

## European Technical Approval ETA-13/0904

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung  
*Trade name*

"System PYROCOMB Intube"

Zulassungsinhaber  
*Holder of approval*

OBO BETTERMANN GmbH & Co. KG  
Hüingser Ring 52  
58710 Menden  
DEUTSCHLAND

Zulassungsgegenstand  
und Verwendungszweck  
*Generic type and use  
of construction product*

Kabelabschottung  
*cable penetration seal*

Geltungsdauer:  
*Validity:*

vom  
*from*  
bis  
*to*

28 June 2013

28 June 2018

Herstellwerke  
*Manufacturing plants*

Herstellerwerk S  
Herstellerwerk S

Diese Zulassung umfasst  
*This Approval contains*

29 Seiten einschließlich 20 Anhänge  
*29 pages including 20 annexes*

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998<sup>4</sup>, as amended by Article 2 of the law of 8 November 2011<sup>5</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>;
  - Guideline for European technical approval of "Fire Stopping and Fire Sealing Products - Part 2: Penetration Seals", ETAG 026-02.
- 2 Deutsches Institut für Bautechnik is authorized 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 manufacturers other than those indicated on page 1, or manufacturing plants other than those on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 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.

<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12  
<sup>2</sup> Official Journal of the European Communities L 220, 30 August 1993, p. 1  
<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25  
<sup>4</sup> *Bundesgesetzblatt Teil I* 1998, p. 812  
<sup>5</sup> *Bundesgesetzblatt Teil I* 2011, p. 2178  
<sup>6</sup> Official Journal of the European Communities L 17, 20 January 1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of product/ products and intended use

#### 1.1 Definition of the construction product

##### 1.1.1 Definition of the cable penetration seal

The cable penetration seal called "System PYROCOMB Intube" mainly consists of a pipe sleeve with intumescent material, a closure of the pipe sleeve with a shaped piece of flexible foam, a final tightening with an ablative coating and of a gap filling material.

The cable penetration seal shall be constructed in accordance with Appendix 3 using the components listed in Appendix 1.

##### 1.1.2 Description of the components of the cable penetration seal

###### 1.1.2.1 Pipe sleeve

The pipe sleeve called "PYROCOMB Intube type CTS" consists of two half shells made from PVC, each with an inlay made from the intumescent material "FSB-WS", produced by OBO BETTERMANN GmbH & CO. KG, 58710 Menden, Germany.

The characteristics and dimensions of the pipe sleeve shall comply with the specifications given in Annex 1.

###### 1.1.2.2 Flexible foam

The flexible foam for the closure of the front sides of the pipe sleeves shall comply with the specifications given in Annex 1.

###### 1.1.2.3 Ablative coatings

The ablative coatings called "Ablative Coat ASX" produced by OBO BETTERMANN GmbH & CO. KG, 58710 Menden, Germany, shall comply with the specifications given in Annex 1.

###### 1.1.2.4 Gap filling material for installation of single sleeves in small openings<sup>7</sup>

Gaps up to a width of 25 mm shall be completely filled with non-combustible materials (class A1 or A2-s1,d0 according to EN 13501-1) which are dimensionally stable, as e. g. concrete, cementitious or gypsum mortar according to Annex 1, e. g. "Fireproof Mortar Type MSX".

###### 1.1.2.5 Gap filling material for installation of single/several sleeves in large openings<sup>7</sup>

The fire protection mortar "Fireproof Mortar Type MSX" for closing the opening shall comply with the specifications given in Annex 1.

#### 1.2 Intended use

##### 1.2.1 General

###### 1.2.1.1 The cable penetration seal is used to seal off openings in accordance with section 1.2.3 in fire-resistant walls or floors according to section 1.2.2 penetrated by cables according to section 1.2.3<sup>8</sup> and serves to preserve the fire resistance of the wall or floor in the vicinity of the penetrations.

<sup>7</sup> For a single arrangement only one sleeve is installed in every opening, remaining only a small annular gap around the pipe sleeve. For a multiple arrangement several pipe sleeves (or also only a single one) may be arranged in a larger opening. Through all pipe sleeves several services may lead through.

<sup>8</sup> The technical provisions of the Member States for the design of electrical systems and the reliability of cable penetrations are not affected by this.

- 1.2.1.2 Depending on the type of installation, the type of building element and the penetrating services, the cable penetration seal reaches a maximum fire resistance class of EI 45, EI 60, EI 90 or EI 120 (see also section 2.3).
- 1.2.1.3 The pipe penetration seal can be used in interiors with and without moisture loads (see section 2.5); for the intumescent/ablative components use category X in accordance with EOTA TR 024 was verified.
- 1.2.1.4 The cable penetration seal may also be used to seal openings which have not yet been used for installations. Subsequent modifications may be made to the installations (retrofitting or removal of installations) provided the provisions of this European technical approval are complied with.

## 1.2.2 Building elements (walls and floors)

The cable penetration seal may be used in rigid walls ( $d_w \geq 150$  mm or  $d_w \geq 100$  mm), flexible walls ( $d_w \geq 100$  mm), rigid floors ( $d_D \geq 150$  mm or  $d_D \geq 125$  mm) according to Appendix 2. The walls and floors shall be classified according to EN 13501-2 in accordance with the fire resistance period required.

## 1.2.3 Openings (in the building elements)

- 1.2.3.1 In 150 mm thick rigid walls the dimensions of the openings to be sealed off shall not exceed 1200 mm (width) x 2000 mm (height).

In floors the width shall not exceed 640 mm. The length is not restricted.

In flexible walls and rigid walls with a thickness  $< 150$  mm the pipe sleeves shall only be installed in separate openings, whereat the remaining annular gap around the pipe sleeve shall be between 5 mm and 25 mm.

- 1.2.3.2 The distance between the opening to be sealed off and other openings or components shall be at least 200 mm. The distance between adjacent large penetration seals according to section 1.1.2.5 of this ETA may be reduced to 100 mm, in cases where the openings are not larger than 400 mm x 400 mm.

## 1.2.4 Services (Installations)

- 1.2.4.1 The cable penetration seal may be used on cables which are fixed perpendicular to the wall or floor surface according to Appendix 2. For multiple arrangements the total permissible cross section of the services (with regard to the external dimensions of the pipe sleeves) must not exceed 60 % of the opening. The distances between the individual pipe sleeves and the distances between the pipe sleeves and the seal edge shall comply with the specifications in Appendix 2.
- 1.2.4.2 For wall applications, the first support of the services shall be at a distance of  $\leq 300$  mm on both sides of the wall. The supports shall be non-combustible in their essential parts.

## 1.2.5 Working life

The provisions in this European technical approval are based on an assumed working life of 10 years for the cable penetration seal "System PYROCOMB Intube" provided the conditions laid down in sections 4 and 5 relating to manufacturing, installation, use and repair are met<sup>9</sup>. The information provided on the working life cannot be interpreted as a guarantee given by the manufacturer, but should be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the construction.

<sup>9</sup> The real working life may be longer without major degradation affecting the Essential Requirements.

## 2 Merkmale des Produkts und Nachweisverfahren

### 2.1 General

2.1.1 The fitness of the cable penetration seal for the intended use was evaluated in accordance with ETAG 026 Part 2:2008-01-01.

For the evaluation of the pipe penetration seal, the product properties "reaction to fire", "fire resistance", "emission of dangerous substances" as well as "durability and serviceability" were taken into consideration.

2.1.2 The product properties specified in sections 2.2 to 2.5 only apply to the penetration seal and its components described in this ETA. Deutsches Institut für Bautechnik shall be immediately notified of any changes to the materials, composition, dimensions or properties of these components. Deutsches Institut für Bautechnik will then decide if a new evaluation is required.

### 2.2 Reaction to fire

The intumescent/ablative materials and the gap filling materials fulfil the requirements for the reaction to fire classes according to EN 13501-1 given in Appendix 1.

### 2.3 Fire resistance

The cable penetration seal was tested in accordance with EN 1366-3:2009-07. As a maximum, the cable penetration seal fulfils the requirements of Class EI 45, EI 60, EI 90 or EI 120 according to EN 13501-2 depending on the type of installation, the type of building element and the penetrating services (see Appendix 2).

In the annexes the maximum fire resistance class verified is specified. If installed in walls or floors of the same thickness and density and with the same structure as specified there, but with a lower fire resistance class, the fire resistance class of the cable penetration seal is reduced to the fire resistance class of the wall or floor.

### 2.4 Emission of dangerous substances

The ablative materials "Ablative Coat ASX" and the intumescent material "FSB-WS" do not contain substances registered as dangerous substances in the list of the European Commission. For assessment purposes, the chemical compositions of the materials were made available to the Deutsches Institut für Bautechnik.

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

### 2.5 Durability and serviceability

The ablative materials "Ablative Coat ASX" and the intumescent material "FSB-WS" fulfil the requirements of use category X in accordance with EOTA TR 024. That means that the materials can be exposed to the conditions in interiors with and without moisture loads, without expecting significant changes in fire protection characteristics.

### 3 Evaluation and attestation of conformity and CE marking

#### 3.1 System of attestation of conformity for the pipe collar

According to Decision 1999/454/EG, amended by Decision 2001/596/EC of the European Commission<sup>10</sup>, system 1 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks of the manufacturer:
  - (1) factory production control;
  - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;
- (b) Tasks of the approved body:
  - (3) initial type-testing of the product;
  - (4) initial inspection of the factory and of factory production control;
  - (5) continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

#### 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. The factory production control shall ensure that the product is in conformity with this European technical approval.

The manufacturer may only use the initial/raw/constituent materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan dated 28. June 2013 relating to the European technical approval ETA-13/0904 granted on 28. June 2013, 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 with Deutsches Institut für Bautechnik.<sup>11</sup>

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 datasheet and an installation guide containing at least the following information:

<sup>10</sup> Official Journal of the European Communities 178/52, 14 July 1999

<sup>11</sup> The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

**Technical data sheet:**

1. Field of application:
  - Building elements into which the penetration seal may be installed, type and properties of the building elements, such as minimum thickness, density and – in the case of lightweight constructions – the construction requirements.
  - Installations that may pass through the penetration seal, type and properties of the installations (including insulation if relevant), such as materials, diameter, thickness; necessary/permitted supports/fastenings; distances.
  - Dimensions, minimum thicknesses etc. of the penetration seal
  - Climatic conditions covered by the ETA
2. Construction of the penetration seal including the necessary components and additional products (i. e. gap filling material) with clear indications whether they are generic or specific.

**Installation instructions:**

- Installation method (e.g. preparation of the supporting structure before installing the penetration seal)
- The sequence of working steps to be followed

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 for products in accordance with ETAG 026-2, in order to undertake the actions laid down in section 3.2.2. 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 approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of the European technical approval ETA-13/0904 issued on 28. June 2013.

**3.2.2 Tasks for the approved bodies**

The approved bodies shall perform the following tasks in accordance with the provisions laid down in the control plan:

- Initial type-testing of the product
- Initial inspection of factory and factory production control
- Continuous surveillance, assessment and approval of factory production control

The approved bodies shall record the essential points of their actions referred to above and state the results obtained and conclusions made in a written report.

The approved certification 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 Deutsches Institut für Bautechnik without delay.

**3.3 CE marking**

The CE marking shall be affixed on the pipe half shells as well as on the packaging of the ablative materials (cartridge)/of the flexible foam (for example as part of a kit comprising 2 half shells, one cartridge and two adapted flexible foam plugs). Alternatively, the CE-marking of the ablative materials may be given on the accompanying commercial documents.

The letters "CE" shall be followed by the identification number of the approved certification body and be accompanied by the following additional information:

- the name and address of the manufacturer (legal entity responsible for the manufacture),
- 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 guideline for European technical approval,
- the use category,
- the designation of the product (trade name) (with indication of the size),
- declaration of any dangerous substances or "no dangerous substances",
- "see ETA-13/0904 for other relevant characteristics".

For an example of the CE marking see Appendix 4.

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

##### **4.1 General**

###### **4.1.1** It is assumed that

- the penetration seal complies with the specifications in this ETA and the installation was carried out in accordance with this ETA and also in accordance with the technical data sheet and the installation instructions by the manufacturer,
- damages to the penetration seal are repaired accordingly,
- the seal is installed only in the building elements specified in this ETA,
- only installations in accordance with the specifications in this ETA pass through the openings (Parts or service support constructions other than those in accordance with section 1.2 shall not pass through the penetration seal.),
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire,
- the installation of the penetration seal does not affect the stability of the adjacent building elements – even in case of fire,
- the installations are fixed to the adjacent building elements (not to the seal) in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed on the seal,
- the support of the installations is maintained for the classification period required.

**4.1.2** This European technical approval does not address any risks associated with the emission of dangerous liquids or gases caused by failure of the pipe(s) in case of fire nor does it prove the prevention of the transmission of fire through heat transfer via the medium in the pipes.

**4.1.3** The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this ETA (see EN 1366-3:2009-07, section 1).

**4.1.4** The durability assessment does not take account of the possible effect on the penetration seal of substances permeating through the pipe walls.



#### 4.2 Production

The European technical approval was issued for the product on the basis of agreed data/information, deposited with Deutsches 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, shall be reported to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval, and if so whether further assessment or alterations to the approval shall be necessary.

#### 4.3 Installation

The product characteristics specified in this European technical approval shall only apply if the penetration seal is installed in accordance with the specifications in Appendix 3 and also with the technical data sheet and the manufacturer's installation instructions.

### 5 Indications to the manufacturer

#### 5.1 Packaging, transport and storage

5.1.1 The manufacturer's specifications for packaging, transport and storage shall be observed.

5.1.2 The packaging of the pipe sleeve and the ablative materials (cartridge) shall contain the following information:

- Trade name or trademark or other symbol identifying the product
- The date of manufacture (day, month, year or coded information)

5.1.3 The products shall be packaged for delivery in compliance with the usual delivery conditions and providing sufficient protection against the effects of normal handling.

#### 5.2 Use, maintenance, repair

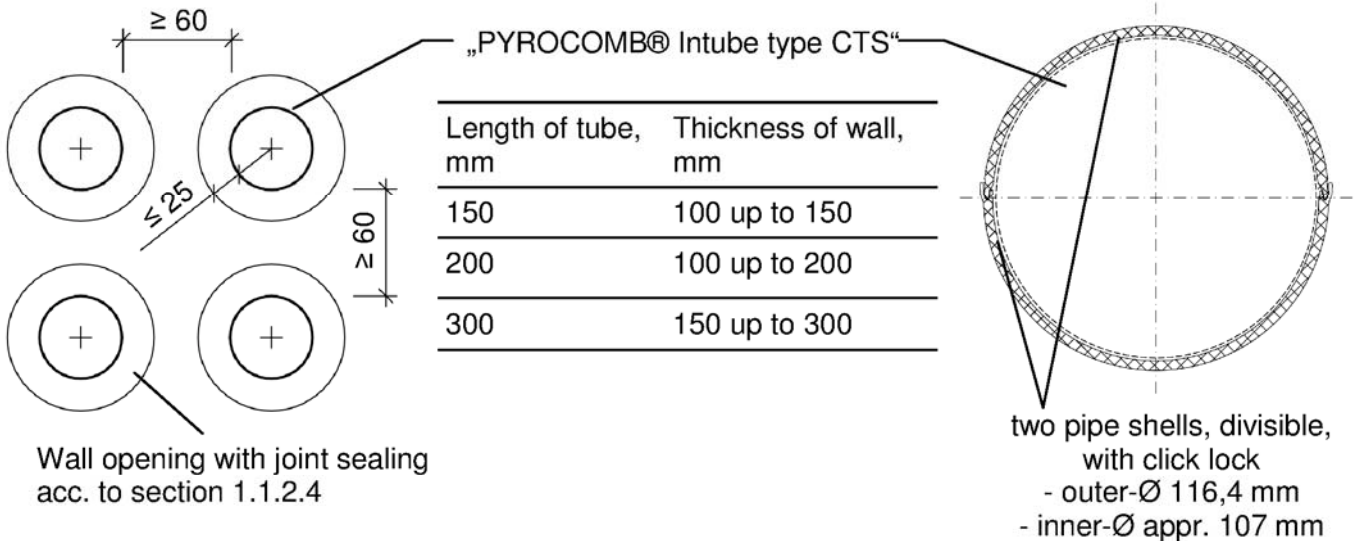
In general, no maintenance work is necessary. Repair can be performed by replacing damaged pipe sleeves and/or by renewing damaged closures of the pipe sleeves or gap seals.

Prof. Gunter Hoppe  
Head of Department

*beglaubigt:*  
Racinowski

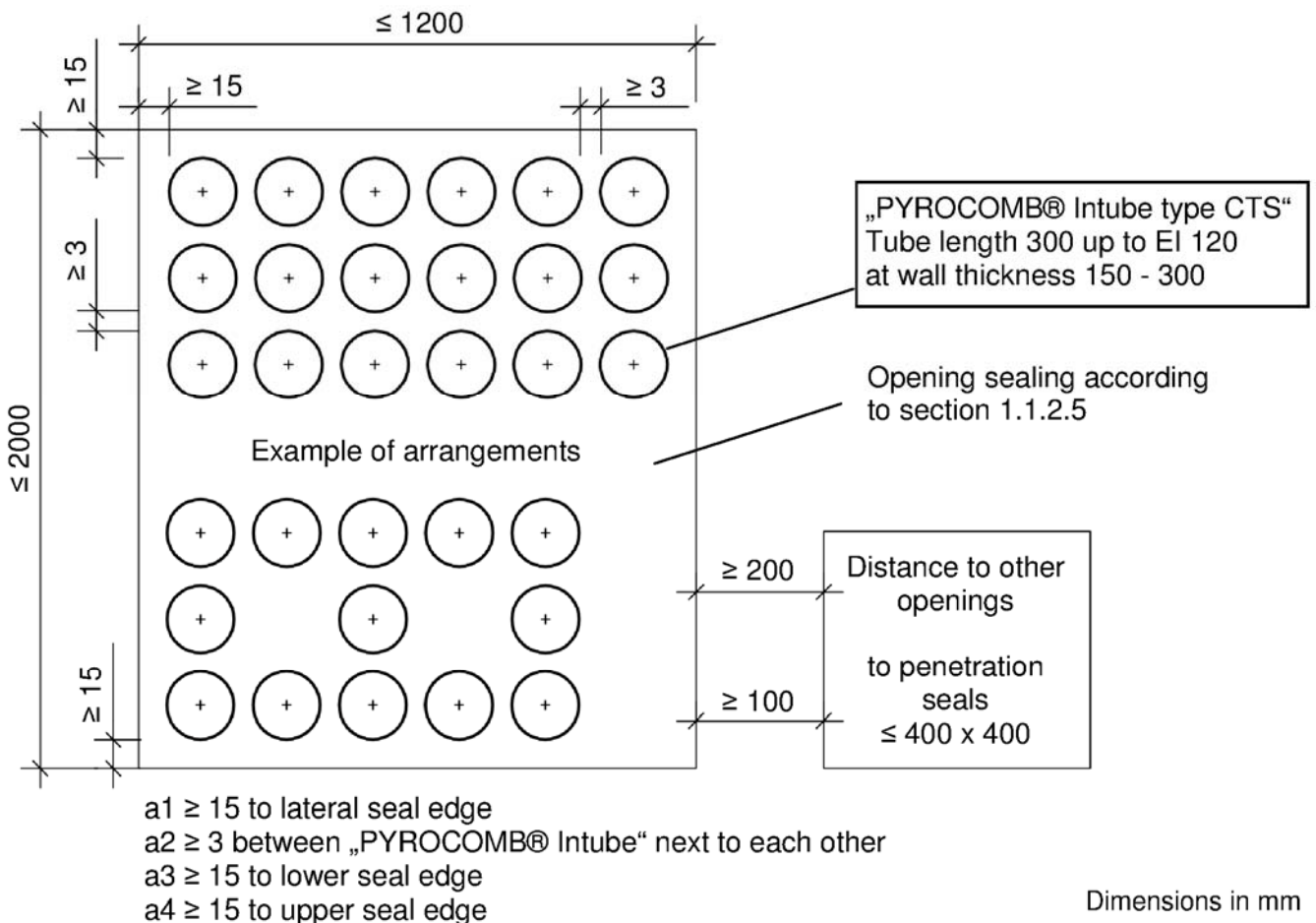
Name/Manufacturer	Description
<p>"PYROCOMB Intube Typ CTS" OBO BETTERMANN GmbH &amp; Co. KG 58710 Menden, Germany</p>	<p>The <b>pipe sleeve</b> called "PYROCOMB Intube Typ CTS" consists of two half shells which can be stuck together by a key and slot system (click lock) and of a glued in inlay made from the intumescent material "FSB-WS".</p> <p>Materials: Pipe made from PVC according to DIN 16879 with an outer diameter of 116,4 mm and a pipe wall thickness of 3,2 mm and the intumescent material "FSB-WS" (see below)</p> <p>Pipe half shells: Dimensions: according to Annex 2</p>
<p>"FSB-WS" OBO BETTERMANN GmbH &amp; Co. KG 58710 Menden, Germany</p>	<p><b>Intumescent material</b> in form of mats with self adhesive device according to ETA-13/0158:</p> <p>Reaction to fire class according to EN 13501-1: Class E</p>
<p>"Ablative Coat ASX" OBO BETTERMANN GmbH &amp; Co. KG 58710 Menden, Germany</p>	<p><b>Ablative material</b>, filled in cartridges or buckets</p> <p>Reaction to fire class according to EN 13501-1: Class E</p> <p>Density (condition on delivery): 1.340 kg/m<sup>3</sup> - 1.480 kg/m<sup>3</sup></p> <p>Content of non-volatile components*: 66,0 % - 86,0 %</p> <p>Mass loss through heating*: 38,0 % - 48,0 %</p> <p>LOI*: 55 % ± 3 % (tested with approx. 1,5 mm thick samples)</p> <p>Flexibility*: ≥ 5 mm tested 1,5 mm thick</p>
<p>Flexible foam plug OBO BETTERMANN GmbH &amp; Co. KG 58710 Menden, Germany</p>	<p>Material: <b>melamine foam</b> colour: light grey or white weight per unit area: 9 +2/-1 kg/m<sup>2</sup>, Reaction to fire class according to EN 13501-1: Class C-s2,d0 Dimensions: according to Annex 2</p>
<p>"Fireproof Mortar Type MSX" OBO BETTERMANN GmbH &amp; Co. KG 58710 Menden, Germany</p>	<p><b>Fire protection mortar</b> (the chemical composition was made available to the Deutsches Institut für Bautechnik)</p> <p>Reaction to fire class according to EN 13501-1: Class A1</p>
<p>gap filling material for single arrangement, manufacturer-independent</p>	<p>The gap filling for single arrangement shall consist of a <b>non-combustible material</b> (class A1 or A2-s1, d0 according to EN 13501-1) which is <b>dimensionally stable</b>, as e. g. concrete, cementitious or gypsum mortar. It is allowed to use the products "Fireproof Mortar Type MSX" according to EN 998-2 of the company OBO BETTERMANN GmbH &amp; Co. KG, 58710 Menden, Germany.</p>
<p>* tested according to ETAG 026-2 (see also TR 024)</p>	
<p>"System PYROCOMB Intube"</p>	<p>Annex 1</p>
<p><b>APPENDIX 1 – DESCRIPTION OF THE PRODUCT</b> Description of the components of the product</p>	

**Arrangement „PYROCOMB® Intube“ in case of single openings in rigid walls**



Wall opening with joint sealing acc. to section 1.1.2.4

**Arrangement of „PYROCOMB® Intube“ in case of large openings in rigid walls (multiple penetration)**



"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in rigid walls; view; distances  
Fire resistance class up to EI 120 – single and multiple arrangement

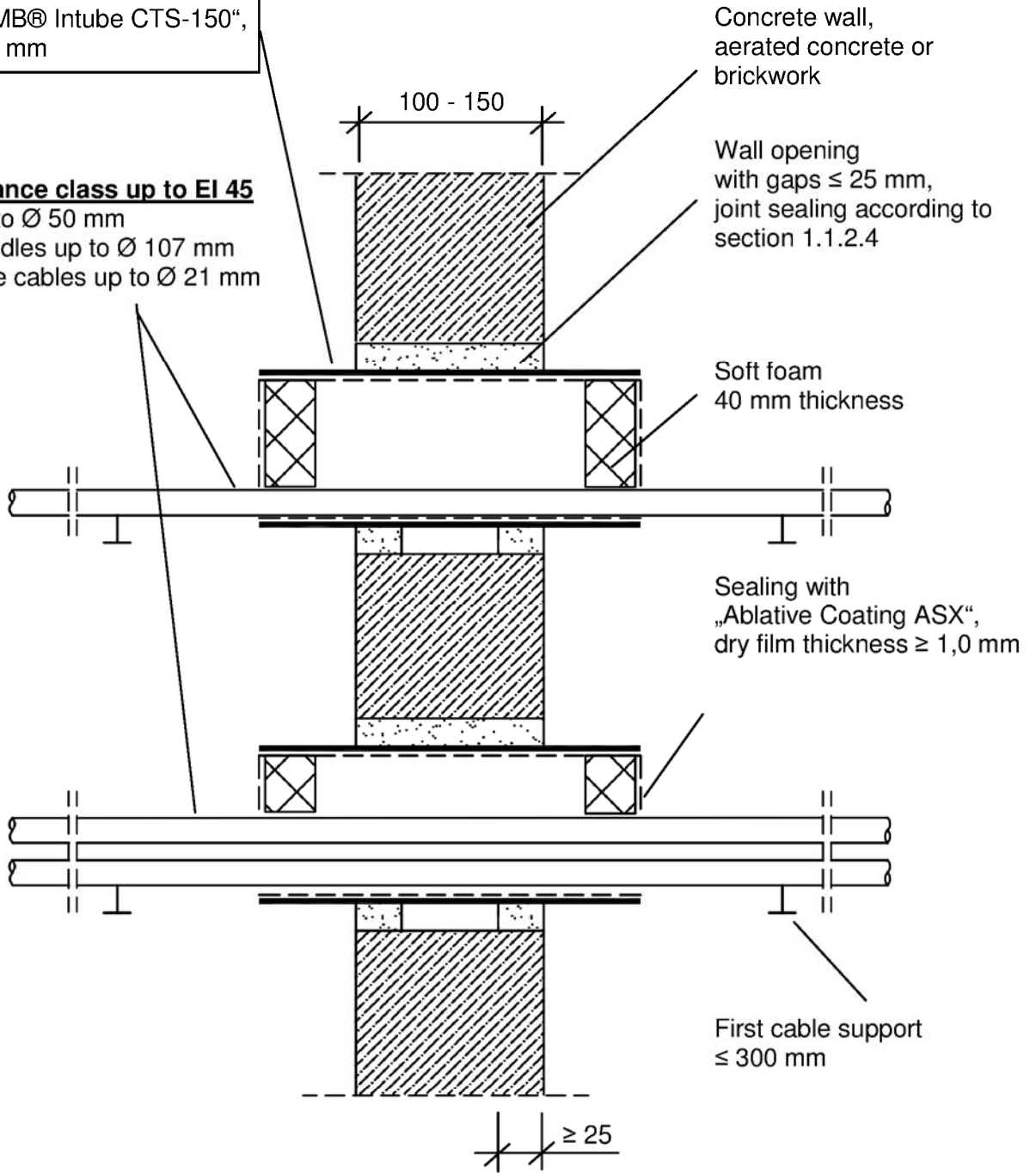
Annex 2

**„PYROCOMB® Intube“ in case of single openings in rigid walls**

„PYROCOMB® Intube CTS-150“,  
Length 150 mm

**Fire resistance class up to EI 45**

- Cable up to Ø 50 mm
- Cable bundles up to Ø 107 mm  
with single cables up to Ø 21 mm



Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in rigid walls; view; distances  
Fire resistance class up to EI 120 – single and multiple arrangement

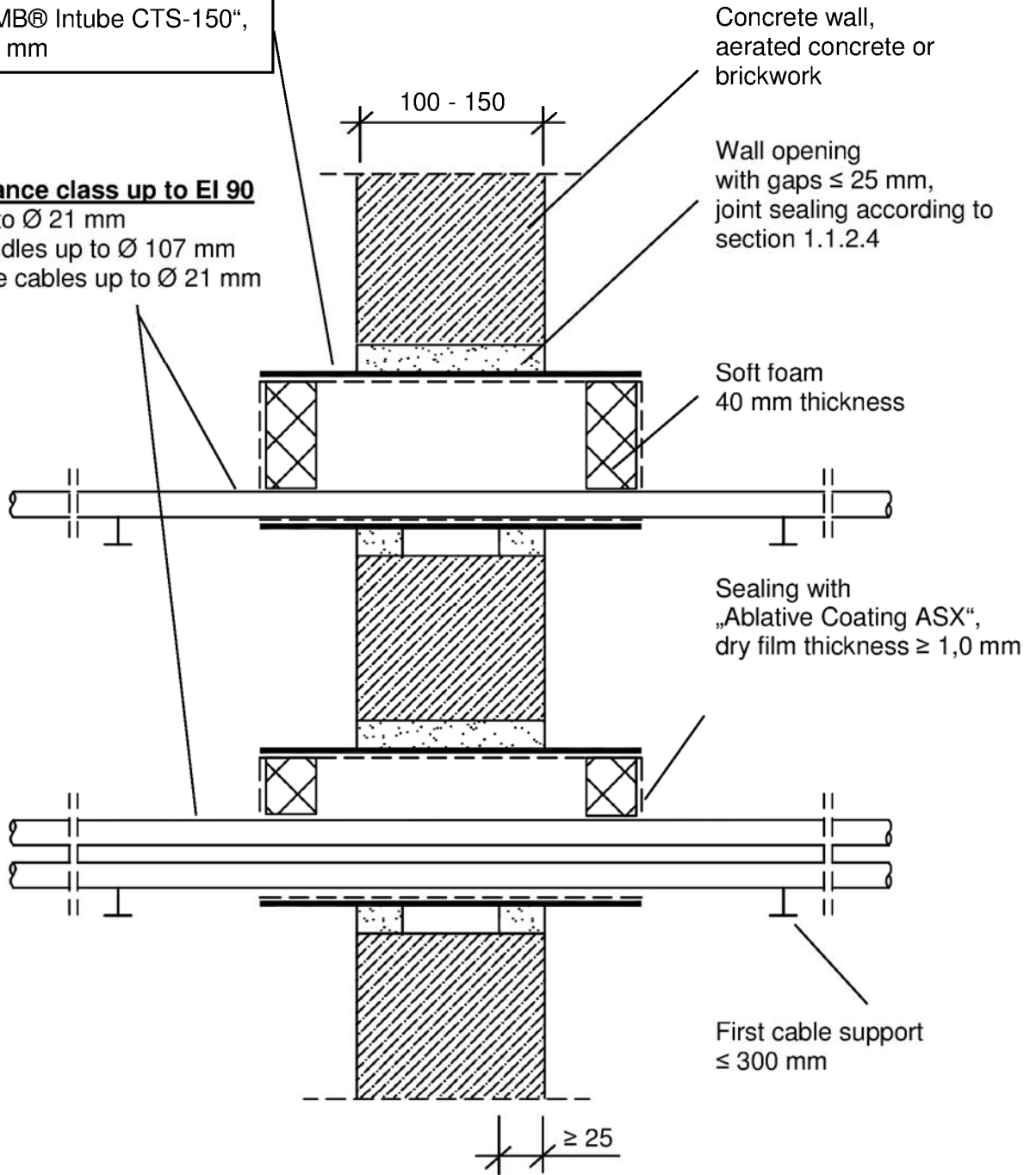
Annex 3

„PYROCOMB® Intube“ in case of single openings in rigid walls

„PYROCOMB® Intube CTS-150“,  
Length 150 mm

**Fire resistance class up to EI 90**

- Cable up to Ø 21 mm
- Cable bundles up to Ø 107 mm  
with single cables up to Ø 21 mm



Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in rigid walls; section  
Fire resistance class up to EI 90 – single arrangement

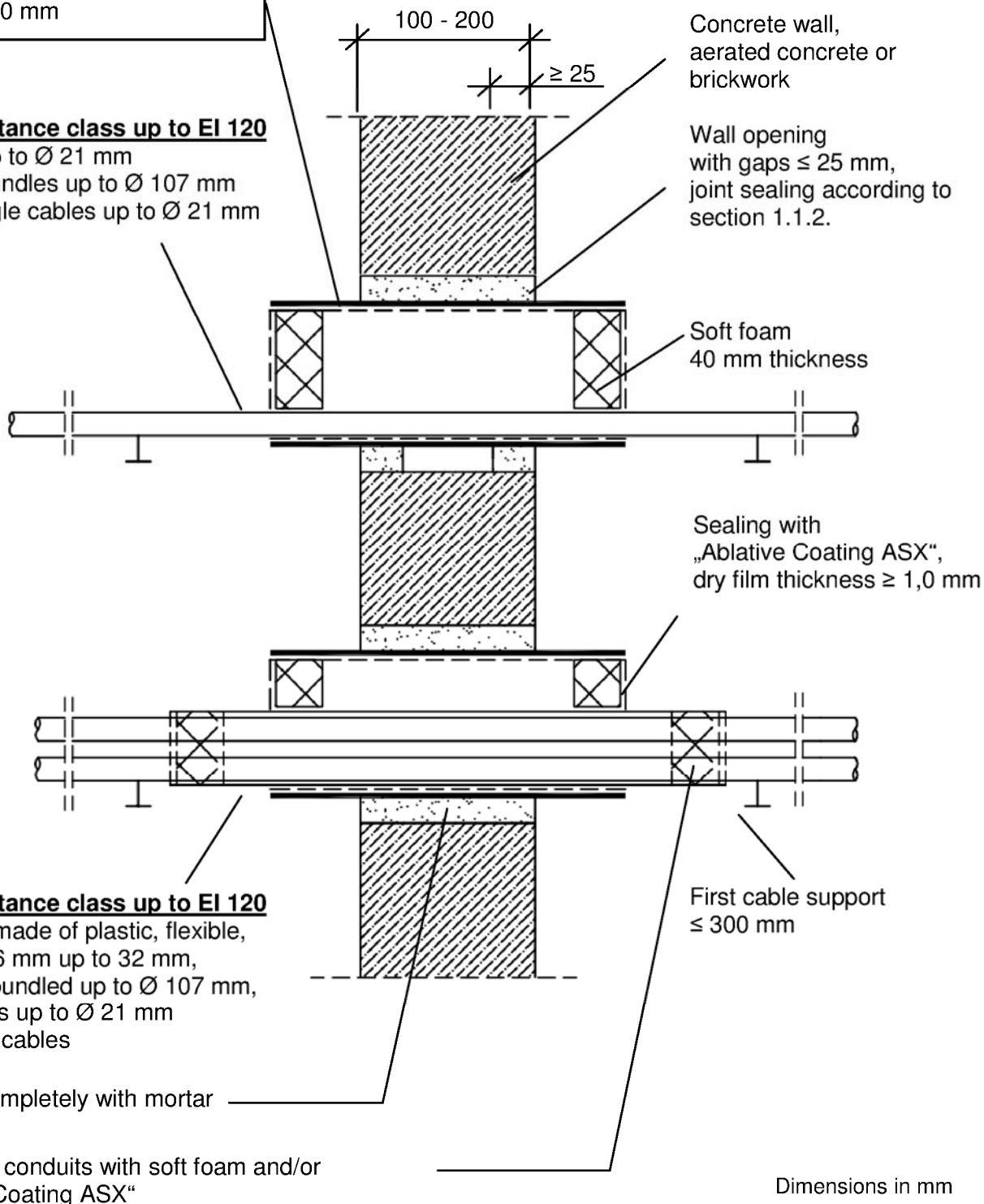
Annex 4

**„PYROCOMB® Intube“ in case of single openings in rigid walls**

„PYROCOMB® Intube CTS-200“,  
Length 200 mm

**Fire resistance class up to EI 120**

- Cable up to  $\varnothing$  21 mm
- Cable bundles up to  $\varnothing$  107 mm  
with single cables up to  $\varnothing$  21 mm



**Fire resistance class up to EI 120**

Conduits made of plastic, flexible,  
outer- $\varnothing$  16 mm up to 32 mm,  
single or bundled up to  $\varnothing$  107 mm,  
with cables up to  $\varnothing$  21 mm  
or without cables

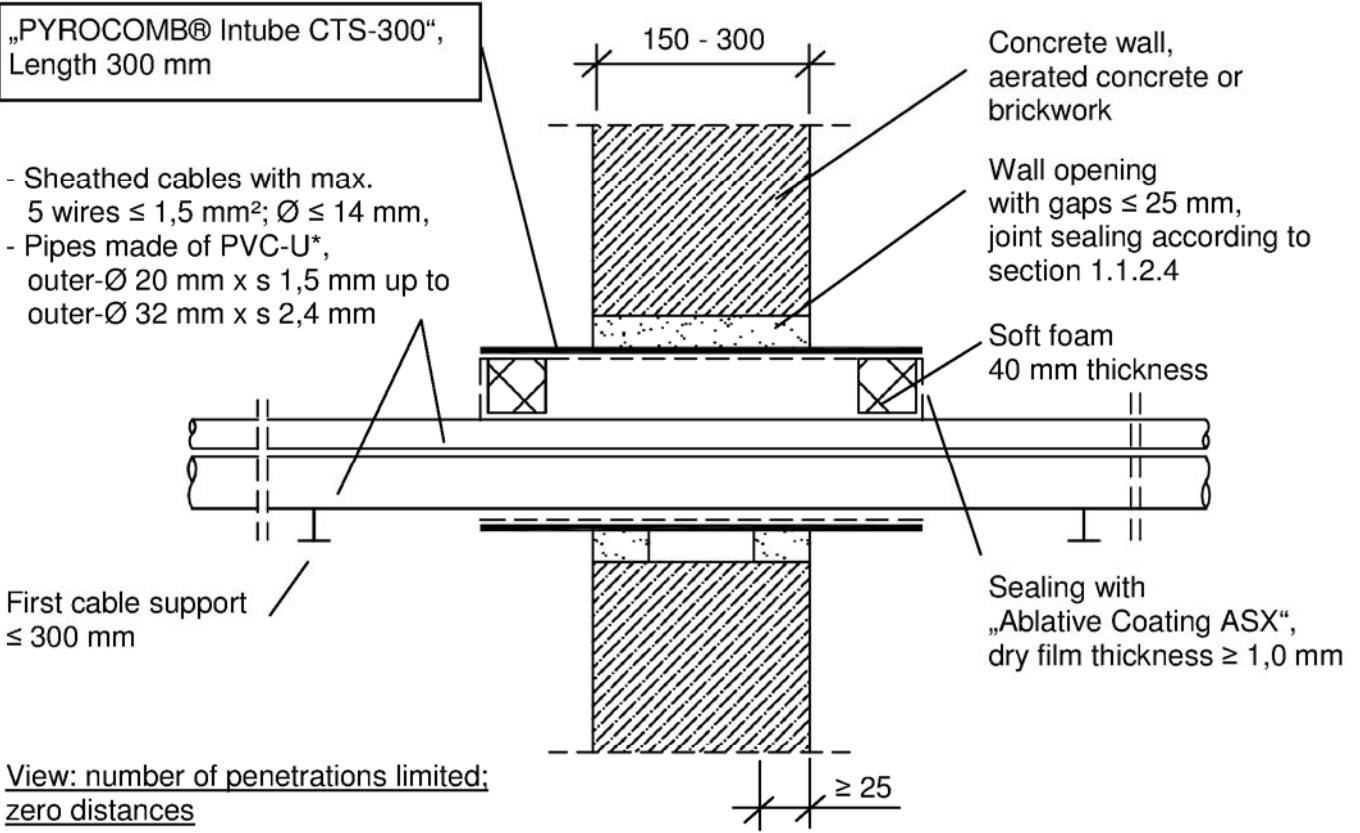
"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in rigid walls; section  
Fire resistance class up to EI 120 – single arrangement

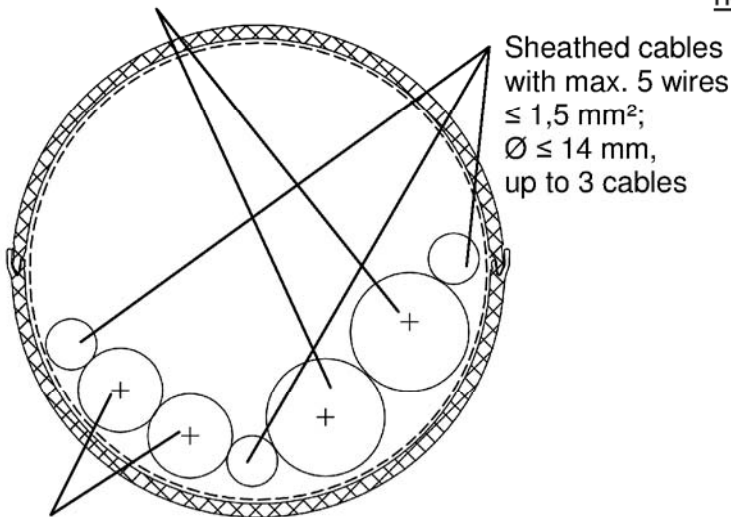
Annex 5

**„PYROCOMB® Intube“ in case of single openings in rigid walls**



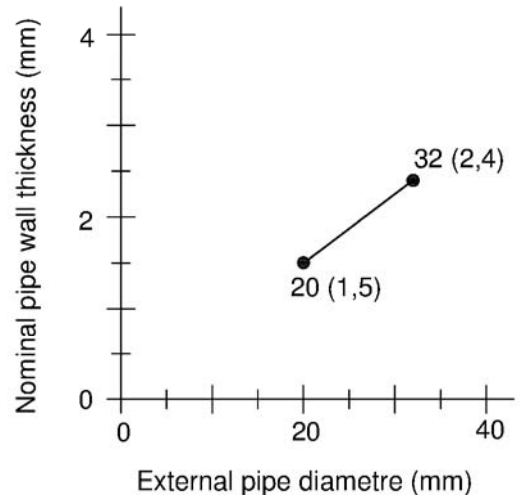
PVC-U pipes\* with outer- $\text{Ø}$  20 mm x s 1,5 mm up to  $\text{Ø}$  32 mm x s 2,4 mm up to 2 pipes

Pipes according to pipe group A (PVC)\*  
rigid in walls; fire resistance class EI 120 - U/U



PVC-U pipes\* with outer- $\text{Ø}$  20 x s 1,5 mm, up to 2 pipes

\* according to EN 1452 and DIN 8061/8062



Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in rigid walls; section; view  
Fire resistance class up to EI 120 – single arrangement

Annex 6

**„PYROCOMB® Intube“ in case of large openings in rigid walls sealing with  
„Fire protection mortar PYROMIX Typ MSX“**

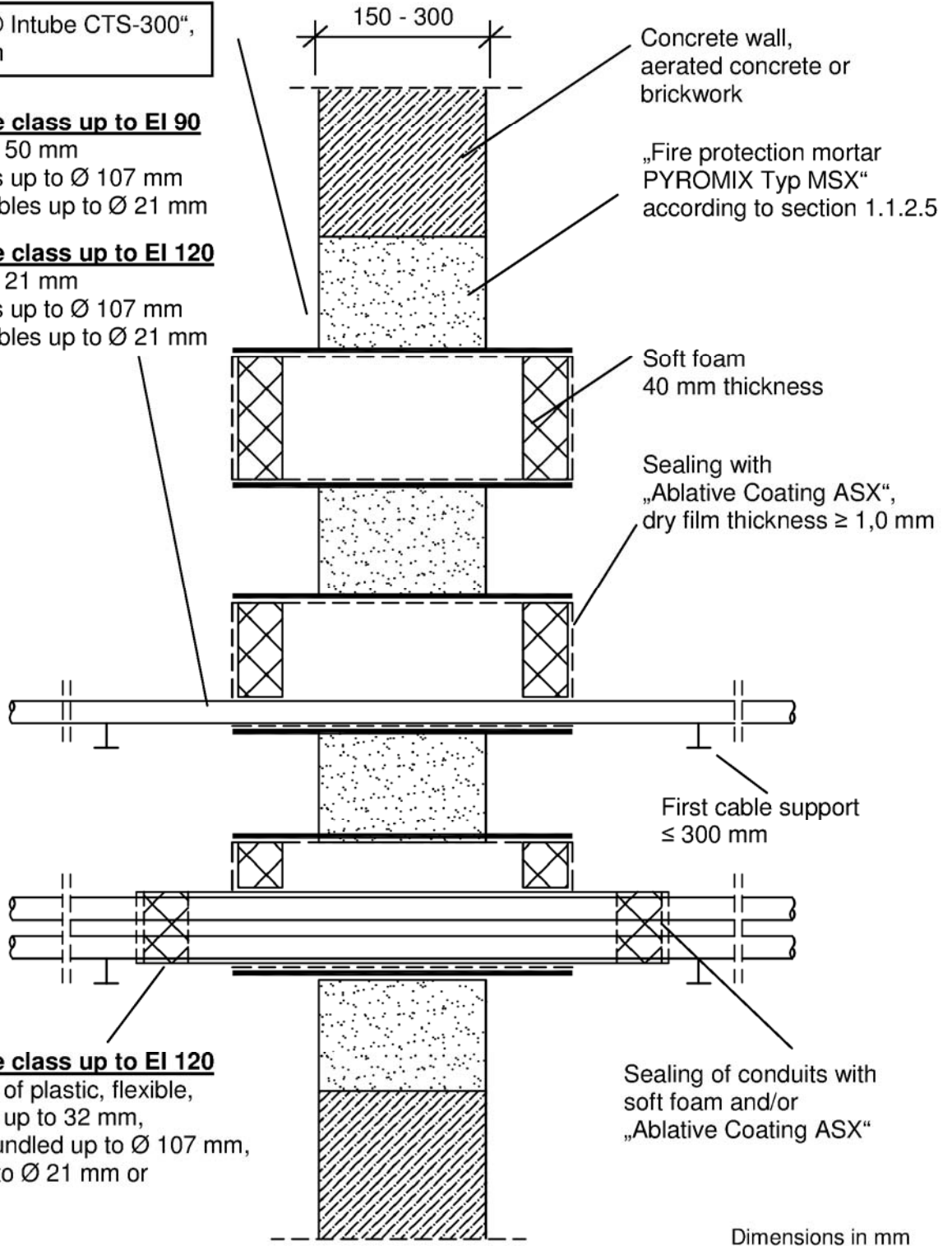
„PYROCOMB® Intube CTS-300“,  
Length 300 mm

**Fire resistance class up to EI 90**

- Cable up to Ø 50 mm
- Cable bundles up to Ø 107 mm  
with single cables up to Ø 21 mm

**Fire resistance class up to EI 120**

- Cable up to Ø 21 mm
- Cable bundles up to Ø 107 mm  
with single cables up to Ø 21 mm



**Fire resistance class up to EI 120**

Conduits made of plastic, flexible,  
outer-Ø 16 mm up to 32 mm,  
single use or bundled up to Ø 107 mm,  
with cables up to Ø 21 mm or  
without cables

Sealing of conduits with  
soft foam and/or  
„Ablative Coating ASX“

Dimensions in mm

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"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in rigid walls; section  
Fire resistance class up to EI 120 – single or multiple arrangement

Annex 7



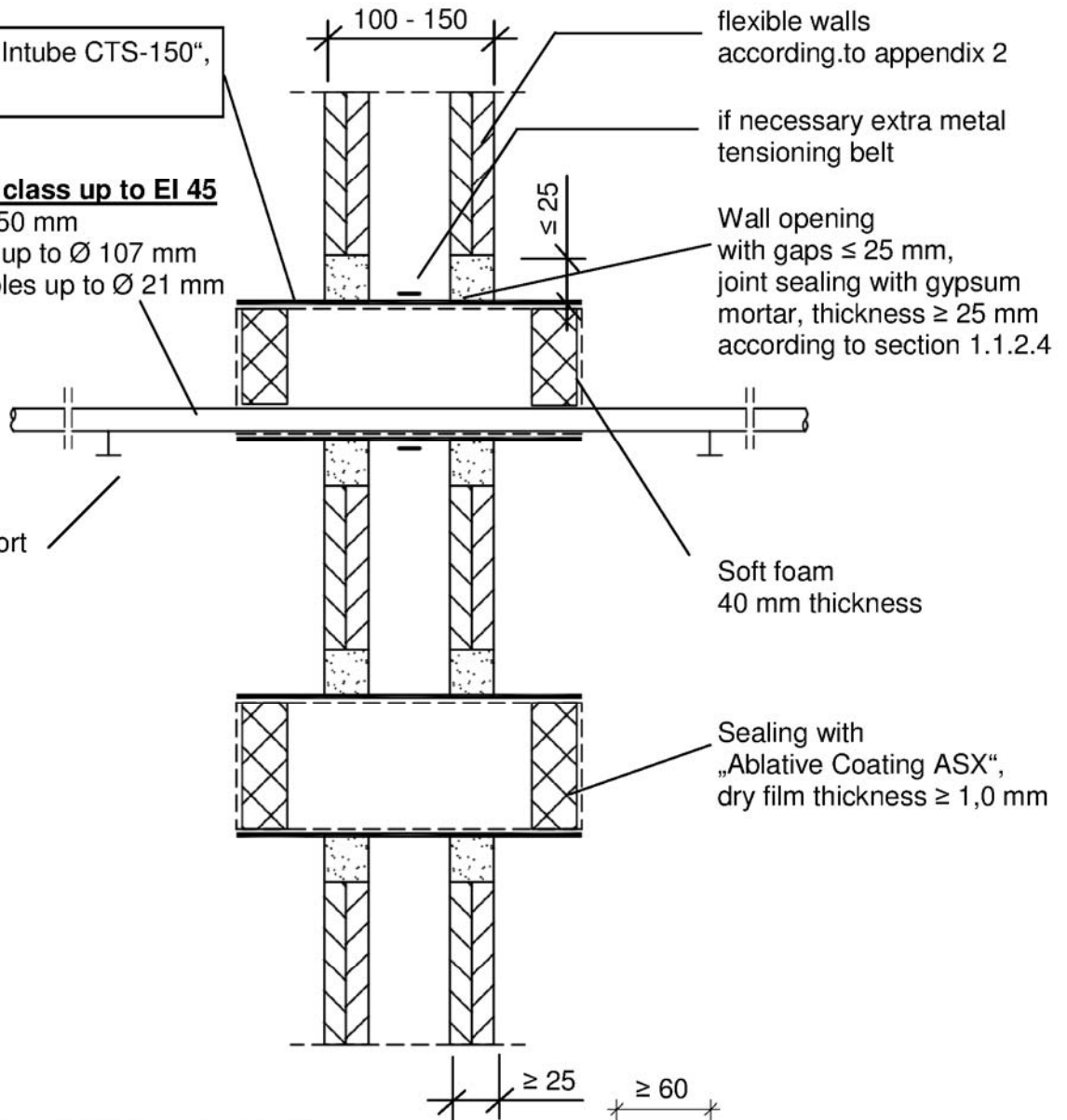
**„PYROCOMB® Intube“ in case of single openings in flexible walls**

„PYROCOMB® Intube CTS-150“,  
Length 150 mm

**Fire resistance class up to EI 45**

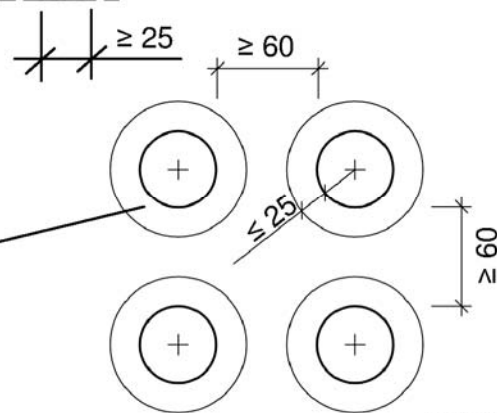
- Cable up to Ø 50 mm
- Cable bundles up to Ø 107 mm  
with single cables up to Ø 21 mm

First cable support  
≤ 300 mm



**Arrangement of „PYROCOMB® Intube“  
in case of single openings in flexible walls  
according to appendix 2**

Wall opening with gaps ≤ 25 mm,  
joint sealing with gypsum mortar, thickness  
≥ 25 mm according to section 1.1.2.4.



Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in flexible walls; section; view  
Fire resistance class up to EI 45 – single arrangement

Annex 8

**„PYROCOMB® Intube“ in case of single openings in flexible walls**

„PYROCOMB® Intube CTS-150“,  
Length 150 mm

**Fire resistance class up to EI 90**

- Cable up to Ø 21 mm
- Cable bundles up to Ø 107 mm  
with single cables up to Ø 21 mm

flexible walls  
according to appendix 2

if necessary extra metal  
tensioning belt

Wall opening  
with gaps  $\leq 25$  mm,  
joint sealing with gypsum  
mortar, thickness  $\geq 25$  mm  
according to section 1.1.2.4

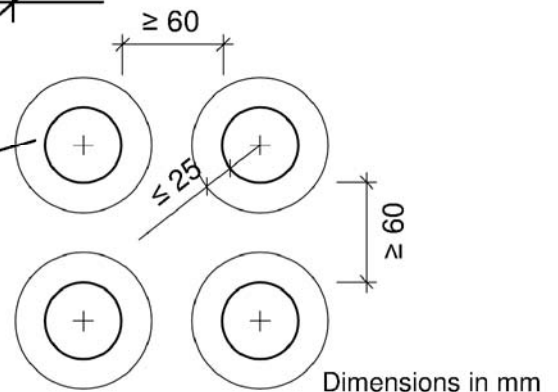
First cable support  
 $\leq 300$  mm

Soft foam  
40 mm thickness

Sealing with  
„Ablative Coating ASX“,  
dry film thickness  $\geq 1,0$  mm

**Arrangement of „PYROCOMB® Intube“  
in case of single openings in flexible walls  
according to appendix 2**

Wall opening with gaps  $\leq 25$  mm,  
joint sealing with gypsum mortar, thickness  
 $\geq 25$  mm according to section 1.1.2.4.



Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in flexible walls; section; view  
Fire resistance class up to EI 90 – single arrangement

Annex 9

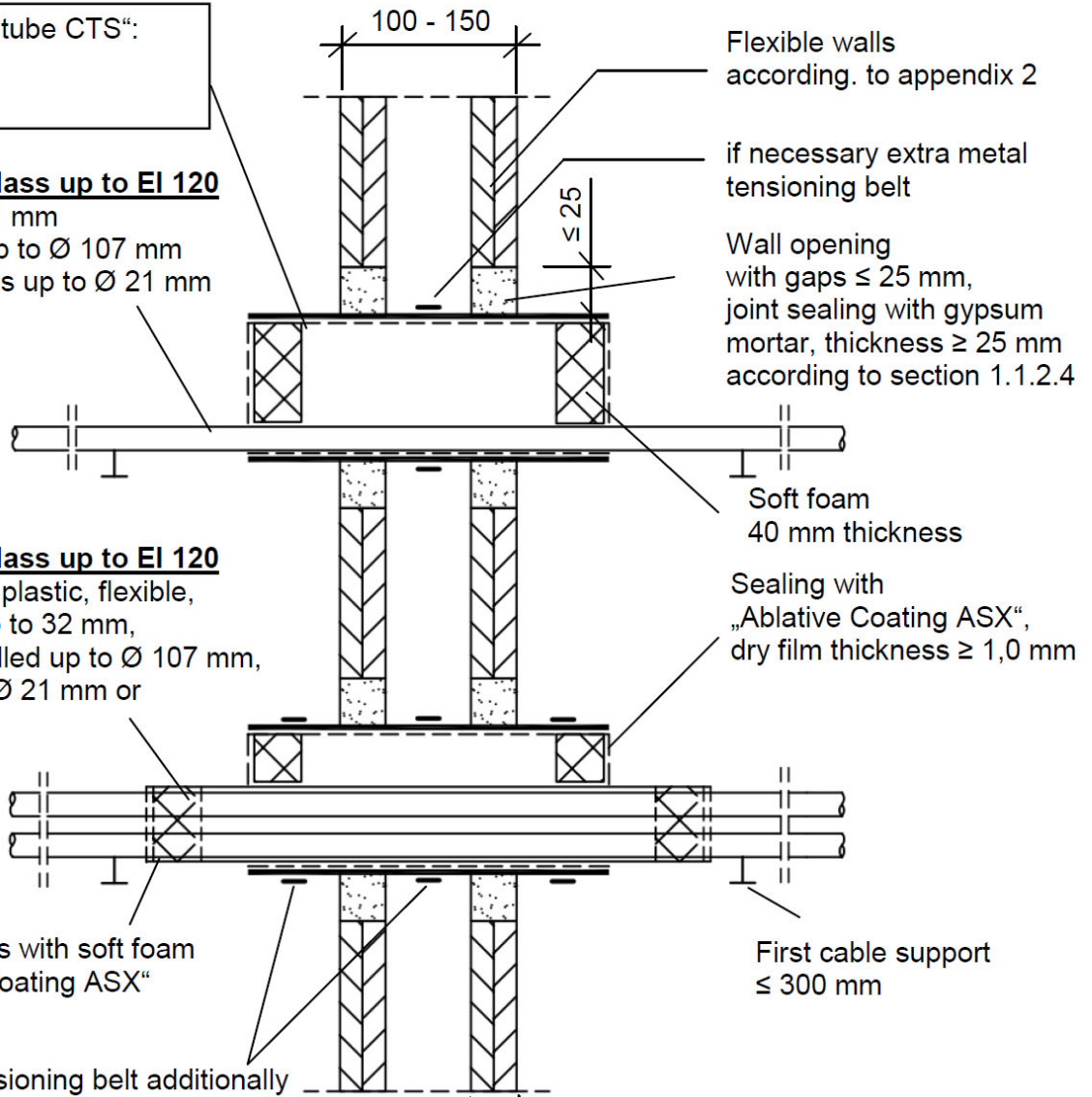
**„PYROCOMB® Intube“ in case of single openings in flexible walls**

„PYROCOMB® Intube CTS“:

- Length 200 mm
- Length 300 mm

**Fire resistance class up to EI 120**

- Cable up to Ø 21 mm
- Cable bundles up to Ø 107 mm with single cables up to Ø 21 mm



Flexible walls according to appendix 2

if necessary extra metal tensing belt

Wall opening with gaps  $\leq 25$  mm, joint sealing with gypsum mortar, thickness  $\geq 25$  mm according to section 1.1.2.4

Soft foam 40 mm thickness

Sealing with „Ablative Coating ASX“, dry film thickness  $\geq 1,0$  mm

**Fire resistance class up to EI 120**

Conduits made of plastic, flexible, outer-Ø 16 mm up to 32 mm, single use or bundled up to Ø 107 mm, with cables up to Ø 21 mm or without cables

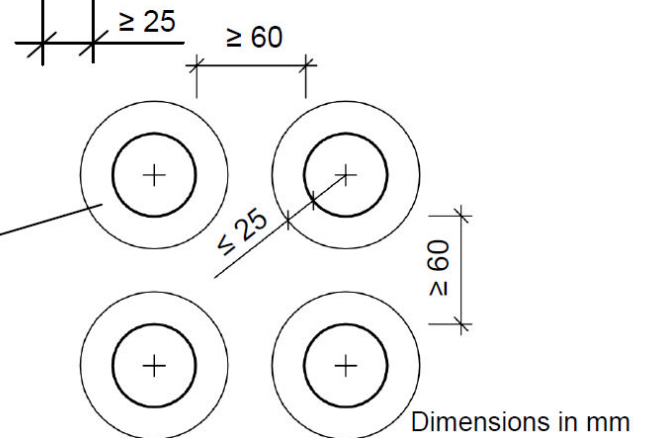
Sealing of conduits with soft foam and/or „Ablative Coating ASX“

First cable support  $\leq 300$  mm

Fix with metal tensing belt additionally

**Arrangement of „PYROCOMB® Intube“ in case of single openings in flexible walls according to appendix 2**

Wall opening with gaps  $\leq 25$  mm, joint sealing with gypsum mortar, thickness  $\geq 25$  mm according to section 1.1.2.4.



Dimensions in mm

"System PYROCOMB Intube"

Annex 10

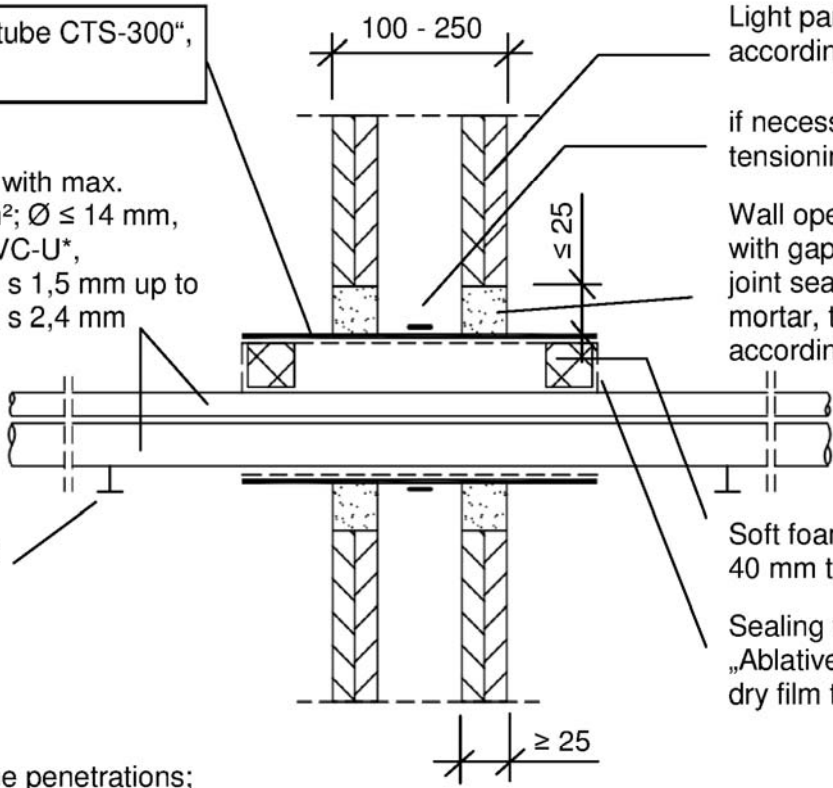
**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in flexible walls; section; view  
Fire resistance class up to EI 120 – single arrangement

**„PYROCOMB® Intube“ in case of single openings in flexible walls**

„PYROCOMB® Intube CTS-300“,  
Length 300 mm

- Sheathed cables with max. 5 wires  $\leq 1,5 \text{ mm}^2$ ;  $\text{Ø} \leq 14 \text{ mm}$ ,
- Pipes made of PVC-U\*, outer- $\text{Ø}$  20 mm x s 1,5 mm up to outer- $\text{Ø}$  32 mm x s 2,4 mm



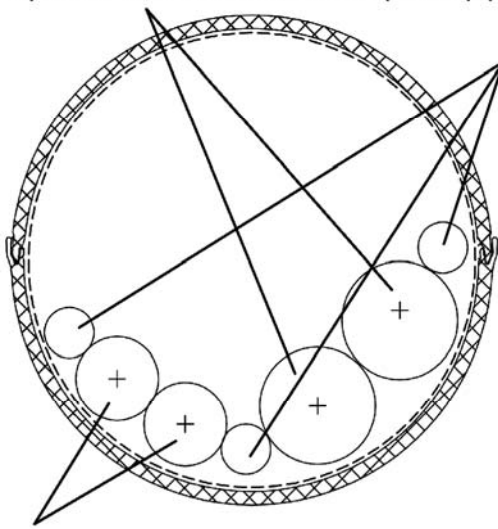
- Light partition walls according to appendix 2
- if necessary extra metal tensioning belt
- Wall opening with gaps  $\leq 25 \text{ mm}$ , joint sealing with gypsum mortar, thickness  $\geq 25 \text{ mm}$  according to section 1.1.2.4
- Soft foam 40 mm thickness
- Sealing with „Ablative Coating ASX“, dry film thickness  $\geq 1,0 \text{ mm}$

First cable support  $\leq 300 \text{ mm}$

View: maximum line penetrations:  
zero distances

PVC-U pipes\* with outer- $\text{Ø}$  20 mm x s 1,5 mm up to  $\text{Ø}$  32 mm x s 2,4 mm up to 2 pipes

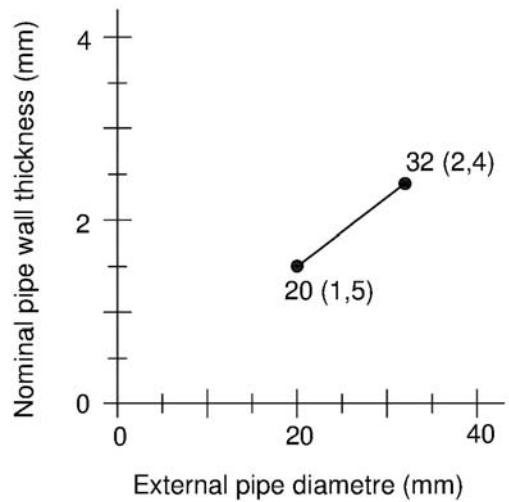
Pipes according to pipe group A (PVC)\*  
rigid in walls: fire resistance class EI 120 - U/U



Sheathed cables with max. 5 wires  $\leq 1,5 \text{ mm}^2$ ;  $\text{Ø} \leq 14 \text{ mm}$ , up to 3 cables

PVC-U pipes\* with outer- $\text{Ø}$  20 x s 1,5 mm, up to 2 pipes

\* according to EN 1452 and DIN 8061/8062



Dimensions in mm

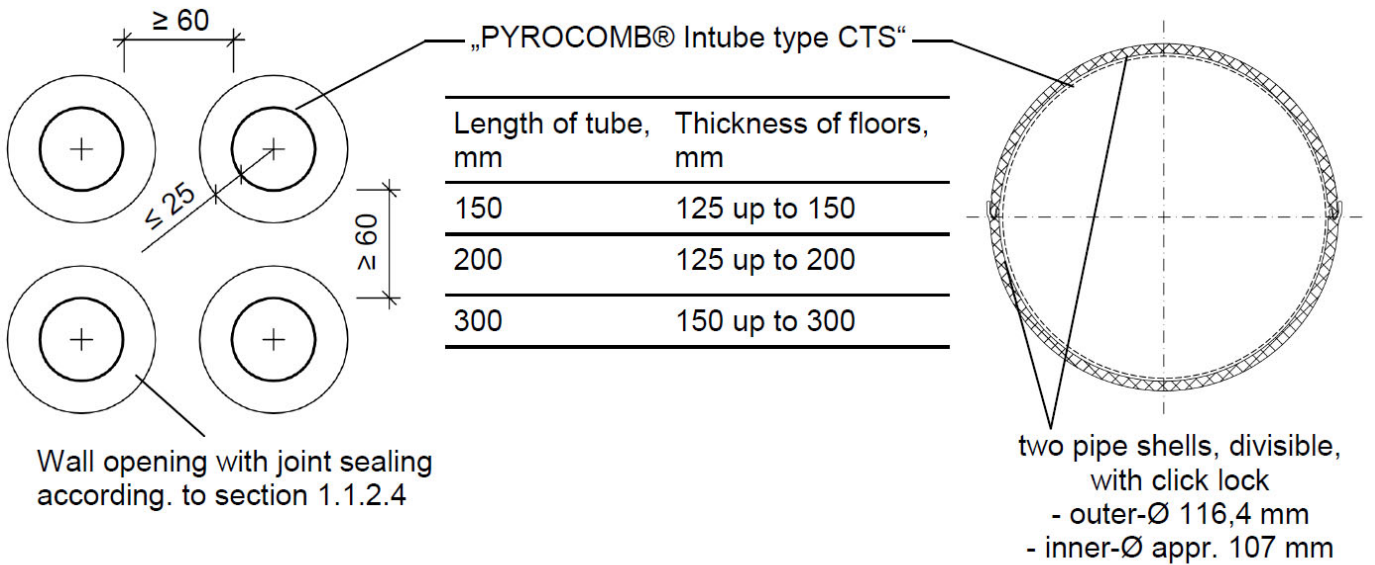
"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

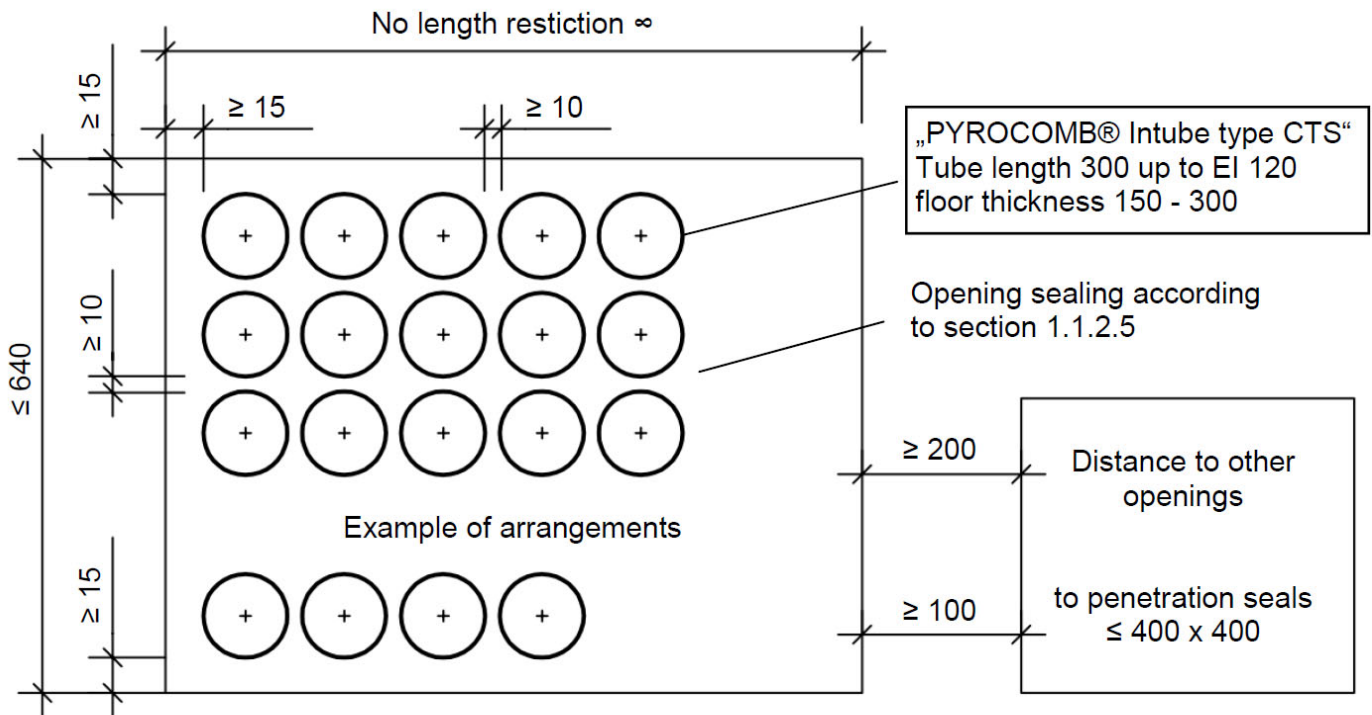
Construction of the cable penetration seal when mounting in flexible walls; section; view  
Fire resistance class up to EI 120 – single arrangement

Annex 11

**Arrangement of „PYROCOMB® Intube“ in case of single openings in rigid floors**



**Arrangement of „PYROCOMB® Intube“ in case of large openings in rigid floors (multiple penetration)**



Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in floors; view; distances  
Fire resistance class up to EI 120 – single or multiple arrangement

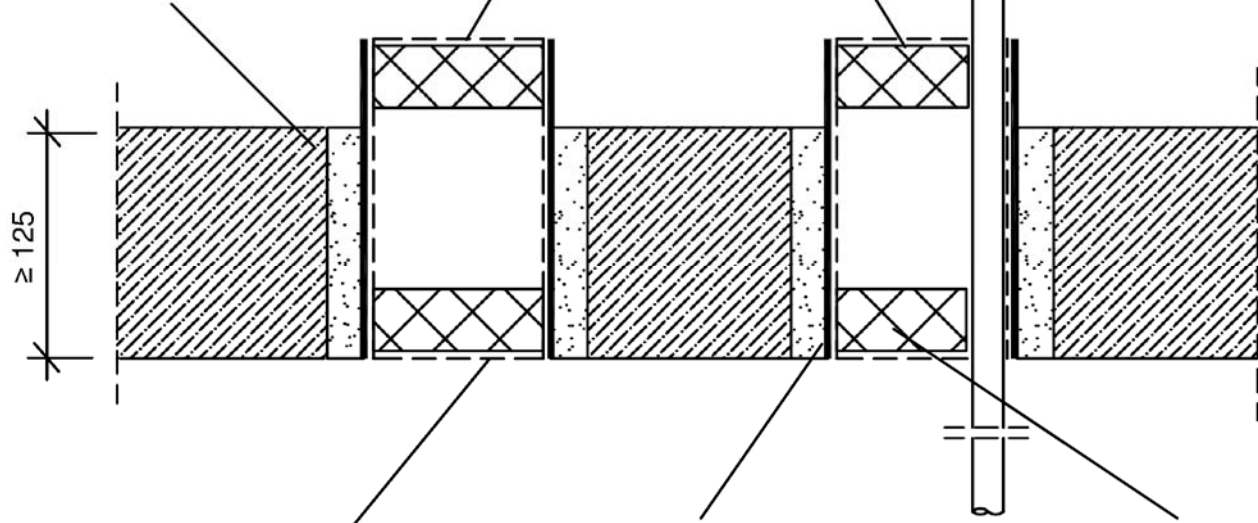
Annex 12

„PYROCOMB® Intube“ in case of single openings in rigid floors

„PYROCOMB® Intube CTS-150“,  
Length 150 mm,  
„PYROCOMB® Intube CTS-200“,  
Length 200 mm

- Cable up to Ø 50 mm
- Cable bundles up to Ø 107 mm with single cables up to Ø 21 mm

Concrete or aerated  
concrete ceiling



Sealing with  
„Ablative Coating ASX“,  
dry film thickness  $\geq 1,0$  mm

Wall opening with gaps  
 $\leq 25$  mm, joint sealing according  
to section 1.1.2.4

Soft foam  
40 mm thickness

Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in floors; section  
Fire resistance class up to EI 45 – single arrangement

Annex 13

**„PYROCOMB® Intube“ in case of single openings in rigid floors**

„PYROCOMB® Intube CTS-150“,  
Length 150 mm,  
„PYROCOMB® Intube CTS-200“,  
Length 200 mm

- Cable up to Ø 21 mm
- Cable bundles up to Ø 107 mm with single cables up to Ø 21 mm

Concrete or aerated  
concrete ceiling

≥ 150

Sealing with  
„Ablative Coating ASX“,  
dry film thickness ≥ 1,0 mm

Opening with gaps  
≤ 25 mm, joint sealing  
according to section 1.1.2.4 or  
section 1.1.2.5

Soft foam  
40 mm thickness

„PYROCOMB® Intube CTS-300“,  
Length 300 mm

- Cable up to Ø 50 mm
- Cable bundles up to Ø 107 mm with single cables up to Ø 21 mm

≥ 150

Sealing of conduits with  
soft foam and/or  
„Ablative Coating ASX“  
on the top of the ceiling

Conduits made of plastic, flexible, outer-Ø 16 mm  
up to 32 mm, single use or bundled up to Ø 107 mm,  
with cables up to Ø 21 mm or without cables

Conduits made of plastic,  
rigid, outer-Ø up to 16 mm,  
with or without cables

Dimensions in mm

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"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

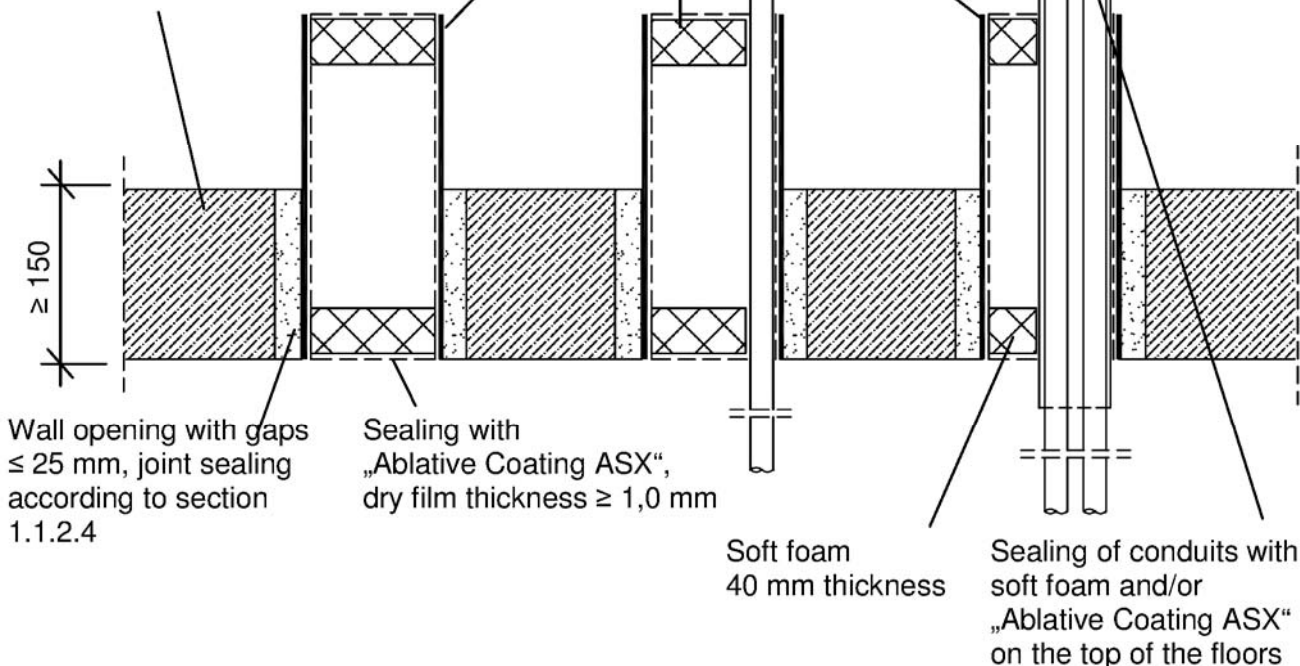
Construction of the cable penetration seal when mounting in floors; section  
Fire resistance class up to EI 60 – single arrangement

Annex 14

**„PYROCOMB® Intube“ in case of single openings in rigid floors**

„PYROCOMB® Intube CTS-300“,  
Length 300 mm

Concrete or aerated  
concrete floors



**Fire rating class up to EI 90**

- Conduits made of plastic, flexible,  
outer-Ø 16 mm up to 32 mm, single use or bundled up to  
Ø 107 mm, with cables up to Ø 21 mm or without cables

**Fire resistance class up to EI 120**

- Cable up to Ø 21 mm
- Cable bundles up to Ø 107 mm with single cables up to Ø 21 mm

Dimensions in mm

"System PYROCOMB Intube"

**APPENDIX 1 – DESCRIPTION OF THE PRODUCT**

Construction of the cable penetration seal when mounting in floors; section  
Fire resistance class up to EI 90 or EI 120 – single arrangement

Annex 15



The cable penetration seal may be used in

#### Rigid walls

- of masonry, concrete, reinforced concrete or aerated concrete
- density  $\geq 450 \text{ kg/m}^3$
- thickness  $\geq 100 \text{ mm}$  or  $\geq 150 \text{ mm}$  (depending on the required fire resistance class, see Annex 8)
- The walls shall be classified according to EN 13501-2 corresponding to the required fire resistance period.

#### Flexible walls

- flexible walls with a steel stud substructure and a lining on both sides made from min. 2 layers of 12,5 mm thick cementitious or gypsum based slabs with a fire reaction class A1 or A2 according to EN 13501-1.
- flexible walls with a wood stud substructure and a lining on both sides made from min. 2 layers of 12,5 mm thick cementitious or gypsum based slabs with a fire reaction class A1 or A2 according to EN 13501-1.  
The distance between the wood substructure and the seal shall be  $\geq 100 \text{ mm}$  and the cavity between the linings of the wall, the wood substructure and the seal shall be tightly clogged with mineral wool of fire reaction class A1 or A2 according to EN 13501-1 in a depth of minimum 100 mm.
- thickness  $\geq 100 \text{ mm}$
- The walls shall be classified according to EN 13501-2 corresponding to the required fire resistance period.
- In cases where the distance between the linings mounted on both sides of the wall is larger than 50 mm, the pipe sleeves shall be secured in the area between the linings with two steel bands, which shall firmly connect the pipe half shells.

#### Rigid floors

- of masonry, concrete, reinforced concrete or aerated concrete
- density  $\geq 650 \text{ kg/m}^3$
- thickness  $\geq 150 \text{ mm}$  or  $\geq 125 \text{ mm}$  (depending on the required fire resistance class, see Annex 8)
- The floors shall be classified according to EN 13501-2 corresponding to the required fire resistance period.

**Note:** This ETA does not cover the installation of the seal in special walls, i. e. in sandwich panel constructions.

"System PYROCOMB Intube"

#### APPENDIX 2 – FIELD OF APPLICATION

Walls and floors

Annex 16

### General

- The pipe sleeves may be filled with cables completely.
- The cables may touch each other and may adjoin the pipe sleeve inside.
- For wall application the distance from the first support on both sides of the wall shall be  $\leq 300$  mm. The main components of the brackets shall consist of materials with a fire reaction class A1 or A2 in accordance with EN 13501-1.

### Type of installations

Typ	Description
Cables	<ul style="list-style-type: none"> <li>➤ All types of sheathed cables* currently and commonly used in building practice in Europe (e.g. power cables, data cables, telecommunications cables, fibre-optic cables) with the exception of waveguides with diameters according to the table below</li> <li>➤ Cable bundles – consisting of parallel cables, densely packed and tightly bound, stitched or welded to one another – may pass through the opening provided the external diameter of the individual cables in the bundle does not exceed 21 mm and the overall diameter of the cable bundle does not exceed the inner diameter of the pipe sleeve.</li> </ul>
Conduits	<ul style="list-style-type: none"> <li>➤ Flexible conduits with a class 223222 according to EN 61386-22 up to a diameter of 32 mm made from PE, flame resistant (resistance to fire class EI 90/E 120 or EI 120/E 120, see Annexes 5, 7, 10, 14 and 15)</li> </ul>

#### maximum cable diameter/maximum fire resistance class (FRC)

length of the pipe sleeve <b>150 mm</b>	building element	100 mm thick wall		125 mm thick floor	
	<b>maximum cable diameter</b>	$\leq 21$ mm	$\leq 50$ mm	$\leq 21$ mm	$\leq 50$ mm
	<b>maximum FRC</b>	<b>EI 90</b> <b>E 120</b>	<b>EI 45</b> <b>E 90</b>	<b>EI 60</b> <b>E 90</b>	<b>EI 45</b> <b>E 90</b>

length of the pipe sleeve <b>200 mm</b>	building element	100 mm thick wall		125 mm thick floor	
	<b>maximum cable diameter</b>	$\leq 21$ mm		$\leq 21$ mm	$\leq 50$ mm
	<b>maximum FRC</b>	<b>EI 120</b> <b>E 120</b>		<b>EI 60</b> <b>E 90</b>	<b>EI 45</b> <b>E 90</b>

length of the pipe sleeve <b>300 mm</b>	building element	rigid wall				floor	
		100 mm thick		150 mm thick		150 mm thick	
	<b>maximum cable diameter</b>	$\leq 21$ mm	$\leq 50$ mm	$\leq 21$ mm	$\leq 80$ mm	$\leq 21$ mm	$\leq 80$ mm
<b>maximum FRC</b>	<b>EI 120</b> <b>E 120</b>	<b>EI 90</b> <b>E 120</b>	<b>EI 120</b> <b>E 120</b>	<b>EI 90</b> <b>E 120</b>	<b>EI 120</b> <b>E 120</b>	<b>EI 60</b> <b>E 120</b>	

For installation in 100 mm thick walls the arrangement according to Annex 6 may be used in addition: maximum fire resistance class: EI 120/E 120

- \* single or multicore cable with individual insulation of the cores and an additional protective covering of the assembly

"System PYROCOMB Intube"

**APPENDIX 2 – FIELD OF APPLICATION**  
Overview of the installations

Annex 17

## INSTALLATION OF THE PENETRATION SEAL

### 1. General

- 1.1 Before installing the cable penetration seals, all framework conditions are to be checked for compliance (e.g. type and thickness of the wall or floor, type and dimensions of the pipes and the ambient conditions) with the provisions of section 1.2 and Appendices 1 and 2.
- 1.2 It shall be ensured that the assumptions under which the fitness for use was evaluated are complied with (see section 4).


### 2. Installation of the pipe sleeves and closure of gaps

- 2.1 The pipe shells of the pipe sleeves shall be installed around the cables and shall be closed using the locking device.  
For installation in flexible walls with a distance of more than 50 mm between the linings mounted on both sides of the wall, the pipe sleeves shall be secured in the area between the linings with two steel bands (see Annexes 8 to 11 and 16). For installation of conduits according to Annex 17 with pipe sleeves projecting more than 50 mm from the wall surfaces additional steel bands have to be applied on the projecting ends.  
The steel bands shall firmly connect the pipe half shells.
- 2.2 The pipe sleeves shall be inserted into the building element and shall be located for floor installation flush with the lower side of the floor and for wall application symmetrical to the axis of the wall.
- 2.3 The 5 mm up to 25 mm wide annular gap between pipe sleeve and building element shall be filled completely over the entire building element's thickness (for installation in flexible walls over the linings thickness) with a gap filling material according to Appendix 1. The distance between adjacent pipe sleeves shall be at least 60 mm.
- 2.4 For installation in at least 150 mm thick rigid building elements the pipe sleeves may also be used in larger openings than those given in Section 2.3. For installation of several pipe sleeves in one opening a distance  $\geq 3$  mm for wall application and a distance  $\geq 10$  mm for floor application is required between the pipe sleeves and a distance  $\geq 15$  mm is required between the pipe sleeves and the building element (see Annexes 2 and 12). All remaining openings between the pipe sleeves or between the pipe sleeves and the building element shall be closed completely and tight in a depth of at least 150 mm with the fire protection mortar "PYRO-SAFE NOVASIT BM" or the cementitious mortar "PYRO-SAFE NOVASIT K2" according to Appendix 1.
- 2.5 All remaining openings inside the pipe sleeves – in particular larger triangular spaces between the cables – shall be closed on both sides flush with the end of the pipe sleeves with fitting pieces made from the flexible foam according to Annex 1 in a depth of 40 mm. The fitting pieces shall be installed fitting tightly. Finally the thus closed areas shall be sealed from the outside with the ablative coating "Ablative Coat ASX" according to Appendix 1 in a thickness (dry layer thickness) of  $\geq 1$  mm.
- 2.6 Blank pipe sleeves may contain inside a piece of mineral fiber board with a thickness of 50 mm and a reaction to fire class A1 according to EN 13501-1.

"System PYROCOMB Intube"

### APPENDIX 3 – INSTALLATION OF THE PENETRATION SEAL

Annex 18

 XXXX
OBO BETTERMANN GmbH & Co. KG Hüingser Ring 52 58710 Menden, DEUTSCHLAND/GERMANY  13  XXXX-CPD-XXXX
ETA-13/0904 ETAG 026 – Teil 2/Part 2  Kabelabschottung / Cable Penetration Seal "System PYROCOMB Intube" Ablative Komponente / ablative component "Ablative Coat ASX" Nutzungskategorie / use category X

"CE"-Zeichen / "CE" marking

Identifizierungsnummer der notifizierten Stelle (für Konformitätsbescheinigungssystem 1) / Identification number of notified certification body

Name und Anschrift des Herstellers oder seines autorisierten Vertreters (verantwortliche juristische Person) / Name and address of the producer (legal entity responsible for the manufacturer)

Die letzten beiden Ziffern des Jahres, in dem die CE-Kennzeichnung angebracht wurde / Two last digits of year of affixing CE marking

Nummer des EG-Konformitätszertifikats / Number of EC certificate of conformity

Nummer der ETA / ETA number

Nummer der Leitlinie / ETAG number

Produktbezeichnung (Handelsname) / Designation of the product (trade name)

Produktbezeichnung der Komponente (Handelsname) / Designation of the component (trade name)

Nutzungskategorie / use category

Für weitere relevante Produktmerkmale (z.B. Feuerwiderstandsklasse, Abgabe gefährlicher Stoffe) s. ETA-13/0904/ See ETA-13/0904 for other relevant characteristics (i. e. fire resistance class, dangerous substances)

"System PYROCOMB Intube"

**APPENDIX 4 – EXAMPLE FOR CE MARKING AND ADDITIONAL INFORMATION**

Annex 19

### Abbreviations

<b>FWKL:</b>	maximum fire resistance class; If installed in building elements of the same type, thickness, density and with the same structure, but with a lower fire resistance class, the fire resistance class of the penetration seal is reduced to the fire resistance class of the building element.
<b>LTW:</b>	flexible wall according to annex 16
<b>MW:</b>	rigid wall according to annex 16
<b>D:</b>	rigid floor according to annex 16
<b>d<sub>w</sub>:</b>	wall thickness
<b>d<sub>f</sub>:</b>	floor thickness
<b>Ø:</b>	external diameter
<b>s:</b>	pipe wall thickness (nominal value according to the standards)
<b>U/U:</b>	pipe end configuration "uncapped/uncapped" (on both sides open pipe ends in the fire test)
<b>EIR:</b>	conduits

### Standards

<b>EN 13501-2:2010-02</b>	Fire classification of construction products and building elements – Part 2: Classification using test data from resistance to fire tests, excluding ventilation services
<b>EN 13501-1:2007</b>	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests
<b>prEN 1366-3:07/2007</b>	Document from CEN TC 127 for formal vote (document N 185); title see EN 1366-3:2009-07
<b>EN 1366-3:2009-07</b>	Fire resistance tests for service installations – Part 3: Penetration seals
<b>EN 998-2:2010</b>	Specification for mortar for masonry - Part 2: Masonry mortar

### Other documents

<b>ETAG 026-2</b>	Guideline for European Technical Approval of Fire Stopping and Fire Sealing Products, Part 2, Penetration Seals (edition January 2008)
<b>EOTA TR 024</b>	Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products (edition November 2006)

"System PYROCOMB Intube"

### **APPENDIX 5 – ABBREVIATIONS AND REFERENCE DOCUMENTS**

Annex 20