

# Certificates



**Insulation**

**PYROPLUG® Block**

European Technical Assessment No. ETA-15/0803 of 12-28-2015

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## European Technical Assessment

**ETA-15/0803**  
of 28.12.2015

General part

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

Österreichisches Institut für Bautechnik (OIB)  
Austrian Institute of Construction Engineering

**Trade name of the construction product**

System PYROPLUG® Block

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

Fire Stopping and Fire Sealing Products:  
Penetration Seals

**Manufacturer**

OBO Bettermann GmbH & Co. KG  
Hüingser Ring 52  
58710 Menden  
GERMANY

**Manufacturing plant**

Herstellwerk Z

**This European Technical Assessment contains**

33 pages including Annexes A-1 to J-1 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 for "Fire Stopping and Fire Sealing Products", ETAG 026 Part 2: "Penetration Seals", edition August 2011, used as European Assessment Document (EAD)

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Specific part

**1 Technical description of the product**

“System PYROPLUG® Block” is a kit to be used as a mixed penetration seal based on the following components and additional insulations.

Components of “System PYROPLUG® Block”	Characteristics
FBA-B	Block-shaped intumescent elastic product (can be vacuum-packed) on the basis of polyurethane with intumescent fire protection additives
PYROPLUG® Screed, FBA-SP	Intumescent pasty, brushable mastic on the basis of acrylate with intumescent fire protection additives
FBA-WI	Intumescent wrap on the basis of butyl rubber with intumescent fire protection additives and glass fabric reinforcement
PYROSIT® NG, FBS	Product in cartridges on the basis of polyurethane with intumescent fire protection additives. After application it reacts and increases its volume

Insulations (additional components)	Characteristics
Prefabricated pipe shells	Prefabricated pipe shells according to EN 14303 made from stone wool with classification A <sub>2L</sub> -s1,d0 or A <sub>1L</sub> according to EN 13501-1, a minimum density of 90 kg/m <sup>3</sup> and a melting point > 1000 °C according to DIN 4102-17 (e.g. “Rockwool 800” from manufacturer “Deutsche Rockwool Mineralwoll GmbH & Co. OHG”)
AF/Armaflex or equal product	Closed cell, flexible elastomeric foam (FEF) insulation in form of (slotted) tubes (can be provided with a self-adhesive device) with classification B <sub>L</sub> -s3,d0 – including “Armaflex Kleber 520” (Armaflex Adhesive 520) – according to EN 13501-1 from manufacturer “Armacell GmbH”
AF/Armaflex Band selbstklebend (AF/Armaflex self-adhesive tape) or equal product	Closed cell, flexible elastomeric foam (FEF) insulation in form of tapes with a self-adhesive device with classification B-s3,d0 according to EN 13501-1 from manufacturer “Armacell GmbH”
Armaflex Kleber 520 (Armaflex Adhesive 520) or equal product	Polychlorene-based adhesive, free from aromatic compounds (special adhesive for processing of all flexible Armaflex insulating material – except “HT/Armaflex”) from manufacturer “Armacell GmbH”

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

### 2.1 Intended use

“System PYROPLUG® Block” is intended to be used as a mixed penetration seal 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, metal pipes, plastic pipes and cable support constructions (perforated or non-perforated steel cable trays and steel ladders).

The thickness of the penetration seal has to be 144 mm or 200 mm (depending on the fire resistance classification; see Annex J-1 of the ETA)

The minimum perimeter length to seal area ratio of the penetration seal in rigid floors is – according to clause 13.5.2 of EN 1366-3:2009 – 5,333 m/m<sup>2</sup>, resp. 0,005333 mm/mm<sup>2</sup> (for penetration seals with a nominal thickness of 144 mm) – or 4,857 m/m<sup>2</sup>, resp. 0,004857 mm/mm<sup>2</sup> (for penetration seals with a nominal thickness of 200 mm)

The maximum opening size of the penetration seal has to comply with the dimensions as specified in the following table.

The installation of a blank penetration seal with the dimensions as specified in the following table is allowed.

“System PYROPLUG® Block” can be installed only in the types of separating elements as specified in the following table.

Separating element	Construction	Maximum opening size of the cable penetration seal (width x height)
Flexible walls	<ul style="list-style-type: none"> <li>&gt; Steel studs or timber studs lined on both faces with minimum 2 layer of boards (minimum thickness 12,5 mm), or minimum one layer of boards (minimum thickness 25 mm)</li> <li>&gt; For timber stud walls there shall be a minimum distance of 100 mm of the penetration seal to any timber stud. The cavity between the penetration seal and the timber stud has to be closed with minimum 100 mm of insulation with classification A1 or A2 according to EN 13501-1</li> <li>&gt; Minimum thickness 94 mm</li> <li>&gt; Classification according to EN 13501-2: ≥ EI 60</li> <li>&gt; This European Technical Assessment does not cover sandwich panel constructions and flexible walls where the lining does not cover studs on both sides. Penetrations in such constructions shall be tested on a case by case basis</li> </ul>	600 mm x 1000 mm  or  1000 mm x 600 mm

Separating element	Construction	Maximum opening size of the cable penetration seal (width x height)
Rigid walls	<ul style="list-style-type: none"> <li>&gt; Aerated concrete, concrete, reinforced concrete masonry</li> <li>&gt; Minimum density 450 kg/m<sup>3</sup></li> <li>&gt; Minimum thickness 100 mm</li> <li>&gt; The rigid wall shall be classified in accordance with EN 13501-2 for the required fire resistance period</li> </ul>	<p>600 mm x 1000 mm</p> <p style="text-align: center;">or</p> <p>1000 mm x 600 mm</p>
Rigid floors	<ul style="list-style-type: none"> <li>&gt; Aerated concrete, concrete, reinforced concrete</li> <li>&gt; Minimum density 450 kg/m<sup>3</sup></li> <li>&gt; Minimum thickness 150 mm</li> <li>&gt; The rigid floor shall be classified in accordance with EN 13501-2 for the required fire resistance period</li> </ul>	<p style="text-align: center;">see Annex C-1 to C-3 of the ETA</p>

“System PYROPLUG® Block” can only be configured as specified in the following tables. Other parts or service support constructions shall not penetrate the penetration seal.

Penetrating element	Construction characteristics of the penetrating element in “System PYROPLUG® Block” in flexible walls, rigid walls and rigid floors
Cables	<ul style="list-style-type: none"> <li>&gt; All types of sheathed cables<sup>1</sup> (except waveguides) currently and commonly used in building practice in Europe (e.g. electrical / telecommunication / data / optical fibre cables) with a diameter ≤ 80 mm</li> <li>&gt; Tied bundles<sup>2</sup> up to 100 mm overall diameter containing sheathed cables (except waveguides) currently and commonly used in building practice in Europe (e.g. electrical / telecommunication / data / optical fibre cables) with a diameter ≤ 21 mm</li> <li>&gt; Non-sheathed electrical cables with a diameter ≤ 24 mm</li> </ul>
Conduits / Tubes	<ul style="list-style-type: none"> <li>&gt; Steel conduits / tubes, Ø ≤ 16 mm, wall thickness minimum 1,5 mm (with / without cables): steel conduits according to EN 61386-21</li> <li>&gt; Plastic conduits, Ø ≤ 16 mm, wall thickness 1,0 mm to 3,0 mm (with / without cables) according to EN 61386-21 or EN 61386-22</li> <li>&gt; Plastic conduits, Ø ≤ 40 mm, wall thickness 1,0 mm to 3,0 mm (with / without cables) according to EN 61386-21 or EN 61386-22</li> <li>&gt; Bundles with a maximum Ø of 80 mm consisting of plastic conduits, Ø ≤ 40 mm, wall thickness 1,0 mm to 3,0 mm (with / without cables) according to EN 61386-21 or EN 61386-22</li> </ul>

<sup>1</sup> Single or multicore cable with individual insulation of the cores and an additional protective covering of the assembly

<sup>2</sup> Several cables running in the same direction, densely packed and bound tightly together by mechanical means

Penetrating element	Construction characteristics of the penetrating element in “System PYROPLUG® Block” in flexible walls, rigid walls and rigid floors
Plastic pipes	<ul style="list-style-type: none"> <li>&gt; PVC-U pipes according to EN ISO 1452-1 and DIN 8061 / DIN 8062 with diameters and wall thicknesses as defined in Annex E-2 of the ETA are allowed. For interpolation between pipe diameters and wall thicknesses see Annex E-2 of the ETA.</li> <li>&gt; PE-HD pipes according to EN 1519-1 and DIN 8074 / DIN 8075 with diameters and wall thicknesses as defined in Annex E-2 of the ETA are allowed. For interpolation between pipe diameters and wall thicknesses see Annex E-2 of the ETA.</li> </ul>
Metal pipes	<ul style="list-style-type: none"> <li>&gt; Metal pipes of reaction to fire class A1 according to EN 13501-1 with decomposition point greater or equal than copper (945 °C for EI 60; 1006 °C for EI 90; 1049 °C for EI 120) and a thermal conductivity smaller or equal than copper with diameters and wall thicknesses as defined in Annex E-1 of the ETA are allowed. For interpolation between pipe diameters and wall thicknesses see Annex E-1 of the ETA.</li> <li>&gt; Metal pipes of reaction to fire class A1 according to EN 13501-1 with decomposition point greater or equal than steel (945 °C for EI 60; 1006 °C for EI 90; 1049 °C for EI 120) and a thermal conductivity smaller or equal than steel with diameters and wall thicknesses as defined in Annex E-1 of the ETA are allowed. For interpolation between pipe diameters and wall thicknesses see Annex E-1 of the ETA.</li> </ul>
Cable support constructions	<ul style="list-style-type: none"> <li>&gt; Steel cable trays (perforated or non-perforated)</li> <li>&gt; Steel ladders</li> <li>&gt; 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</li> </ul>

## 2.2 Use category

“System PYROPLUG® Block” is intended for internal use with humidity equal to or higher than 85 % RH, excluding temperatures below 0 °C<sup>3</sup>, without exposure to rain or UV, 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.

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

## 2.3 Working life

The provisions made in this European Technical Assessment are based on an assumed working life of “System PYROPLUG® Block” of 10 years, provided the conditions laid down in the technical literature of the manufacturer relating to packaging, transport, storage, installation, use and repair are met.

The indications given on the intended 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 selecting the appropriate product in relation to the expected economically reasonable working life of the works.

<sup>3</sup> These uses apply for internal humidity class 5 in accordance with EN ISO 13788



The real working life might be, in normal use conditions, considerably longer without major degradation affecting the Basic requirements for construction works.

## **2.4 General assumptions**

### **2.4.1** It is assumed that

- > damages to the penetration seal are repaired accordingly,
- > the installation of the penetration seal does not effect the stability of the adjacent building element – even in case of fire,
- > the lintel or floor above the penetration seal is designed structurally and in terms of fire protection such that no additional mechanical load (other than its own weight) is imposed on the penetration seal,
- > the aperture lining within a flexible wall is supported by the studs (transoms and mullions) in such a way that the mechanical load imposed to the aperture lining by the penetration seal does not affect the stability of the aperture lining and the flexible wall,
- > the thermal movement in the pipe work will be accommodated in such way that it does not impose a load on the penetration seal,
- > the installations are fixed to the adjacent building element (not to the penetration seal) in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal,
- > the support of the installations is maintained for the required period of fire resistance and
- > pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire (for sealing off plastic pipes).

## **2.5 Manufacturing**

The European Technical Assessment 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 European Technical Assessment and consequently the validity of the CE marking on the basis of the European Technical Assessment and if so whether further assessment or alterations to the European Technical Assessment, shall be necessary.

## **2.6 Installation**

The product shall be installed and used as described in this European Technical Assessment.

Additional marking of the penetration seal shall be done in case of national requirements.

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

Basic requirements for construction works	Essential characteristic	Method of verification	Performance
<b>BWR 2</b>	Reaction to fire	EN 13501-1:2007	Clause 3.1.1 of the ETA
	Resistance to fire	EN 13501-2:2007+A12009	Annex J-1 of the ETA
<b>BWR 3</b>	Air permeability (material property)	EN 1026:2000	Clause 3.2.1 of the ETA
	Water permeability (material property)	No performance assessed	
	Content and/or release of dangerous substances	European Council Directive 67/548/EEC and Regulation (EC) No 1272/2008 as well as EOTA TR 034, edition March 2012	Declaration of conformity by the manufacturer
<b>BWR 4</b>	Mechanical resistance and stability	No performance assessed	
	Resistance to impact / movement	No performance assessed	
	Adhesion	No performance assessed	
<b>BWR 5</b>	Airborne sound insulation	EN ISO 10140-1:2010	Clause 3.4.1 of the ETA
<b>BWR 6</b>	Thermal properties	DIN EN 12667:2001	Clause 3.5.1 of the ETA
	Water vapour permeability	No performance assessed	
<b>BWR 7</b>	No performance assessed		

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

##### 3.1.1 Reaction to fire

The components of "System PYROPLUG® Block" were assessed according to ETAG 026-Part 2 clause 2.4.1 and classified according to EN 13501-1:2007.

Component	Class according to EN 13501-1:2007
FBA-B	E
PYROPLUG® Screed, FBA-SP	E
FBA-WI	E
PYROSIT® NG, FBS	E

### 3.1.2 Resistance to fire

“System PYROPLUG® Block” was tested according to ETAG 026-Part 2 clause 2.4.2, prEN 1366-3.2:N185:2007-07 and EN 1366-3:2009 in conjunction with EN 1363-1:1999.

Based upon the gained test results and the field of application specified within prEN 1366-3.2:N185:2007-07 and EN 1366-3:2009 “System PYROPLUG® Block” has been classified according to EN 13501-2:2007+A1:2009. The individual fire resistance classes are listed in Annex J-1 of the ETA.

The maximum fire resistance class of the penetration seal in vertical or horizontal separating element depends on the fire resistance class of the penetrating elements. The fire resistance class of the penetration seal is reduced to the fire resistance class of the penetrating element with the lowest fire resistance classification.

The resistance to fire classification listed in Annex J-1 of the ETA is only valid if “System PYROPLUG® Block” is installed according to Annex B-1 to C-3 of the ETA.

## 3.2 Hygiene, health and environment (BWR 3)

### 3.2.1 Air permeability

The air permeability of “System PYROPLUG® Block” with a thickness of 200 mm was tested according to EN 1026:2000 in a flexible wall with a thickness of 100 mm. The aperture was lined with 2 layers of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520 (classification A2-s1,d0 according to EN 13501-1) with a width of 200 mm. The opening size was 355 mm x 550 mm (width x height), resp. 0,195 m<sup>2</sup>.

“System PYROPLUG® Block” was tested as blank penetration seal according to ETAG 026-Part 2 clause 2.4.3.

The components “PYROPLUG® Screed, FBA-SP”, “FBA-WI” and “PYROSIT® NG, FBS” were not included in these tests. The measurement accuracy was 0,01 m<sup>3</sup>/h. The values given in the following table are the mean values from the pressure- and suction tests.

$\Delta p$ in Pa	50	100	150	200	250	300	450	600
q/A in m <sup>3</sup> /(h*m <sup>2</sup> )	0,82	1,43	1,74	2,28	3,07	3,74	4,97	6,61

### 3.2.2 Water permeability

No performance assessed.

### 3.2.3 Release of dangerous substances

According to the manufacturer’s declaration the products “FBA-B”, “PYROPLUG® Screed, FBA-SP”, “FBA-WI” and “PYROSIT® NG, FBS” do not contain dangerous substances detailed in Council Directive 67/548/EEC and Regulation (EC) no 1272/2008 as well as EOTA TR 034 (General ER 3 Checklist for ETAGs/CUAPs/ETAs- Content and/or release of dangerous substances in products/kits), edition March 2012 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 European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

### 3.3 Safety in use (BWR 4)

#### 3.3.1 Mechanical resistance and stability

No performance assessed.

#### 3.3.2 Resistance to impact / movement

No performance assessed.

Provisions shall be taken to prevent a person from stepping onto a horizontal penetration seal or falling against a vertical penetration seal (e.g. by covering with a wire mesh).

#### 3.3.3 Adhesion

No performance assessed.

### 3.4 Protection against noise (BWR 5)

#### 3.4.1 Airborne sound insulation

The airborne sound insulation of "System PYROPLUG® Block" was tested according to EN ISO 10140-2:2010 in a flexible wall with a thickness of 200 mm. The aperture was lined with 2 layers of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520 (classification A2-s1,d0 according to EN 13501-1) with a width of 200 mm. The opening size was 360 mm x 360 mm (width x height).

"System PYROPLUG® Block" was tested as blank penetration seal according to ETAG 026-Part 2 clause 2.4.9. The components "PYROPLUG® Screed, FBA-SP", "FBA-WI" and "PYROSIT® NG, FBS" were not included in these tests.

The reached values for the airborne sound insulation in accordance with EN ISO 717-1:1996+A1:2006 are given in the following table.

$D_{n,e,w}$ in dB	C in dB	$C_{tr}$ in dB	$R_w$ in dB	C in dB	$C_{tr}$ in dB
68	-4	-11	49	-4	-11

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

#### 3.5.1 Thermal properties

The thermal properties of "FBA-B" and "PYROSIT® NG, FBS" were tested according to EN 12667:2001.

Component	$\lambda_{10,23/50}$ in W/(m*K)
FBA-B	0,103
PYROSIT® NG, FBS	0,088

#### 3.5.2 Water vapour permeability

No performance assessed.

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

No performance assessed.

### 3.7 General aspects relating to fitness for use

All components of "System PYROPLUG® Block" fulfil the requirements for the intended use category.

"System PYROPLUG® Block" is therefore appropriate for internal use with humidity equal to or higher than 85 % RH, excluding temperatures below 0 °C<sup>4</sup>, without exposure to rain or UV, and can – 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.

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

According to the Decision 1999/454/EC<sup>5</sup>, amended by Decision 2001/596/EC<sup>6</sup> of the European Commission the system of assessment and verification of constancy of performance (see Annex V of Regulation (EU) No 305/2011) is given in the following table.

Product(s)	Intended use(s)	Level(s) or class(es) (resistance to fire)	System of assessment and verification of constancy of performance
Fire Stopping and Fire Sealing Products	for fire compartmentation and/or fire protection or fire performance	any	1

In addition, according to the Decision 1999/454/EC, amended by Decision 2001/596/EC of the European Commission the system(s) of assessment and verification of constancy of performance, with regard to reaction to fire, is 3.

Product(s)	Intended use(s)	Level(s) or class(es) (reaction to fire)	System of assessment and verification of constancy of performance
Fire Stopping and Fire Sealing Products	For uses subject to regulations on reaction to fire	A1*, A2*, B*, C*	1
		A1**, A2**, B**, C**, D, E	3
		(A1 to E)***, F	4
<p>* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)</p> <p>** Products/materials not covered by footnote (*)</p> <p>*** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of class A1 according to Commission Decision 96/603/EC, as amended)</p>			

<sup>4</sup> These uses apply for internal humidity class 5 in accordance with EN ISO 13788

<sup>5</sup> Official Journal of the European Communities no. L 178, 14.7.1999, p. 52

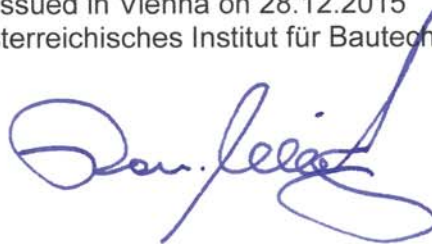
<sup>6</sup> Official Journal of the European Communities no. L 209, 2.8.2001, p. 33

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

The notified product certification body shall visit the factory at least once a year for surveillance of the manufacturer.

Issued in Vienna on 28.12.2015  
by Österreichisches Institut für Bautechnik



Rainer Mikulits  
Managing Director

## 1 General

- > "System PYROPLUG® Block" can be used in apertures in walls (vertical separating element) and floors (horizontal separating element) according to clause 2.1 of the ETA.
- > The penetration of cables, conduits / tubes, metal pipes, plastic pipes and cable support constructions according to clause 2.1 of the ETA is allowed.
- > The total cross section of the installations (including insulation and cable support constructions) must not be more than 60 % of the opening size of the penetration seal.
- > Metal pipes with an outer diameter > 18 mm have to be insulated with prefabricated pipe shells (e.g. "Rockwool 800") according to clause 1 of the ETA or "AF/Armaflex".
- > Metal pipes with an outer diameter ≤ 18 mm can be insulated with prefabricated pipe shells (e.g. "Rockwool 800") according to clause 1 of the ETA or "AF/Armaflex".
- > Metal pipes insulated with prefabricated pipe shells (e.g. "Rockwool 800") according to clause 1 of the ETA can be clad with sheet steel with a thickness of 0,4 mm to 1,0 mm or plastic with a thickness of 0,35 mm to 1,0 mm.

### 1.1 Pipe end configuration

- > For plastic conduits / tubes the pipe end configuration can be U/C, C/C.
- > For steel conduits / tubes the pipe end configuration can be C/U, U/C, C/C.
- > For plastic pipes pipe end configuration can be U/C, C/C.
- > For metal pipes insulated with prefabricated pipe shells (e.g. "Rockwool 800") according to clause 1 of the ETA pipe end configuration can be C/U, C/C.
- > For metal pipes insulated with "AF/Armaflex" pipe end configuration can be C/U, C/C.
- > For non-insulated metal pipes (outer diameter ≤ 18,0 mm) pipe end configuration can be C/U, C/C.

### 1.2 Orientation of the penetrating elements

- > Conduits / tubes, metal pipes and plastic pipes have to be installed perpendicular to the surface of the penetration seal.
- > Metal pipes insulated with prefabricated pipe shells (e.g. "Rockwool 800") according to clause 1 of the ETA can be installed in all angles between 90° and 45°.

### 1.3 Service support constructions

- > All types of cables, conduits / tubes, metal pipes and plastic pipes – in flexible walls and rigid walls – have to be supported on both side of the separating element by steel cable trays (perforated or non-perforated), steel ladders or alternative service support constructions (e.g. pipe hangers) made of metal with a decomposition point greater or equal than 945 °C for EI 60, or 1006 °C for EI 90, or 1049 °C for EI 120 (e.g. stainless steel or galvanized steel) according to the ETA-holder's installation instructions.

**System PYROPLUG® Block**  
**- Details for installation -**

**ANNEX A-1**

- > All types of cables, conduits / tubes, metal pipes and plastic pipes – in rigid floors – have to be supported at least on the top side of the separating element by steel cable trays (perforated or non-perforated), steel ladders or alternative service support constructions (e.g. pipe hangers) made of metal with a decomposition point greater or equal than 945 °C for EI 60, or 1006 °C for EI 90, or 1049 °C for EI 120 (e.g. stainless steel or galvanized steel) 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 penetration seal.
- > Lidded cable trays / trunkings must not pass through the penetration seal.
- > The first support (service support construction) for cables and conduits / tubes in flexible walls and rigid walls has to be at maximum 200 mm (measured from the surface of the penetration seal).
- > The first support (service support construction) for cables and conduits / tubes in rigid floors has to be at maximum 250 mm (measured from the surface of the penetration seal).
- > The first support (service support construction) for plastic pipes and metal pipes in flexible walls and rigid walls has to be at maximum 750 mm (measured from the surface of the penetration seal).
- > The first support (service support construction) for plastic pipes and metal pipes in rigid floors has to be at maximum 1200 mm (measured from the surface of the penetration seal).
- > All types of cables, conduits / tubes, metal pipes and plastic pipes have to be fixed according to the ETA-holder's installation instructions to the service support construction.
- > Conduit bundles have to be fixed (bound together) on both sides of the penetration seal with at least one winding of e.g. steel wire (minimum diameter 1 mm) at maximum 200 mm (measured from the surface of the penetration seal).

## 2 Details for installation of "System PYROPLUG® Block" (see Annex B-1 to C-3 of the ETA)

- > "System PYROPLUG® Block" has to be installed according to the ETA-holder's installation instructions.
- > "System PYROPLUG® Block" will be formed by fitting "FBA-B" tightly in the opening of the separating element so that all interstices and voids are carefully sealed.
- > Open joints ( $\leq 5$  mm) and joints between the cables, conduits / pipes, cable support constructions and the penetration seal have to be filled according to the ETA-holder's installation instructions with "PYROPLUG® Screed, FBA-SP" to a depth of minimum 20 mm.
- > If the opening size is maximum 270 mm x 270 mm (width x height) and if there are no open joints or joints between the cables, conduits / pipes, cable support constructions and the penetration seal "PYROPLUG® Screed, FBA-SP" needs not to be applied.

**System PYROPLUG® Block**  
- Details for installation -

**ANNEX A-2**



- > It is allowed to close areas within the Mixed penetration seal "System PYROPLUG® Block" alternatively to "FBA-B" completely with "PYROSIT® NG, FBS". In this case the maximum area which can be closed with "PYROSIT® NG, FBS" is 450 mm x 500 mm (width x height) or 0,225 m<sup>2</sup>. For details see Annex I-1 of the ETA.
- > It is also allowed to fill open joints between "FBA-B" and the aperture with "PYROSIT® NG, FBS". For details see Annex I-1 of the ETA.
- > Joints between "FBA-B" need not be filled with "PYROPLUG® Screed, FBA-SP" or "PYROSIT® NG, FBS".
- > Joints between "FBA-B" and the aperture need not be filled with "PYROPLUG® Screed, FBA-SP" or "PYROSIT® NG, FBS".
- > For tied cable bundles (see clause 2.1 of the ETA) the space between the cables needs not be filled with "PYROPLUG® Screed, FBA-SP" or "PYROSIT® NG, FBS".
- > In some cases (see Annex J-1 of the ETA) – for fire resistance class EI 90 – cables and conduits / tubes have to be coated at a length of minimum 30 mm (measured from the surface of the penetration seal) with "PYROPLUG® Screed, FBA-SP" with a minimum thickness of 5 mm on both sides of the penetration seal according to the ETA-holder's installation instructions.
- > In some cases (see Annex J-1 of the ETA) – for fire resistance class EI 90 (as an alternative for the above described coating with "PYROPLUG® Screed, FBA-SP") and fire resistance class EI 120 – "FBA-WI" has to be wrapped on both sides of the penetration seal according to the ETA-holder's installation instructions around the cables, conduits / tubes and cable support constructions (see Annex H-1 of the ETA).

## 2.1 Details for installation in flexible wall constructions (see Annex B-1 and B-2 of the ETA)

- > The aperture within the wall has to be lined with steel studs (steel studs are not required for apertures of dimension  $\leq 320$  mm x 320 mm; construction and installation according to the ETA-holder's installation instructions) and minimum 2 layers of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520 (classification A2-s1,d0 according to EN 13501-1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1) 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 mm or 200 mm (depending on the fire resistance classification; see Annex B-1 and J-1 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 (depending on the fire resistance classification; see Annex J-1 of the ETA) by fitting a board frame, minimum 50 mm wide, around the opening (see Annex B-2 of the ETA). Minimum 1 layer of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520 (classification A2-s1,d0 according to EN 13501-1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1) with a minimum density of 450 kg/m<sup>3</sup> can be used. The aperture within the wall has to be lined with steel studs (construction and installation according to the ETA-holder's installation instructions). The board frame has to be installed and fixed according to the ETA-holder's installation instructions.

**System PYROPLUG® Block**  
**- Details for installation -**

**ANNEX A-3**

- > Joints between the aperture framing and the aperture have to be filled with "PYROPLUG® Screed, FBA-SP" or gypsum joint filler (non-combustible material with classification A2-s1,d0 or A1 according to EN 13501-1 which is dimensionally stable) on both sides of the penetration seal according to the ETA-holder's installation instructions.

## 2.2 Details for installation in rigid walls (see Annex B-3 to B-5 of the ETA)

- > For walls thinner than the minimum thickness of the penetration seal (144 mm or 200 mm; depending on the fire resistance classification, see Annex J-1 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 (classification A2-s1,d0 according to EN 13501-1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1) 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 (depending on the fire resistance classification; see Annex B-4 and J-1 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 (depending on the fire resistance classification; see Annex J-1 of the ETA) by fitting a board frame, minimum 50 mm wide, around the opening (see Annex B-5 of the ETA). Minimum 1 layer of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520 (classification A2-s1,d0 according to EN 13501-1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1) 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.
- > Joints between the aperture framing and the aperture have to be filled with "PYROPLUG® Screed, FBA-SP", or gypsum joint filler or mineral mortar (non-combustible material with classification A2-s1,d0 or A1 according to EN 13501-1 which is dimensionally stable) on both sides of the penetration seal according to the ETA-holder's installation instructions.

## 2.3 Details for installation in rigid floors (see Annex C-1 to C-3)

- > For floors thinner than penetration seals with a nominal thickness of 200 mm the opening shall be lined with minimum 2 layers of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520 (classification A2-s1,d0 according to EN 13501-1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1) with a minimum density of  $450 \text{ kg/m}^3$  and a minimum thickness of 25 mm. The boards shall be at least 200 mm wide (see Annex C-2 of the ETA). 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 by fitting a board frame, minimum 50 mm wide, around the opening (see Annex C-3 of the ETA). Minimum 1 layer of  $\geq 12,5$  mm thick type F gypsum boards according to EN 520 (classification A2-s1,d0 according to EN 13501-1) or silicate- or calcium silicate boards (classification A1 according to EN 13501-1) 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.
- > Joints between the aperture framing and the aperture have to be filled with "PYROPLUG® Screed, FBA-SP", or gypsum joint filler or mineral mortar (non-combustible material with classification A2-s1,d0 or A1 according to EN 13501-1 which is dimensionally stable) on both sides of the penetration seal according to the ETA-holder's installation instructions.

**System PYROPLUG® Block**  
- Details for installation -

**ANNEX A-4**

**3 Minimum working clearances**

- > The minimum working clearances (a1, a2, a3; for pipes only linear arrangement is allowed, no clusters) and the minimum clearance between the penetration seals are specified in Annex D-1 of the ETA.

**4 Subsequent addition (retrofitting) and removal**

- > Subsequent addition (retrofitting) and removal of cables, conduits / tubes, pipes and cable support constructions according to the ETA holder's installation instructions is allowed.
- > Retrofitting and removal without addition of cables, conduits / tubes, pipes and cable support constructions shall be done according to the ETA holder's installation instructions and the regulations of Annex A-2 of the ETA.

**5 Transport and storage**

- > The indications of the manufacturer regarding transport and storage (minimum and maximum storing temperature, maximum duration of storage) have to be followed.

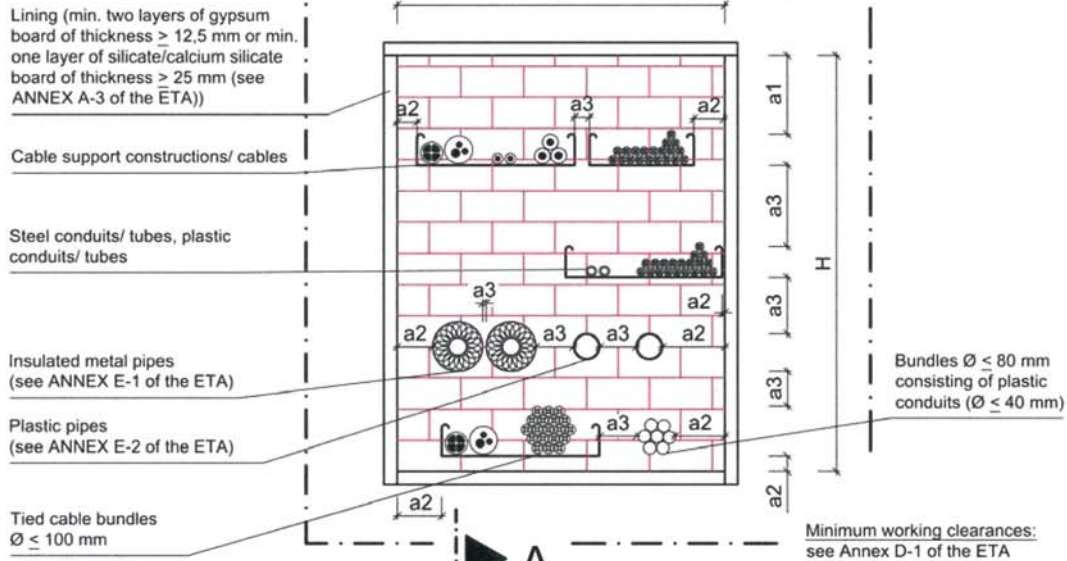
**6 Use, maintenance and repair**

- > The fire resistance of the penetration seal shall not be negatively affected by future changes to buildings or building elements.
- > 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.

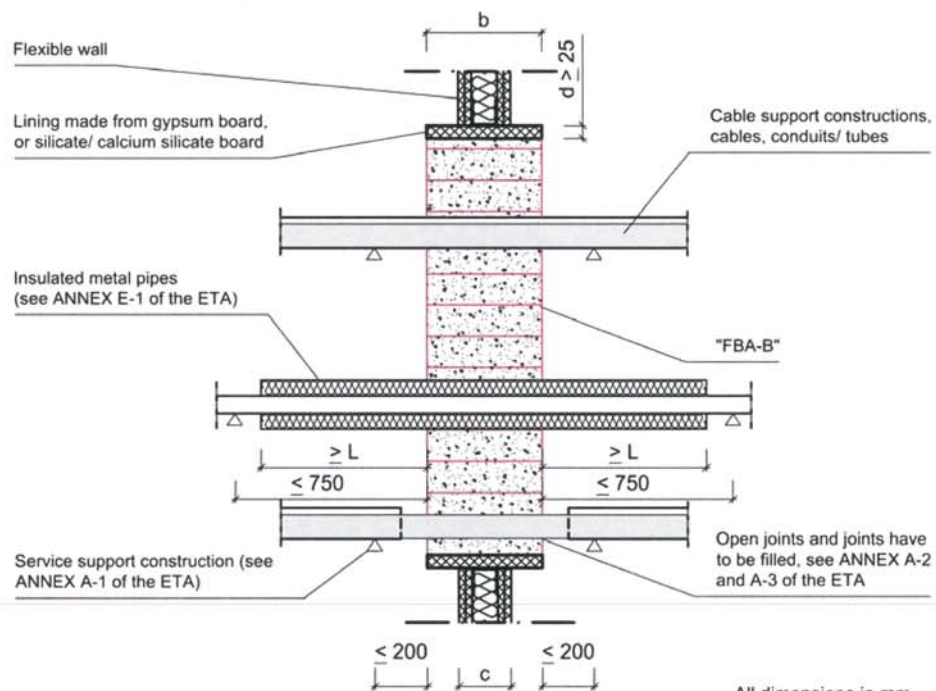
**System PYROPLUG® Block**  
**- Details for installation -**

**ANNEX A-5**

**View:**



**Cross Section A-A:**



Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Thickness of penetration seal b [mm]
			H [mm]	B [mm]	
Flexible wall	see ANNEX J-1 of the ETA	≥ 94	≤ 1000	≤ 600	see ANNEX J-1 of the ETA
			≤ 600	≤ 1000	

**System PYROPLUG® Block**

- Installation in flexible wall, thickness  $c \geq 94$  mm -

**ANNEX B-1**

**3 Minimum working clearances**

- > The minimum working clearances (a1, a2, a3; for pipes only linear arrangement is allowed, no clusters) and the minimum clearance between the penetration seals are specified in Annex D-1 of the ETA.

**4 Subsequent addition (retrofitting) and removal**

- > Subsequent addition (retrofitting) and removal of cables, conduits / tubes, pipes and cable support constructions according to the ETA holder's installation instructions is allowed.
- > Retrofitting and removal without addition of cables, conduits / tubes, pipes and cable support constructions shall be done according to the ETA holder's installation instructions and the regulations of Annex A-2 of the ETA.

**5 Transport and storage**

- > The indications of the manufacturer regarding transport and storage (minimum and maximum storing temperature, maximum duration of storage) have to be followed.

**6 Use, maintenance and repair**

- > The fire resistance of the penetration seal shall not be negatively affected by future changes to buildings or building elements.
- > 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.

**System PYROPLUG® Block**  
**- Details for installation -**

**ANNEX A-5**

**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 (see ANNEX A-3 of the ETA))

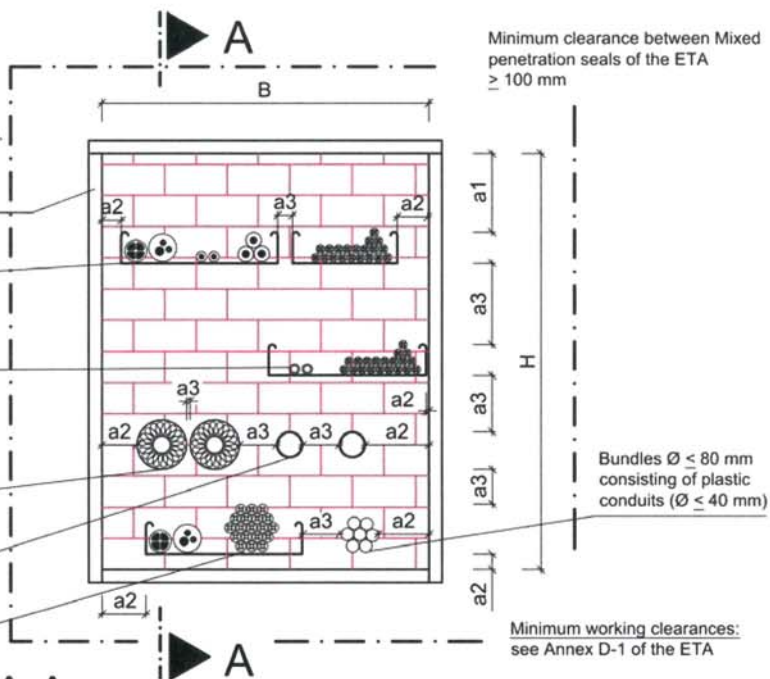
Cable support constructions/ cables

Steel conduits/ tubes, plastic conduits/ tubes

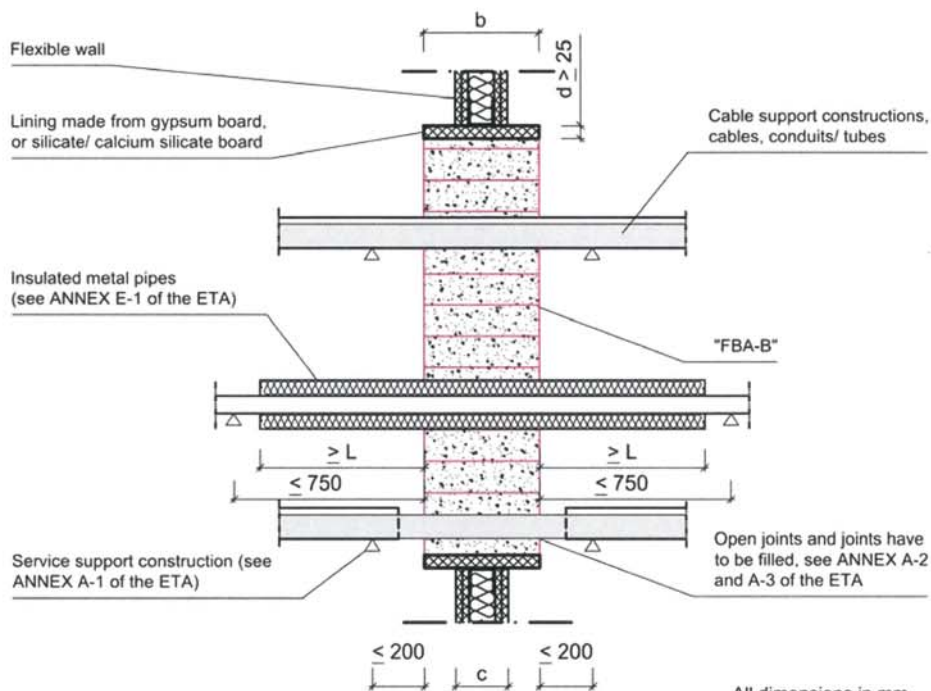
Insulated metal pipes (see ANNEX E-1 of the ETA)

Plastic pipes (see ANNEX E-2 of the ETA)

Tied cable bundles  $\varnothing \leq 100$  mm



**Cross Section A-A:**

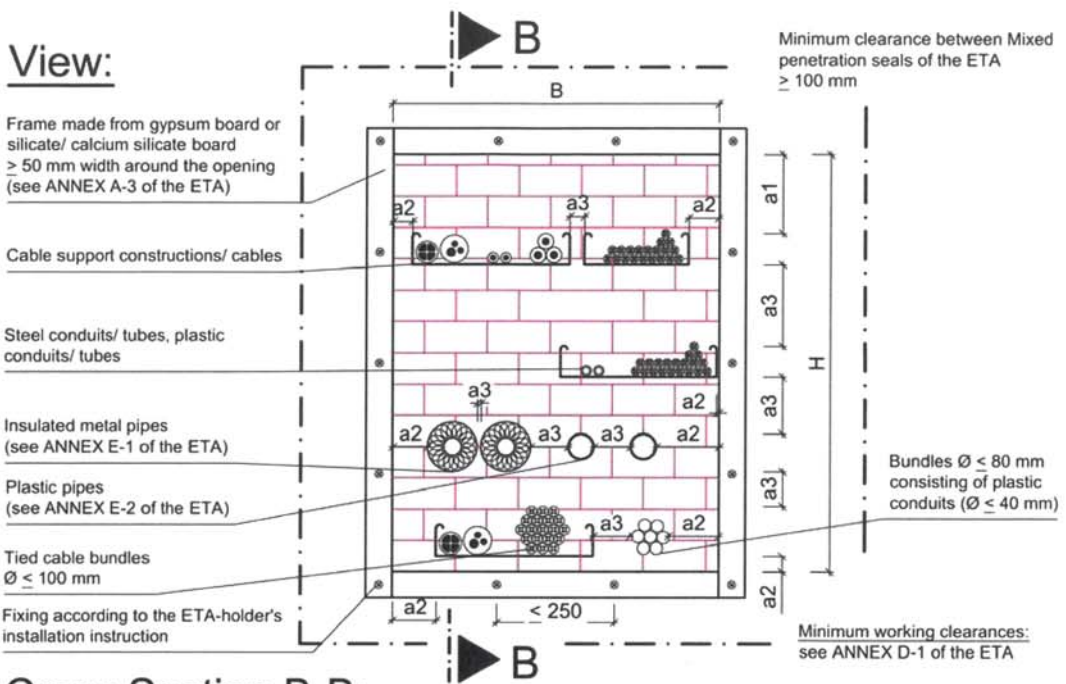


Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Thickness of penetration seal b [mm]
			H [mm]	B [mm]	
Flexible wall	see ANNEX J-1 of the ETA	$\geq 94$	$\leq 1000$	$\leq 600$	see ANNEX J-1 of the ETA
			$\leq 600$	$\leq 1000$	

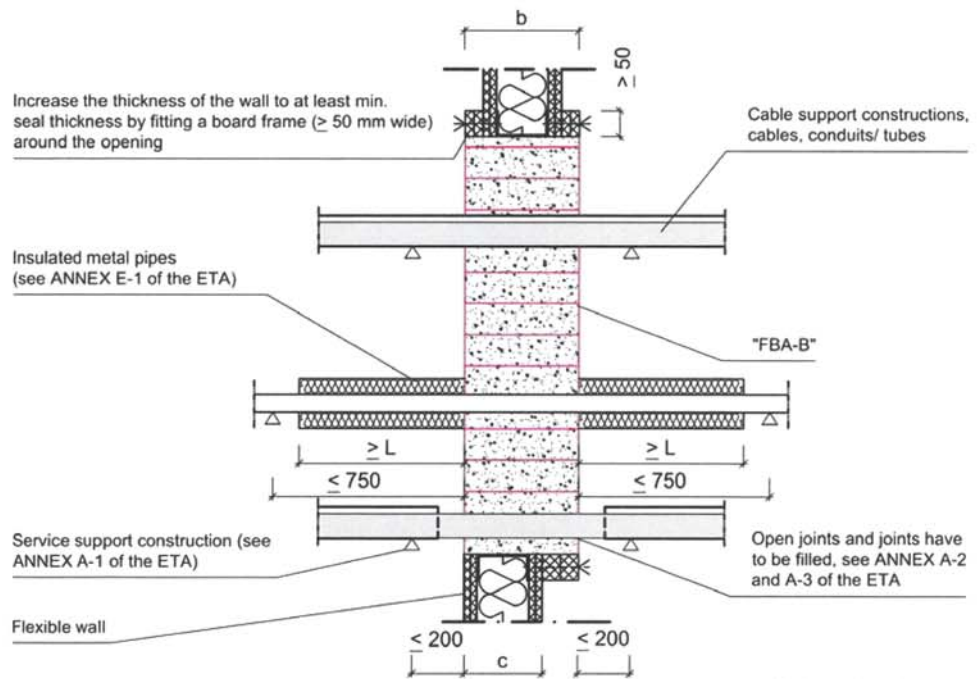
**System PYROPLUG® Block**

- Installation in flexible wall, thickness  $c \geq 94$  mm -

**ANNEX B-1**



**Cross Section B-B:**

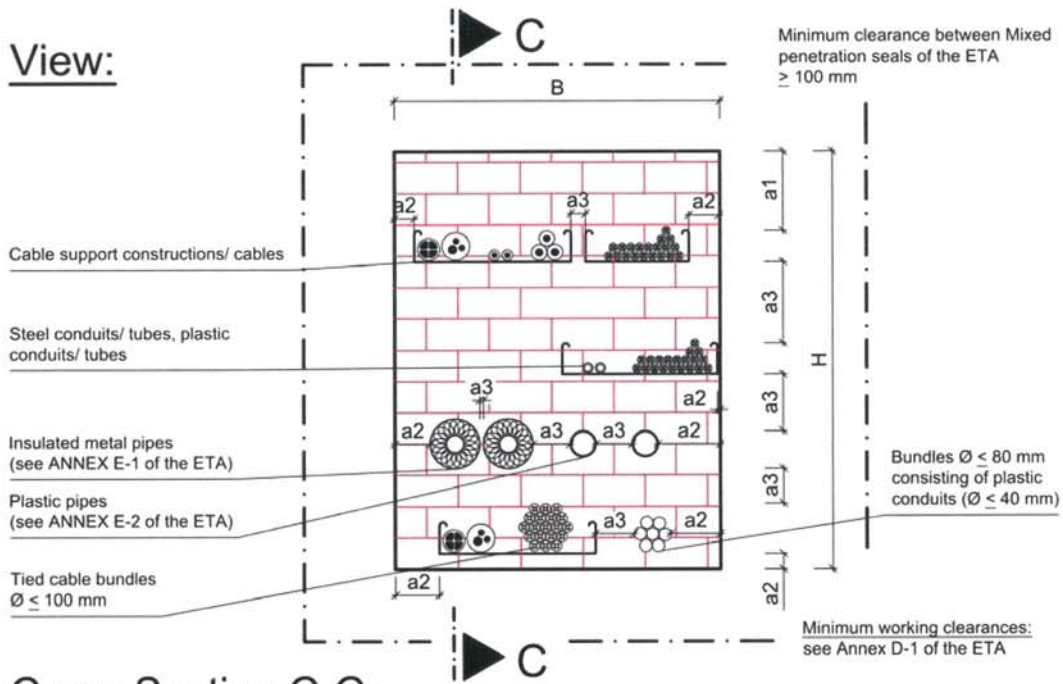


Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Thickness of penetration seal b [mm]
			H [mm]	B [mm]	
Flexible wall	see ANNEX J-1 of the ETA	$\geq 94$	$\leq 1000$	$\leq 600$	see ANNEX J-1 of the ETA
			$\leq 600$	$\leq 1000$	

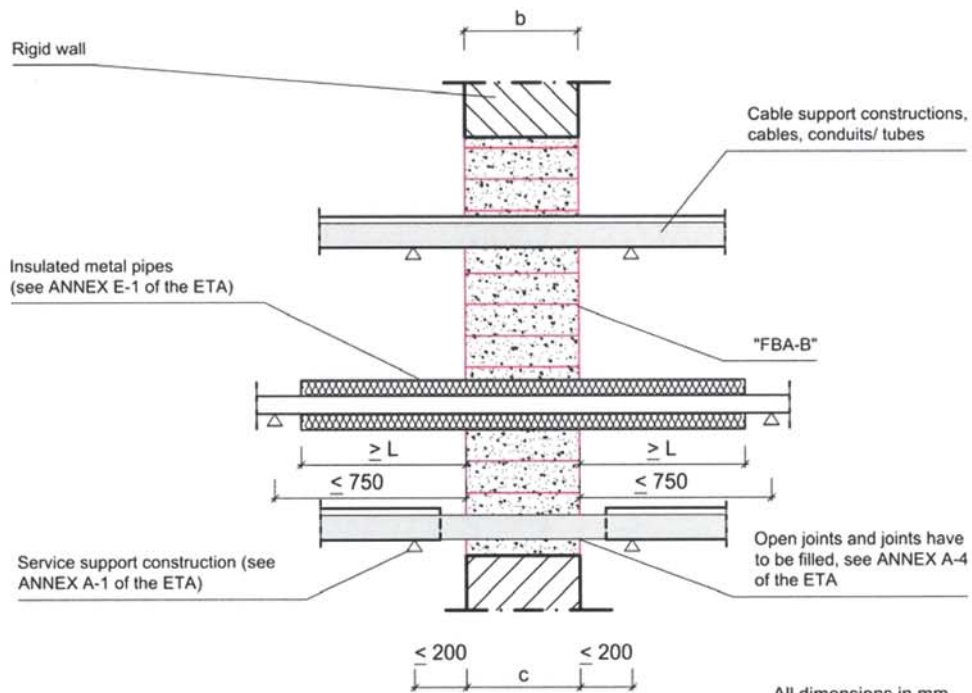
**System PYROPLUG® Block**  
- Installation in flexible wall, thickness c  $\geq 94$  mm -

**ANNEX B-2**

**View:**



**Cross Section C-C:**



All dimensions in mm

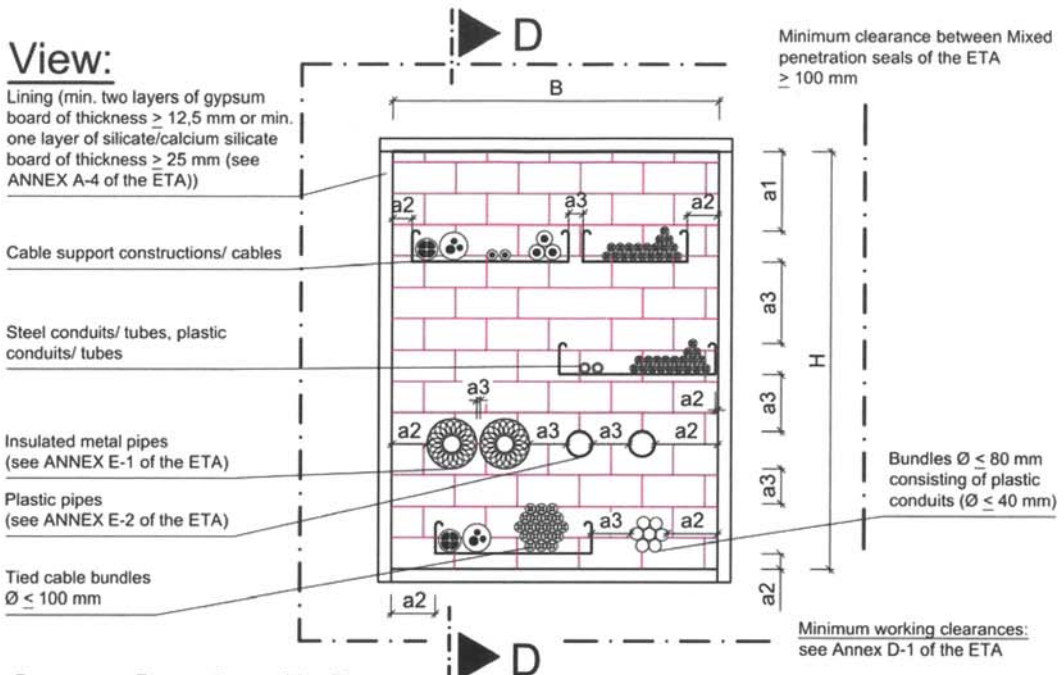
Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Thickness of penetration seal b [mm]
			H [mm]	B [mm]	
Rigid wall	see ANNEX J-1 of the ETA	$\geq b$	$\leq 1000$	$\leq 600$	see ANNEX J-1 of the ETA
			$\leq 600$	$\leq 1000$	

**System PYROPLUG® Block**

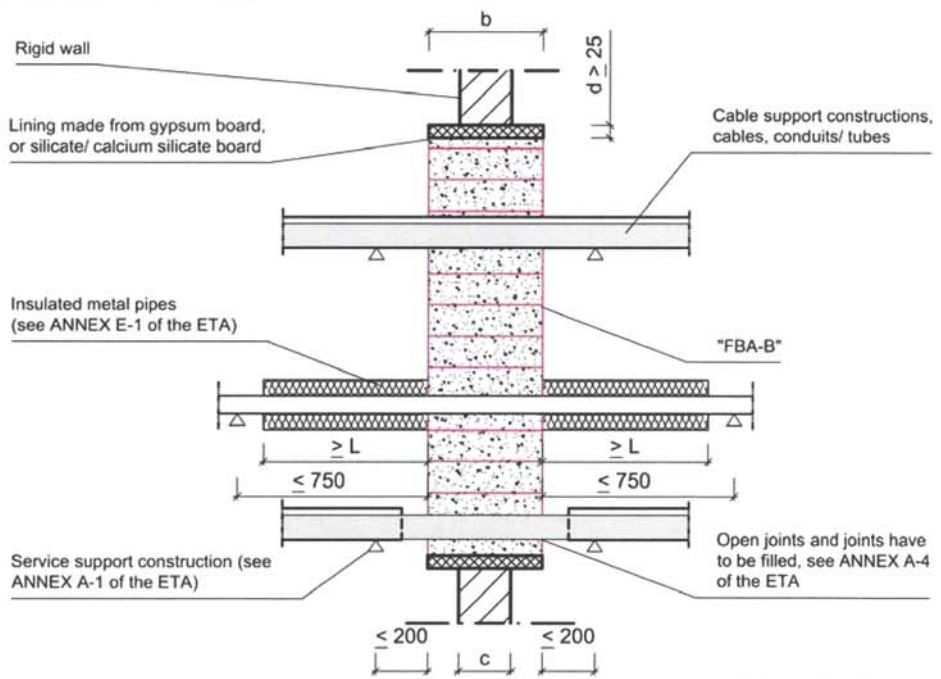
- Installation in rigid wall, thickness  $c \geq b$  -

**ANNEX B-3**





**Cross Section D-D:**



All dimensions in mm

Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Thickness of penetration seal b [mm]
			H [mm]	B [mm]	
Rigid wall	see ANNEX J-1 of the ETA	$100 \text{ mm} \leq c < b$	$\leq 1000$	$\leq 600$	see ANNEX J-1 of the ETA
			$\leq 600$	$\leq 1000$	

**System PYROPLUG® Block**

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

**ANNEX B-4**

**View:**

Frame made from gypsum board or silicate/ calcium silicate board  $\geq 50$  mm width around the opening (see ANNEX A-4 of the ETA)

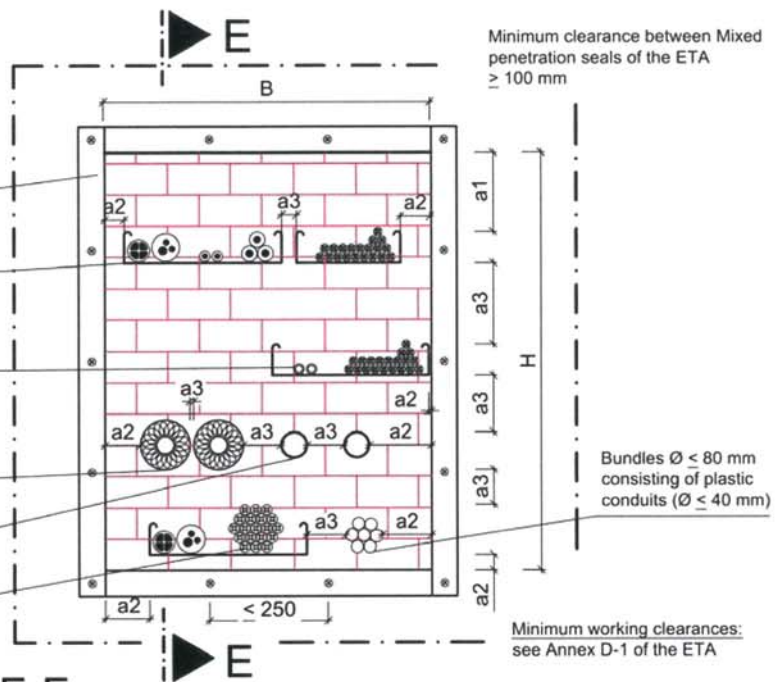
Cable support constructions/ cables

Steel conduits/ tubes, plastic conduits/ tubes

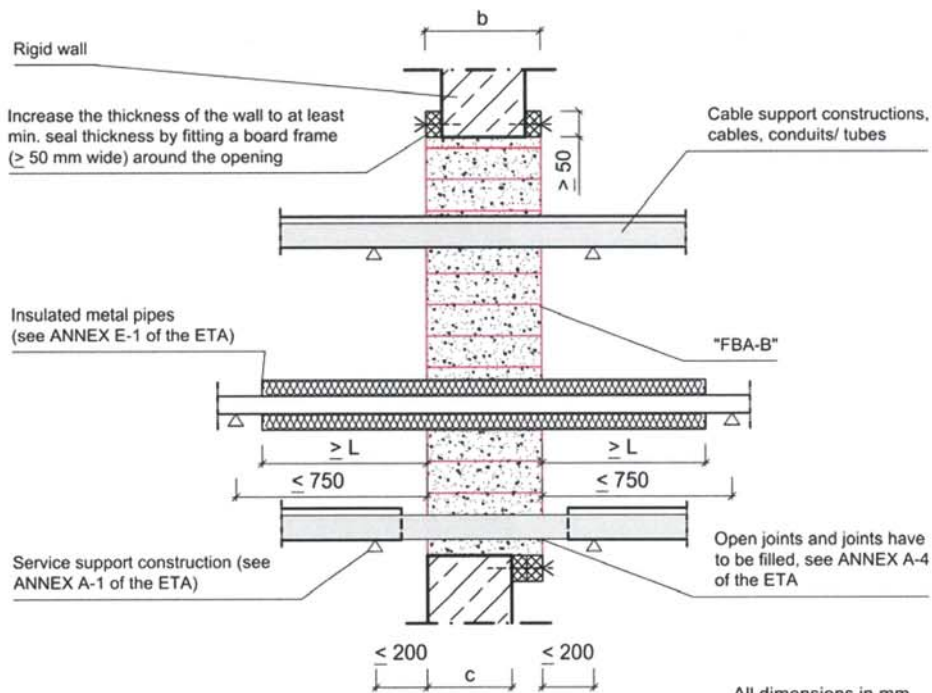
Insulated metal pipes (see ANNEX E-1 of the ETA)

Plastic pipes (see ANNEX E-2 of the ETA)

Tied cable bundles  $\varnothing \leq 100$  mm



**Cross Section E-E:**



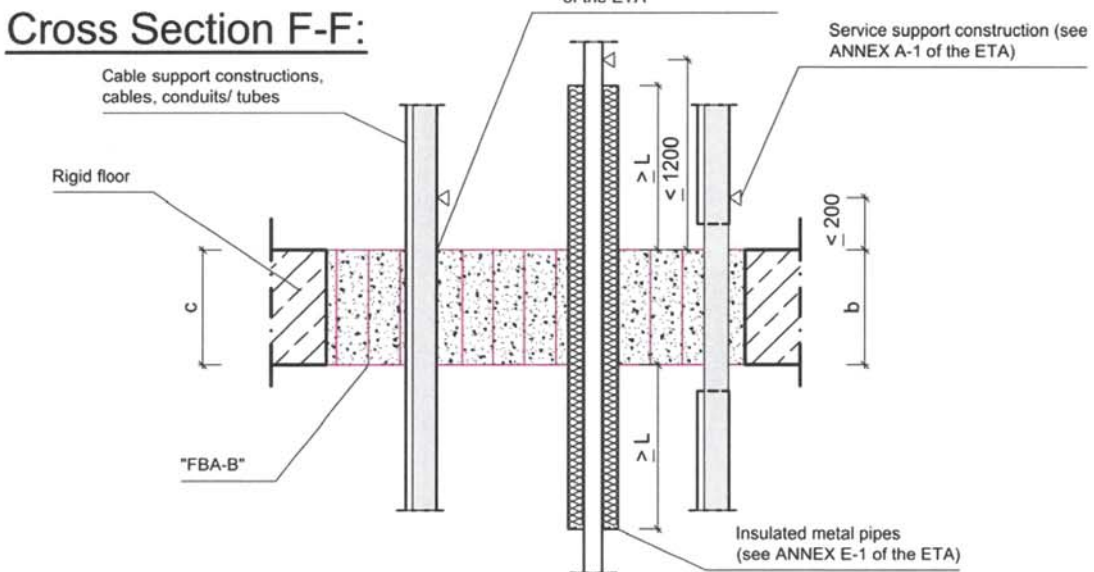
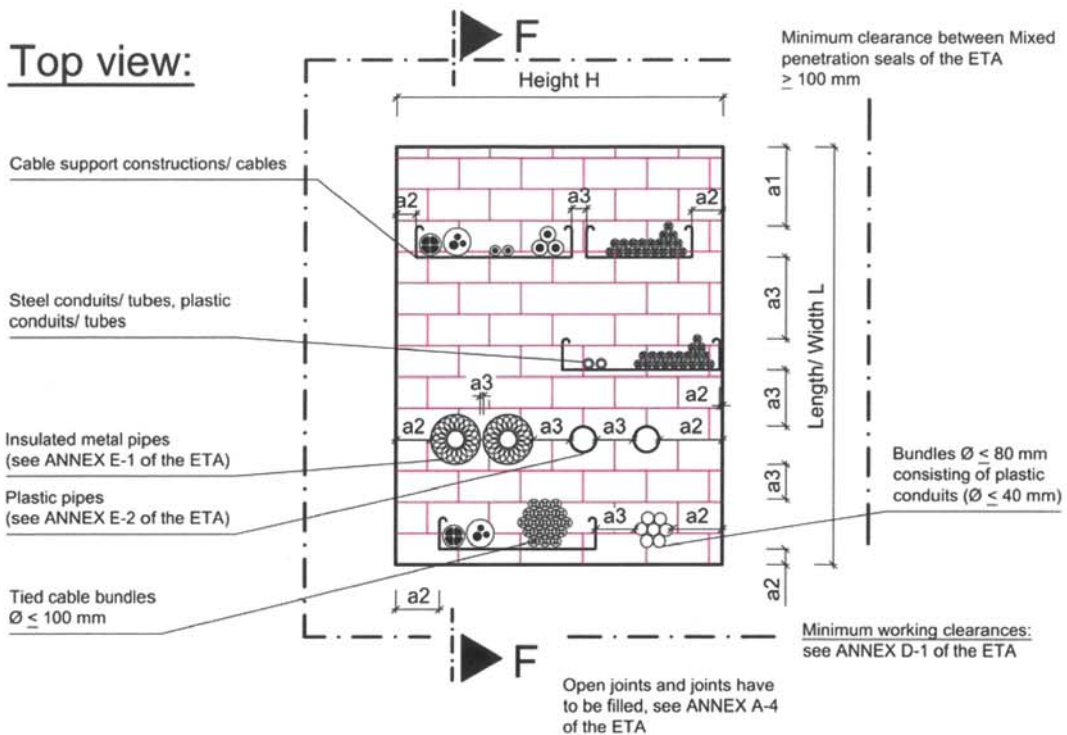
All dimensions in mm

Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Thickness of penetration seal b [mm]
			H [mm]	B [mm]	
Rigid wall	see ANNEX J-1 of the ETA	$100 \text{ mm} \leq c < b$	$\leq 1000$	$\leq 600$	see ANNEX J-1 of the ETA
			$\leq 600$	$\leq 1000$	

**System PYROPLUG® Block**

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

**ANNEX B-5**



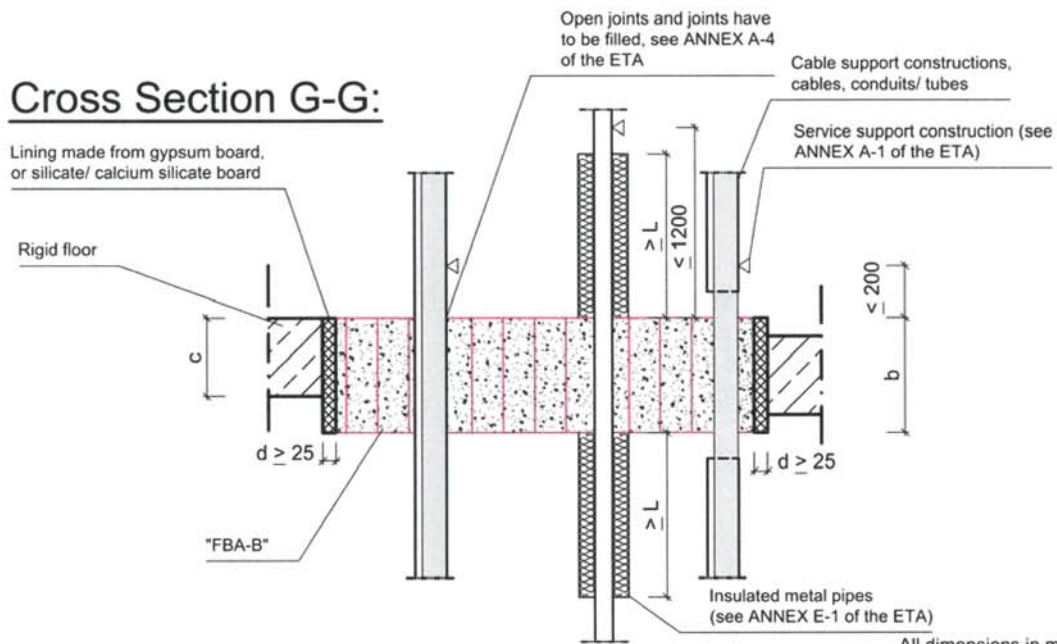
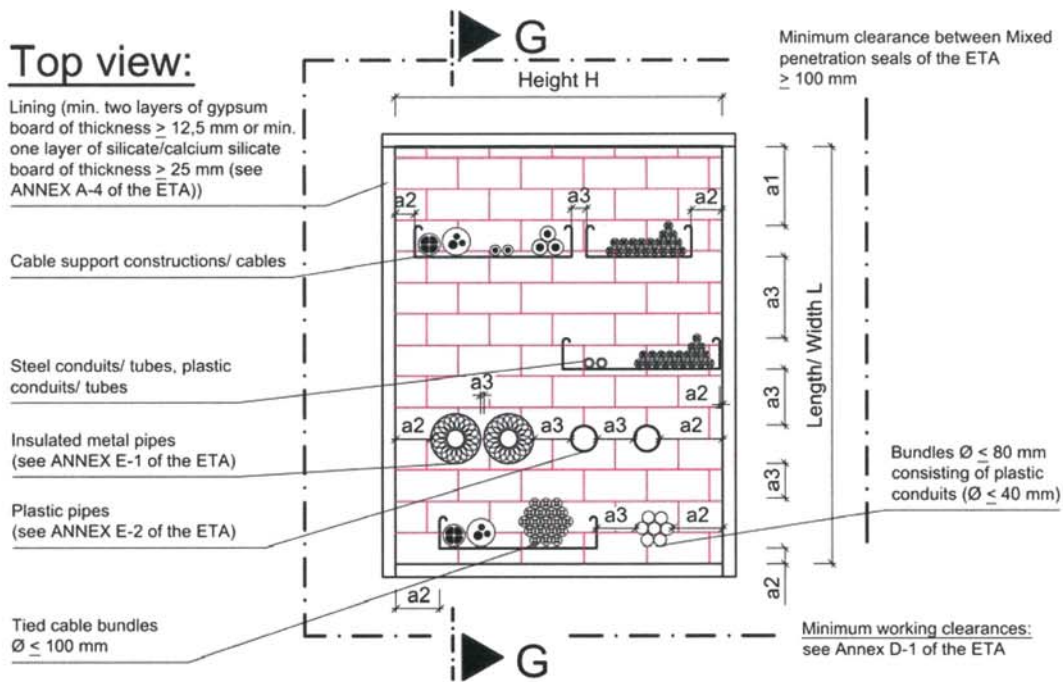
All dimensions in mm

Separating element	Fire resistance classification	Floor Thickness c [mm]	Max. opening size *)		Thickness of penetration seal b [mm]
			Length/Width L [mm] b = 144 mm   b = 200 mm	Height H [mm]	
Rigid floor	see ANNEX J-1 of the ETA	≥ b (min. 150 mm)	unlimited	unlimited	≤ 375
			6000	unlimited	400
			2250	4800	450
			1000	1300	600
			---	1000	700

\*) The maximum length/width L depends on the height H of the penetration seal. For other combinations see ANNEX G-1 of the ETA.

**System PYROPLUG® Block**  
- Installation in rigid floor, thickness  $c \geq b$  -

**ANNEX C-1**



All dimensions in mm

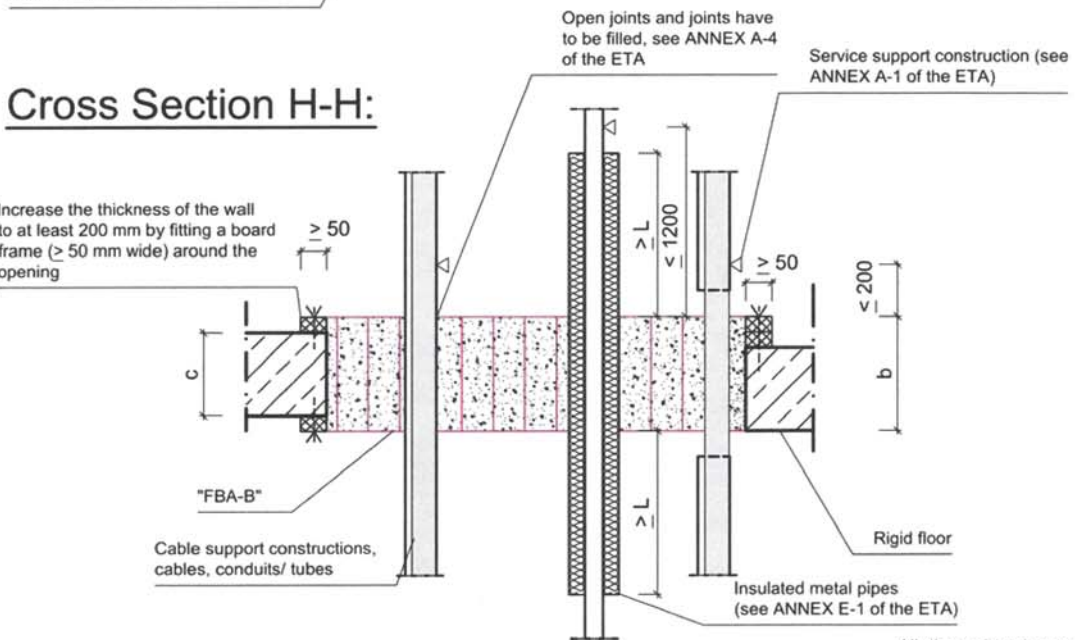
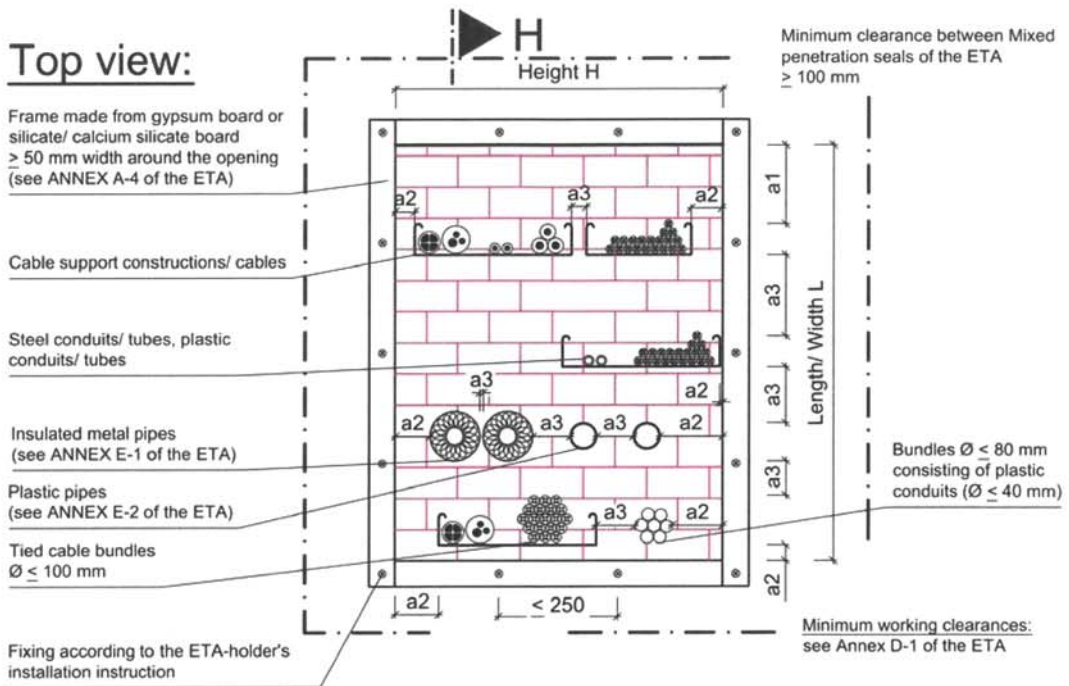
Separating element	Fire resistance classification	Floor Thickness $c$ [mm]	Max. opening size *)		Thickness of penetration seal $b$ [mm]
			Length/Width $L$ [mm] $b = 200$ mm	Height $H$ [mm]	
Rigid floor	see ANNEX J-1 of the ETA	$150 \leq c < 200$ mm	unlimited	$\leq 375$	see ANNEX J-1 of the ETA
			unlimited	400	
			4800	450	
			1300	600	
			1000	700	

\*) The maximum length/width  $L$  depends on the height  $H$  of the penetration seal. For other combinations see ANNEX G-1 of the ETA.

**System PYROPLUG® Block**

- Installation in rigid floor, thickness  $150 \text{ mm} \leq c < 200 \text{ mm}$  -

**ANNEX C-2**



Separating element	Fire resistance classification	Floor Thickness c [mm]	Max. opening size *)		Thickness of penetration seal b [mm]
			Length/Width L [mm] b = 200 mm	Height H [mm]	
Rigid floor	see ANNEX J-1 of the ETA	$150 \leq c < 200$ mm	unlimited	$\leq 375$	see ANNEX J-1 of the ETA
			unlimited	400	
			4800	450	
			1300	600	
			1000	700	

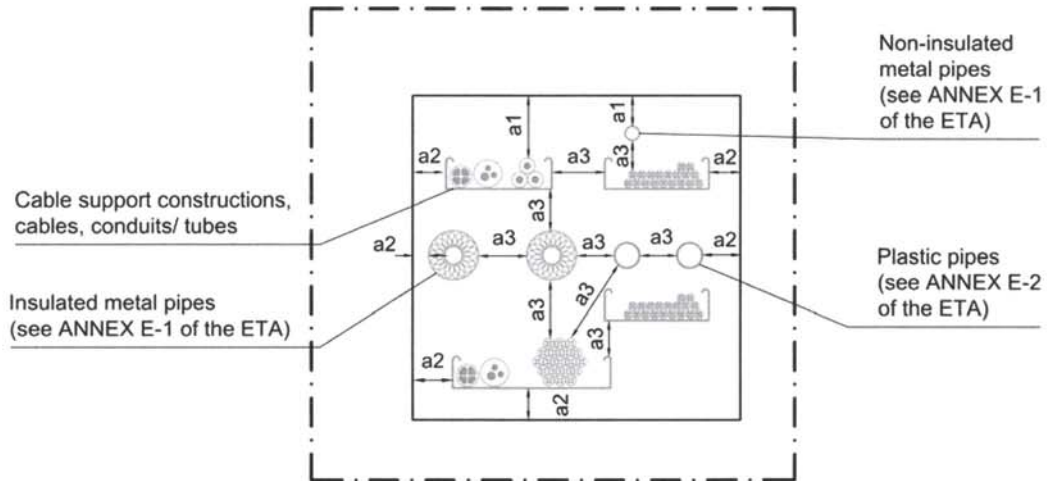
\*) The maximum length/width L depends on the height H of the penetration seal. For other combinations see ANNEX G-1 of the ETA.

## System PYROPLUG® Block

- Installation in rigid floor, thickness  $150 \text{ mm} \leq c < 200 \text{ mm}$  -

**ANNEX C-3**

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

<u>Minimum working clearance</u>			
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 (see clause 1 of the ETA) 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>

**System PYROPLUG® Block**  
- Minimum working clearances -

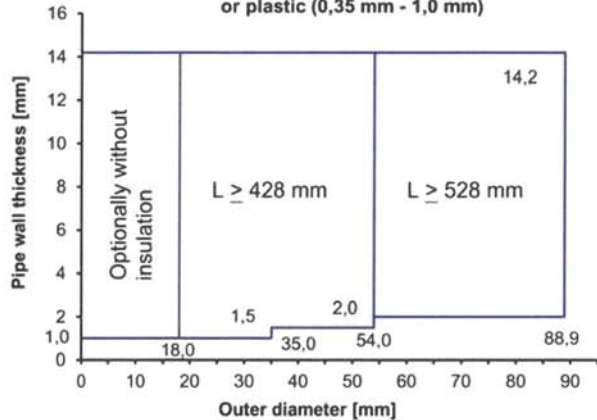
**ANNEX D-1**

## Field of application of metal pipes

### Mineral wool (acc. to clause 1 of the ETA) insulated metal pipes

### acc. to clause 2.1 of the ETA (C/U) and (C/C)

Metal pipes made of copper, steel, stainless steel, cast iron insulated with mineral wool, insulation optional sustained (LS, CS) or interrupted (LI, CI), optional clad with sheet steel (thickness 0,4 mm - 1,0 mm) or plastic (0,35 mm - 1,0 mm)

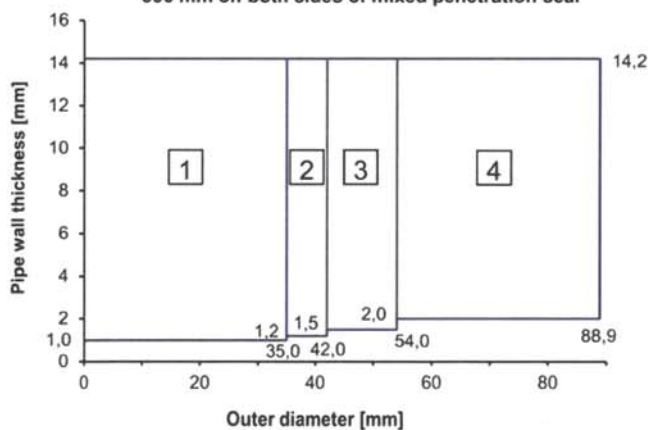


L measured from the surface of the penetration seal see ANNEX B-1 to C-3 of the ETA.

Case	Density of mineral wool	Thickness of mineral wool
LI (local-interrupted)	≥ 90 kg/m <sup>3</sup>	30 mm
LS (local-sustained)		30 mm
CI (continued-interrupted)		≥ 30 mm
CS (continued-sustained)		≥ 30 mm

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

Metal pipes made of copper, steel, stainless steel, cast iron insulated with AF/Armaflex, insulation sustained (LS or CS), minimum length 500 mm on both sides of mixed penetration seal

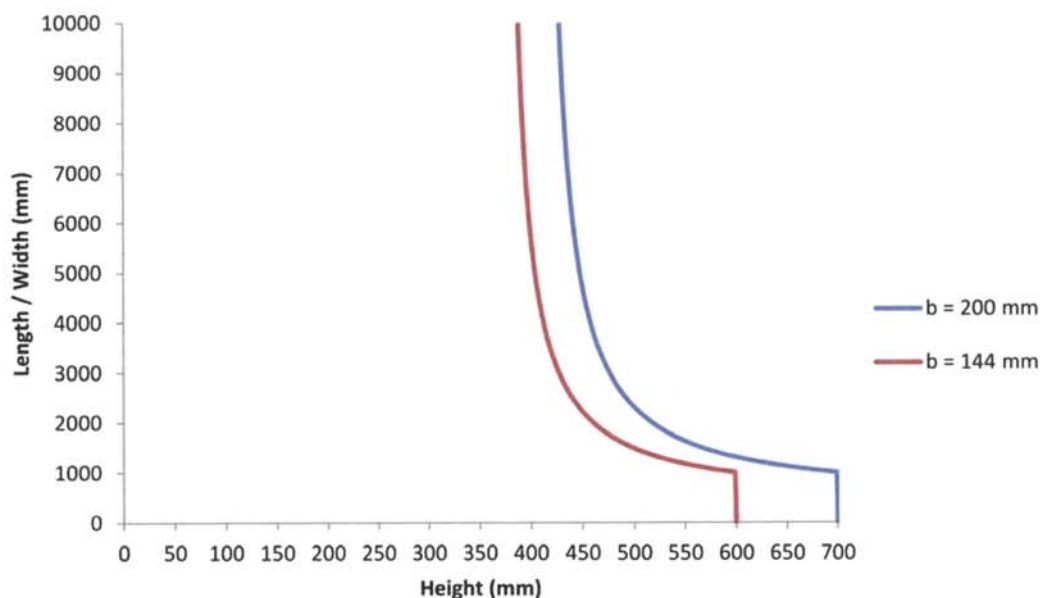


- 1 Insulation thickness 9,0 mm to 35,0 mm,  $L \geq 500$  mm
- 2 Insulation thickness 9,0 mm to 36,5 mm,  $L \geq 500$  mm
- 3 Insulation thickness 9,0 mm to 38,0 mm,  $L \geq 500$  mm
- 4 Insulation thickness 41,5 mm,  $L \geq 500$  mm

**Interpolation between pipe diameters and wall thicknesses for metal pipes according to clause 2.1 of the ETA in flexible walls, rigid walls and rigid floors**

**ANNEX E-1**

**Maximum dimensions of Mixed penetration seal "System PYROPLUG® Block" in rigid floors**



The maximum length (width) of the seal in rigid floors has to be calculated as follows:

$$\text{length (width)} = \frac{\text{height}}{(((c_{\text{tested}} / 2) * \text{height}) - 1)}$$

	Seal thickness b = 144 mm	Seal thickness b = 200 mm
Maximum height	600 mm	700 mm
Minimum perimeter length to seal area ratio ( $c_{\text{tested}}$ )	0,005333 mm / mm <sup>2</sup>	0,004857 mm / mm <sup>2</sup>
length (width)	$\frac{\text{height}}{(((0,005333 \text{ mm} / \text{mm}^2 / 2) * \text{height}) - 1)}$ ex.: H = 500 mm → L = 1500 mm	$\frac{\text{height}}{(((0,004857 \text{ mm} / \text{mm}^2 / 2) * \text{height}) - 1)}$ ex.: H = 500 mm → L = 2333 mm

The area on the left side of the graph gives an overview of all possible combinations of length (width) and height where the minimum perimeter length to seal area ratio is  $\geq c_{\text{tested}}$ .

For a height smaller than 375 mm (b = 144 mm) and 412 mm (b = 200 mm) no limitation of length (width) is required.

Note: The dimensions of the graph are not true to scale.

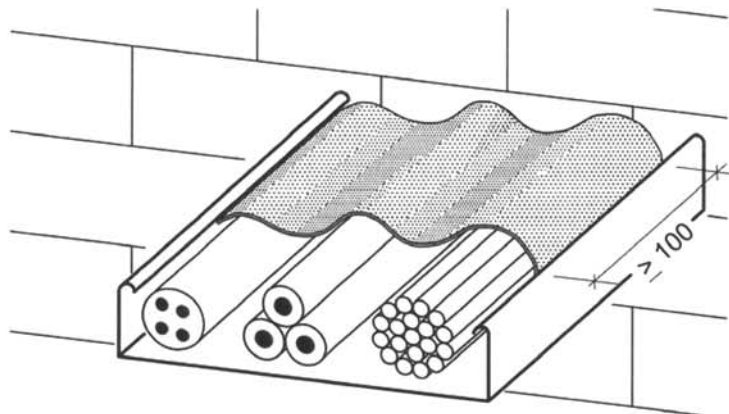
**System PYROPLUG® Block**  
- Installation in rigid floor – perimeter length to seal area ratio -

**ANNEX G-1**

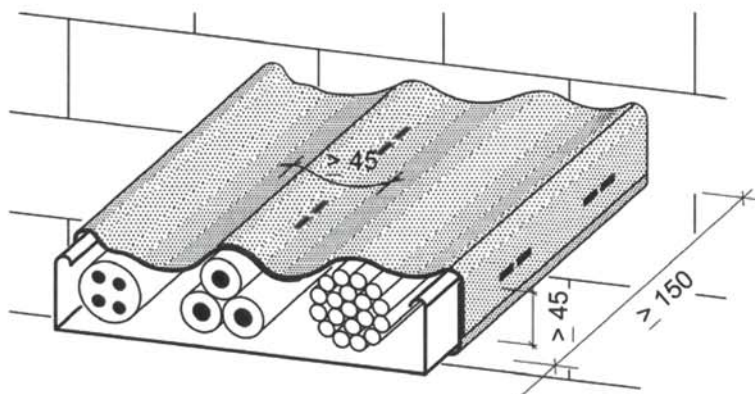


## Arrangement of "FBA-WI" for fire resistance classification EI 90 / EI 120 (s. ANNEX J-1 of the ETA):

Step 1: Place a strip of min. 100 mm width of "FBA-WI" on top



Step 2: Wrap the cables/ cable bundles and cable trays with "FBA-WI"



Step 1, only for EI 120: On both sides of the Mixed penetration seal a strip of "FBA-WI" of at least 100 mm width has to be placed on top of the cables.

Step 2, for EI 90 and EI120: The cables or cable trays have to be wrapped with strips of "FBA-WI" 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.

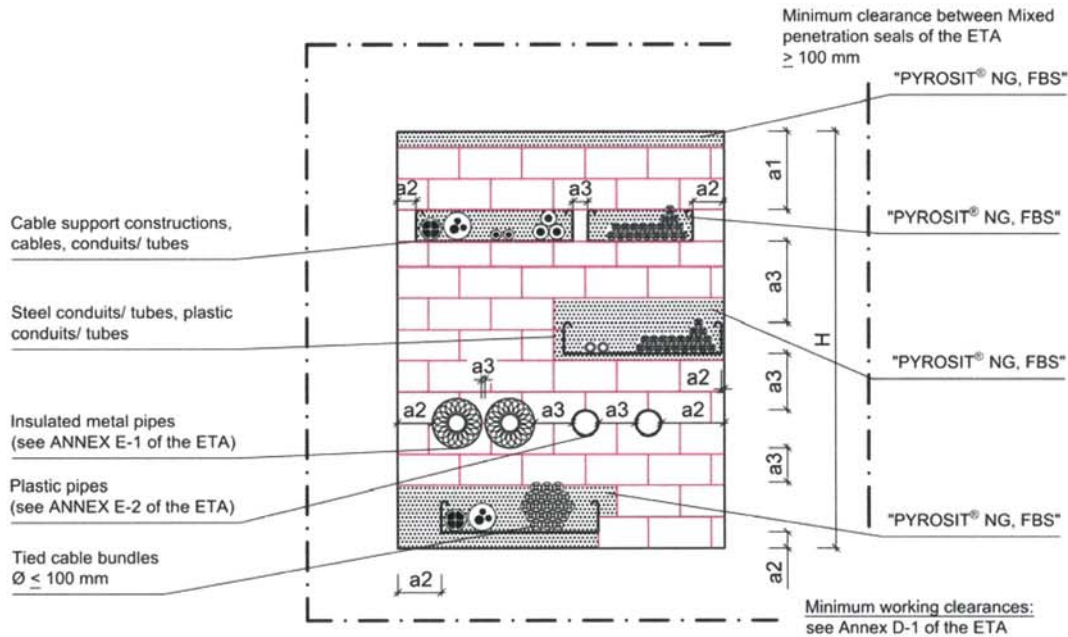
All dimensions in mm

**System PYROPLUG® Block**  
**- Arrangement of "FBA-WI" -**

**ANNEX H-1**

## Application of "PYROSIT<sup>®</sup> NG, FBS":

### View:



Max. area to be closed with "PYROSIT<sup>®</sup> NG, FBS" is 450 mm x 500 mm (width x height) or 0,225 m<sup>2</sup> (see ANNEX A-2 to A-4 of the ETA).

All dimensions in mm

Separating element	Fire resistance classification	Wall/ Floor thickness c [mm]	Max. opening size	Thickness of penetration seal b [mm]
Flexible/ Rigid wall and Rigid floor	see ANNEX J-1 of the ETA	see ANNEX B-1 to C-3 of the ETA	see ANNEX B-1 to C-3 of the ETA	see Annex J-1 of the ETA

**System PYROPLUG<sup>®</sup> Block**  
- Application of PYROSIT<sup>®</sup> NG, FBS -

**ANNEX I-1**

**Fire resistance classifications: Installation in flexible walls of at least 94 mm, rigid walls of at least 100 mm or rigid floors of at least 150 mm thickness**

<b>Penetrating element</b>	<b>Min. thickness of Mixed penetration seal</b>	
	<b>b = 144 mm</b>	<b>b = 200 mm</b>
Sheathed electrical / telecommunication / optical fibre cables up to a maximum diameter of 21 mm	E 60 EI 60	E 120 EI 90 / EI 120 <sup>2)</sup>
Sheathed electrical / telecommunication / optical fibre cables with diameter 21 mm < D ≤ 50 mm	E 60 EI 60	E 120 wall: EI 90 / EI 120 <sup>2)</sup> floor: EI 90 <sup>1) or 2)</sup> / EI 120 <sup>2)</sup>
Sheathed electrical / telecommunication / optical fibre cables with diameter 50 mm < D ≤ 80 mm	E 60 EI 60	E 120 EI 90 <sup>1) or 2)</sup> / EI 120 <sup>2)</sup>
Tied bundles up to 100 mm overall diameter containing sheathed electrical / telecommunication / optical fibre cables of a max. diameter up to 21 mm	E 60 EI 60	E 120 EI 90 / EI 120 <sup>2)</sup>
Non-sheathed cables up to a maximum outer diameter of 24 mm	E 60 wall: EI 45 floor: EI 60	E 120 EI 60
Steel conduits/ tubes up to Ø 16 mm with/ without cables	E 60-U/C EI 60-U/C	E 120-U/C EI 120-U/C
Plastic conduits/ tubes up to Ø 40 mm and bundles up to 80 mm consisting of plastic conduits (Ø ≤ 40 mm) with/ without cables	E 60-U/C EI 60-U/C	E 120-U/C EI 120-U/C
Non-insulated metal pipes up to a max. outer diameter of 18 mm	E 60-C/U EI 60-C/U	E 120-C/U EI 60-C/U
Mineral wool insulated metal pipes up to a max. outer diameter of 88,9 mm	E 60-C/U EI 60-C/U	E 120-C/U wall: EI 90-C/U floor: EI 120-C/U
AF/Armaflex (thickness ≥ 9 mm) insulated metal pipes up to a max. outer diameter of 88,9 mm*	E 60-C/U EI 60-C/U	E 120-C/U EI 90-C/U
Plastic pipes up to a max. outer diameter of 50 mm	E 60-U/C EI 60-U/C	E 120-U/C EI 120-U/C

\* For permitted insulation see ANNEX E-1 of the ETA

- 1) Cables and conduits / tubes have to be coated at a length of minimum 30 mm (measured from the surface of the penetration seal) with "PYROPLUG® Sreced, FBA-SP" with a minimum thickness of 5 mm on both sides of the penetration seal.
- 2) "FBA-WI" (see ANNEX H-1 of the ETA) has to be wrapped around the penetrating element on both sides of the penetration seal.

**System PYROPLUG® Block**  
**- Fire resistance classification -**

**ANNEX J-1**

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**Building Connections**

