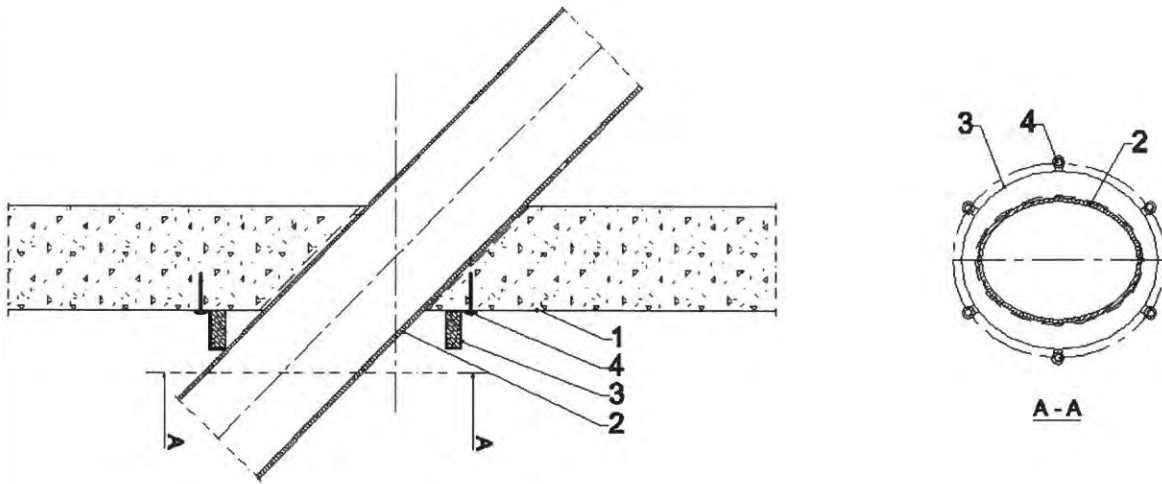
**Resistance to fire classification of plastic pipe elbow penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II:**

**Table C17.1 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 63$	2,0 – 5,1	30	5,0	EI 90 – U/C EI 90 – C/C
	$63 < \varnothing \leq 86$	2,3 – 5,7	30	7,5	
	$86 < \varnothing \leq 110$	2,6 – 6,5	30	10,0	
	$110 < \varnothing \leq 135$	2,9 – 5,6	30	12,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	30	15,0	

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C17</b>  of European Technical Assessment ETA-17/0866
<b>Construction details and resistance to fire classification of penetration seals made with use of ISITHERM-Rohrmanschette BBR II</b> Plastic pipe elbow penetration seal in rigid floor	

**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the floor.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

**Resistance to fire classification of plastic pipes penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II, placed in angle between 0° and 89° to the floor:**

**Table C18.1 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 32$	1,8 – 3,4	30	5,0	EI 120 – U/C EI 120 – C/C
	$32 < \varnothing \leq 51$	2,2 – 4,1	30	7,5	
	$51 < \varnothing \leq 71$	2,5 – 4,9	30	10,0	
	$71 < \varnothing \leq 90$	2,9 – 5,7	30	12,5	
	$90 < \varnothing \leq 110$	3,2 – 6,5	30	15,0	
	$110 < \varnothing \leq 135$	3,2 – 5,6	60	17,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	60	20,0	

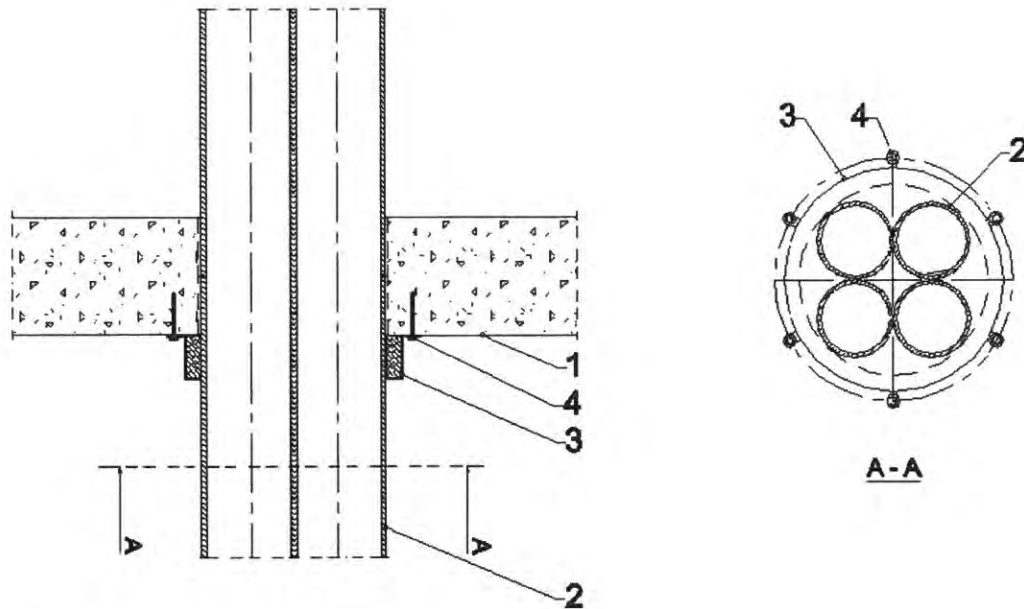
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details and resistance to fire classification of  
penetration seals made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipe penetration seal in rigid floor

**Annex C18**

of European  
Technical Assessment  
ETA-17/0866

**Plastic pipes bundle penetration seal in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe (maximum 4 pipes in bundle)
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

**Resistance to fire classification of plastic pipes bundle penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II:**

**Table C19.1 PP-R pipes (maximum 4 pipes in bundle)**

Pipe material	Single pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 32$	2,9 – 5,4	30	7,5	EI 120 – U/C EI 120 – C/C
	$32 < \varnothing \leq 40$	3,5 – 6,7	60	10,0	
	$40 < \varnothing \leq 49$	4,1 – 8,2	60	12,5	
	$49 < \varnothing \leq 57$	4,6 – 9,5	60	15,0	
	$57 < \varnothing \leq 66$	5,2 – 11,0	60	17,5	
	$66 < \varnothing \leq 75$	5,8 – 12,5	60	20,0	

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

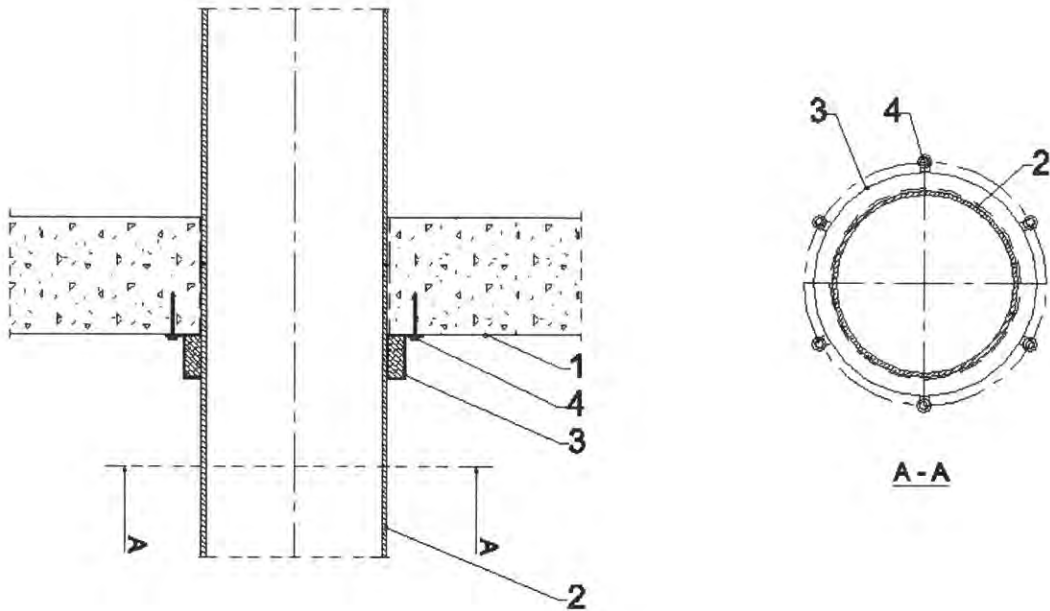
**Construction details and resistance to fire classification of  
penetration seals made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipes bundle penetration seal in rigid floor

**Annex C19**

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**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details of penetration seals  
made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipe penetration seal in rigid floor

**Annex C20**

of European  
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**Resistance to fire classification of plastic pipes penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II, in accordance with Annex C20:**

**Table C21.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 63$	3,0 – 5,8	30	5,0	EI 120 – U/C EI 120 – C/C
	$63 < \varnothing \leq 87$	3,8 – 7,9	30	7,5	
	$87 < \varnothing \leq 111$	4,6 – 10,1	30	10,0	
	$111 < \varnothing \leq 135$	5,4 – 12,3	30	12,5	
	$135 < \varnothing \leq 160$	6,2 – 14,6	30	15,0	
	$160 < \varnothing \leq 205$	7,9 – 12,1	60	17,5	
	$205 < \varnothing \leq 250$	9,6	60	20,0	

**Table C21.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 63$	5,8 – 10,5	30	5,0	EI 120 – U/C EI 120 – C/C
	$63 < \varnothing \leq 87$	5,8 – 9,2	30	7,5	
	$87 < \varnothing \leq 111$	5,8 – 8,0	30	10,0	
	$111 < \varnothing \leq 135$	5,7 – 6,8	30	12,5	
	$135 < \varnothing \leq 160$	5,6	30	15,0	

**Table C21.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 63$	2,0 – 5,1	30	5,0	EI 120 – U/C EI 120 – C/C
	$63 < \varnothing \leq 87$	2,3 – 5,0	30	7,5	
	$87 < \varnothing \leq 111$	2,6 – 4,9	30	10,0	
	$111 < \varnothing \leq 135$	2,9 – 4,8	30	12,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	30	15,0	
	$160 < \varnothing \leq 205$	4,7 – 8,5	60	17,5	
	$205 < \varnothing \leq 250$	6,2 – 9,6	60	20,0	

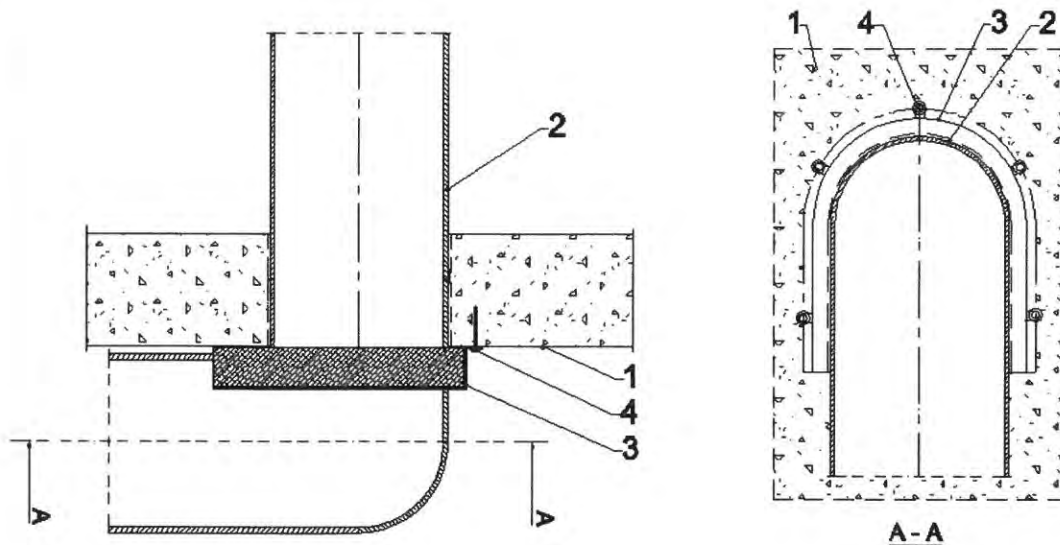
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Rohrmanschette BBR II**  
Plastic pipe penetration seal in rigid floor

**Annex C21**

of European  
Technical Assessment  
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**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II – pipe elbow on the bottom of the floor.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Rohrmanschette BBR II, fixed at the bottom of the floor
- 4 Fastener M6x60, number of fasteners in accordance with Annex A

**Resistance to fire classification of plastic pipe elbow penetration seals in rigid floor, made with use of ISITHERM-Rohrmanschette BBR II:**

**Table C22.1 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 63$	2,0 – 5,1	30	5,0	EI 120 – U/C EI 120 – C/C
	$63 < \varnothing \leq 86$	2,3 – 5,7	30	7,5	
	$86 < \varnothing \leq 110$	2,6 – 6,5	30	10,0	
	$110 < \varnothing \leq 135$	2,9 – 5,6	30	12,5	
	$135 < \varnothing \leq 160$	3,2 – 4,7	30	15,0	

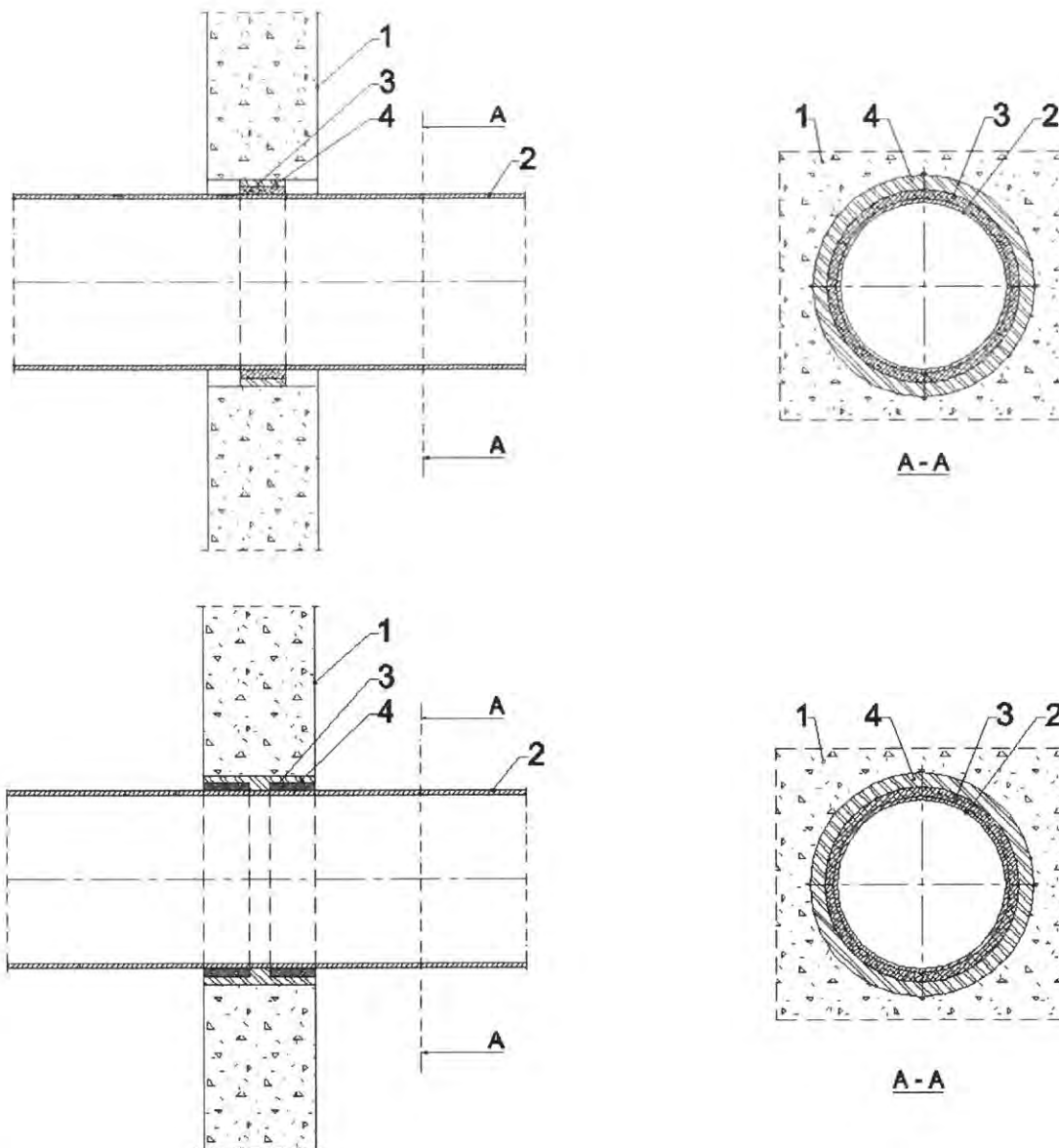
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details and resistance to fire classification of  
penetration seals made with use of ISITHERM-Rohrmanschette BBR II  
Plastic pipe elbow penetration seal in rigid floor**

**Annex C22**

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**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II.**



- 1 Rigid wall with thickness  $\geq 100 \text{ mm}$ <sup>1)</sup> and density  $\geq 600 \text{ kg/m}^3$
  - 2 Plastic pipe
  - 3 ISITHERM-Leitungsbandage BBR II:
    - one wrap for pipes with diameter  $\leq 75 \text{ mm}$ , placed in the centre of the wall thickness
    - two wraps for pipes with diameter  $> 75 \text{ mm}$ , placed symmetrically on both sides of the axis of the wall
  - 4 Gap filler (cement or gypsum mortar); gap width  $\leq 15 \text{ mm}$
- <sup>1)</sup> In certain cases wall thickness is increased to  $\geq 150 \text{ mm}$ , by means of two layers of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, placed on both sides of the wall (see Table C24.3 in Annex C24)

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C23</b>
<b>Construction details of penetration seals made with use of ISITHERM-Leitungsbandage BBR II</b> Plastic pipe penetration seal in rigid wall	of European Technical Assessment ETA-17/0866

**Resistance to fire classification of plastic pipes penetration seals in rigid wall, made with use of ISITHERM-Leitungsbandage BBR II, in accordance with Annex C23:**

**Table C24.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 75$	3,0 – 6,8	60	5,0	EI 60 – U/C EI 60 – C/C
	$75 < \varnothing \leq 96$	3,8 – 8,7	60	7,5	
	$96 < \varnothing \leq 117$	4,6 – 10,6	60	10,0	
	$117 < \varnothing \leq 138$	5,4 – 12,5	60	12,5	
	$138 < \varnothing \leq 160$	6,2 – 14,6	60	15,0	
	$160 < \varnothing \leq 205$	7,9 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	9,6 – 14,6	60	20,0	

**Table C24.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 75$	6,8 – 12,5	60	5,0	EI 60 – U/C EI 60 – C/C
	$75 < \varnothing \leq 96$	6,6 – 13,0	60	7,5	
	$96 < \varnothing \leq 117$	6,3 – 13,5	60	10,0	
	$117 < \varnothing \leq 138$	6,0 – 14,0	60	12,5	
	$138 < \varnothing \leq 160$	5,6 – 14,6	60	15,0	

**Table C24.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 75$	1,8 – 6,5	60	5,0	EI 60 – U/C EI 60 – C/C
		2,2 – 6,0	60	7,5	
	$75 < \varnothing \leq 96$	2,8 – 6,8 <sup>)</sup>	60 <sup>)</sup>	7,5 <sup>)</sup>	EI 60 – U/C <sup>)</sup> EI 60 – C/C <sup>)</sup>
		2,5 – 5,6	60	10,0	
	$96 < \varnothing \leq 117$	3,7 – 7,2 <sup>)</sup>	60 <sup>)</sup>	10,0 <sup>)</sup>	EI 60 – U/C <sup>)</sup> EI 60 – C/C <sup>)</sup>
		2,9 – 5,1	60	12,5	
	$117 < \varnothing \leq 138$	4,7 – 7,6 <sup>)</sup>	60 <sup>)</sup>	12,5 <sup>)</sup>	EI 60 – U/C <sup>)</sup> EI 60 – C/C <sup>)</sup>

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid wall

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**Table C24.3 (continued) PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	138 < Ø ≤ 160	3,2 – 4,7	60	15,0	EI 60 – U/C EI 60 – C/C
		4,7 – 8,0 <sup>*)</sup>	60 <sup>*)</sup>	15,0 <sup>*)</sup>	EI 60 – U/C <sup>*)</sup> EI 60 – C/C <sup>*)</sup>
	160 < Ø ≤ 205	4,7 – 8,8 <sup>*)</sup>	60 <sup>*)</sup>	17,5 <sup>*)</sup>	
	205 < Ø ≤ 250	6,2 – 9,6 <sup>*)</sup>	60 <sup>*)</sup>	20,0 <sup>*)</sup>	

<sup>\*)</sup> wall thickness ≥ 150 mm (initial thickness increased by two layers of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, placed on both sides of the wall)

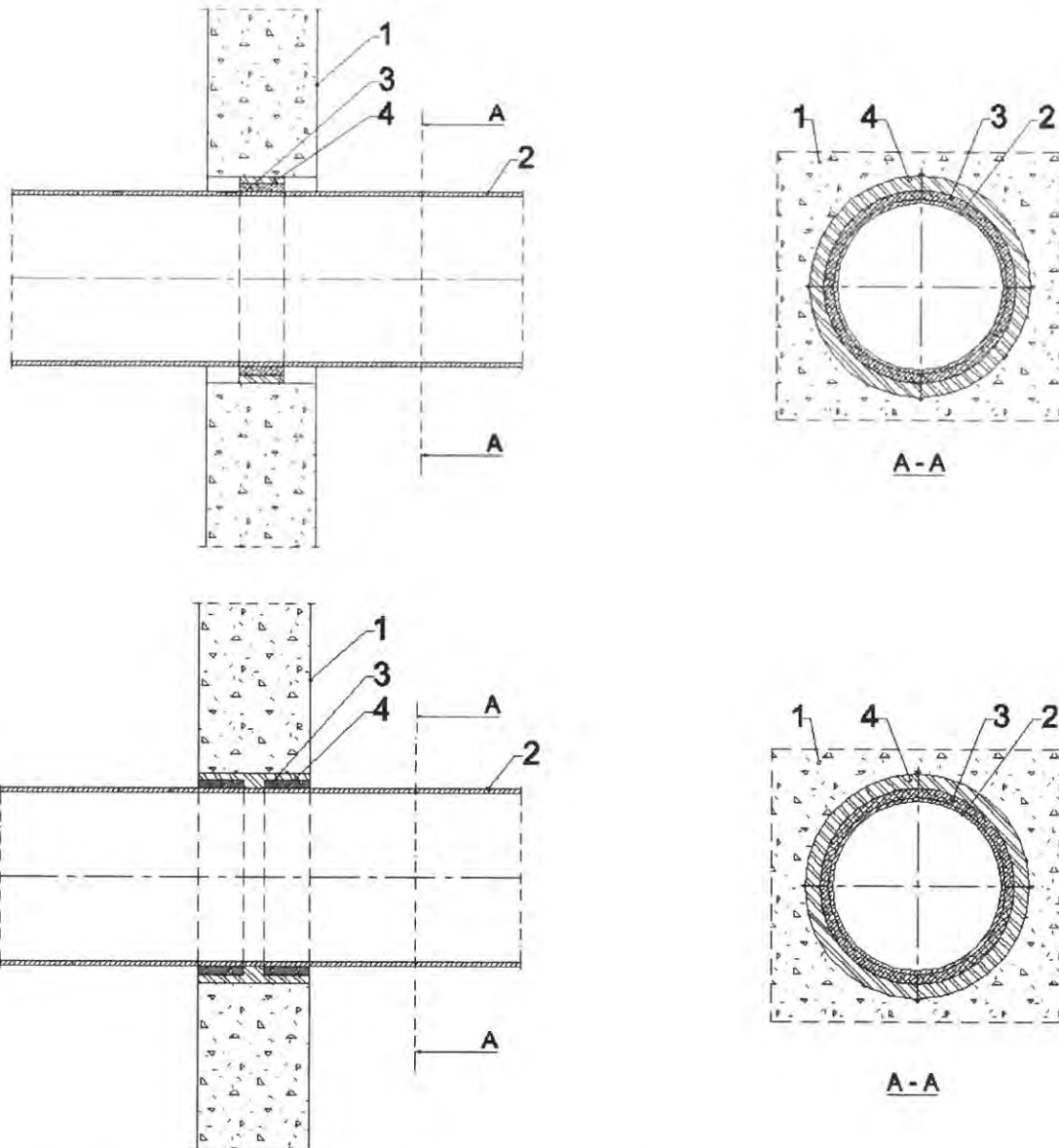
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid wall

**Annex C24**

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**Plastic pipe penetration seal in rigid wall, made with use of ISITHERM-Leitungsbandage BBR II.**



- 1 Rigid wall with thickness  $\geq 100 \text{ mm}$ <sup>1)</sup> and density  $\geq 600 \text{ kg/m}^3$
  - 2 Plastic pipe
  - 3 ISITHERM-Leitungsbandage BBR II:
    - one wrap for pipes with diameter  $\leq 75 \text{ mm}$ , placed in the centre of the wall thickness
    - two wraps for pipes with diameter  $> 75 \text{ mm}$ , placed symmetrically on both sides of the axis of the wall
  - 4 Gap filler (cement or gypsum mortar); gap width  $\leq 15 \text{ mm}$
- <sup>1)</sup> In certain cases wall thickness is increased to  $\geq 150 \text{ mm}$ , by means of two layers of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, placed on both sides of the wall (see Table C26.3 in Annex C26)

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C25</b>
<b>Construction details of penetration seals made with use of ISITHERM-Leitungsbandage BBR II</b> Plastic pipe penetration seal in rigid wall	of European Technical Assessment ETA-17/0866

**Resistance to fire classification of plastic pipes penetration seals in rigid wall, made with use of ISITHERM-Leitungsbandage BBR II, in accordance with Annex C25:**
**Table C26.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 75$	3,0 – 6,8	60	5,0	EI 90 – U/C EI 90 – C/C
	$75 < \varnothing \leq 96$	4,4 – 8,7	60	7,5	
	$96 < \varnothing \leq 117$	5,8 – 10,6	60	10,0	
	$117 < \varnothing \leq 138$	7,2 – 12,5	60	12,5	
	$138 < \varnothing \leq 160$	8,7 – 14,6	60	15,0	
	$160 < \varnothing \leq 205$	11,7 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	14,6	60	20,0	

**Table C26.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 75$	6,8 – 12,5	60	5,0	EI 90 – U/C EI 90 – C/C
	$75 < \varnothing \leq 96$	6,6 – 13,0	60	7,5	
	$96 < \varnothing \leq 117$	6,3 – 13,5	60	10,0	
	$117 < \varnothing \leq 138$	6,0 – 14,0	60	12,5	
	$138 < \varnothing \leq 160$	5,6 – 14,6	60	15,0	

**Table C26.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 75$	1,8 – 6,5	60	5,0	EI 90 – U/C EI 90 – C/C
		2,2 – 6,0	60	7,5	
	$75 < \varnothing \leq 96$	2,8 – 6,8 <sup>)</sup>	60 <sup>)</sup>	7,5 <sup>)</sup>	EI 90 – U/C <sup>)</sup> EI 90 – C/C <sup>)</sup>
		2,5 – 5,6	60	10,0	EI 90 – U/C EI 90 – C/C
	$96 < \varnothing \leq 117$	3,7 – 7,2 <sup>)</sup>	60 <sup>)</sup>	10,0 <sup>)</sup>	EI 90 – U/C <sup>)</sup> EI 90 – C/C <sup>)</sup>
		2,9 – 5,1	60	12,5	EI 90 – U/C EI 90 – C/C
	$117 < \varnothing \leq 138$	4,7 – 7,6 <sup>)</sup>	60 <sup>)</sup>	12,5 <sup>)</sup>	EI 90 – U/C <sup>)</sup> EI 90 – C/C <sup>)</sup>

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**
**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid wall

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**Table C26.3 (continued) PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	138 < Ø ≤ 160	3,2 – 4,7	60	15,0	EI 90 – U/C EI 90 – C/C
		4,7 – 8,0 <sup>*)</sup>	60 <sup>*)</sup>	15,0 <sup>*)</sup>	EI 90 – U/C <sup>*)</sup> EI 90 – C/C <sup>*)</sup>
	160 < Ø ≤ 205	4,7 – 8,8 <sup>*)</sup>	60 <sup>*)</sup>	17,5 <sup>*)</sup>	
	205 < Ø ≤ 250	6,2 – 9,6 <sup>*)</sup>	60 <sup>*)</sup>	20,0 <sup>*)</sup>	

<sup>\*)</sup> wall thickness ≥ 150 mm (initial thickness increased by two layers of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, placed on both sides of the wall)

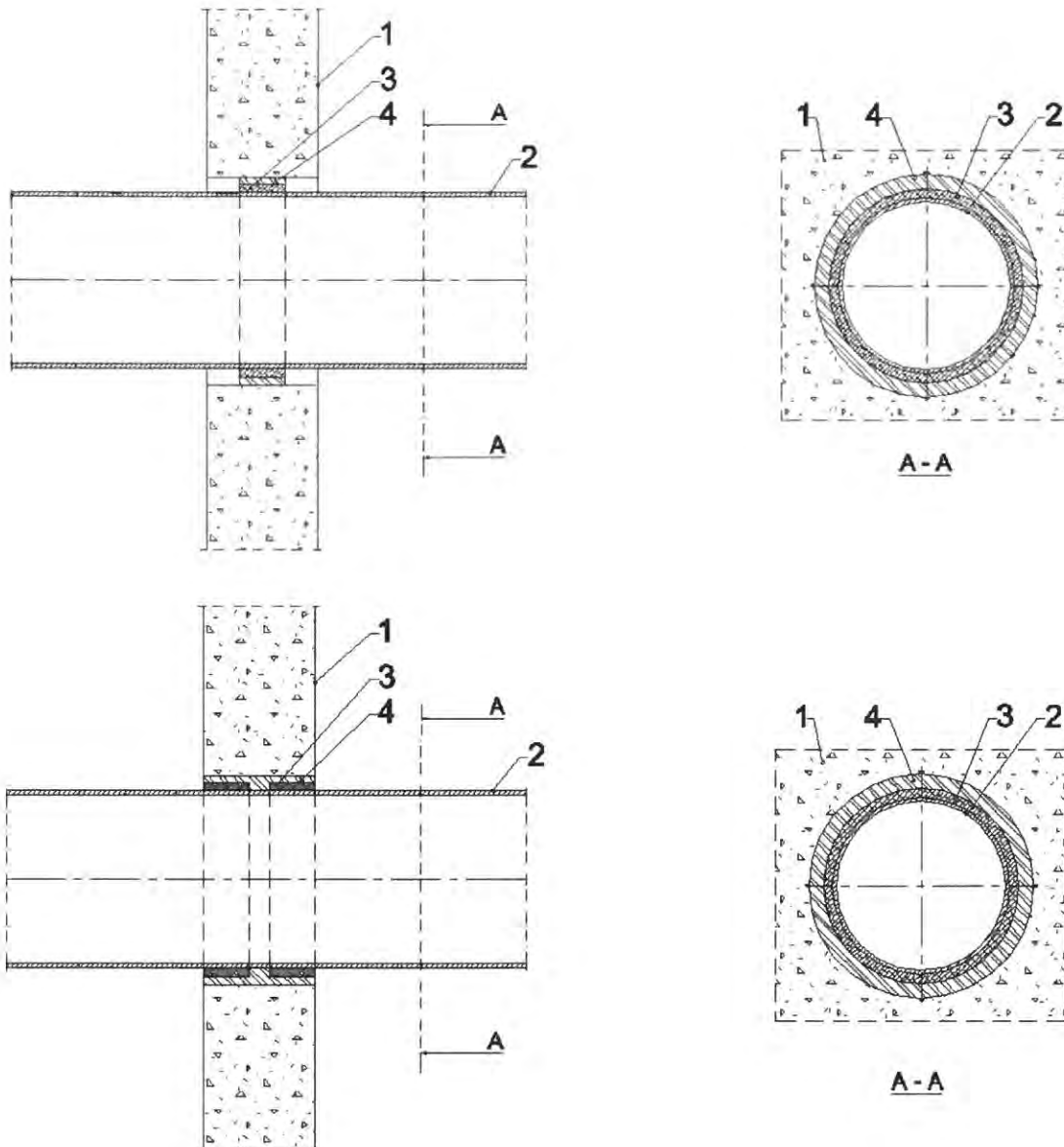
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid wall

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**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II.**



- 1 Rigid wall with thickness  $\geq 100 \text{ mm}$ <sup>1)</sup> and density  $\geq 600 \text{ kg/m}^3$
  - 2 Plastic pipe
  - 3 ISITHERM-Leitungsbandage BBR II:
    - one wrap for pipes with diameter  $\leq 75 \text{ mm}$ , placed in the centre of the wall thickness
    - two wraps for pipes with diameter  $> 75 \text{ mm}$ , placed symmetrically on both sides of the axis of the wall
  - 4 Gap filler (cement or gypsum mortar); gap width  $\leq 15 \text{ mm}$
- <sup>1)</sup> In certain cases wall thickness is increased to  $\geq 150 \text{ mm}$ , by means of two layers of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, placed on both sides of the wall (see Table C28.3 in Annex C28)

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C27</b>
<b>Construction details of penetration seals made with use of ISITHERM-Leitungsbandage BBR II</b> Plastic pipe penetration seal in rigid wall	of European Technical Assessment ETA-17/0866

**Resistance to fire classification of plastic pipes penetration seals in rigid wall, made with use of ISITHERM-Leitungsbandage BBR II, in accordance with Annex C27:**

**Table C28.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 75$	3,0 – 6,8	60	5,0	EI 120 – U/C EI 120 – C/C
	$75 < \varnothing \leq 96$	4,4 – 8,7	60	7,5	
	$96 < \varnothing \leq 117$	5,8 – 10,6	60	10,0	
	$117 < \varnothing \leq 138$	7,2 – 12,5	60	12,5	
	$138 < \varnothing \leq 160$	8,7 – 14,6	60	15,0	
	$160 < \varnothing \leq 205$	11,7 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	14,6	60	20,0	

**Table C28.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 75$	6,8 – 12,5	60	5,0	EI 120 – U/C EI 120 – C/C
	$75 < \varnothing \leq 96$	8,8 – 13,0	60	7,5	
	$96 < \varnothing \leq 117$	10,7 – 13,5	60	10,0	
	$117 < \varnothing \leq 138$	12,6 – 14,0	60	12,5	
	$138 < \varnothing \leq 160$	8,7 – 14,6	60	15,0	

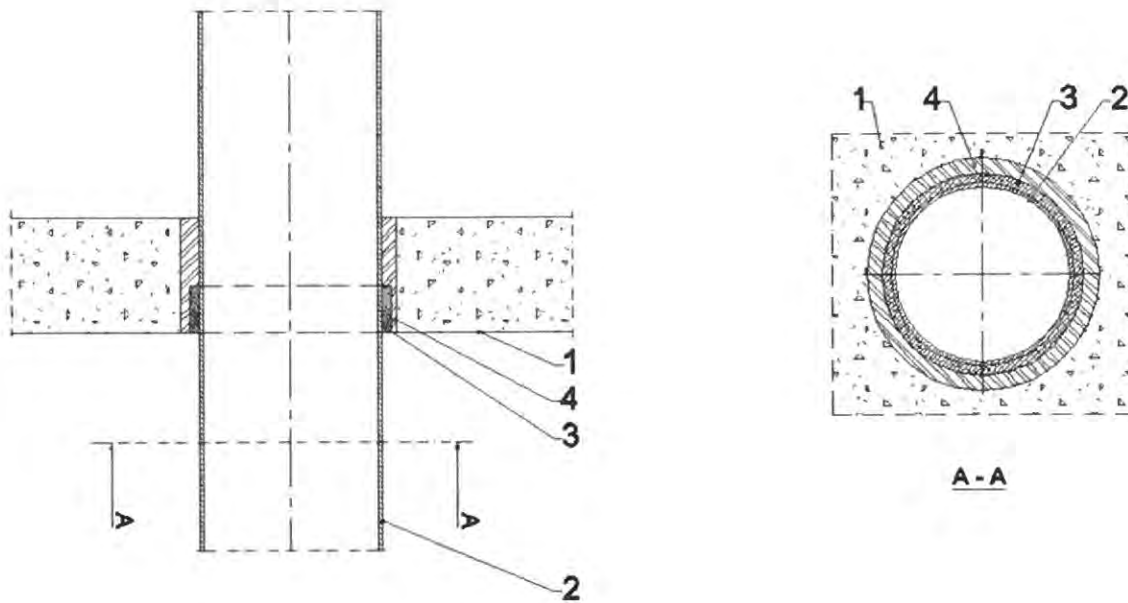
**Table C28.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 75$	1,8 – 6,5	60	5,0	EI 120 – U/C EI 120 – C/C
	$75 < \varnothing \leq 96$	2,8 – 6,8 <sup>*)</sup>	60 <sup>*)</sup>	7,5 <sup>*)</sup>	EI 120 – U/C <sup>*)</sup> EI 120 – C/C <sup>*)</sup>
	$96 < \varnothing \leq 117$	3,7 – 7,2 <sup>*)</sup>	60 <sup>*)</sup>	10,0 <sup>*)</sup>	
	$117 < \varnothing \leq 138$	4,7 – 7,6 <sup>*)</sup>	60 <sup>*)</sup>	12,5 <sup>*)</sup>	
	$138 < \varnothing \leq 160$	5,6 – 8,0 <sup>*)</sup>	60 <sup>*)</sup>	15,0 <sup>*)</sup>	
	$160 < \varnothing \leq 205$	7,6 – 8,8 <sup>*)</sup>	60 <sup>*)</sup>	17,5 <sup>*)</sup>	
	$205 < \varnothing \leq 250$	9,6 <sup>*)</sup>	60 <sup>*)</sup>	20,0 <sup>*)</sup>	

<sup>\*)</sup> wall thickness  $\geq 150$  mm (initial thickness increased by two layers of 12,5 mm thick 'Type F' gypsum plasterboards according to EN 520, placed on both sides of the wall)

<b>ISITHERM-Rohrmanschette BBR II and ISITHERM-Leitungsbandage BBR II</b>	<b>Annex C28</b>
Resistance to fire classification of penetration seals made with use of ISITHERM-Leitungsbandage BBR II Plastic pipe penetration seal in rigid wall	of European Technical Assessment ETA-17/0866

**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Leitungsbandage BBR II placed on the bottom of the floor
- 4 Gap filler (cement or gypsum mortar); gap width  $\leq 15$  mm

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid floor

**Annex C29**

of European  
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**Resistance to fire classification of plastic pipes penetration seals in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II, in accordance with Annex C29:**

**Table C30.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 75$	3,0 – 6,8	60	5,0	EI 45 – U/C EI 45 – C/C
	$75 < \varnothing \leq 96$	3,8 – 8,7	60	7,5	
	$96 < \varnothing \leq 117$	4,6 – 10,6	60	10,0	
	$117 < \varnothing \leq 138$	5,4 – 12,5	60	12,5	
	$138 < \varnothing \leq 160$	6,2 – 14,6	60	15,0	
	$160 < \varnothing \leq 205$	7,9 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	9,6 – 14,6	60	20,0	

**Table C30.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 75$	6,8 – 12,5	60	5,0	EI 45 – U/C EI 45 – C/C
	$75 < \varnothing \leq 96$	6,6 – 13,0	60	7,5	
	$96 < \varnothing \leq 117$	6,3 – 13,5	60	10,0	
	$117 < \varnothing \leq 138$	6,0 – 14,0	60	12,5	
	$138 < \varnothing \leq 160$	5,6 – 14,6	60	15,0	

**Table C30.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 75$	1,8 – 6,5	60	5,0	EI 45 – U/C EI 45 – C/C
	$75 < \varnothing \leq 96$	2,2 – 6,8	60	7,5	
	$96 < \varnothing \leq 117$	2,5 – 7,2	60	10,0	
	$117 < \varnothing \leq 138$	2,9 – 7,6	60	12,5	
	$138 < \varnothing \leq 160$	3,2 – 8,0	60	15,0	
	$160 < \varnothing \leq 205$	4,7 – 8,8	60	17,5	
	$205 < \varnothing \leq 250$	6,2 – 9,5	60	20,0	
		9,7 – 14,6	60	20,0	

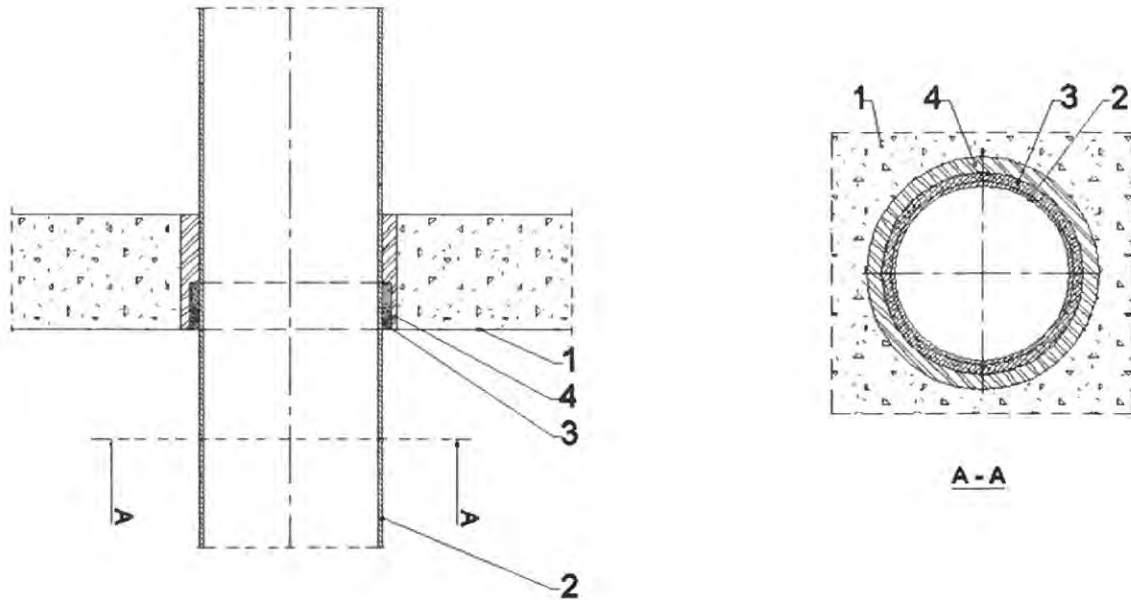
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid floor

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**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Leitungsbandage BBR II placed on the bottom of the floor
- 4 Gap filler (cement or gypsum mortar); gap width  $\leq 15$  mm

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid floor

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**Resistance to fire classification of plastic pipes penetration seals in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II, in accordance with Annex C31:**

**Table C32.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 75$	3,0 – 6,8	60	5,0	EI 90 – U/C EI 90 – C/C
	$75 < \varnothing \leq 96$	3,8 – 8,7	60	7,5	
	$96 < \varnothing \leq 117$	4,6 – 10,6	60	10,0	
	$117 < \varnothing \leq 138$	5,4 – 12,5	60	12,5	
	$138 < \varnothing \leq 160$	6,2 – 14,6	60	15,0	
	$160 < \varnothing \leq 205$	7,9 – 14,6	60	17,5	
	$205 < \varnothing \leq 250$	9,6 – 14,6	60	20,0	

**Table C32.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 75$	6,8 – 12,5	60	5,0	EI 90 – U/C EI 90 – C/C
	$75 < \varnothing \leq 96$	6,6 – 13,0	60	7,5	
	$96 < \varnothing \leq 117$	6,3 – 13,5	60	10,0	
	$117 < \varnothing \leq 138$	6,0 – 14,0	60	12,5	
	$138 < \varnothing \leq 160$	5,6 – 14,6	60	15,0	

**Table C32.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 75$	1,8 – 6,5	60	5,0	EI 90 – U/C EI 90 – C/C
	$75 < \varnothing \leq 96$	2,2 – 6,8	60	7,5	
	$96 < \varnothing \leq 117$	2,5 – 7,2	60	10,0	
	$117 < \varnothing \leq 138$	2,9 – 7,6	60	12,5	
	$138 < \varnothing \leq 160$	3,2 – 8,0	60	15,0	
	$160 < \varnothing \leq 205$	6,4 – 8,8	60	17,5	
	$205 < \varnothing \leq 250$	9,7 – 14,6	60	20,0	

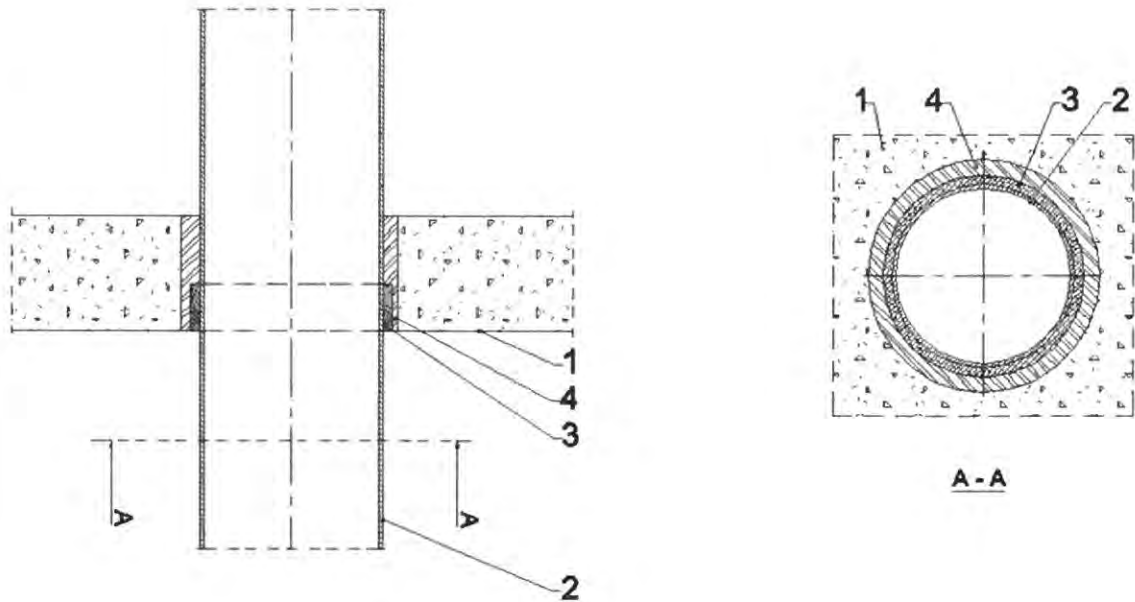
**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid floor

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**Plastic pipe penetration seal in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II.**



- 1 Rigid floor with thickness  $\geq 150$  mm and density  $\geq 600$  kg/m<sup>3</sup>
- 2 Plastic pipe
- 3 ISITHERM-Leitungsbandage BBR II placed on the bottom of the floor
- 4 Gap filler (cement or gypsum mortar); gap width  $\leq 15$  mm

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Construction details of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid floor

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**Resistance to fire classification of plastic pipes penetration seals in rigid floor, made with use of ISITHERM-Leitungsbandage BBR II, in accordance with Annex C33:**

**Table C34.1 PE-HD pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PE-HD	$\varnothing \leq 75$	3,0 – 6,8	60	5,0	EI 120 – U/C EI 120 – C/C
	$75 < \varnothing \leq 96$	3,8 – 8,7	60	7,5	
	$96 < \varnothing \leq 117$	4,6 – 10,6	60	10,0	
	$117 < \varnothing \leq 138$	5,4 – 12,5	60	12,5	
	$138 < \varnothing \leq 160$	6,2 – 14,6	60	15,0	
	$160 < \varnothing \leq 205$	7,9 – 12,1	60	17,5	
	$205 < \varnothing \leq 250$	9,6	60	20,0	

**Table C34.2 PP-R pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PP-R	$\varnothing \leq 75$	6,8 – 12,5	60	5,0	EI 120 – U/C EI 120 – C/C
	$75 < \varnothing \leq 96$	6,6 – 13,0	60	7,5	
	$96 < \varnothing \leq 117$	6,3 – 13,5	60	10,0	
	$117 < \varnothing \leq 138$	6,0 – 14,0	60	12,5	
	$138 < \varnothing \leq 160$	5,6 – 14,6	60	15,0	

**Table C34.3 PVC-U / PVC-C pipes**

Pipe material	Pipe diameter, [mm]	Pipe wall thickness, [mm]	Intumescent material		Fire resistance class
			width, [mm]	thickness, [mm]	
PVC-U / PVC-C	$\varnothing \leq 75$	1,8 – 6,5	60	5,0	EI 120 – U/C EI 120 – C/C
	$75 < \varnothing \leq 96$	2,2 – 6,8	60	7,5	
	$96 < \varnothing \leq 117$	2,5 – 7,2	60	10,0	
	$117 < \varnothing \leq 138$	2,9 – 7,6	60	12,5	
	$138 < \varnothing \leq 160$	3,2 – 8,0	60	15,0	
	$160 < \varnothing \leq 205$	6,4 – 8,8	60	17,5	
	$205 < \varnothing \leq 250$	9,7 – 14,6	60	20,0	

**ISITHERM-Rohrmanschette BBR II  
and ISITHERM-Leitungsbandage BBR II**

**Resistance to fire classification of penetration seals  
made with use of ISITHERM-Leitungsbandage BBR II**  
Plastic pipe penetration seal in rigid floor

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