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and notified according  
to Article 10 of the Council  
Directive 89/106/EEC of  
21 December 1988 on the  
approximation of laws,  
regulations and administrative  
provisions of Member States  
relating to construction  
products

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**OiB**  
Member of EOTA

## European technical approval

**ETA-11/0206**

(English language translation, the original version is in German language)

Handelsbezeichnung:  
*Trade name:*

Joins 2K Fire Foam Pro+ Palokatkovahto  
Mixed/ Cable penetration seal  
„System ZZ-Fire protection foam 2K NE“

Zulassungsinhaber:  
*Holder of approval:*

Joins L.R. Oy Industry  
Teollisuustie 6, 51200  
Kangasniemi

Zulassungsgegenstand  
und Verwendungszweck:

**Kombi-/ Kabelabschottung**

*Generic type and use of construction product:*

*Mixed/ Cable penetration seal*

Geltungsdauer vom:  
*Validity from:*  
bis:  
*to:*

**28.06.2013**

**27.06.2018**

Herstellwerk:  
*Manufacturing plant:*

Joins L.R. Oy Industry  
Teollisuustie 6, 51200  
Kangasniemi

Diese Europäische  
technische Zulassung umfasst:  
*This European technical approval  
contains:*

**32 Seiten inklusive 16 Anhängen**

*32 pages including 16 Annexes*

Diese Europäische  
technische Zulassung ersetzt:  
*This European technical approval  
replaces:*

**ETA-11/0206 mit Geltungsdauer vom 26.08.2011 bis  
25.08.2016**

ETA-11/0206 with validity from 26.08.2011 to 25.08.2016



European Organisation for Technical Approvals  
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## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by the Österreichisches Institut für Bautechnik in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by the Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) no. 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - Wiener Bauprodukte- und Akkreditierungsgesetz – WBAG. LGBl. Nr. 30/1996, zuletzt geändert durch das Gesetz LGBl. für Wien Nr. 36/2007;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>4</sup>;
  - Guideline for European technical approval for “Fire Stopping and Fire Sealing Products - : Part 2: Penetration Seals” ETAG no. 026-Part 2, edition 2011.
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1 Official Journal of the European Communities no. L 40, 11.2.1989, p. 12  
2 Official Journal of the European Communities no. L 220, 30.8.1993, p. 1  
3 Official Journal of the European Union no. L 284, 31.10.2003, p. 1  
4 Official Journal of the European Communities no. L 17, 20.1.1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) and intended use

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) is designed and installed in accordance with the ETA-holder’s design and installation instructions, deposited with the Österreichisches Institut für Bautechnik. The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) comprises the following components, which are factory-produced by the ETA-holder or a supplier. The holder is ultimately responsible for the Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE).

#### 1.1 Definition of the construction product

„System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) is a Mixed/ Cable penetration seal based on intumescent fire protection foam.

Components of Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE)	Characteristics
Joints 2K Fire Foam Pro+ (ZZ-Fire protection foam 2K NE)	product in cartridges on the basis of polyurethane with intumescent fire protection additives. After application it reacts and increases its volume.
Joints Fire Wrap Pro+ ZZ-Wickel NE (ZZ-Wrap NE)	intumescent wrap on the basis of butyl rubber with intumescent fire protection additives and glass fabric reinforcement of dimension 150 mm (width) x 3 mm (thickness)
Joints Fire Block Pro+ (ZZ-Foam block NE)	block-shaped intumescent elastic product (can be vacuum-packed) on the basis of polyurethane with intumescent fire protection additives

#### 1.2 Intended use, use category and working life

##### 1.2.1 Intended use

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) is intended to be used to temporarily or permanently reinstate the fire resistance performance of flexible wall constructions, rigid wall constructions and rigid floor constructions where they have been provided with apertures which are penetrated by various cables, conduits / tubes, pipes and installation supports (perforated or non-perforated steel cable trays and steel ladders).

The thickness of the seal has to be minimum 144 mm or 200 mm (Mixed penetration seal, depends on fire resistance classification, see Annex I of the ETA) and minimum 100 mm, 144 mm, 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex P of the ETA). For dimensions of mixed penetration seal and cable penetration seal in flexible walls, rigid walls and rigid floors see table on page 4.

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) can be installed only in the types of separating elements as specified in the following table.

Separating element	Construction	a) Maximum opening size (width x height) b) Min. thickness of the cable penetration seal
Flexible walls	<ul style="list-style-type: none"> <li>➤ Timber or steel studs lined on both faces</li> <li>➤ Minimum thickness 100 mm</li> <li>➤ Classification according to EN 13501-2:2007+A1:2009: ≥ EI 60</li> <li>➤ This ETA does not cover sandwich panel construction – penetrations in such constructions shall be tested on a case by case basis</li> </ul>	<p><u>Mixed penetration seal (see Annex A of the ETA):</u> a) 450 x 500 [mm] b) 144 mm / 200 mm</p> <p><u>Cable penetration seal (see Annex J of the ETA):</u> a) 270 x 270 [mm] / Ø 300 mm b) 100mm / 144 mm / 200 mm / 250 mm</p>
Rigid walls	<ul style="list-style-type: none"> <li>➤ Aerated concrete, concrete, reinforced concrete, masonry</li> <li>➤ Minimum density 450 kg/m<sup>3</sup></li> <li>➤ Minimum thickness 100 mm</li> <li>➤ Classification according to EN 13501-2:2007+A1:2009: ≥ EI 60</li> </ul>	<p><u>Mixed penetration seal (see Annex B and C of the ETA):</u> a) 450 x 500 [mm] b) 144 mm / 200 mm</p> <p><u>Cable penetration seal (see Annex K and L of the ETA):</u> a) 270 x 270 [mm] / Ø 300 mm b) 100mm / 144 mm / 200 mm / 250 mm</p>
Rigid floors	<ul style="list-style-type: none"> <li>➤ Aerated concrete, concrete, reinforced concrete</li> <li>➤ Minimum density 450 kg/m<sup>3</sup></li> <li>➤ Minimum thickness 150 mm</li> <li>➤ Classification according to EN 13501-2:2007+A1:2009: ≥ REI 60</li> </ul>	<p><u>Mixed penetration seal (see Annex D and E of the ETA):</u> a) 450 x 450 [mm] b) 144 mm / 200 mm</p> <p><u>Cable penetration seal (see Annex M and N of the ETA):</u> a) 270 x 270 [mm] Ø 300 mm b) 100mm / 144 mm / 200 mm / 250 mm</p>

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE“ (*System ZZ-Fire protection foam 2K NE*) can only be configured as specified in the following table.

Penetrating element	Construction characteristics
Cables	<ul style="list-style-type: none"> <li>➤ Sheathed electrical / telecommunication / optical fibre cables up to a maximum outer diameter of 80 mm</li> <li>➤ Tied bundles<sup>5</sup> up to 100 mm overall diameter containing sheathed electrical / telecommunication / optical fibre cables of a maximum outer diameter up to 21 mm</li> <li>➤ Non-sheathed electrical cables up to a maximum outer diameter of 24 mm</li> </ul>
Conduits / Tubes	<ul style="list-style-type: none"> <li>➤ Steel conduits / tubes up to 16 mm maximum outer diameter with / without cables</li> <li>➤ Rigid plastic conduits / tubes up to 40 mm maximum outer diameter (U/U), (U/C), (C/U), (C/C) with / without cables</li> <li>➤ Bundles with a maximum outer diameter of 80 mm consisting of plastic conduits, outer diameter ≤ 40 mm, wall thickness 1,0 mm to 3,0 mm (with / without cables) acc. to. EN 61386-21 or EN 61386-22</li> </ul>

<sup>5</sup> Several cables running in the same direction and bound closely together by mechanical means

Penetrating element	Construction characteristics
Installation supports	<ul style="list-style-type: none"> <li>➤ Steel cable trays (perforated or non-perforated)</li> <li>➤ Steel ladders</li> <li>➤ Steel cable trays (perforated or non-perforated) and steel ladders with organic coatings shall at least be classified A2-s1,d0 according to EN 13501-1:2007+A1:2009</li> </ul>
<u>Mixed penetration seal:</u> Metal pipes	Pipes made of copper, steel, stainless steel, cast iron up to 88,9 mm diameter
<u>Mixed penetration seal:</u> Plastic pipes	<ul style="list-style-type: none"> <li>➤ PVC-U pipes according to EN ISO 1452-1 and DIN 8061/DIN 8062 with a diameter up to 50 mm. For wall thickness see Annex H.</li> <li>➤ Test results from PVC-U pipes according to EN 1452-1 are also valid for PVC-U pipes according to EN 1329-1 and EN 1453-1 as well as PVC-C pipes according to EN 1566.</li> <li>➤ PE-HD pipes according to EN 1519-1:1999 and DIN 8074/DIN 8075 with a diameter up to 50 mm. For wall thickness see Annex H.</li> <li>➤ Test results from PE-HD pipes according to EN 1519-1 are also valid for PE pipes according to EN 12201-2, EN 1519-1 and EN 12666-1, ABS pipes according to EN 1455-1 as well as SAN+PVC pipes according to EN 1565-1.</li> </ul>

### 1.2.2 Use category

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (*System ZZ-Fire protection foam 2K NE*) is intended for internal use with high humidity, excluding temperatures below 0 °C, and can therefore – according to ETAG 026-Part 2 clause 2.4.12.1.3.3 – be categorized as Type Z<sub>1</sub>. Since the requirements for Type Z<sub>1</sub> are met, also the requirements for Type Z<sub>2</sub> are fulfilled.

### 1.2.3 Working life

The provisions made in this ETA are based on an assumed intended working life of the product for the intended use of 10 years, provided that it is subject to appropriate use and maintenance.

The indications given on the intended working life cannot be interpreted as a guarantee given by the producer or the approval body, but are to be used as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

The real working life might be, in normal use conditions, considerably longer without major degradation affecting the Essential Requirements.

## 2 Characteristics of the product and methods of verification

### 2.1 General

The identification tests and the assessment of the fitness for use according to the Essential Requirements were carried out in compliance with the “ETA Guidance no. 026-Part 2” concerning “Penetration Seals” –edition August 2011 (called ETAG 026-Part 2 in this ETA) and with the “EOTA technical Report no. 024” concerning “Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products” –edition November 2006, amended July 2009 (called TR 024 in this ETA).

Clause No.	ETA Clause No.	Characteristic	Expression of product performance
<b>Mechanical resistance and stability</b>			
	2.2	None	Not relevant
<b>Safety in case of fire</b>			
ETAG 2.4.1	2.3.1	Reaction to fire	Classification according to EN 13501-1:2007+A1:2009
ETAG 2.4.2	2.3.2	Resistance to fire	Classification according to EN 13501-2:2007+A1:2009
<b>Hygiene, health and environment</b>			
ETAG 2.4.3	2.4.1	Air permeability (material property)	EN 1026:2000
ETAG 2.4.4	2.4.2	Water permeability (material property)	No Performance Determined
ETAG 2.4.5	2.4.3	Release of dangerous substances	Declaration of manufacturer
<b>Safety in use</b>			
ETAG 2.4.6	2.5.1	Mechanical resistance and stability	No Performance Determined
ETAG 2.4.7	2.5.2	Resistance to impact/movement	No Performance Determined
ETAG 2.4.8	2.5.3	Adhesion	No Performance Determined
<b>Protection against noise</b>			
ETAG 2.4.9	2.6.1	Airborne sound insulation	EN ISO 10140-1:2010 $D_{n,e,w}(C;Ctr) = 66 (-1;-6) \text{ dB}$
<b>Energy economy and heat retention</b>			
ETAG 2.4.10	2.7.1	Thermal properties	EN 12667:2001 $\lambda = 0,088 \text{ W/(m}\cdot\text{K)}$
ETAG 2.4.11	2.7.2	Water vapour permeability	No Performance Determined
<b>General aspects relating to fitness for use</b>			
TR 024 4.2.5	2.8	Exposure conditions	Test results of unexposed and exposed specimens

## 2.2 Mechanical resistance and stability

Not relevant.

## 2.3 Safety in case of fire

### 2.3.1 Reaction to fire

All components of Mixed-/ Cable penetration seal “System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) were tested according to ETAG 026-Part 2 clause 2.4.1, EN ISO 11925-2:2002 and in turn application of FSG recommendation 107:2004 and classified according to EN 13501-1:2007+A1:2009.

Components	Class according to EN 13501-1:2007
Joints 2K Fire Foam Pro+	E
Joints Fire Wrap Pro+	E
Joints Fire Block Pro+	E

### 2.3.2 Resistance to fire

The Mixed/ Cable penetration seal “System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) was tested according to ETAG 026-Part 2 clause 2.4.2, EN 1366-3:2009 in conjunction with EN 1363-1:2012. The tests were conducted under the following conditions:

- Standard flexible walls and standard rigid floors
- Largest blank penetration seal in wall and floor
- Maximum aperture size
- Standard configuration for large cable penetration seals
- Standard configuration for small cable penetration seals
- Standard service support construction and installation supports
- Subsequent addition / removal of cables

Based upon the gained test results and the field of direct application specified within EN 1366-3:2009 the Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) has been classified according to EN 13501-2:2007+A1:2009. The fire resistance classes are listed in Annex I (Mixed penetration seal) and P (Cable penetration seal) of the ETA.

#### General

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) can be used in apertures in walls and floors according to clause 1.2.1 of the ETA.

The penetration of cables, conduits / tubes, pipes and installation supports in accordance with clause 1.2.1 of the ETA is allowed.

The total cross section of the installations must not be more than 60 % of the opening size of the seal.

For plastic conduits / tubes the pipe end configuration can be U/U, U/C, C/U, C/C (depends on the seal thickness).

For steel conduits / tubes the pipe end configuration can be U/U.

For metal pipes the pipe end configuration has to be C/U, for plastic pipes the pipe end configuration can be U/U, U/C, C/U, C/C (depends on the seal thickness).

Conduits/ tubes, metal pipes and plastic pipes have to be installed perpendicular to the surface of the sealing.

Metal pipes insulated with mineral wool according to Annex G of the ETA can be installed in all angles between 90° and 45°.

Other parts or service support constructions must not penetrate the seal.

All types of cables and conduits/ tubes – in flexible walls, rigid walls and rigid floors – have to be supported on both sides of the sealing by steel cable trays (perforated or non-perforated), steel ladders or alternative service support constructions according to the ETA-holder's installation instructions. Steel cable trays (perforated or non-perforated) or steel ladders can pass through or end at the surface of the sealing.

The first support (service support construction) for cables, cable trays and conduits / tubes in flexible walls, rigid walls and rigid floors has to be at maximum 200 mm (measured from the surface of the sealing).

All pipes have to be supported on both sides of the sealing by service support construction. The first support has to be at maximum 750 mm in walls and 1200 mm in floors.

All types of cables and conduits / tubes, metal pipes and plastic pipes have to be fixed according to the ETA-holder's installation instructions to the installation supports / service support construction.

The installation supports have to be fixed according to the ETA-holder's installation instructions to the service support constructions.

The installation supports and the service support constructions have to be fixed according to the ETA-holder's installation instructions to the separating element or a suitable adjacent building element on both sides of the penetration seal in such a manner that in the case of fire no additional load is imposed on the seal. Furthermore it is assumed that this support is maintained for the required period of fire resistance.

Provisions according to the ETA-holder's installation instructions have to be taken that penetration seals installed in rigid floors cannot be stepped on.

Subsequent addition/removal of cables, conduits/tubes, pipes and installation supports is allowed.

After removal without addition of cables, conduits / tubes and installation supports the hole has to be closed according to the ETA-holder's installation instructions with „ZZ-Brandschutzschaum 2K NE“ (ZZ-Fire protection foam 2K NE).

### **Details for installation of Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE“ / „System ZZ-Fire protection foam 2K NE“**

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE“ (System ZZ-Fire protection foam 2K NE) will be formed by filling „ZZ-Brandschutzschaum 2K NE“ (ZZ-Fire protection foam 2K NE) in the opening of the separating element so that all interstices and voids are carefully sealed. Alternatively the remaining space around penetrating elements can be closed with „ZZ-Brandschutzstein NE“ (ZZ-Foam block NE).

It is possible to use formwork for the installation of the Mixed/ Cable penetration seal in walls and floors. If the formwork consists of cardboard or plastic foil, it may remain on the Mixed/ Cable penetration seal.

For tied cable bundles (see clause 1.2.1 of the ETA) the space between the cables needs not be filled with „ZZ-Brandschutzschaum 2K NE“ (ZZ-Fire protection foam 2K NE).

In some cases it is required – for fire resistance class EI 120 of Cable penetration seal – to wrap „ZZ-Wickel NE“ (ZZ-Wrap NE) on both sides of the sealing according to the ETA-holder's installation instructions around the cables, conduits / tubes and installation supports (see Annex O and Annex P of the ETA).

The minimum working clearances (a1, a2, a3) and the minimum clearance between the seals are specified in Annex F (Mixed penetration seal) and J to N (Cable penetration seal) of the ETA.

### **Details for installation in flexible wall constructions (see Annex A and J of the ETA)**

For walls thinner than the minimum thickness of the penetration seal (144 mm or 200 mm (Mixed Penetration seal, depends on the fire resistance classification, see Annex I of the ETA) and 144 mm, 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex P of the ETA)) the opening shall be lined with minimum 2 layers of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520:2004 (classification A2-s1,d0 according to EN 13501-1:2009+A1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1:2009+A1) with a minimum density of  $450 \text{ kg/m}^3$  and a minimum thickness of 25 mm. The boards shall be at least 144 mm or 200 mm (Mixed penetration seal, depends on the fire resistance classification, see Annex A and I of the ETA) and 144 mm, 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex J and P of the ETA) wide. The boards have to be installed and fixed according to the ETA-holder's installation instructions.

Alternatively the thickness of the wall can be increased to at least 144 mm or 200 mm (Mixed Penetration seal, depends on the fire resistance classification, see Annex I of the ETA) and 144 mm, 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex P of the ETA) by fitting a board frame, minimum 50 mm wide, around the opening (see Annex C and L of the ETA). Minimum 1 layer of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520:2004 (classification A2-s1,d0 according to EN 13501-1:2009+A1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1:2009+A1) with a minimum density of  $450 \text{ kg/m}^3$  can be used. The board frame has to be installed and fixed according to the ETA-holder's installation instructions.

When no lining is necessary or a board frame is used, the whole cavity within the wall has to be filled with insulation material (e. g. mineral wool with a melting point  $\geq 1000$  °C and a minimum compacted apparent density of  $40 \text{ kg/m}^3$  and class A1 or A2 according to EN 13501-1:2007+A1:2009 minimum 100 mm around the aperture).

If the aperture is greater than 320 mm x 320 mm it has to be lined additionally with two horizontal steel studs (construction and installation according to the ETA-holder's installation instructions).

Joints between the lining and the aperture have to be filled with „ZZ-Brandschutzschaum 2K NE“ (ZZ-Fire protection foam 2K NE), plaster or mineral mortar on both sides of the sealing according to the ETA-holder's installation instructions.

For timber stud walls there must be a minimum distance of 100 mm of the seal to any timber stud. The cavity between timber stud and seal must be closed completely with insulation with classification A1 or A2-s1,d0 according to EN 13501-1:2009+A1. The dimensions of the timber studs shall be  $\geq 50$  mm x 75 mm (breadth / depth).

#### **Details for installation in rigid walls (see Annex B to C (Mixed penetration seal) and K to L (Cable penetration seal) of the ETA)**

For walls thinner than the minimum thickness of the penetration seal (144 mm or 200 mm (Mixed Penetration seal, depends on the fire resistance classification, see Annex I of the ETA) and 144 mm, 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex P of the ETA)) the opening shall be lined with minimum 2 layers of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520:2004 (classification A2-s1,d0 according to EN 13501-1:2009+A1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1:2009+A1) with a minimum density of 450 kg/m<sup>3</sup> and a minimum thickness of 25 mm. The boards shall be at least 144 or 200 mm (Mixed penetration seal, depends on the fire resistance classification, see Annex C and I of the ETA) and 144 mm, 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex L and P of the ETA) wide. The boards have to be installed and fixed according to the ETA-holder's installation instructions.

Alternatively the thickness of the wall can be increased to at least 144 mm or 200 mm (Mixed Penetration seal, depends on the fire resistance classification, see Annex I of the ETA) and 144 mm, 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex P of the ETA) by fitting a board frame, minimum 50 mm wide, around the opening (see Annex C and L of the ETA). Minimum 1 layer of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520:2004 (classification A2-s1,d0 according to EN 13501-1:2009+A1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1:2009+A1) with a minimum density of 450 kg/m<sup>3</sup> can be used. The board frame has to be installed and fixed according to the ETA-holder's installation instructions.

#### **Details for installation in rigid floors (see Annex D to E (Mixed penetration seal) and M to N (Cable penetration seal) of the ETA)**

For floors thinner than the minimum thickness of the penetration seal (200 mm (Mixed penetration seal) and 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex P of the ETA)) the opening shall be lined with minimum 2 layers of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520:2004 (classification A2-s1,d0 according to EN 13501-1:2009+A1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1:2009+A1) with a minimum density of 450 kg/m<sup>3</sup> and a minimum thickness of 25 mm. The boards shall be at least 200 mm (Mixed penetration seal, see Annex E of the ETA) and 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex N and P of the ETA) wide. The boards have to be installed and fixed according to the ETA-holder's installation instructions.

Alternatively the thickness of the floor can be increased to at least 200 mm (Mixed Penetration seal) and 200 mm or 250 mm (Cable penetration seal, depends on the fire resistance classification, see Annex P of the ETA) by fitting a board frame, minimum 50 mm wide, around the opening (see Annex E and N of the ETA). Minimum 1 layer of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520:2004 (classification A2-s1,d0 according to EN 13501-1:2009+A1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1:2009+A1) with a minimum density of 450 kg/m<sup>3</sup> can be used. The board frame has to be installed and fixed according to the ETA-holder's installation instructions.

## 2.4 Hygiene, health and environment

### 2.4.1 Air permeability

The air permeability of Mixed-/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) was tested according to EN 1026:2000 in a flexible wall with a thickness of 100 mm. The lining of the opening made of calcium silicate boards was 200 mm wide. The opening size was 350 mm x 350 mm.

Due to the wide variation of service configurations the Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) was tested as blank penetration seal according to ETAG 026-Part 2 clause 2.4.3.

Up to a pressure difference of 600 Pa no air permeability was measured. The measurement accuracy of the test facility was 0,01 m<sup>3</sup>/h, so that the air permeability at  $\Delta p = 600$  Pa is less than 0,2 m<sup>3</sup>/(h\*m<sup>2</sup>).

### 2.4.2 Water permeability

No Performance Determined.

### 2.4.3 Release of dangerous substances

According to the manufacturer's declaration, the product specification has been compared with the list of dangerous substances of the European Commission to verify that it does not contain such substances above the acceptable limits.

A written declaration in this respect was submitted by the ETA-holder.

In addition to the specific clauses relating to dangerous substances contained in this ETA, 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 Directive, these requirements need also to be complied with, when and where they apply.

## 2.5 Safety in use

### 2.5.1 Mechanical resistance of stability

No Performance Determined.

### 2.5.2 Resistance to impact/movement

No Performance Determined.

### 2.5.3 Adhesion

No Performance Determined.

## 2.6 Protection against noise

### 2.6.1 Airborne sound insulation

The airborne sound insulation of Mixed-/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) was tested according to EN ISO 10140-2:2010 in a flexible wall with a thickness of 200 mm. The opening size was 360 x 360 mm.

Due to the wide variation of service configurations the Mixed-/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) was tested as blank penetration seal according to ETAG 026-Part 2 clause 2.4.9.

The minimum measured sound insulation in accordance with EN ISO 717-1:1996 was  
 $D_{n,e,w}(C;Ctr) = 66 (-1; -6)$  dB

## 2.7 Energy economy and heat retention

### 2.7.1 Thermal properties

The thermal properties of Mixed-/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) were tested according to EN 12667:2001.

The thermal conductivity value measured was  $\lambda = 0,088$  W/(m\*K).

### 2.7.2 Water vapour permeability

No Performance Determined.

## 2.8 General aspects relating to fitness for use

All components of Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) were tested according to ETAG 026-Part 2 clause 2.4.12.

All components of Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) fulfil the requirements for the intended use category.

The Mixed/ Cable penetration seal „System ZZ-Brandschutzschaum 2K NE” (System ZZ-Fire protection foam 2K NE) is therefore appropriate for internal use with high humidity, excluding temperatures below 0 °C, and can – according to ETAG 026-Part 2 clause 2.4.12.1.3.3 – be categorized as Type Z1. Since the requirements for Type Z1 are met, also the requirements for Type Z2 are fulfilled.

## 3 Evaluation of Conformity and CE Marking

### 3.1 Attestation of Conformity system

According to the Decision 1999/454/EC of the European Commission<sup>6</sup> system 1 of the attestation of conformity applies for fire-resistance-performance. This system of attestation of conformity is to be described in the following:

System 1: Certification of the conformity of the product by a Notified Certification Body on the basis of:

- a) Tasks of the manufacturer
  - 1) Factory Production Control
  - 2) Further testing of samples taken at the factory in accordance with a prescribed control plan
- b) Tasks of the Notified Body
  - 3) Initial type-testing of the product
  - 4) Initial inspection of factory and of factory production control
  - 5) Continuous surveillance, assessment and approval of factory production control

<sup>6</sup> Official Journal of the European Communities no. L 178, 14.7.1999, p. 52

Additionally according to the Decision 2001/596/EC of the European Commission<sup>7</sup> system 3 of the attestation of conformity is to be used in relation to the reaction-to-fire performance. This system of attestation of conformity is to be described in the following:

System 3: Declaration of conformity of the product by the manufacturer:

- a) Tasks of the manufacturer
  - 1) Factory Production Control
- b) Tasks of the Notified Body
  - 2) Initial type-testing of the product

## 3.2 Responsibilities

### 3.2.1 Tasks of the manufacturer

#### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer shall draw up and keep up-to-date documents defining the factory production control that applies. The documentation to be carried out by the manufacturer and the applicable procedures shall be appropriate to the product and manufacturing process. The factory production control shall ensure the conformity of the product to an appropriate level. This involves:

- a) the preparation of documented procedures and instructions relating to factory production control operations.
- b) the effective implementation of these procedures and instructions.
- c) the recording of these procedures and their results.
- d) the use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the factory production control to rectify the cause of non-conformity.
- e) a procedure to ensure that both the approval Body and the Notified (Certification) Bodies are advised before any significant change to the product, its components or manufacturing process, is made.
- f) a procedure to ensure that personnel involved in the production processes and the quality control procedures are qualified and adequately trained to carry out their required tasks.
- g) that all testing and measuring equipment is maintained and up to date calibration records are documented.
- h) maintenance of records to ensure every batch produced is clearly labelled with the batch number, which allows traceability to its production to be identified.

The manufacturer may only use components stated in the technical documentation of this European technical approval.

For the components which the ETA-holder does not manufacture by himself, he shall make sure that factory production control carried out by the other manufacturers gives the guaranty of the components compliance with the European technical approval.

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<sup>7</sup> Official Journal of the European Communities no. L 209, 2.8.2001, p. 33

The factory production control and the provisions taken by the ETA-holder for components not produced by himself shall be in accordance with the control plan<sup>8</sup> relating to this European technical approval which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at the Österreichisches Institut für Bautechnik.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

### 3.2.1.2 Other tasks of the manufacturer

The manufacturer shall provide a technical data sheet and an installation instruction with the following minimum information:

- technical data sheet:
  - a) Field of application:
    - 1) Building elements for which the penetration seal is suitable, type and properties of the building elements like minimum thickness, density, and – in case of lightweight constructions – the construction requirements.
    - 2) Services for which the penetration seal is suitable, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings (e.g. cable trays).
    - 3) Limits in size, minimum thickness etc. of the penetration seal.
  - b) Construction of the penetration seal including the necessary components and additional products (e.g. backfilling material) with clear indication whether they are generic or specific.
- Installation instruction:
  - a) Steps to be followed.
  - b) Procedure in case of retrofitting.

The manufacturer shall, on the basis of a contract, involve a body (bodies) which is (are) notified for the tasks referred to in section 3.1 in the field of approval product in order to undertake the actions laid down in section 3.3. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the Notified Body or Bodies involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval

### 3.2.2 Tasks of the Notified Bodies

The Notified Body (Bodies) shall perform the:

- initial type-testing of the product  
The results of the tests performed as part of the assessment for the European technical approval can be used unless there are changes in the production line or plant. In such cases, the necessary initial type testing has to be agreed between the Österreichisches Institut für Bautechnik and the Notified Bodies involved.
- initial inspection of factory and of factory production control  
The Notified Body (Bodies) shall ascertain that, in accordance with the control plan, the factory (in particular the employees and the equipment) and the factory production control are suitable to ensure continuous and orderly manufacturing of the components according to the specifications mentioned in clause 2 of this ETA.

<sup>8</sup> The control plan is a confidential part of the European technical approval and only handed over to the Notified Body or Bodies involved in the procedure of conformity.

- continuous surveillance, assessment and approval of factory production control  
The Notified Body (Bodies) shall visit the factory at least once a year for surveillance of this manufacturer having a FPC system complying with a quality management system covering the manufacturing of the approval product components. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking into account the control plan

These tasks shall be performed in accordance with the provisions laid down in the control plan of this European technical approval.

The Notified Body (Bodies) shall retain the essential points of its (their) actions referred to above and state the results obtained and conclusions drawn in written report.

- In the case of Attestation of Conformity system 1:  
The Notified Body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled, the Certification Body shall withdraw the certificate of conformity and inform the Österreichisches Institut für Bautechnik without delay.

### **3.3 CE marking**

The CE marking shall be affixed either on the product itself, on a label attached to it, on its packaging or on the commercial documents accompanying the components of the product. The letters « CE » shall be followed by the identification number of the Notified Body involved and be accompanied by the following additional information:

- the name or identifying mark and address of the ETA-holder
- the last two digits of the year in which the CE marking was affixed
- the number of the EC certificate of conformity for the product
- the number of the European technical approval
- the number of the ETAG (ETAG N° 026 part 2)
- the designation of the product (trade name)
- the use category in accordance with the ETA section 1 and 2
- for other relevant characteristics (e.g. resistance to fire) see ETA-11/0206

## **4 Assumptions under which the fitness of the product for the intended use was favourably assessed**

### **4.1 Manufacturing**

The European technical approval is issued for the product on the basis of agreed data/information, deposited with the Österreichisches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the Österreichisches Institut für Bautechnik before the changes are introduced. The Österreichisches Institut für Bautechnik will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

## **4.2 Installation**

The ETA is issued under the assumption that the installation of the approval product shall be in accordance with the manufacturer's technical literature.

## **5 Indications to the manufacturers**

### **5.1 Packaging, transport and storage**

In the accompanying document and/or on the packaging the manufacturer shall give information as to transport and storage.

At least the following shall be indicated: storing temperature, maximum duration of storage and required data related to minimum temperature for transport and storage.

### **5.2 Use, maintenance and repair**

The product shall be installed and used as described in this ETA.

The assessment of the fitness for use is based on the assumption that necessary maintenance and repair if required is carried out in accordance with the manufacturer's instructions during the assumed intended working life.

On behalf of Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits  
Managing Director

## View:

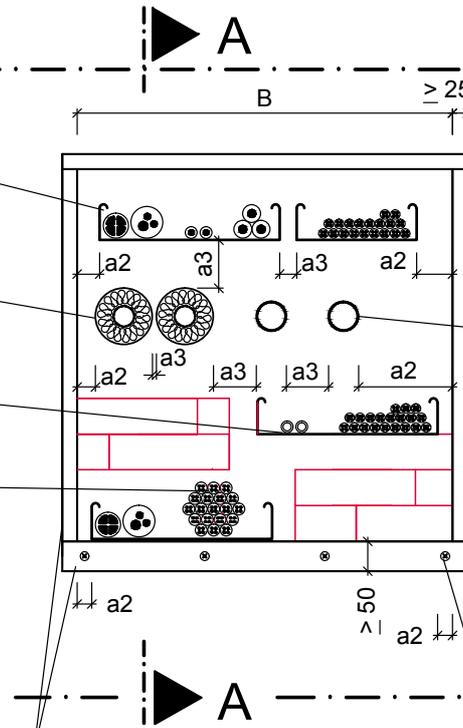
Installation supports / cables

Insulated metal pipes  
(see ANNEX G)

Steel conduits/ tubes, plastic  
conduits/ tubes

Tied cable bundles  
 $\varnothing \leq 100$  mm

Lining (min. two layers of gypsum board of thickness  $\geq 12,5$  mm or min. one layer of silicate/calcium silicate board of thickness  $\geq 25$  mm), alternatively frame made from gypsum board or silicate/ calcium silicate board  $\geq 50$  mm width around the opening (see clause 2.3.2 of the ETA)



Minimum clearance between cable penetration seals of the ETA  $\geq 100$  mm

Plastic pipes  
(see ANNEX H)

Fixing according to the ETA-holder's installation instruction

Min. working clearance:  
see ANNEX F

## Cross Section A-A:

Flexible wall

Lining made from gypsum board, or silicate/ calcium silicate board

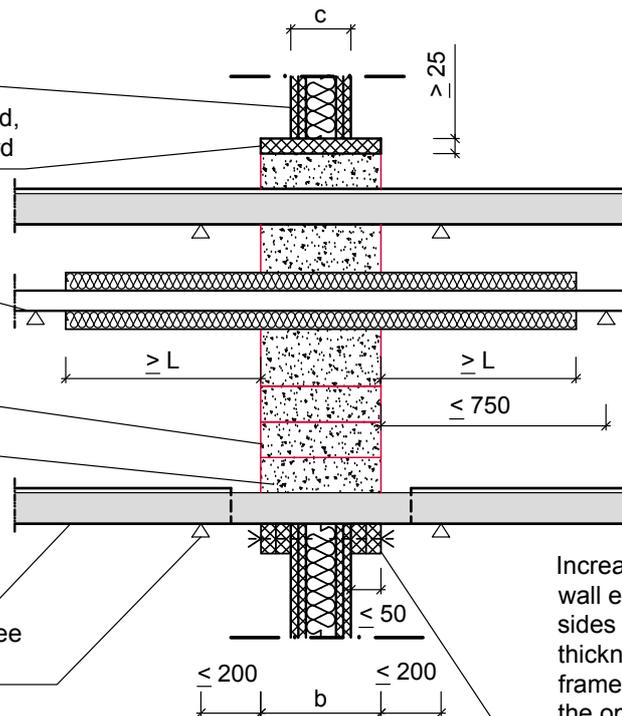
Insulated metal pipes  
(see ANNEX G)

"Joints Fire Block Pro+"

"Joints 2K Fire Foam Pro+"

Installation supports, cables, conduits/ tubes

Service support construction (see clause 2.3.2 of the ETA)



Increase the thickness of the wall either on one or on both sides to min. seal thickness by fitting a board frame ( $\geq 50$  mm wide) around the opening. Max. thickness of board frame is 50 mm.

All dimensions in mm

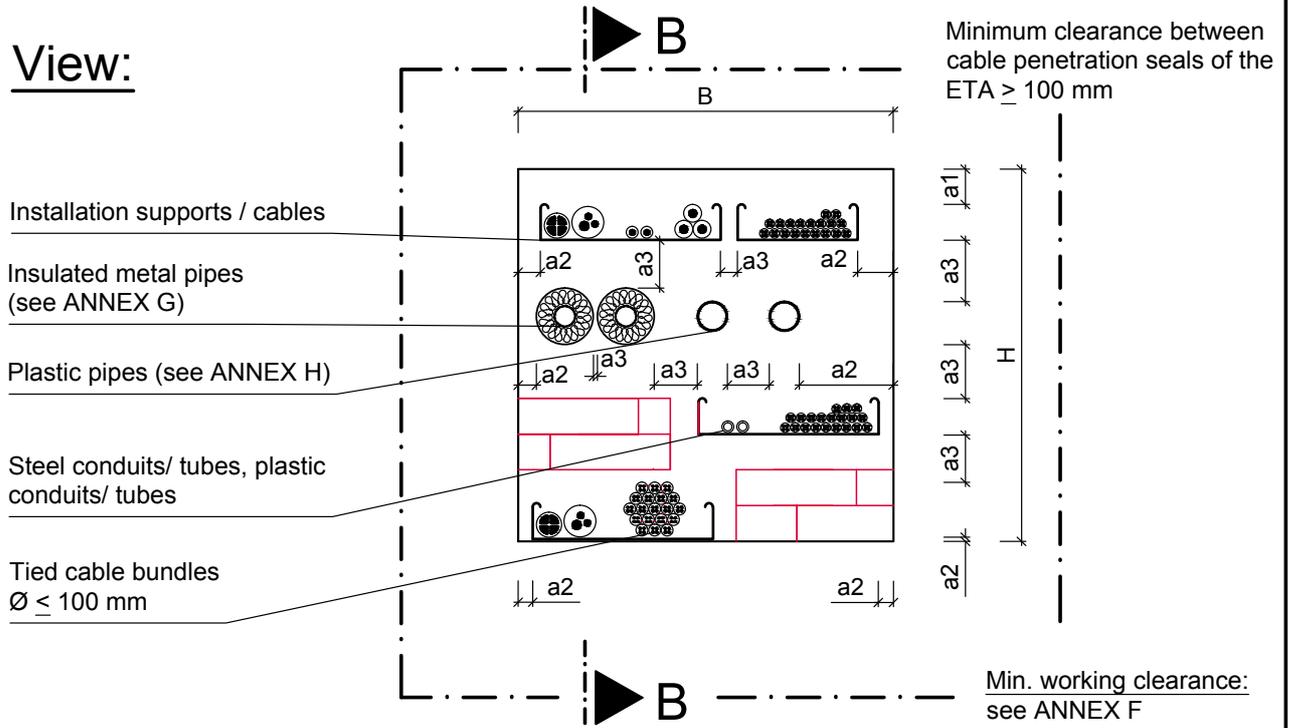
Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size H [mm]	B [mm]	Seal Thickness b [mm]
Flexible wall	see ANNEX I	$\geq 100$	$\leq 500$	$\leq 450$	see ANNEX I

Mixed penetration seal "Joints 2K Fire Foam Pro+"

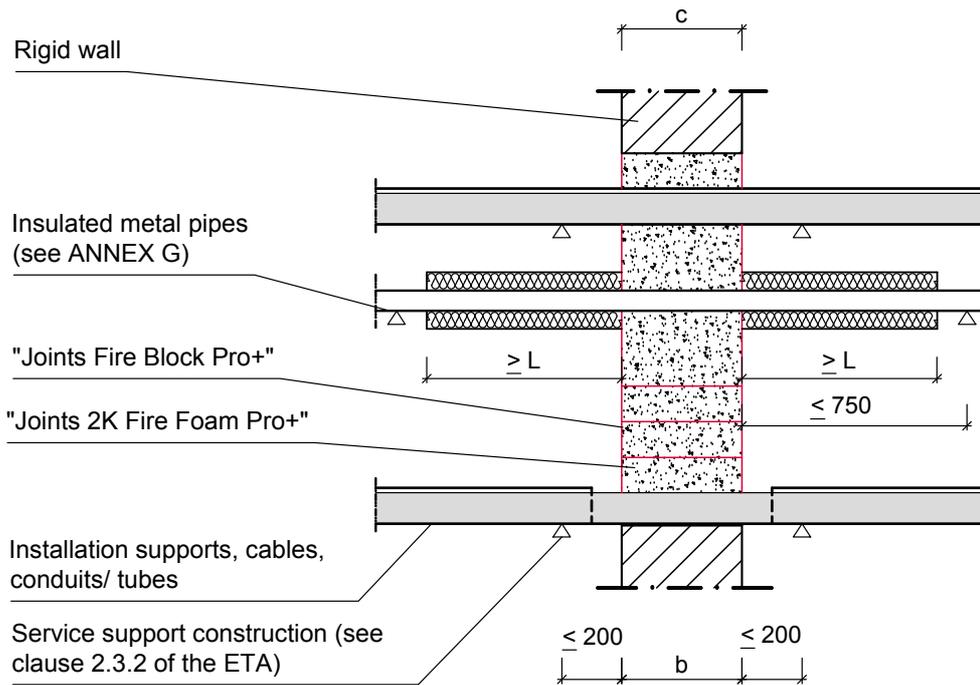
- Installation in flexible wall  $c \geq 100$  mm -

ANNEX A

# View:



# Cross Section B-B:



All dimensions in mm

Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Seal Thickness b [mm]
			H [mm]	B [mm]	
Rigid wall	see ANNEX I	$\geq b$	$\leq 500$	$\leq 450$	see ANNEX I

**Mixed penetration seal "Joints 2K Fire Foam Pro+"**  
 - Installation in rigid wall  
 c (wall thickness)  $\geq$  b (seal thickness) -

**ANNEX B**

# View:

Installation supports / cables

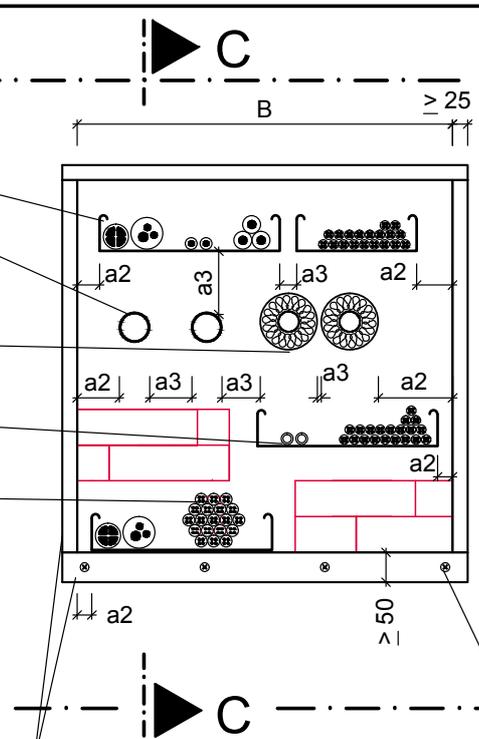
Plastic pipes (see ANNEX H)

Insulated metal pipes (see ANNEX G)

Steel conduits/ tubes, plastic conduits/ tubes

Tied cable bundles  $\varnothing \leq 100$  mm

Lining (min. two layers of gypsum board of thickness  $\geq 12,5$  mm or min. one layer of silicate/calcium silicate board of thickness  $\geq 25$  mm), alternatively frame made from gypsum board or silicate/ calcium silicate board  $\geq 50$  mm width around the opening (see clause 2.3.2 of the ETA)



Minimum clearance between cable penetration seals of the ETA  $\geq 100$  mm

Fixing according to the ETA-holder's installation instruction

Min. working clearance: see ANNEX F

# Cross Section C-C:

Lining made from gypsum board, or silicate/ calcium silicate board

Plastic pipes (see ANNEX H)

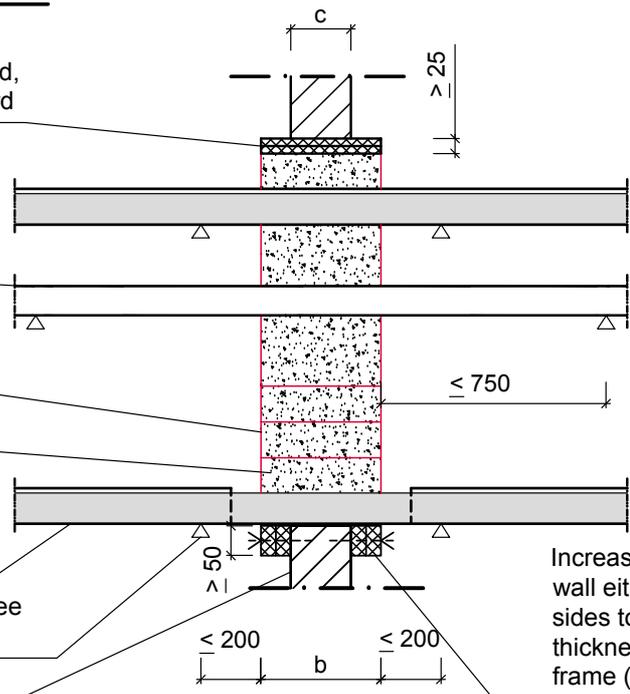
"Joints Fire Block Pro+"

"Joints 2K Fire Foam Pro+"

Installation supports, cables, conduits/ tubes

Service support construction (see clause 2.3.2 of the ETA)

Rigid wall



Increase the thickness of the wall either on one or on both sides to min. seal thickness by fitting a board frame ( $\geq 50$  mm wide) around the opening

All dimensions in mm

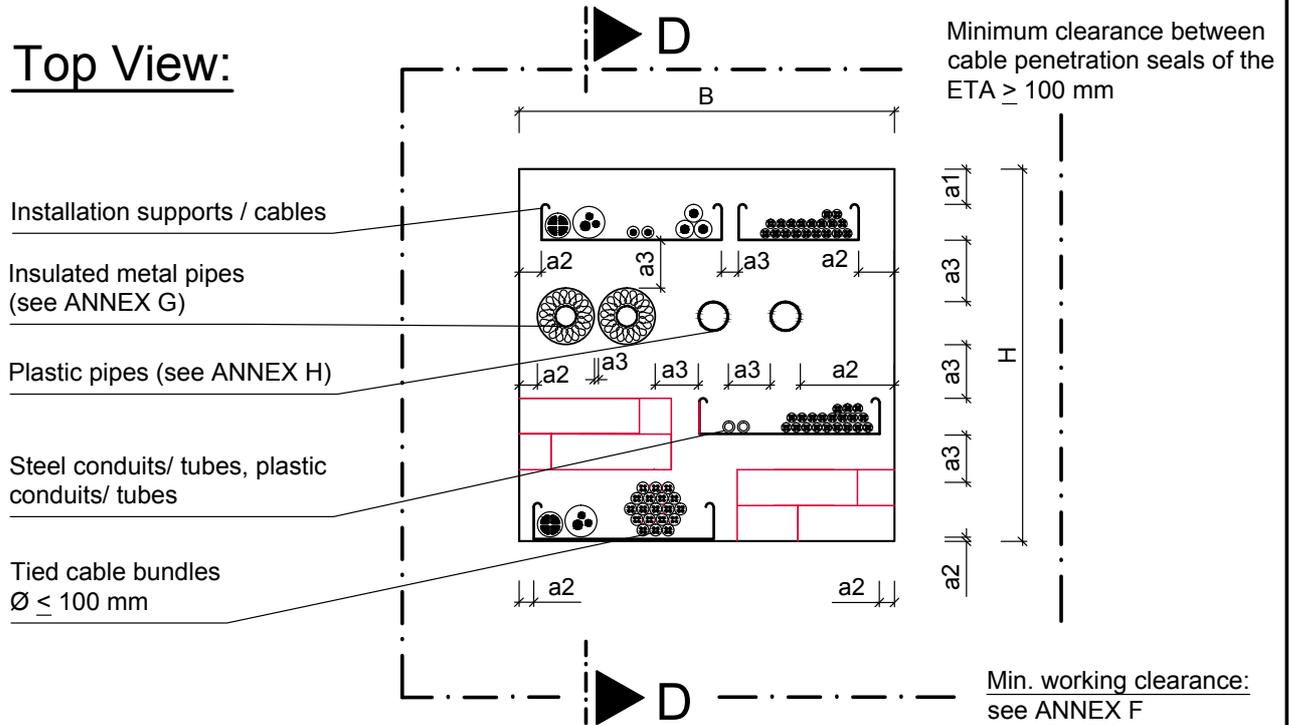
Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size H [mm]	B [mm]	Seal Thickness b [mm]
Rigid wall	see ANNEX I	$100 \leq c < b$	$\leq 500$	$\leq 450$	see ANNEX I

## Mixed penetration seal "Joints 2K Fire Foam Pro+"

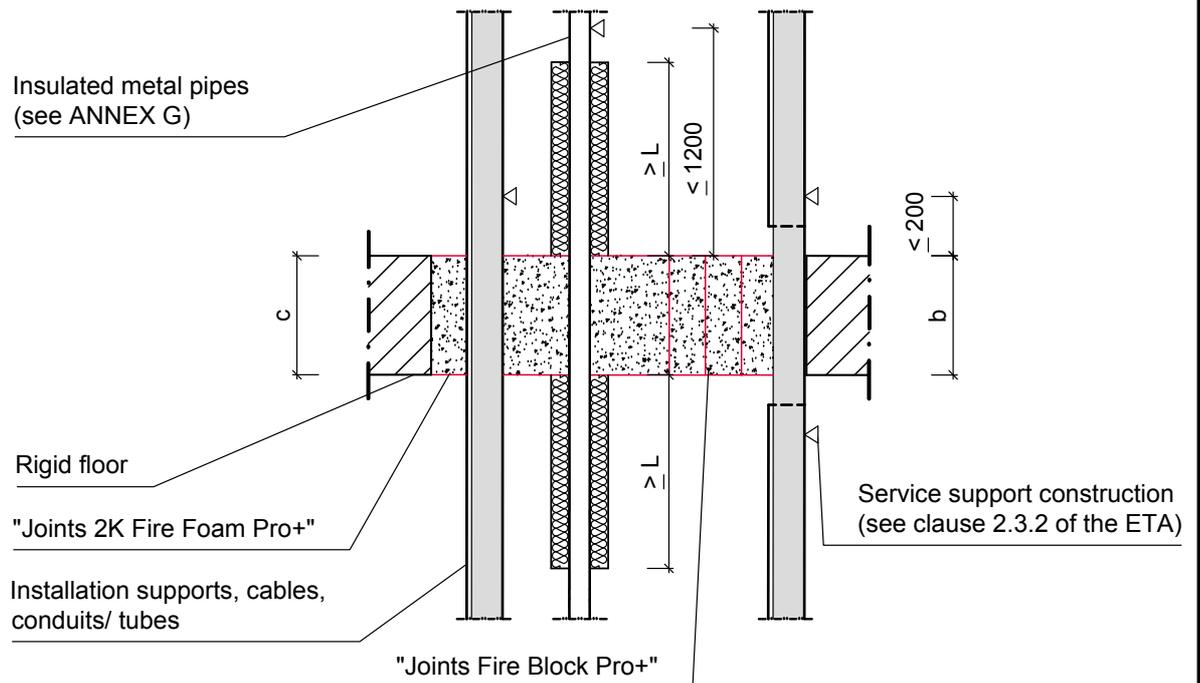
- Installation in rigid wall  $100 \text{ mm} \leq c < b$  -

ANNEX C

## Top View:



## Cross Section D-D:



All dimensions in mm

Separating element	Fire resistance classification	Floor thickness c [mm]	Max. opening size		Seal Thickness b [mm]
			H [mm]	B [mm]	
Rigid Floor	see ANNEX I	$\geq b$ (min. 150 mm)	$\leq 450$	$\leq 450$	see ANNEX I

**Mixed penetration seal "Joints 2K Fire Foam Pro+"**  
 - Installation in rigid floor  
 c (floor thickness)  $\geq$  b (seal thickness) -

ANNEX D

## Top View:

Installation supports / cables

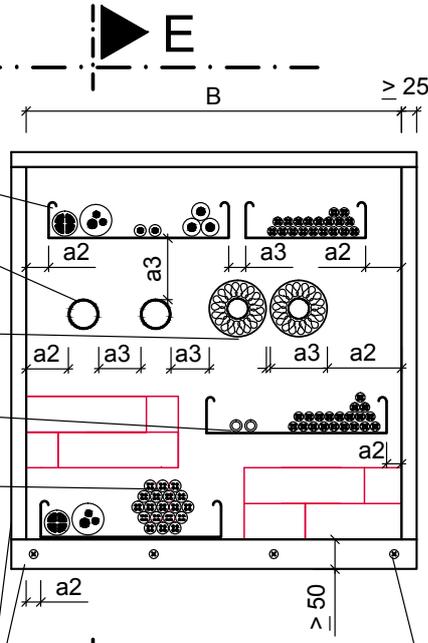
Plastic pipes (see ANNEX H)

Insulated metal pipes  
(see ANNEX G)

Steel conduits/ tubes, plastic  
conduits/ tubes

Tied cable bundles  
 $\varnothing \leq 100$  mm

Lining (min. two layers of gypsum board of thickness  $\geq 12,5$  mm or min. one layer of silicate/calcium silicate board of thickness  $\geq 25$  mm), alternatively frame made from gypsum board or silicate/ calcium silicate board  $\geq 50$  mm width around the opening (see clause 2.3.2 of the ETA)



Minimum clearance between cable penetration seals of the ETA  $\geq 100$  mm

Fixing according to the ETA-holder's installation instruction

Min. working clearance:  
see ANNEX F

## Cross Section E-E:

Lining made from gypsum board, or silicate/ calcium silicate board for seal thickness  $\geq 150$  mm

Rigid floor

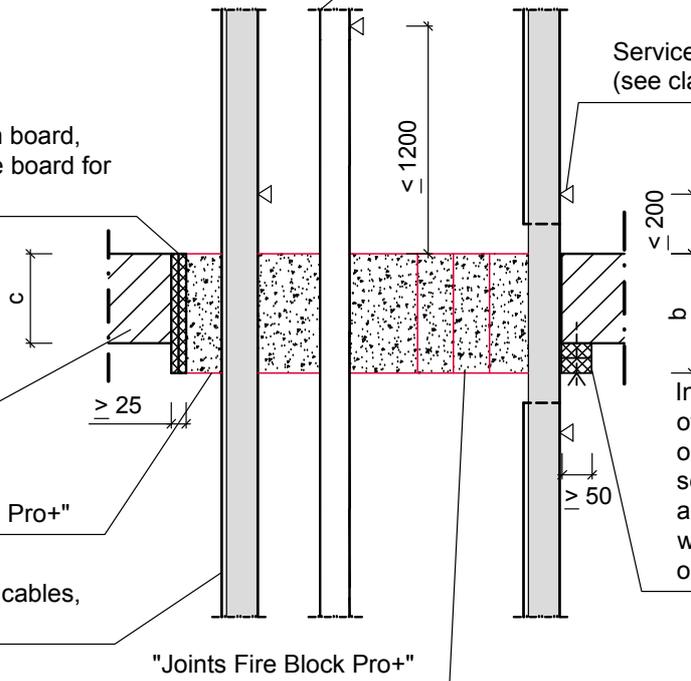
"Joints 2K Fire Foam Pro+"

Installation supports, cables, conduits/ tubes

"Joints Fire Block Pro+"

Plastic pipes  
(see ANNEX H)

Service support construction  
(see clause 2.3.2 of the ETA)



Increase the thickness of the floor either on one or on both sides to min. seal thickness by fitting a board frame ( $\geq 50$  mm wide) around the opening

All dimensions in mm

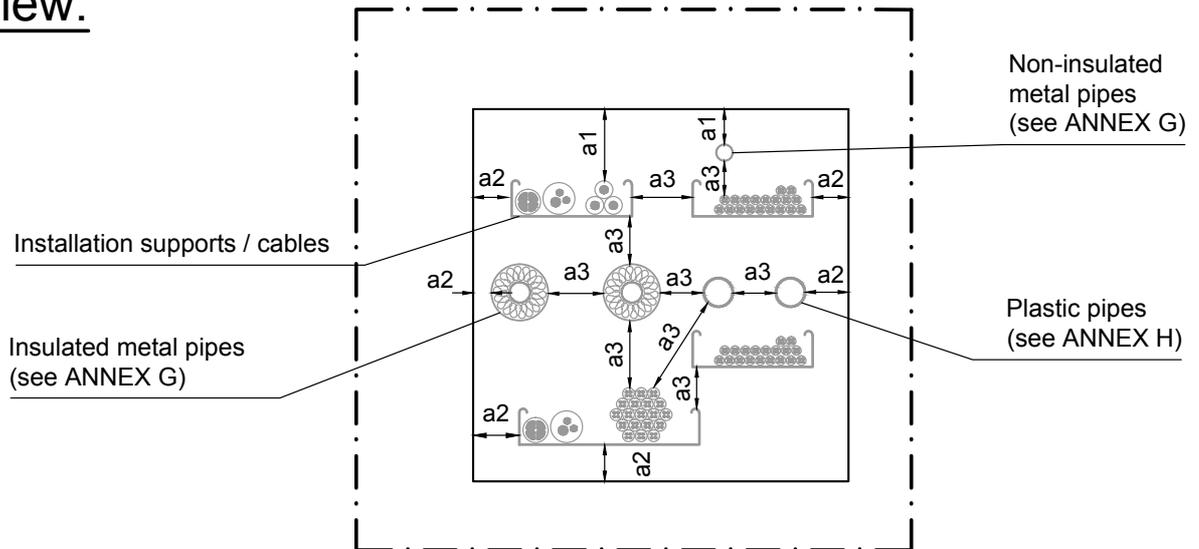
Separating element	Fire resistance classification	Floor thickness c [mm]	Max. opening size		Seal Thickness b [mm]
			H [mm]	B [mm]	
Rigid floor	see ANNEX I	$150 \leq c < b$	$\leq 450$	$\leq 450$	see ANNEX I

## Mixed penetration seal "Joints 2K Fire Foam Pro+"

- Installation in rigid floor  $150 \text{ mm} \leq c < b$  -

ANNEX E

## View:



Min. working clearance:

a1: Penetrating element / top edge of penetration seal

a2: Penetrating element / side or lower edge of penetration seal

a3: Penetrating element / Penetrating element

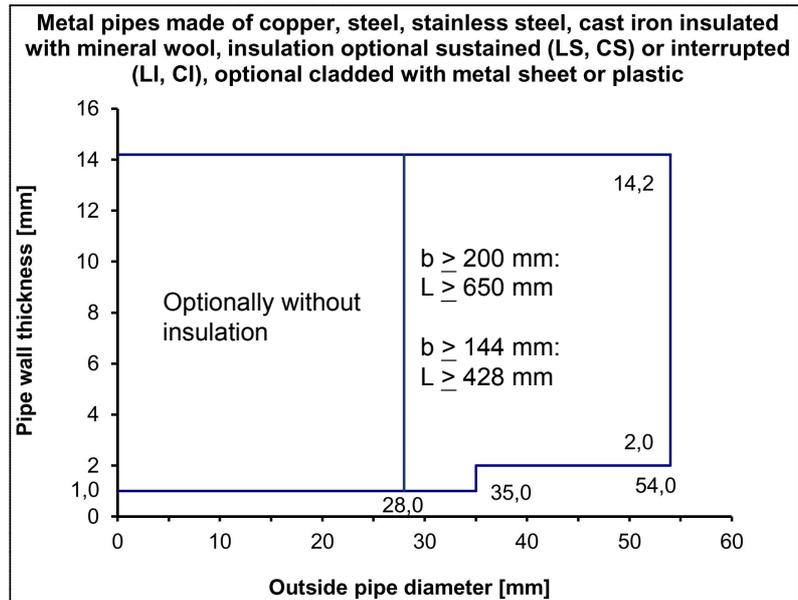
Minimum working clearance			
Penetrating element	a1	a2	a3
<b>Cables/ Cable trays/ Conduits</b>	50 mm	0 mm	<ul style="list-style-type: none"> <li>• Cables/ Cable trays/ Conduits, horizontal 0 mm</li> <li>• Cables/ Cable trays/ Conduits, vertical 50 mm</li> <li>• Non-insulated metal pipes 60 mm</li> <li>• Other penetrating elements 50 mm</li> </ul>
<b>Mineral wool insulated metal pipes</b>	0 mm	0 mm	<ul style="list-style-type: none"> <li>• Mineral wool insulated metal pipes 0 mm</li> <li>• Non-insulated metal pipes 60 mm</li> <li>• Other penetrating elements 50 mm</li> </ul>
<b>AF/Armaflex insulated metal pipes</b>	35 mm	35 mm	<ul style="list-style-type: none"> <li>• AF/Armaflex (thickness &gt; 9 mm) insulated metal pipes 35 mm</li> <li>• AF/Armaflex (thickness 9 mm) insulated metal pipes 50 mm</li> <li>• Non-insulated metal pipes 60 mm</li> <li>• Other penetrating elements 50 mm</li> </ul>
<b>Non-insulated metal pipes</b>	35 mm	35 mm	<ul style="list-style-type: none"> <li>• Non-insulated metal pipes 60 mm</li> <li>• Other penetrating elements 60 mm</li> </ul>
<b>Plastic pipes</b>	50 mm	50 mm	<ul style="list-style-type: none"> <li>• Plastic pipes 50 mm</li> <li>• Non-insulated metal pipes 60 mm</li> <li>• Other penetrating elements 50 mm</li> </ul>

Mixed penetration seal "Joints 2K  
Fire Foam Pro+"  
- Minimum working clearance -

ANNEX F

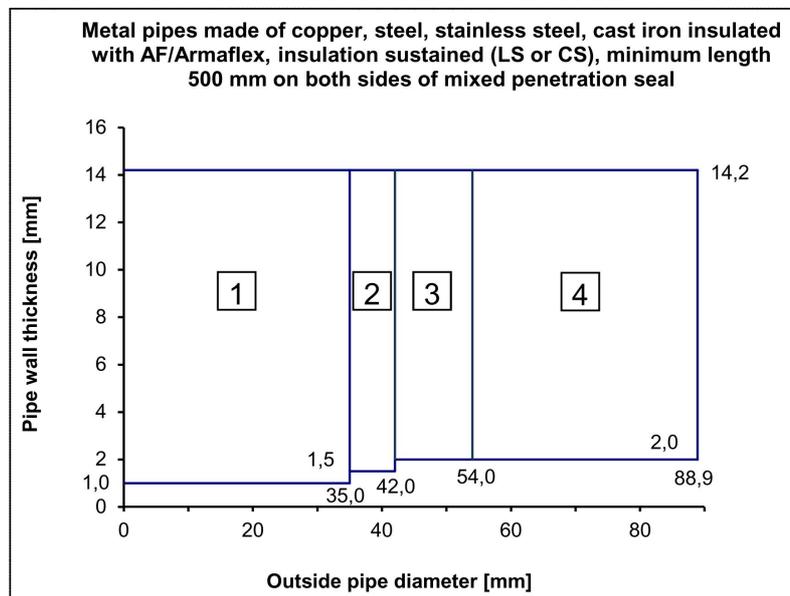
# Field of application of metal pipes

## Mineral wool (Rockwool) insulated metal pipes (C/U)



Case	Density of mineral wool	Thickness of mineral wool
LI (local-interrupted)	$\geq 90 \text{ kg/m}^3$	30 mm
LS (local-sustained)		30 mm
CI (continued-interrupted)		$\geq 30$ mm
CS (continued-sustained)		$\geq 30$ mm

## AF/Armaflex insulated metal pipes (C/U)



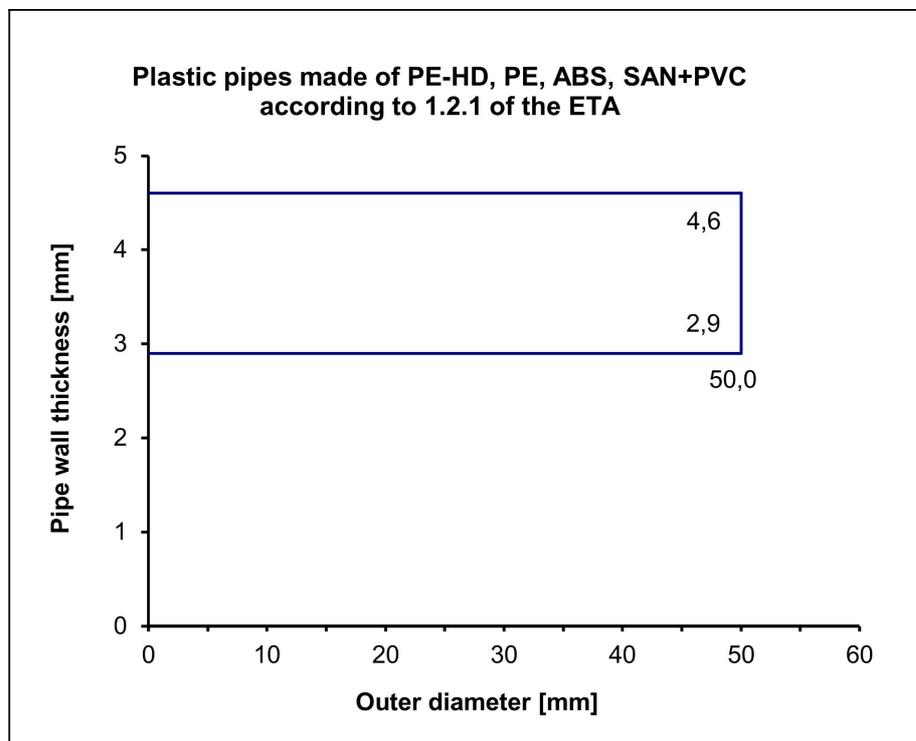
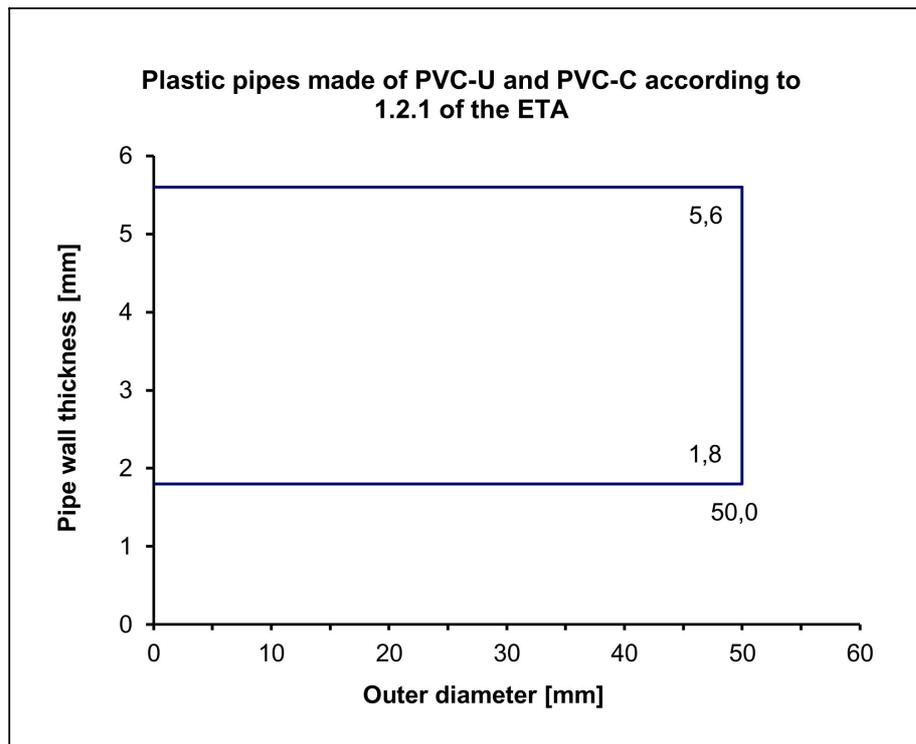
- 1 Insulation thickness 9,0 mm to 35,0 mm,  $L > 500$  mm
- 2 Insulation thickness 9,0 mm to 36,5 mm,  $L \geq 500$  mm
- 3 Insulation thickness 9,0 mm to 38,0 mm,  $L \geq 500$  mm
- 4 Insulation thickness 41,5 mm,  $L \geq 500$  mm

Mixed penetration seal "Joints 2K  
Fire Foam Pro+"

- Field of application of metal pipes -

ANNEX G

## Field of application of plastic pipes:



Mixed penetration seal "Joints 2K  
Fire Foam Pro+"  
- Field of application of plastic pipes -

ANNEX H

**Fire resistance classification of Mixed penetration seals:**  
**Installation in flexible walls and rigid walls (thickness  $\geq 100$  mm) up to 450 mm**  
**x 500 mm or rigid floors (thickness  $\geq 150$  mm) up to 450 mm x 450 mm**

<b>Penetrating element</b>	<b>Min. thickness of Mixed penetration seal</b>	
	<b>b <math>\geq 144</math> mm</b>	<b>b <math>\geq 200</math> mm</b>
<ul style="list-style-type: none"> <li>• Sheathed electrical/ telecommunication /optical fibre cables up to a maximum outer diameter of 80 mm</li> <li>• Tied bundles up to 100 mm overall diameter containing sheathed electrical/ telecommunication /optical fibre cables of a max.diameter up to 21 mm</li> </ul>	wall: E 120 / EI 60 floor: E 60 / EI 60	wall and floor: E 120 / EI 90
Non-sheathed cables up to a maximum outer diameter of 24 mm	wall: E 120 / EI 45 floor: E 60 / EI 30	wall and floor: E 120 / EI 60
Steel conduits/ tubes up to $\varnothing$ 16 mm with/ without cables	wall: E 120-U/C / EI 60-U/C floor: E 60-U/C / EI 60-U/C	wall and floor: E 120-U/U / EI 90-U/U
Plastic conduits/ tubes up to $\varnothing$ 40 mm with/ without cables	wall: E 120-U/C / EI 90-U/C floor: E 60-U/C / EI 60-U/C	wall and floor: E 120-U/U / EI 120-U/U
Mineral wool (Rockwool) insulated metal pipes up to a max. outer diameter of 54 mm	wall: E 120-C/U / EI 90-C/U floor: E 60-C/U / EI 60-C/U	wall and floor: E 120-C/U / EI 90-C/U
Non-insulated metal pipes up to a max. outer diameter of 28 mm	wall: E 120-C/U / EI 60-C/U floor: E 60-C/U / EI 60-C/U	wall and floor: E 120-C/U / EI 90-C/U
AF/Armaflex (thickness > 9 mm) insulated metal pipes up to a max. outer diameter of 88,9 mm *)	wall: E 120-C/U / EI 90-C/U floor: E 60-C/U / EI 60-C/U	wall and floor: E 120-C/U / EI 120-C/U
AF/Armaflex (thickness 9 mm) insulated metal pipes up to a max. outer diameter of 54 mm	wall: E 120-C/U / EI 90-C/U floor: E 60-C/U / EI 60-C/U	wall and floor: E 120-C/U / EI 90-C/U
Plastic pipes up to a max. outer diameter of 50 mm	wall: E 120-U/C / EI 120-U/C floor: E 60-U/C / EI 60-U/C	wall and floor: E 120-U/U / EI 120-U/U

\*) For allowable max insulation thickness see ANNEX G

Mixed penetration seal "Joints 2K  
Fire Foam Pro+"  
- Fire resistance classification -

ANNEX I

## View:

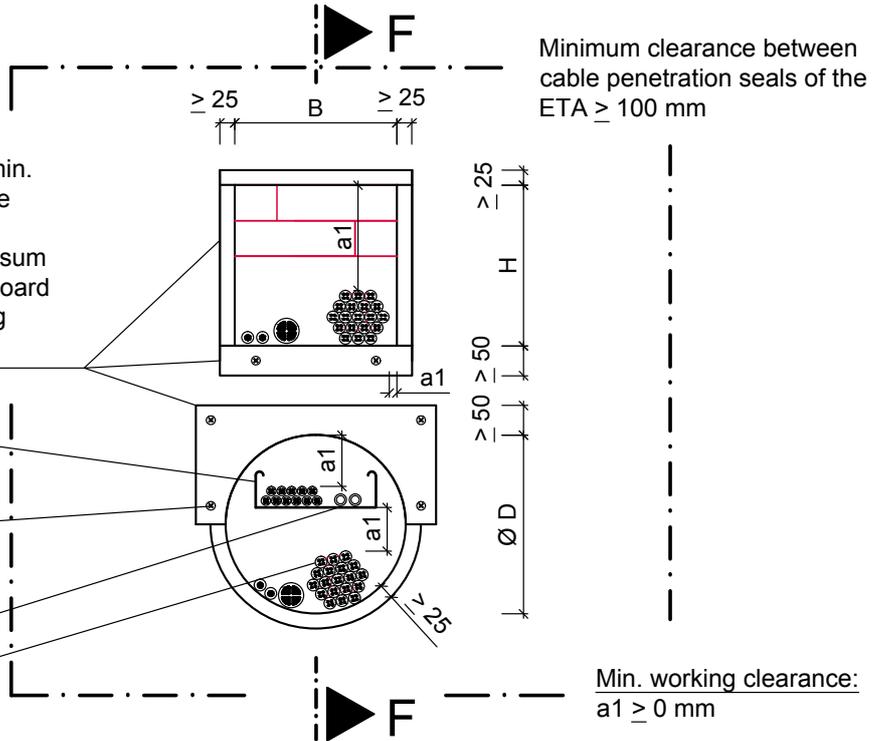
Lining (min. two layers of gypsum board of thickness  $\geq 12,5$  mm or min. one layer of silicate/calcium silicate board of thickness  $\geq 25$  mm), alternatively frame made from gypsum board or silicate/ calcium silicate board  $\geq 50$  mm width around the opening (see clause 2.3.2 of the ETA)

Installation supports / cables

Fixing according to the ETA-holder's installation instruction

Steel conduits/ tubes, plastic conduits/ tubes

Tied cable bundles  
 $\varnothing \leq 100$  mm



## Cross Section F-F:

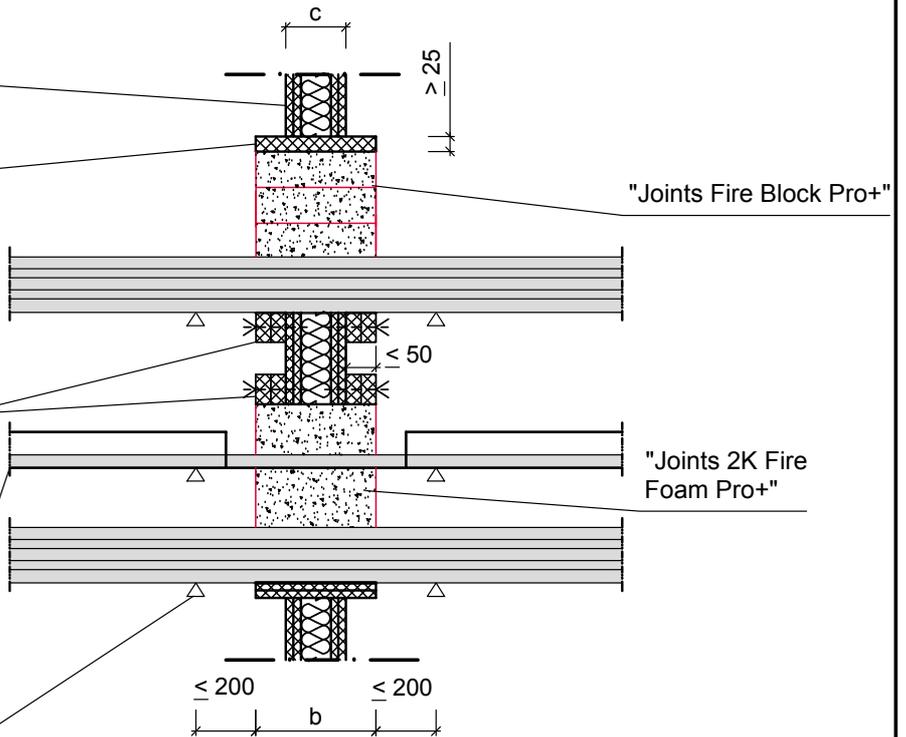
Flexible wall

Lining made from gypsum board, or silicate/ calcium silicate board

Increase the thickness of the wall either on one or on both sides to min. seal thickness by fitting a board frame ( $\geq 50$  mm wide) around the opening. Max. thickness of board frame is 50 mm.

Installation supports, cables, conduits/ tubes

Service support construction (see clause 2.3.2 of the ETA)



All dimensions in mm

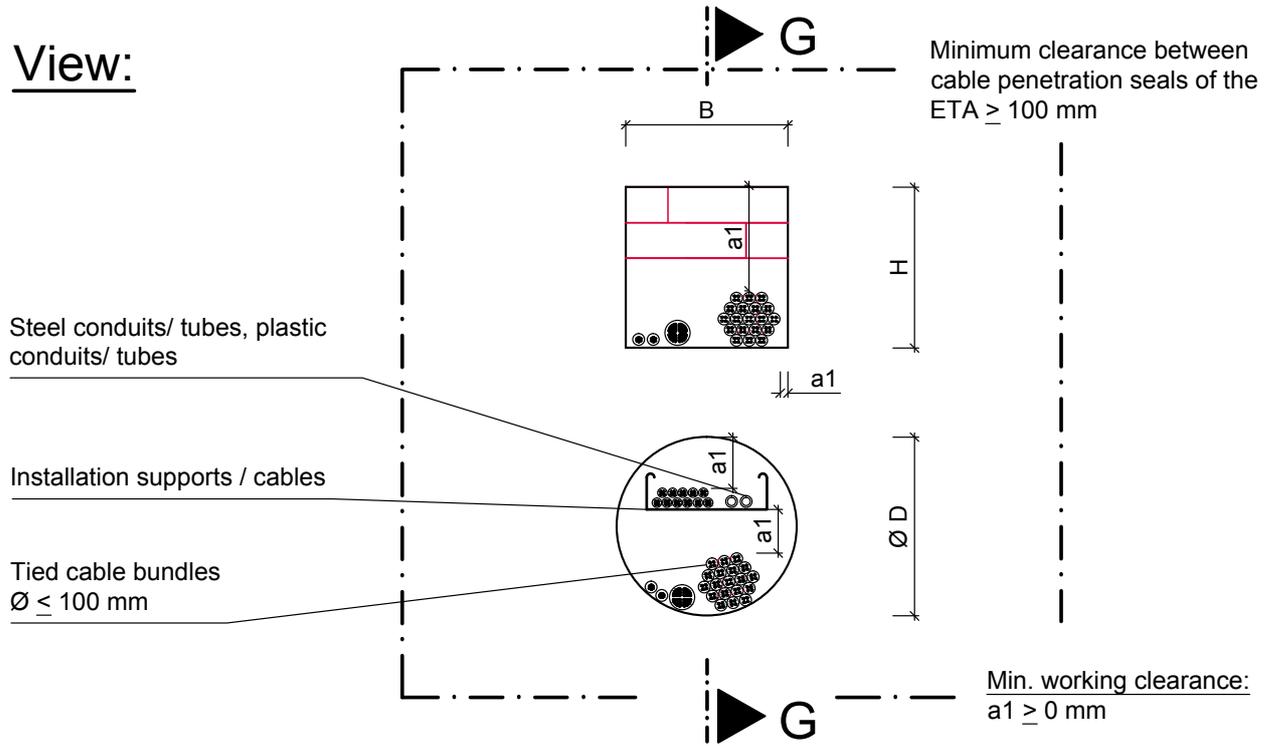
Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size H [mm] x B [mm] / $\varnothing$ D [mm]	Seal Thickness b [mm]
Flexible wall	see ANNEX P	$\geq 100$	$\leq 270 \times 270 / \varnothing \leq 300$	see ANNEX P

Cable penetration seal "Joints 2K Fire Foam Pro+"

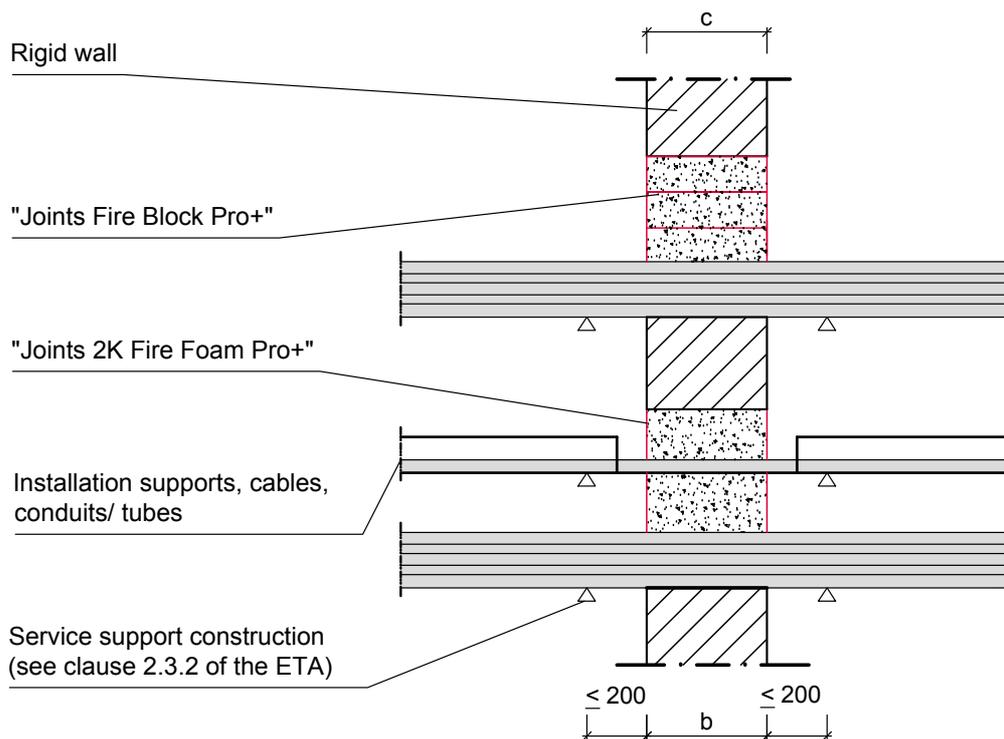
ANNEX J

- Installation in flexible wall  $c \geq 100$  mm -

## View:



## Cross Section G-G:



All dimensions in mm

Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size H [mm] x B [mm] / Ø D [mm]	Seal Thickness b [mm]
Rigid wall	see ANNEX P	$\geq b$	$\leq 270 \times 270 / \text{Ø} \leq 300$	see ANNEX P

**Cable penetration seal "Joints 2K Fire Foam Pro+"**  
 - Installation in rigid wall  
 c (wall thickness)  $\geq$  b (seal thickness) -

ANNEX K

## View:

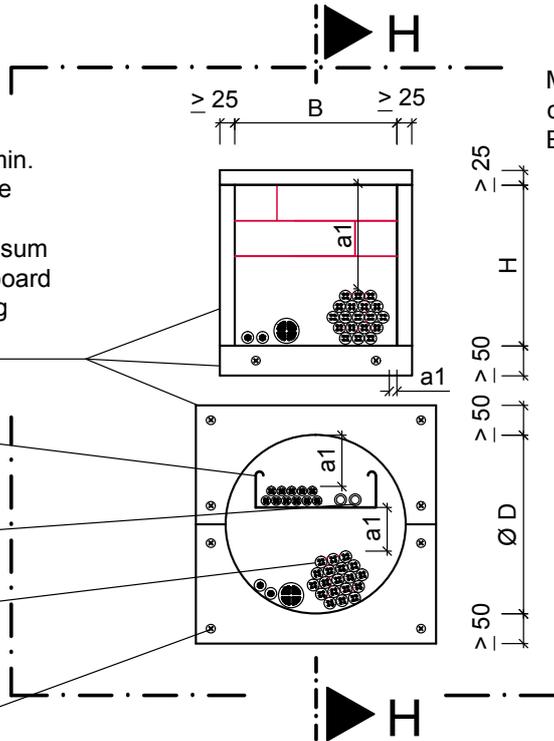
Lining (min. two layers of gypsum board of thickness  $\geq 12,5$  mm or min. one layer of silicate/calcium silicate board of thickness  $\geq 25$  mm), alternatively frame made from gypsum board or silicate/ calcium silicate board  $\geq 50$  mm width around the opening (see clause 2.3.2 of the ETA)

Installation supports / cables

Steel conduits/ tubes, plastic conduits/ tubes

Tied cable bundles  
 $\varnothing \leq 100$  mm

Fixing according to the ETA-holder's installation instruction



Minimum clearance between cable penetration seals of the ETA  $\geq 100$  mm

Min. working clearance:  
 $a1 \geq 0$  mm

## Cross Section H-H:

Lining made from gypsum board, or silicate/ calcium silicate board

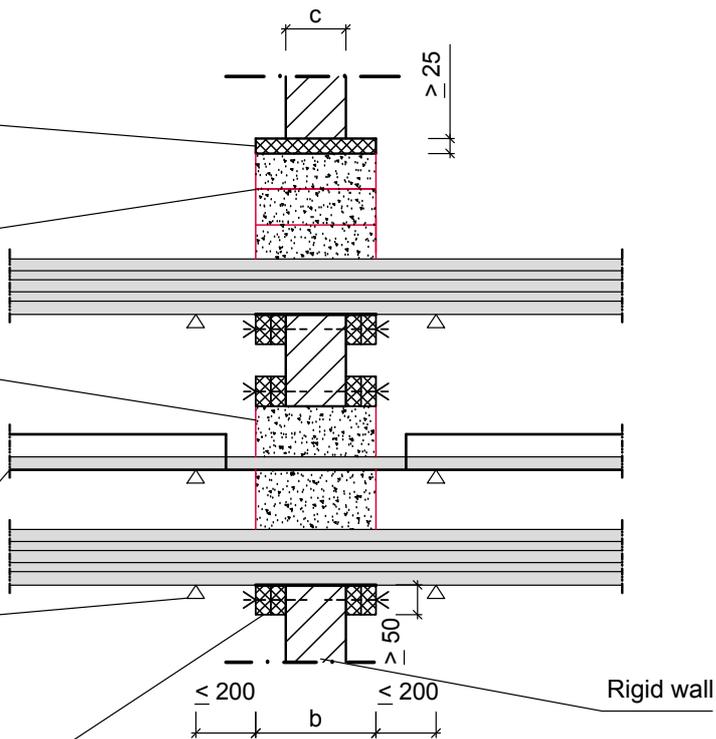
"Joints Fire Block Pro+"

"Joints 2K Fire Foam Pro+"

Installation supports, cables, conduits/ tubes

Service support construction (see clause 2.3.2 of the ETA)

Increase the thickness of the wall either on one or on both sides to min. seal thickness by fitting a board frame ( $\geq 50$  mm wide) around the opening



All dimensions in mm

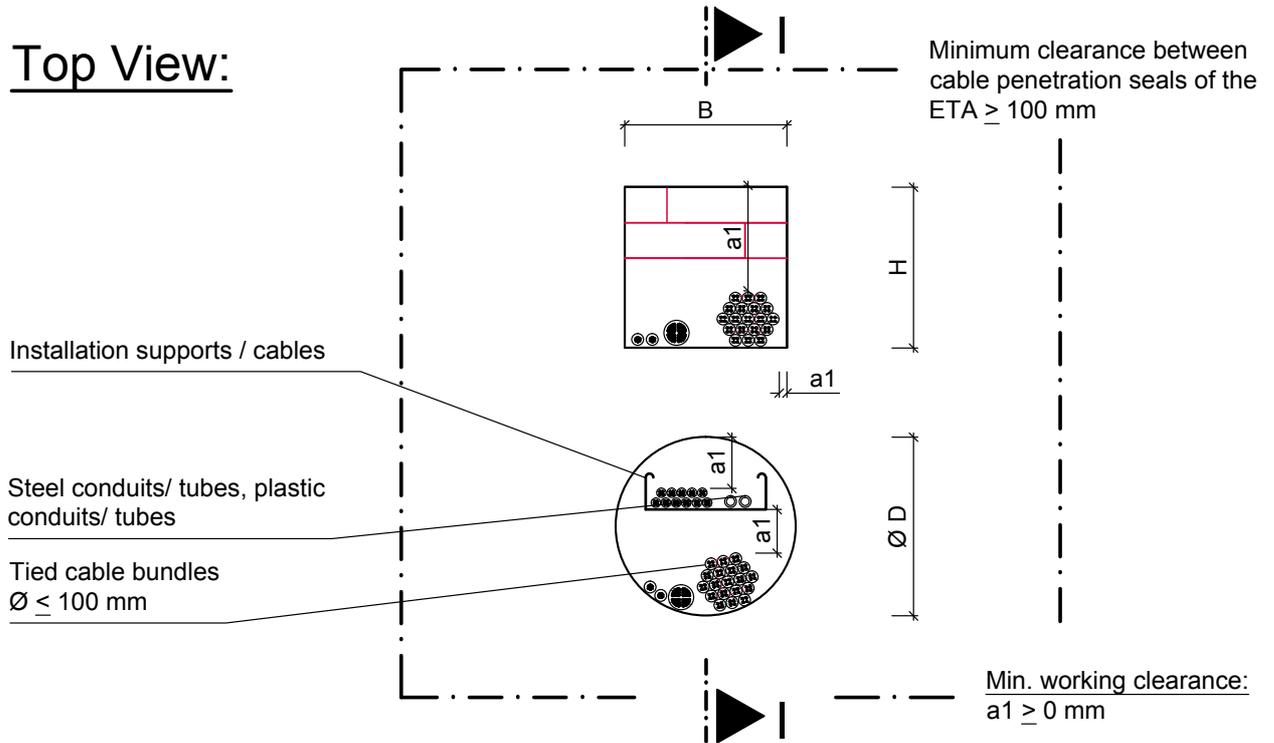
Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size H [mm] x B [mm] / Ø D [mm]	Seal Thickness b [mm]
Rigid wall	see ANNEX P	$100 \leq c < b$	$\leq 270 \times 270 / \varnothing \leq 300$	see ANNEX P

## Cable penetration seal "Joints 2K Fire Foam Pro+"

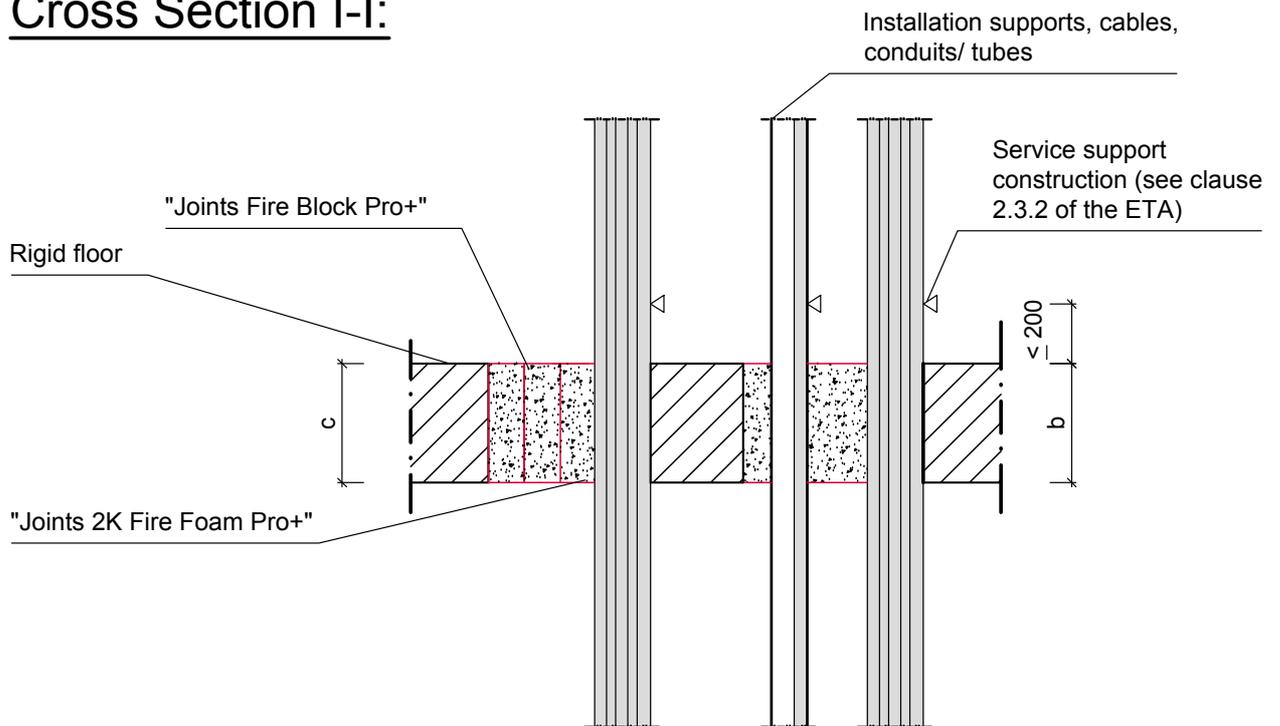
- Installation in rigid wall  $100 \text{ mm} \leq c < b$  -

ANNEX L

## Top View:



## Cross Section I-I:



All dimensions in mm

Separating element	Fire resistance classification	Floor thickness $c$ [mm]	Max. opening size $H$ [mm] x $B$ [mm] / $\varnothing D$ [mm]	Seal Thickness $b$ [mm]
Rigid floor	see ANNEX P	$\geq b$ (min. 150 mm)	$\leq 270 \times 270$ / $\varnothing \leq 300$	see ANNEX P

**Cable penetration seal "Joints 2K Fire Foam Pro+"**  
 - Installation in rigid floor  
 $c$  (floor thickness)  $\geq b$  (seal thickness) -

**ANNEX M**

## Top View:

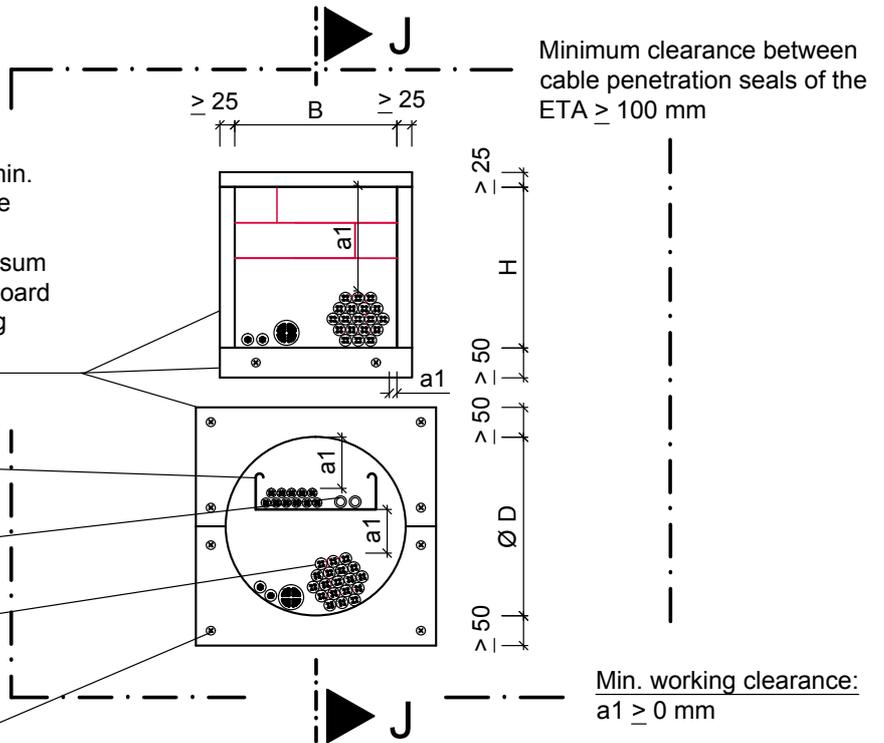
Lining (min. two layers of gypsum board of thickness  $\geq 12,5$  mm or min. one layer of silicate/calcium silicate board of thickness  $\geq 25$  mm), alternatively frame made from gypsum board or silicate/ calcium silicate board  $\geq 50$  mm width around the opening (see clause 2.3.2 of the ETA)

Installation supports / cables

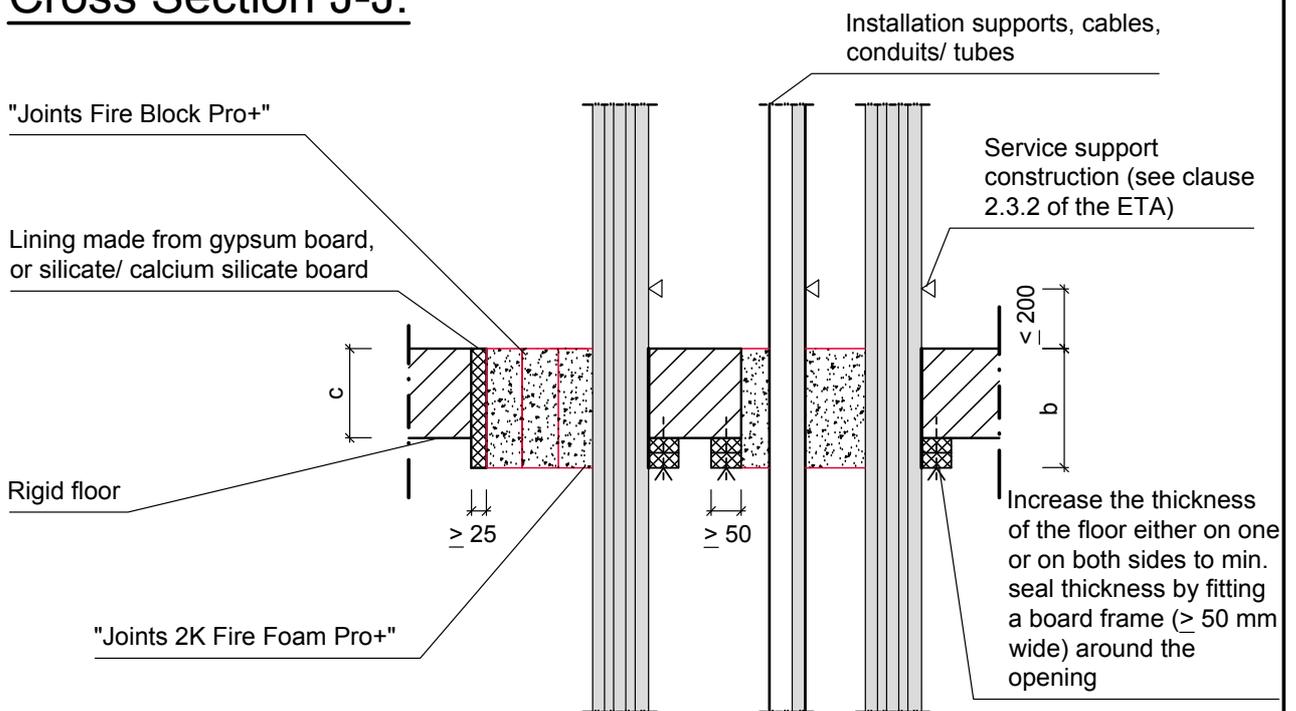
Steel conduits/ tubes, plastic conduits/ tubes

Tied cable bundles  
 $\varnothing \leq 100$  mm

Fixing according to the ETA-holder's installation instruction



## Cross Section J-J:



All dimensions in mm

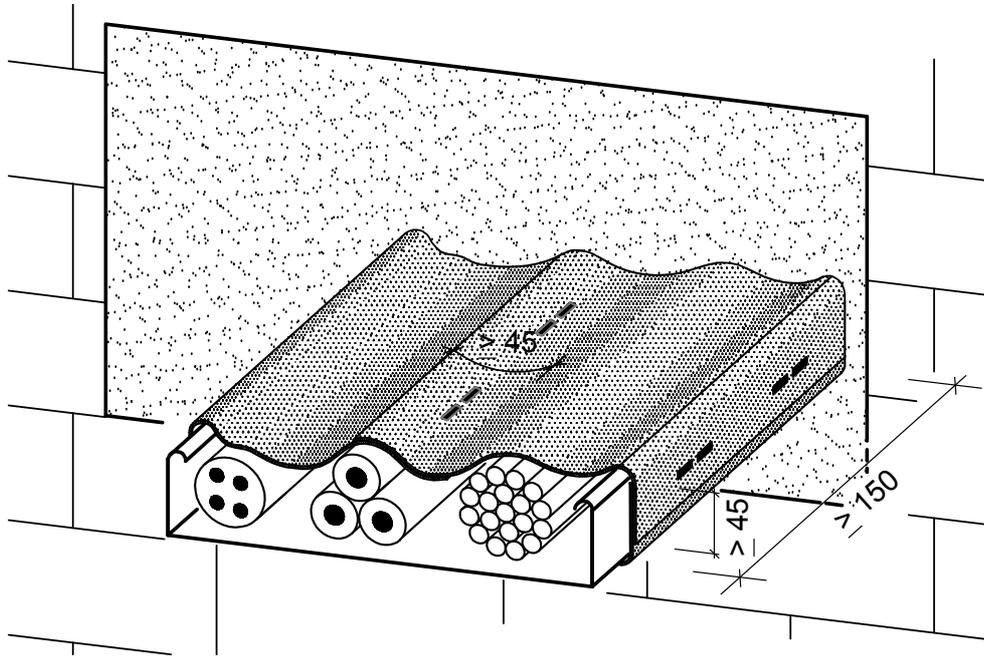
Separating element	Fire resistance classification	Floor thickness c [mm]	Max. opening size H [mm] x B [mm] / $\varnothing$ D [mm]	Seal Thickness b [mm]
Rigid floor	see ANNEX P	$150 \leq c < b$	$\leq 270 \times 270 / \varnothing \leq 300$	see ANNEX P

Cable penetration seal "Joints 2K  
Fire Foam Pro+"

- Installation in rigid floor  $150 \leq c < b$  -

ANNEX N

## Arrangement of "Joints Fire Wrap Pro+" for fire resistance classification EI 120:



### For fire resistance classification EI120:

The cables or cable trays have to be wrapped with strips of "Joints Fire Wrap Pro+" of at least 150 mm width on both sides.

The glass fabric reinforcement fixed to one side of the wrap has to be on the outside. The ends of the wrap have to be fixed with two steel clips or steel wire according to the ETA-holder's installation instruction.

Strips have to overlap each other at least 45 mm.

All dimensions in mm

Cable penetration seal "Joints 2K  
Fire Foam Pro+"  
- Arrangement of "Joints Fire Wrap Pro+" for  
fire resistance classification EI 120 -

ANNEX O

**Fire resistance classification of Cable penetration seals:  
Installation in flexible walls and rigid walls (thickness  $\geq 100$  mm) or rigid  
floors (thickness  $\geq 150$  mm) up to 270 mm x 270 mm or  $\varnothing$  300 mm**

<b>Penetrating element</b>	<b>Min. thickness of Cable penetration seal</b>			
	<b>b <math>\geq 100</math> mm</b>	<b>b <math>\geq 144</math> mm</b>	<b>b <math>\geq 200</math> mm</b>	<b>b <math>\geq 250</math> mm</b>
Sheathed electrical/ telecommunication /optical fibre cables up to a maximum outer diameter of 21 mm	E 120 EI 60	E 120 EI 90	E 120 wall: EI 90 / EI 120 <sup>2)</sup> floor: EI 120	E 120 EI 120
Sheathed electrical/ telecommunication /optical fibre cables up to a maximum outer diameter of 21 mm < $\varnothing \leq 50$ mm	wall: E 120 / EI 45 / EI 60 <sup>1)</sup>	E 120 EI 60	E 120 EI 90 / EI 120 <sup>2)</sup>	E 120 EI 120
Sheathed electrical/ telecommunication /optical fibre cables up to a maximum outer diameter of 50 mm < $\varnothing \leq 80$ mm	---	E 120 EI 60	E 120 EI 90/ EI 120 <sup>2)</sup>	E 120 EI 90
Tied bundles up to 100 mm overall diameter containing sheathed electrical/ telecommunication /optical fibre cables of a max.diameter up to 21 mm	---	E 120 EI 60	E 120 wall: EI 90 floor: EI 90/ EI 120 <sup>2)</sup>	E 120 wall: EI 90 floor: EI 120
Non-sheathed cables up to a maximum outer diameter of 24 mm	---	E 120 wall: EI 45 floor: EI 30	E 120 wall: EI 90 floor: EI 60	E 120 wall: EI 90 floor: EI 60
Steel conduits/ tubes up to $\varnothing$ 16 mm with/ without cables	---	E 120-U/C EI 60-U/C	E 120-U/U wall: EI 120-U/U floor: EI 90-U/U	E 120-U/U wall: EI 120-U/U floor: EI 120-U/U
Plastic conduits/ tubes up to $\varnothing$ 40 mm with/ without cables	---	E 120-U/C EI 120-U/C	E 120-U/U EI 120-U/U	E 120-U/U EI 120-U/U

- 1) A bead of "Joints 2K Fire Foam Pro+" with min. dimension of 30 mm (length) x 20 mm (thickness) has to be applied around the penetrating element on both sides of the wall.
- 2) "Joints Fire Wrap Pro+" (see ANNEX O) has to be wrapped around the penetrating element.

**Cable penetration seal  
"Joints 2K Fire Foam Pro+"  
- Fire resistance classification -**

**ANNEX P**