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European technical approval

ETA-11/0206

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

Handelsbezeichnung:
Trade name:

Kombi-/Kabelabschottung

„System ZZ-Brandschutzschaum 2K NE“

Mixed/ Cable penetration seal

„System ZZ-Fire protection foam 2K NE“

Zulassungsinhaber:
Holder of approval:

Karl Zimmermann

Miltzstraße 29

51061 Köln

GERMANY

Zulassungsgegenstand
und Verwendungszweck:

Kombi-/ Kabelabschottung

Generic type and use of construction product:

Mixed/ Cable penetration seal

Geltungsdauer vom:
Validity from:

28.06.2013

bis:

27.06.2018

to:

Herstellwerk:
Manufacturing plant:

Karl Zimmermann GmbH

Marconistraße 7-9

50769 Köln

GERMANY

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

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 products¹, modified by the Council Directive 93/68/EEC² and Regulation (EC) no. 1882/2003 of the European Parliament and of the Council³;
 - 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/EC⁴;
 - Guideline for European technical approval for “Fire Stopping and Fire Sealing Products - : Part 2: Penetration Seals” ETAG no. 026-Part 2, edition 2011.
- 2 The Österreichisches Institut für Bautechnik is authorised to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturer other than those indicated on page 1; or manufacturing plants other than those laid down in the context of this European technical approval.
- 4 This European technical approval may be withdrawn by the Österreichisches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
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- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

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
ZZ-Brandschutzschaum 2K NE (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.
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)
ZZ-Brandschutzstein NE (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.

Penetrating element	Construction characteristics
Installation supports	<ul style="list-style-type: none"> ➤ Steel cable trays (perforated or non-perforated) ➤ Steel ladders ➤ 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
<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"> ➤ 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. ➤ 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. ➤ 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. ➤ 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.

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 Z₁. Since the requirements for Type Z₁ are met, also the requirements for Type Z₂ 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
Mechanical resistance and stability			
	2.2	None	Not relevant
Safety in case of fire			
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
Hygiene, health and environment			
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
Safety in use			
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
Protection against noise			
ETAG 2.4.9	2.6.1	Airborne sound insulation	EN ISO 10140-1:2010 $D_{n,e,w}(C;Ctr) = 66 (-1;-6) \text{ dB}$
Energy economy and heat retention			
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
General aspects relating to fitness for use			
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
ZZ-Brandschutzschaum 2K NE (ZZ-Fire protection foam 2K NE)	E
ZZ-Wickel NE (ZZ-Wrap NE)	E
ZZ-Brandschutzstein NE (ZZ-Foam block NE)	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.

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 Commission⁶ 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

⁶ 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 Commission⁷ 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.

⁷ 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 plan⁸ 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.

⁸ 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

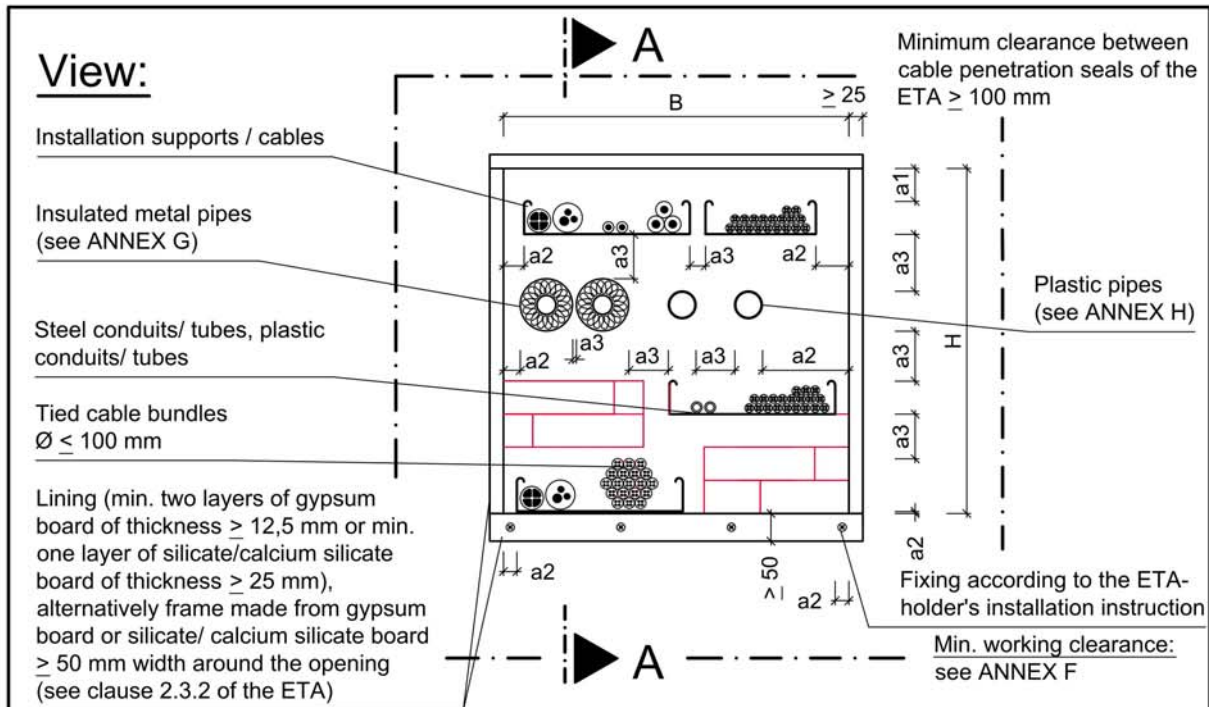
The product shall be installed and used as described in this ETA.

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.

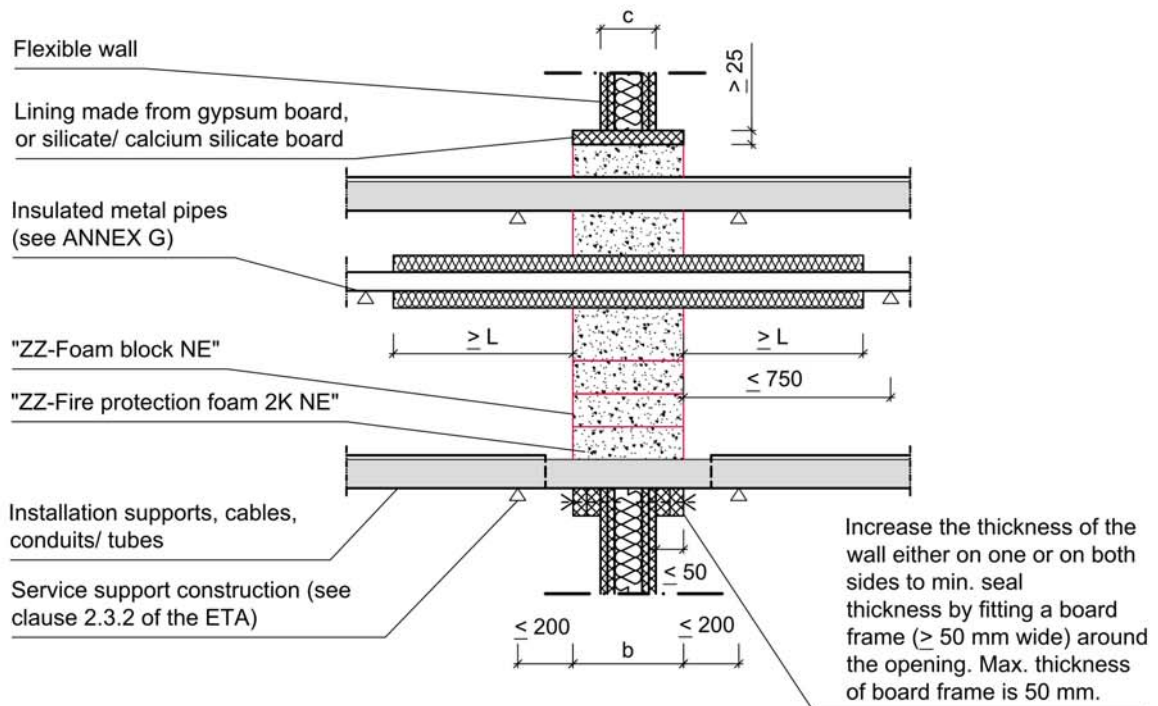
On behalf of Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits
Managing Director



Cross Section A-A:



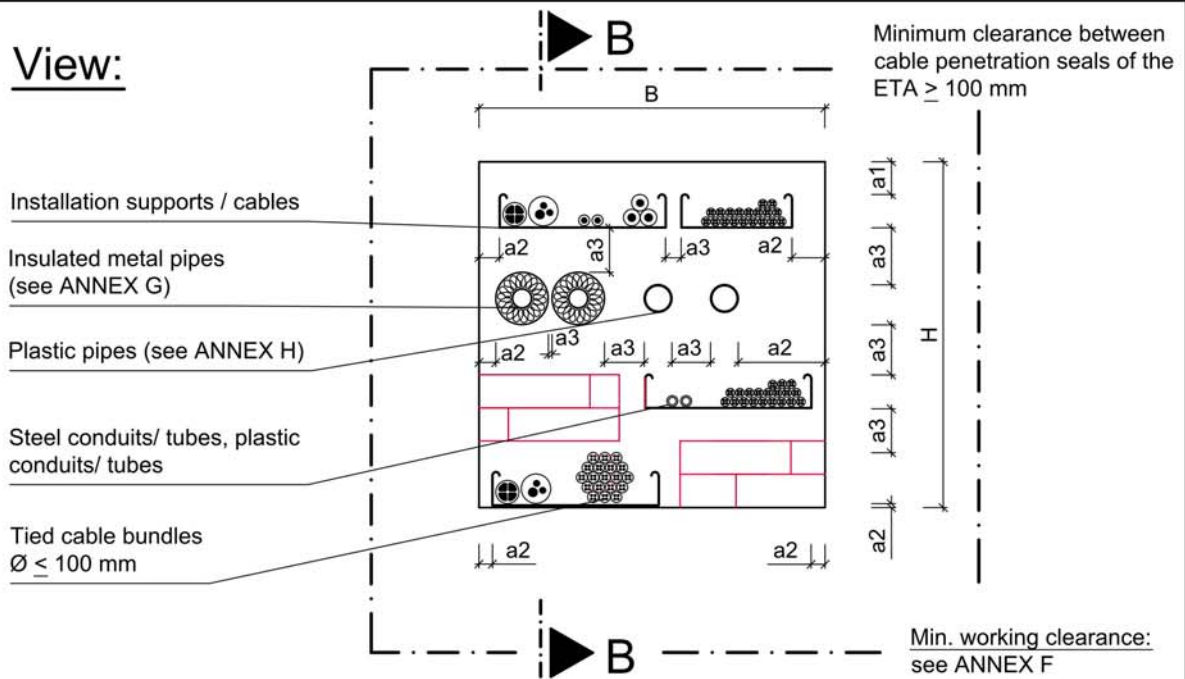
All dimensions in mm

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

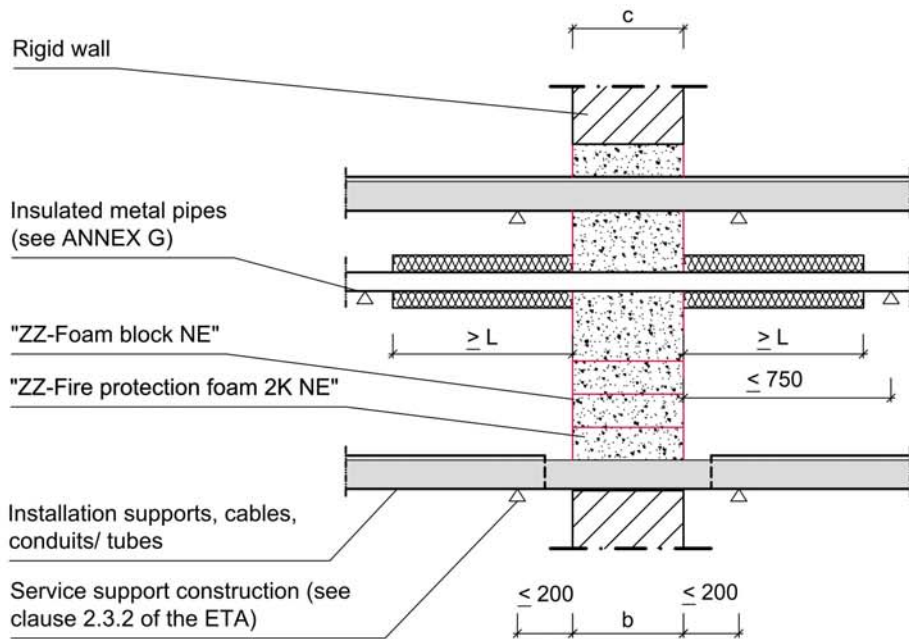
Mixed penetration seal "ZZ-Fire protection foam 2K NE"
- Installation in flexible wall $c \geq 100$ mm -

ANNEX A

View:



Cross Section B-B:

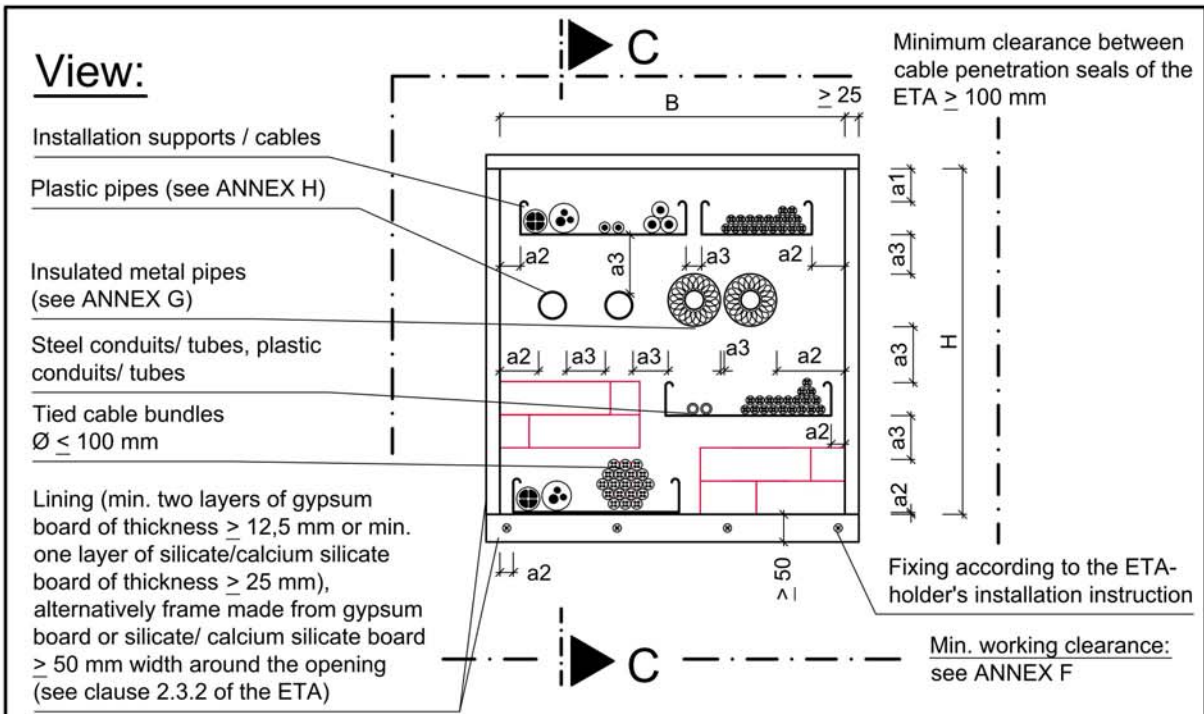


All dimensions in mm

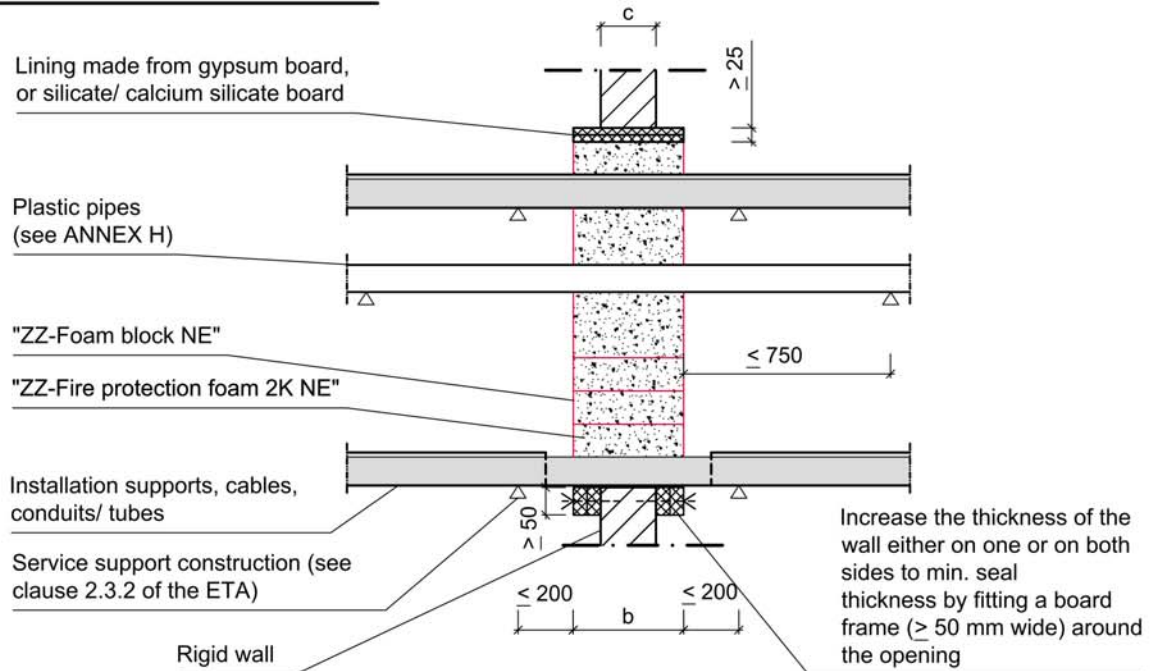
Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size		Seal Thickness b [mm]
			H [mm]	B [mm]	
Rigid wall	see ANNEX I	$\geq b$	≤ 500	≤ 450	see ANNEX I

Mixed penetration seal "ZZ-Fire protection foam 2K NE"
- Installation in rigid wall
c (wall thickness) \geq b (seal thickness) -

ANNEX B



Cross Section C-C:



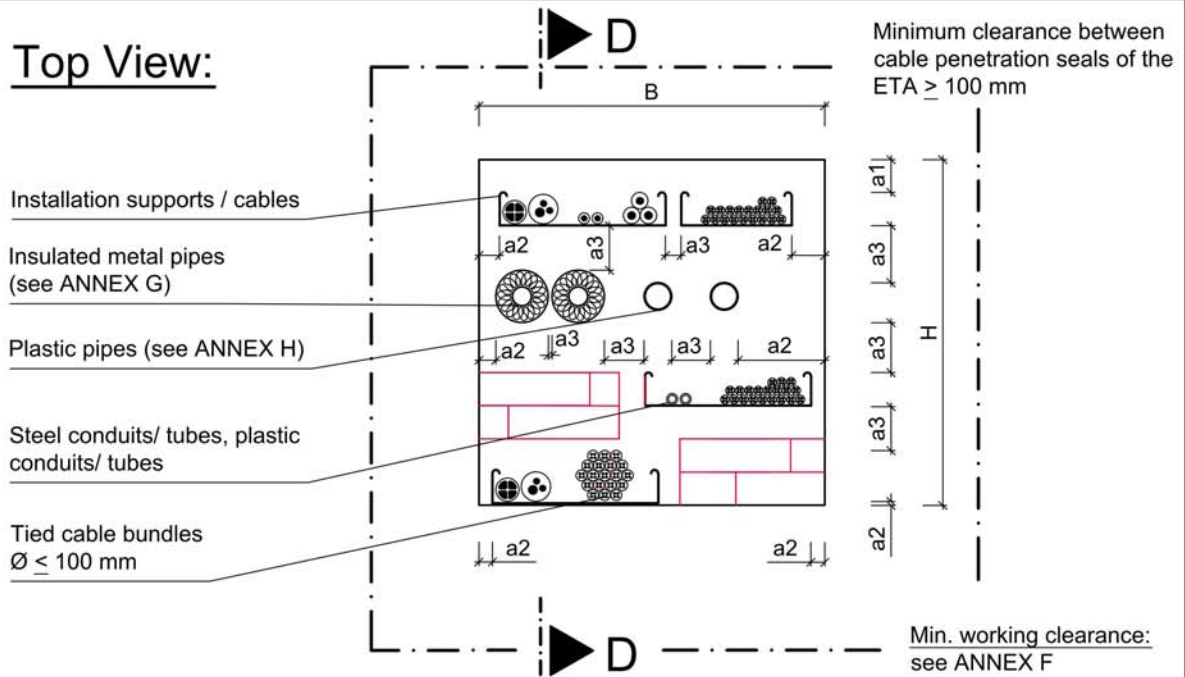
All dimensions in mm

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	$100 \leq c < b$	≤ 500	≤ 450	see ANNEX I

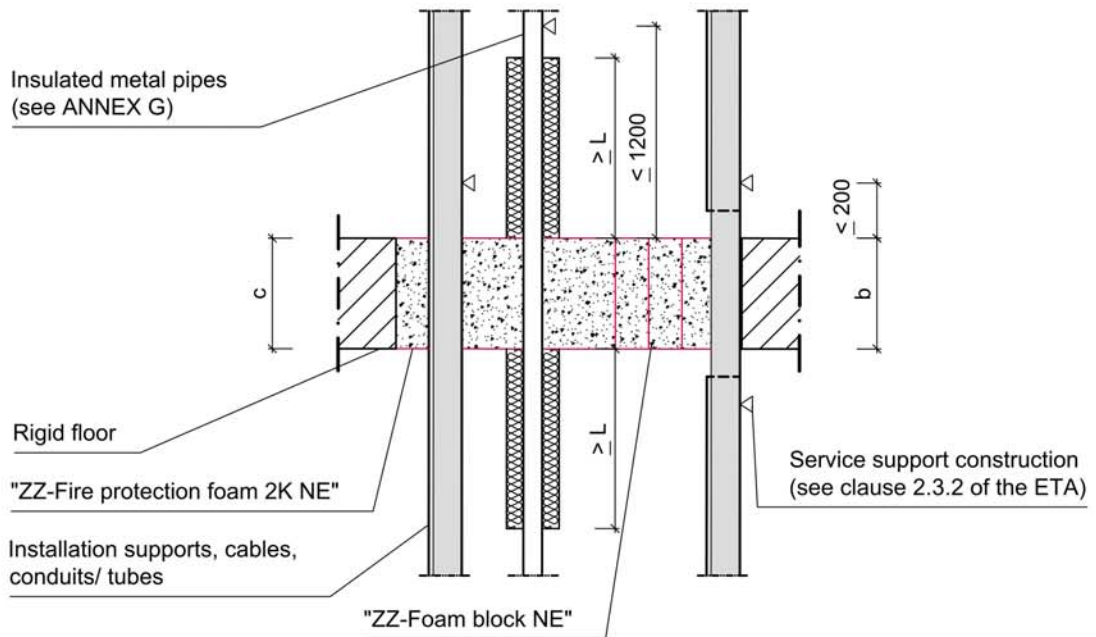
Mixed penetration seal "ZZ-Fire protection foam 2K NE"
- Installation in rigid wall $100 \text{ mm} \leq c < b$ -

ANNEX C

Top View:



Cross Section D-D:

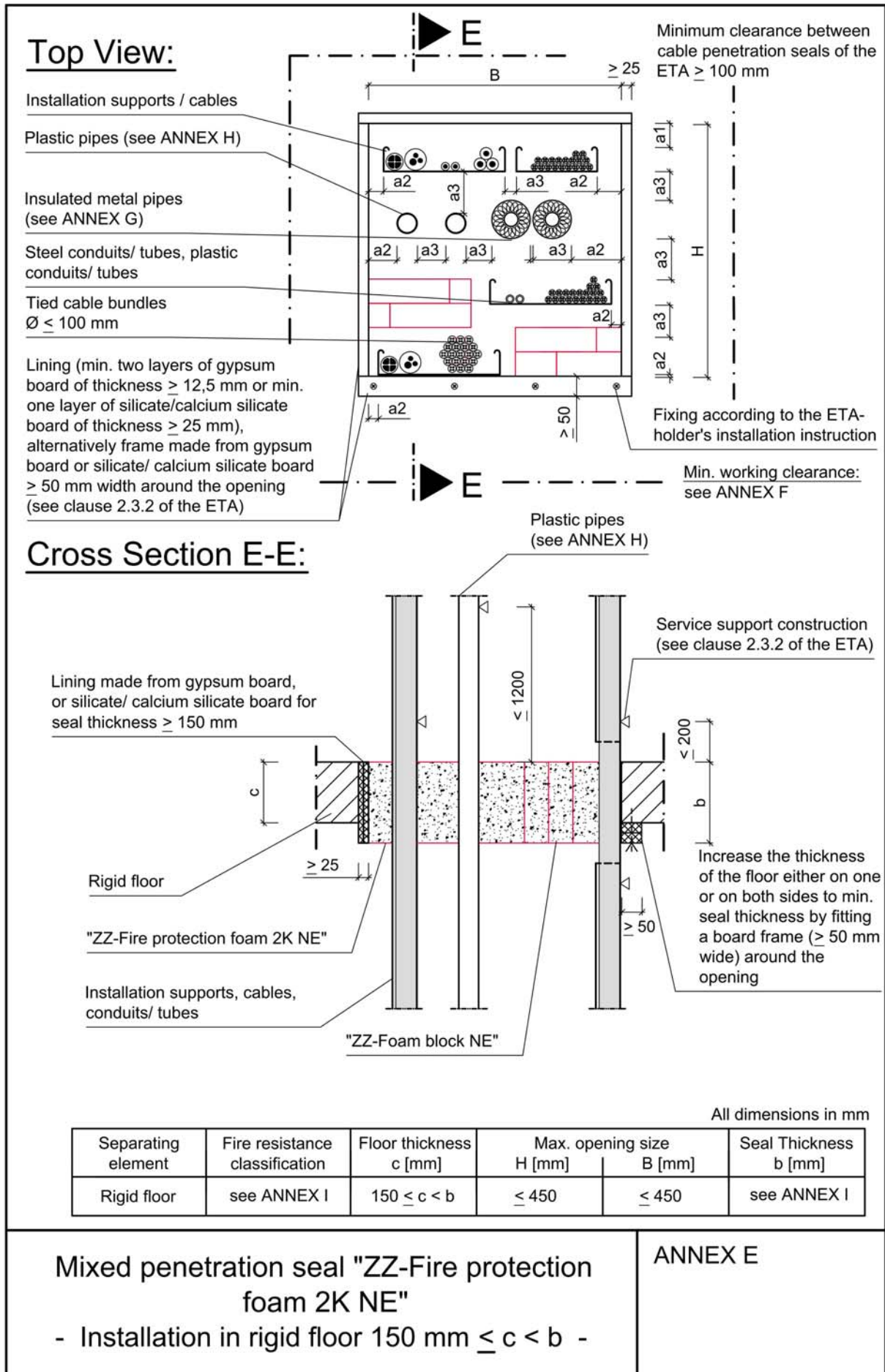


All dimensions in mm

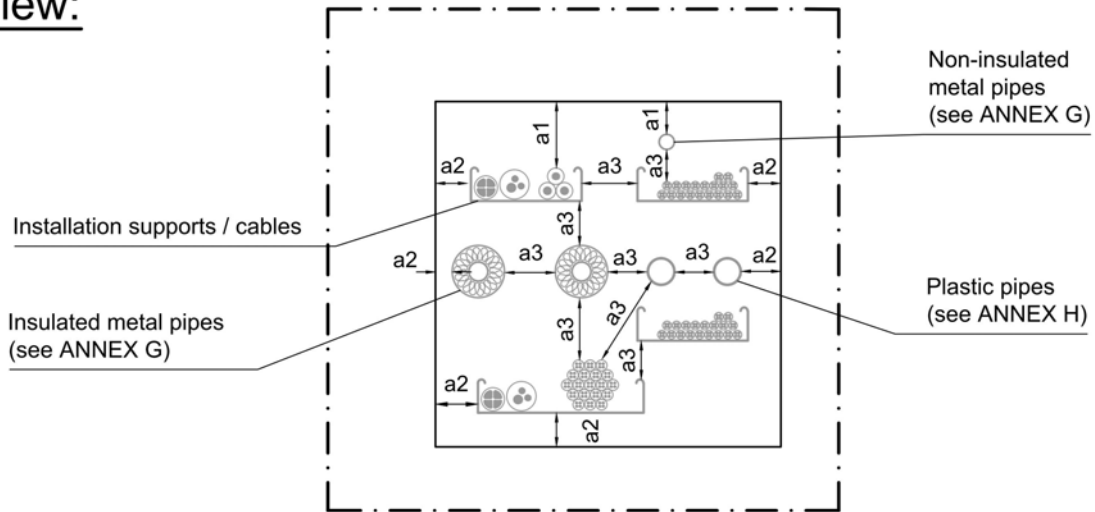
Separating element	Fire resistance classification	Floor thickness c [mm]	Max. opening size		Seal Thickness b [mm]
			H [mm]	B [mm]	
Rigid Floor	see ANNEX I	$\geq b$ (min. 150 mm)	≤ 450	≤ 450	see ANNEX I

Mixed penetration seal "ZZ-Fire protection foam 2K NE"
- Installation in rigid floor
c (floor thickness) \geq b (seal thickness) -

ANNEX D



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

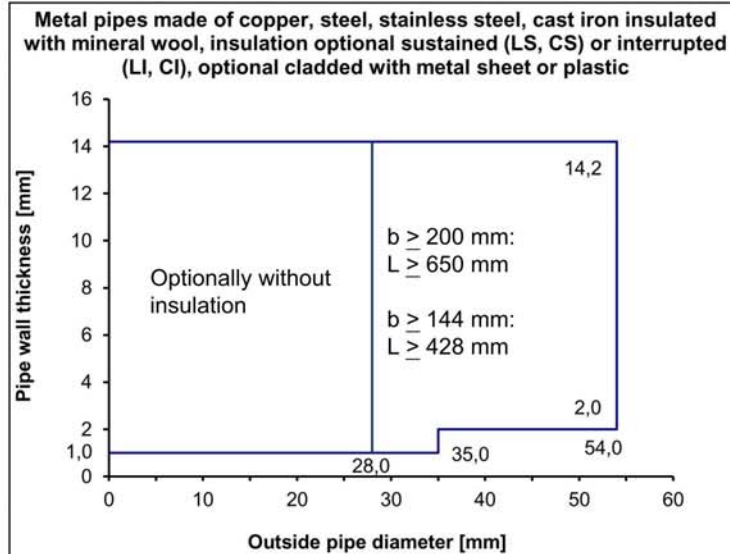
Minimum working clearance			
Penetrating element	a1	a2	a3
Cables/ Cable trays/ Conduits	50 mm	0 mm	<ul style="list-style-type: none"> Cables/ Cable trays/ Conduits, horizontal: 0 mm Cables/ Cable trays/ Conduits, vertical: 50 mm Non-insulated metal pipes: 60 mm Other penetrating elements: 50 mm
Mineral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

Mixed penetration seal "ZZ-Fire protection foam 2K NE"
- Minimum working clearance -

ANNEX F

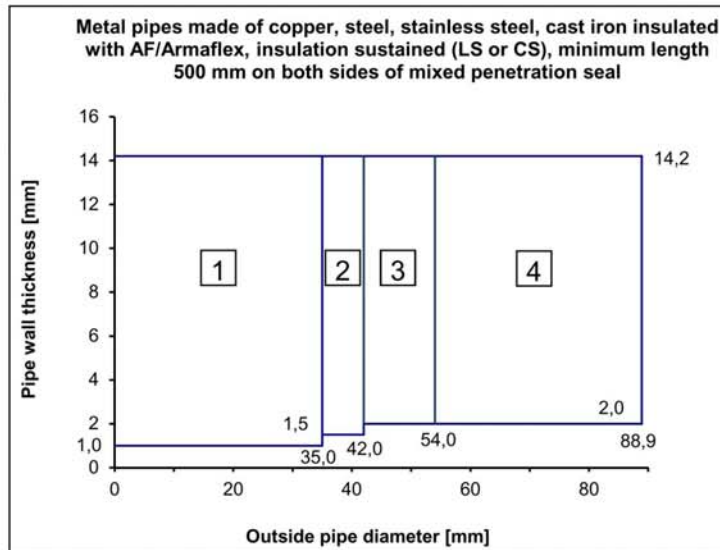
Field of application of metal pipes

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)		$\geq 30 \text{ mm}$
CS (continued-sustained)		$\geq 30 \text{ mm}$

AF/Armaflex insulated metal pipes (C/U)

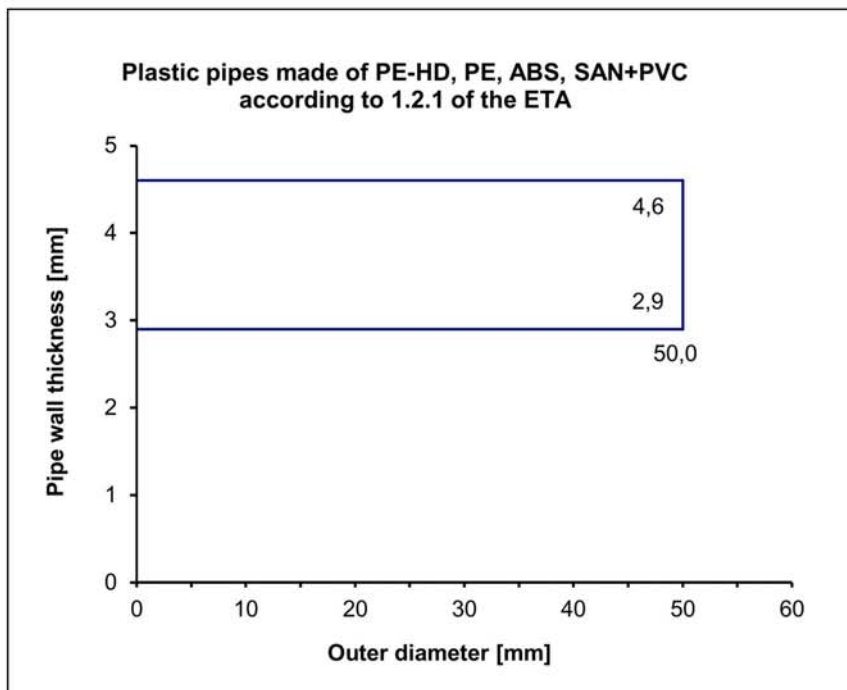
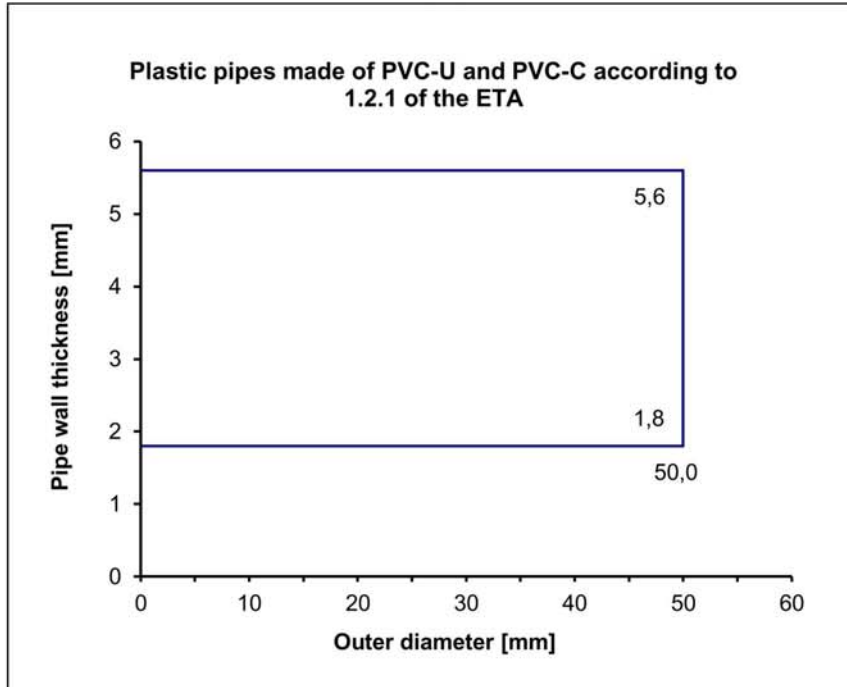


- 1 Insulation thickness 9,0 mm to 35,0 mm, $L \geq 500 \text{ mm}$
- 2 Insulation thickness 9,0 mm to 36,5 mm, $L \geq 500 \text{ mm}$
- 3 Insulation thickness 9,0 mm to 38,0 mm, $L \geq 500 \text{ mm}$
- 4 Insulation thickness 41,5 mm, $L \geq 500 \text{ mm}$

Mixed penetration seal "ZZ-Fire protection
 foam 2K NE"
 - Field of application of metal pipes -

ANNEX G

Field of application of plastic pipes:



Mixed penetration seal "ZZ-Fire protection
foam 2K NE"
- Field of application of plastic pipes -

ANNEX H

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

Penetrating element	Min. thickness of Mixed penetration seal	
	b ≥ 144 mm	b ≥ 200 mm
<ul style="list-style-type: none"> • Sheathed electrical/ telecommunication /optical fibre cables up to a maximum outer diameter of 80 mm • Tied bundles up to 100 mm overall diameter containing sheathed electrical/ telecommunication /optical fibre cables of a max.diameter up to 21 mm 	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 "ZZ-Fire protection
foam 2K NE"
- Fire resistance classification -

ANNEX I

View:

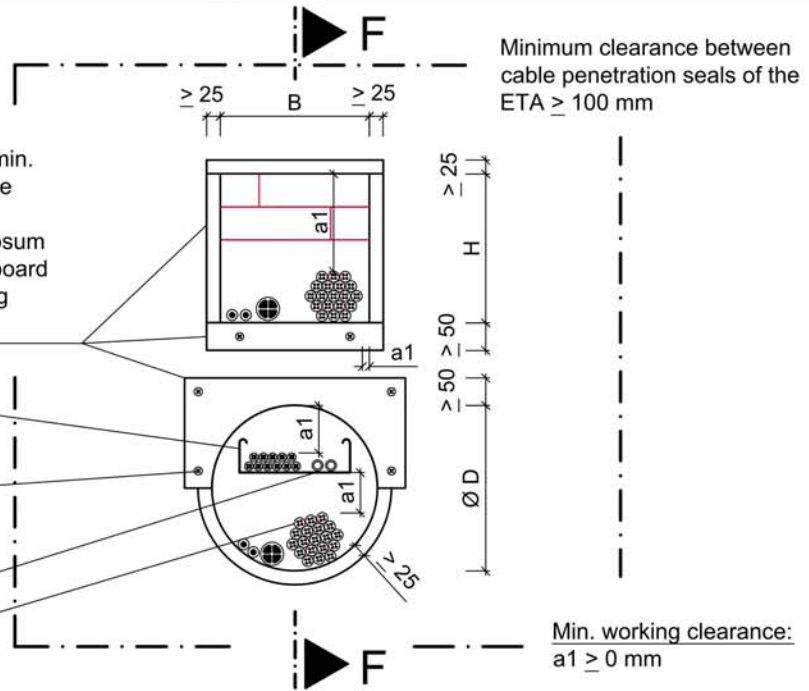
Lining (min. two layers of gypsum board of thickness $\geq 12,5$ mm or min. one layer of silicate/calcium silicate board of thickness ≥ 25 mm), alternatively frame made from gypsum board or silicate/ calcium silicate board ≥ 50 mm width around the opening (see clause 2.3.2 of the ETA)

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:

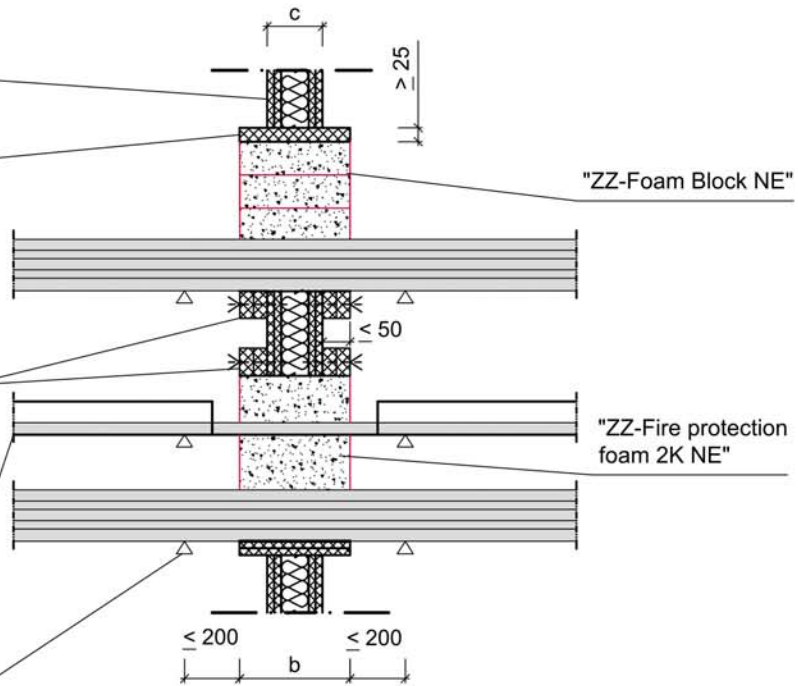
Flexible wall

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 (≥ 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)

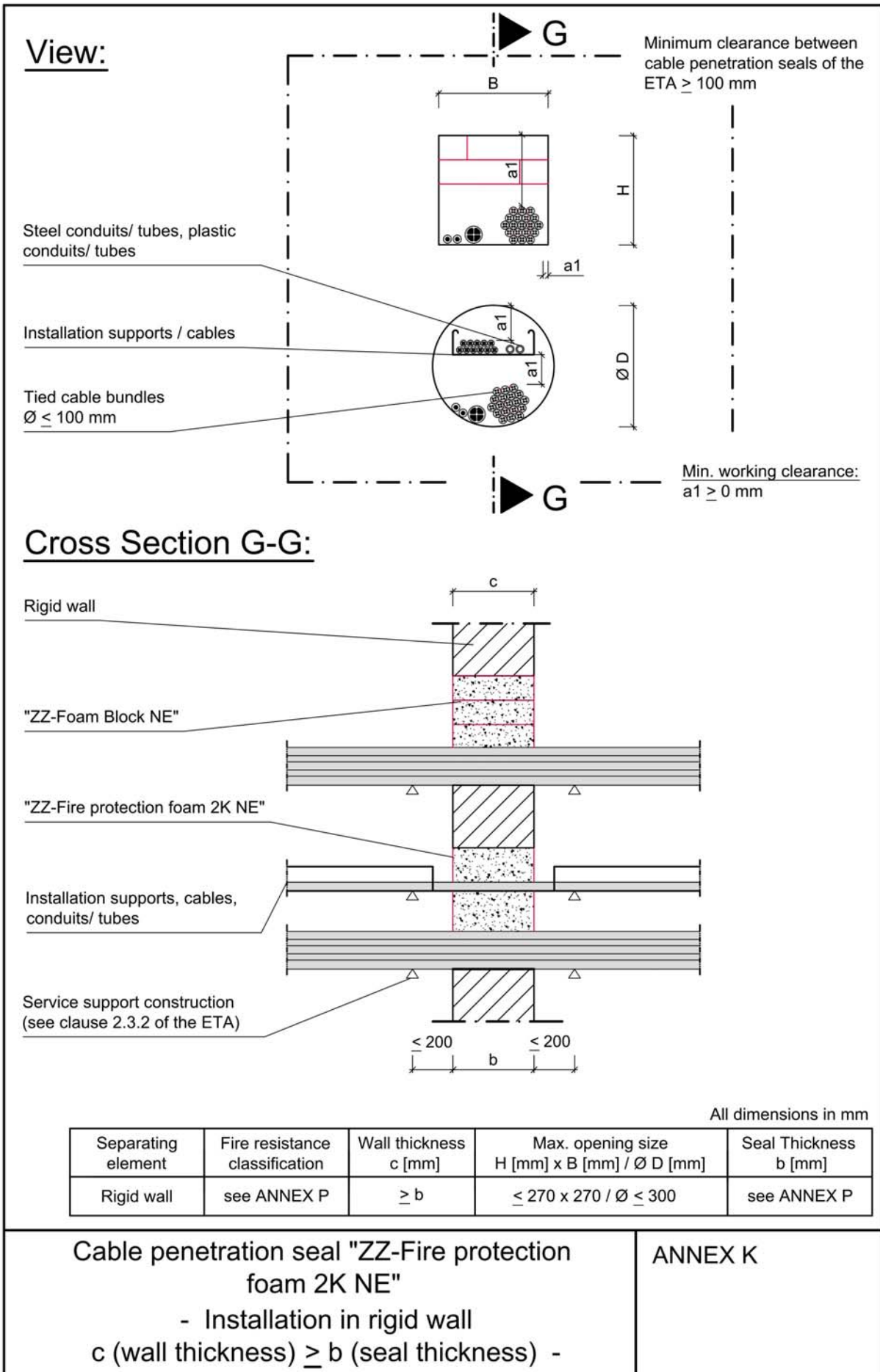


All dimensions in mm

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

Cable penetration seal "ZZ-Fire protection foam 2K NE"
- Installation in flexible wall $c \geq 100$ mm -

ANNEX J



View:

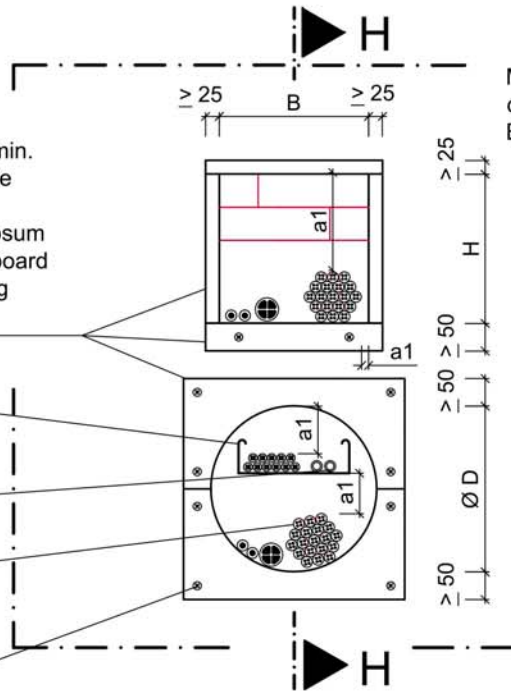
Lining (min. two layers of gypsum board of thickness $\geq 12,5$ mm or min. one layer of silicate/calcium silicate board of thickness ≥ 25 mm), alternatively frame made from gypsum board or silicate/ calcium silicate board ≥ 50 mm width around the opening (see clause 2.3.2 of the ETA)

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 ≥ 100 mm

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

Cross Section H-H:

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

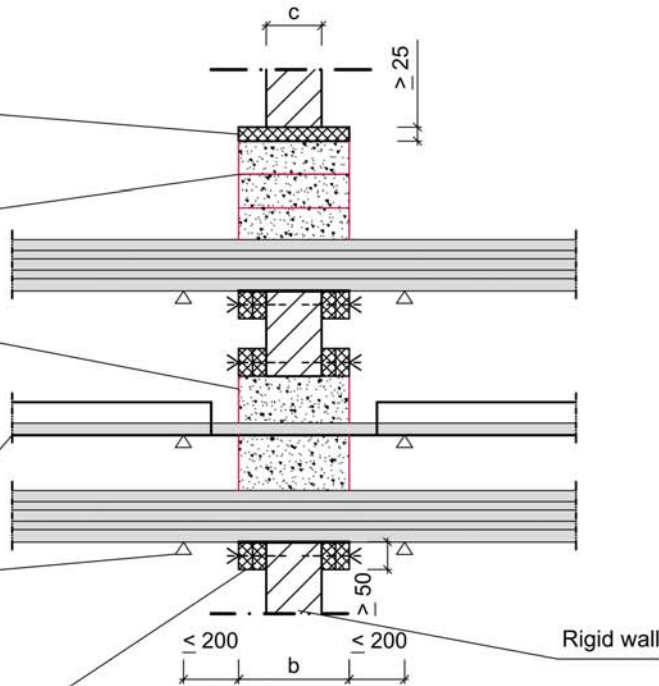
"ZZ-Foam Block NE"

"ZZ-Fire protection foam 2K NE"

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 (≥ 50 mm wide) around the opening



All dimensions in mm

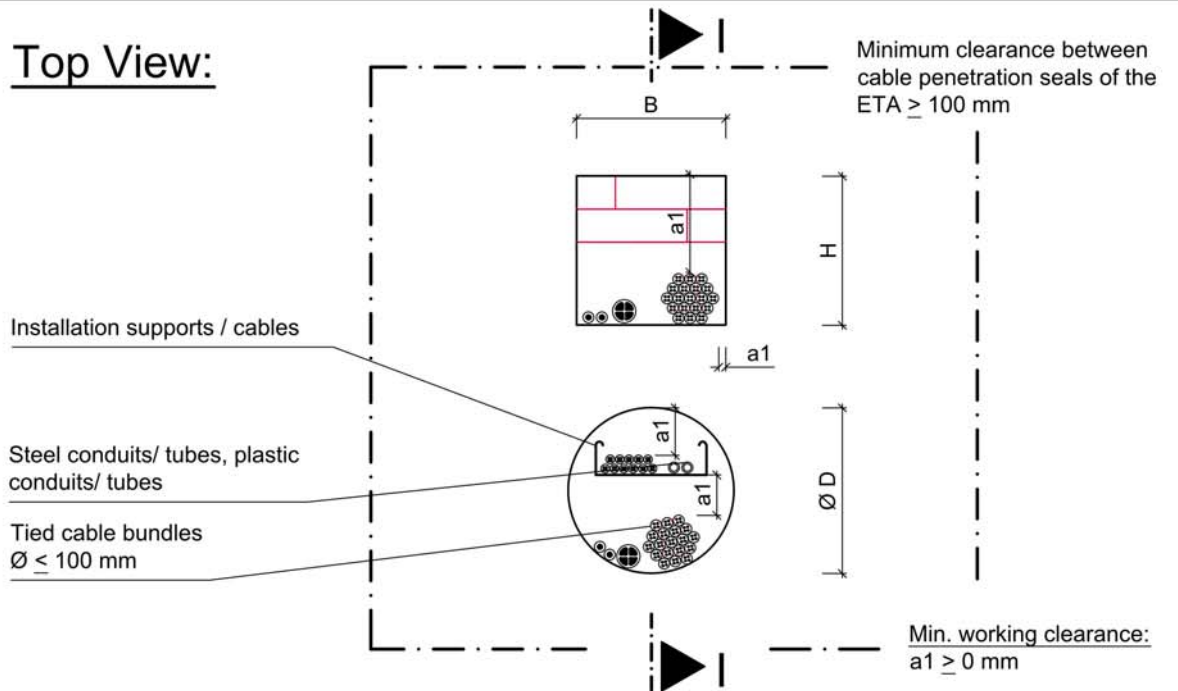
Separating element	Fire resistance classification	Wall thickness c [mm]	Max. opening size H [mm] x B [mm] / Ø D [mm]	Seal Thickness b [mm]
Rigid wall	see ANNEX P	$100 \leq c < b$	$< 270 \times 270 / \varnothing \leq 300$	see ANNEX P

Cable penetration seal "ZZ-Fire protection foam 2K NE"

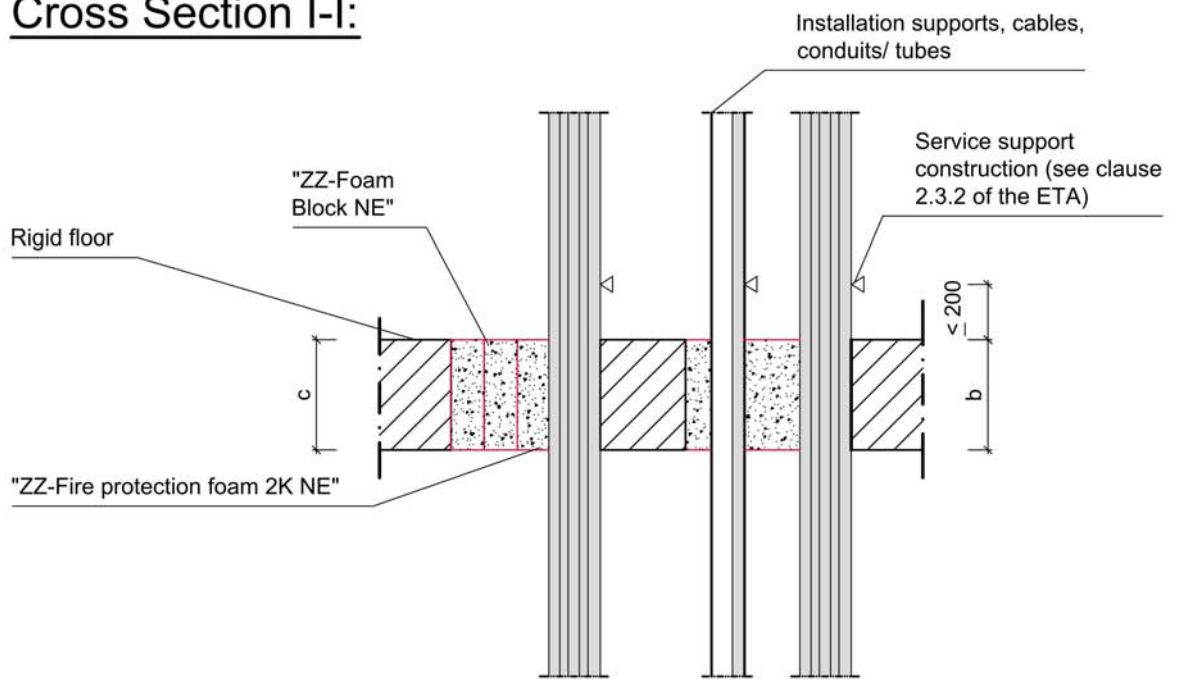
- Installation in rigid wall $100 \text{ mm} \leq c < b$ -

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] / Ø D [mm]	Seal Thickness b [mm]
Rigid floor	see ANNEX P	$\geq b$ (min. 150 mm)	$\leq 270 \times 270 / \text{Ø} \leq 300$	see ANNEX P

Cable penetration seal "ZZ-Fire protection foam 2K NE"
- Installation in rigid floor
c (floor thickness) \geq b (seal thickness) -

ANNEX M

Top View:

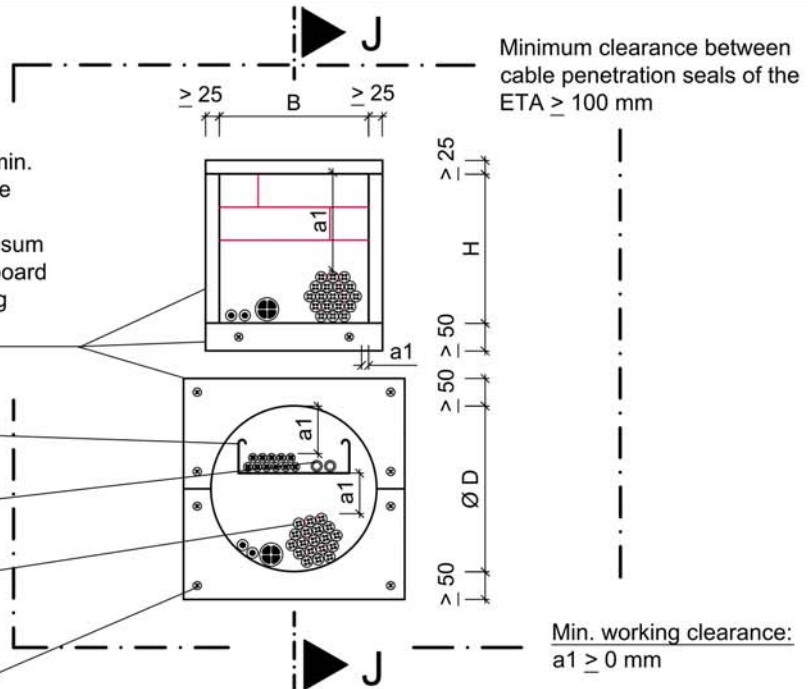
Lining (min. two layers of gypsum board of thickness $\geq 12,5$ mm or min. one layer of silicate/calcium silicate board of thickness ≥ 25 mm), alternatively frame made from gypsum board or silicate/ calcium silicate board ≥ 50 mm width around the opening (see clause 2.3.2 of the ETA)

Installation supports / cables

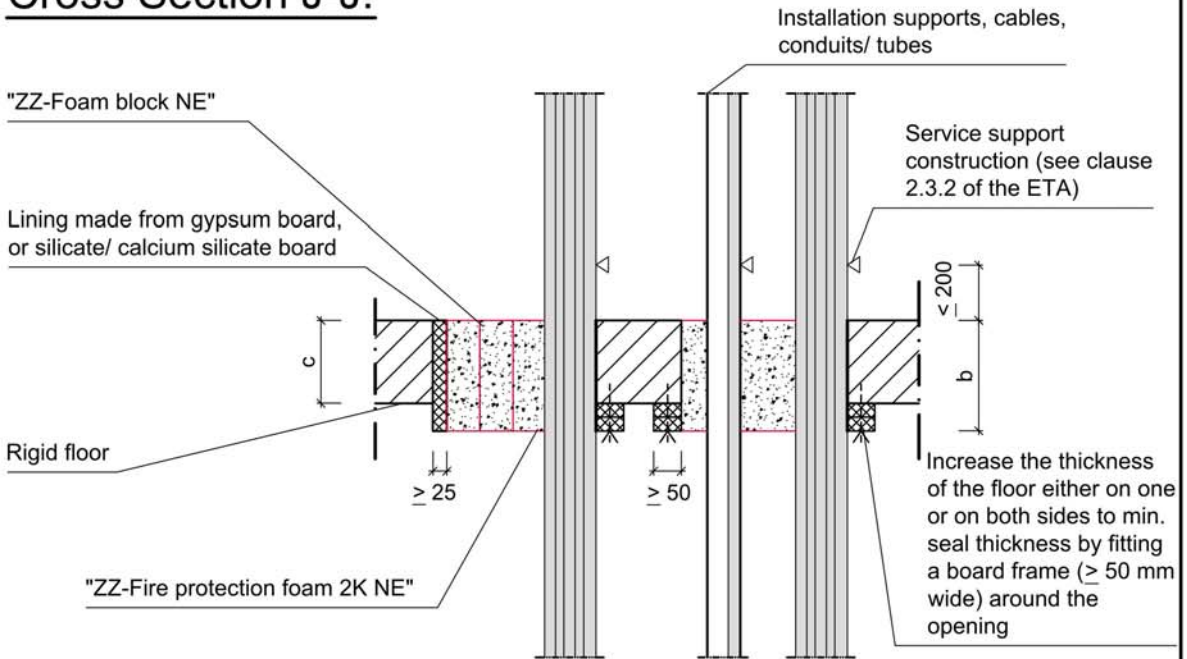
Steel conduits/ tubes, plastic conduits/ tubes

Tied cable bundles $\varnothing \leq 100$ mm

Fixing according to the ETA-holder's installation instruction



Cross Section J-J:



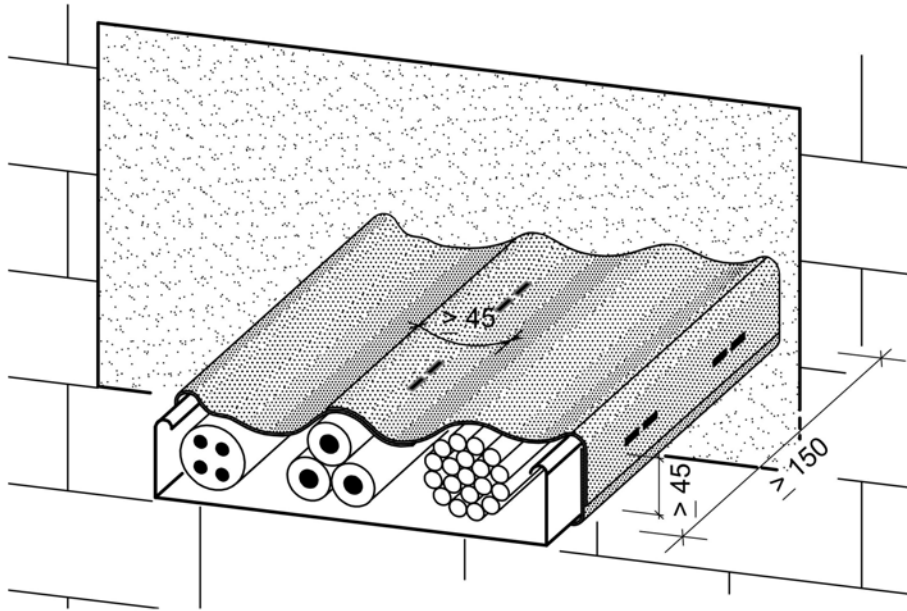
All dimensions in mm

Separating element	Fire resistance classification	Floor thickness c [mm]	Max. opening size H [mm] x B [mm] / Ø 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 "ZZ-Fire protection foam 2K NE"
- Installation in rigid floor $150 \leq c < b$ -

ANNEX N

Arrangement of "ZZ-Wrap NE" for fire resistance classification EI 120:



For fire resistance classification EI120:

The cables or cable trays have to be wrapped with strips of "ZZ-Wrap NE" 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 "ZZ-Fire protection
foam 2K NE"
- Arrangement of "ZZ-Wrap NE" for
fire resistance classification EI 120 -

ANNEX O

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

Penetrating element	Min. thickness of Cable penetration seal			
	b ≥ 100 mm	b ≥ 144 mm	b ≥ 200 mm	b ≥ 250 mm
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 ²⁾ 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 ¹⁾	E 120 EI 60	E 120 EI 90 / EI 120 ²⁾	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 ²⁾	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 ²⁾	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 "ZZ-Fire protection foam NE" 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) "ZZ-Wickel NE" (see ANNEX O) has to be wrapped around the penetrating element.

**Cable penetration seal "ZZ-Fire protection
foam 2K NE"
- Fire resistance classification -**

ANNEX P