Deutsches Institut für Bautechnik
Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfamt
Eine vom Bund und den Ländern gemeinsam getragene Anstalt des öffentlichen Rechts

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

Deutsches Institut für Bautechnik

DIBt

Mitglied der EOTA
Member of EOTA

European Technical Approval ETA-13/0903

English translation prepared by DIBt – Original version in German language

Handelsbezeichnung *Trade name*	"PYRO-SAFE Flammotect - zweilagig" *"PYRO-SAFE Flammotect - Double layer"*
Zulassungsinhaber *Holder of approval*	svt Brandschutz Vertriebsgesellschaft mbH International Glüsinger Straße 86 21217 Seevetal DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck *Generic type and use of construction product*	Kombiabschottung *mixed penetration seal*
Geltungsdauer: *Validity:* vom *from* bis *to*	28 June 2013 28 June 2018
Herstellwerk *Manufacturing plant*	svt Brandschutz Vertriebsgesellschaft mbH International Glüsinger Straße 86 21217 Seevetal DEUTSCHLAND

Diese Zulassung umfasst *This Approval contains*	38 Seiten einschließlich 28 Anhänge *38 pages including 28 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[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- 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[4], as amended by Article 2 of the law of 8 November 2011[5];
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6];
- 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 indicated 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.

1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2011*, p. 2178
6 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 and intended use

1.1 Definition of the construction product

1.1.1 Description of the mixed penetration seal

The mixed penetration seal called "PYRO-SAFE Flammotect", double layer", mainly consists of mineral fibre boards, a coating with an ablative and an intumescent material and – depending on the installations passing through – if necessary with wrapping with an intumescent material, applied on fabric (see Appendix 1). The mixed 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 mixed penetration seal

1.1.2.1 Mineral boards

The mineral fibre boards, called "Hardrock 040", produced by Deutsche Rockwool Mineralwoll GmbH, Germany, shall comply with the specifications given in Annex 1.

1.1.2.2 Ablative material

The ablative material, called "PYRO-SAFE FLAMMOTECT-A" bzw. "SIBRALIT AS", produced by svt Brandschutz Vertriebsgesellschaft mbH International, Germany, shall comply with the specifications given in Annex 1.

1.1.2.3 Intumescent material

The intumescent material, called "PYRO-SAFE DG-CR", produced by svt Brandschutz Vertriebsgesellschaft mbH International, Germany, shall comply with the specifications given in Annex 1.

1.1.2.4 Mineral fibre mats

The mineral fibre mats for wrapping of the local insulation if necessary called "Klimarock", produced by Deutsche Rockwool Mineralwoll GmbH, Germany, shall comply with the specifications given in Annex 1.

1.1.2.5 Pipe shells

The pipe shells for the local sustained insulation, called "ProRox PS 960", produced by Deutsche Rockwool Mineralwoll GmbH, Germany, shall comply with the specifications given in Annex 1.

1.1.2.6 Pipe insulation

- The pipe insulation for the local sustained insulation, called "Armaflex Protect", produced by Armacell GmbH, Germany,
- The pipe insulation for the local sustained insulation, called "Kaiflex ST" produced by Kaimann GmbH, Germany,

shall comply with the specifications given in Annex 1.

1.2 Intended use

1.2.1 General

1.2.1.1 The mixed penetration seal is used to seal off openings in accordance with section 1.2.3 in fire resistant walls and floors in accordance with section 1.2.2 penetrated by installations in accordance with section 1.2.4[7] and serves to preserve the fire resistance of the wall or floor in the vicinity of the penetrations.

1.2.1.2 The mixed penetration seal reaches a maximum fire resistance class of EI 120 (EI 120-U/U for plastic pipes and EI 120-U/C for metal pipes) (see also section 2.3).

1.2.1.3 The mixed penetration seal can be used in interiors with and without moisture loads (see section 2.5). Suitability for external use was demonstrated for the ablative components (use category X in accordance with EOTA TR 024).

1.2.1.4 The mixed penetration seal can also be used to seal openings which have not yet been used for installations. Modifications may be made to the installations subsequently (retrofitting or removal of installations) provided compliance with the provisions of this European technical approval is ensured.

1.2.2 Building elements

The mixed penetration seal may be used in flexible walls (thickness $d_W \geq 100$ mm), rigid walls (thickness $d_W \geq 100$ mm) and rigid floors (thickness $d_D \geq 150$ mm) in accordance with Appendix 2, which are classified in accordance with the required fire resistance duration according to EN 13501-2.

1.2.3 Openings (in the building elements)

1.2.3.1 The dimensions of the openings to be sealed off shall not exceed 1250 mm (width) x 1200 mm (height) in walls.

1.2.3.2 There shall be a distance of at least 200 mm between the opening to be sealed off and other openings or components. The distance between adjacent penetration seals according to this ETA can be reduced to 100 mm if the openings to be sealed off are no larger than 400 mm x 400 mm.

1.2.4 Installations

1.2.4.1 The mixed penetration seal may be used on cables, cable supporting constructions (cable trays or ladders), combustible and/or non-combustible pipes in accordance with Appendix 2. The total permitted cross section of the installations (relative to the respective external dimensions; including cable supporting constructions) may not exceed 60 % of the opening. The installations shall be fixed perpendicularly to the surface of the wall/floor/penetration seal. The distances between the individual installations and between the installations and the seal edge shall comply with the specifications in Appendix 2, taking into account the type of the installation.

1.2.4.2 The pipe work shall only be used for non-combustible liquids and fluids, pneumatic dispatch systems or vacuum cleaning pipes.

The regulations of the member states shall be observed for more precise specifications of the pipe works (intended use of pipes) for which the penetration seal may be used (e.g. drinking water pipes, heating pipes, waste water pipes)[8].

[7] The technical provisions of the member states for the design of piping systems and the reliability of pipe penetrations are not affected by this.

[8] The penetration seal may only be fitted to these pipe work types if it fulfils the classification required in the respective country. Particular attention must be paid to the ending of the classification, which reflects the pipe end situation from the fire resistance tests performed to prove serviceability (see section 2.2).

The suitability of the mixed penetration seal in accordance with this European technical approval on pipes was demonstrated using the U/U (plastic pipes) and U/C (metal pipes) test conditions, which means that the classifications (pipe end situations) -C/U and -C/C are covered in accordance with EN 1366-3.

1.2.4.3 The first bracket of the installations has to be by installation in walls according to Annex 19.

1.2.5 Working life

The provisions in this European technical approval are based on an assumed working life of 10 years for the mixed penetration seal "PYRO-SAFE Flammotect" provided the conditions laid down in sections 4 and 5 relating to manufacturing, installation, use and repair are met. 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.

2 Product characteristics and methods of verification

2.1 General

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

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

2.1.2 The product characteristics 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 mineral fibre boards, the pipe shells for the local insulation, the synthetic rubber insulation, the intumescent component and the ablative components comply with the fire reaction classes in accordance with EN 13501-1 specified in Annex 1.

2.3 Fire resistance

The mixed penetration seal was tested in accordance with EN 1366-3:07/2009. As a maximum, the penetration seal fulfils the requirements of Class EI 120 (ending for plastic pipes -U/U and for metal pipes -C/U) in accordance with EN 13501-2.

In the annexes the maximum verified fire resistance class – under the respective installation conditions – 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 mixed penetration seal is reduced to the fire resistance class of the wall or floor.

The fire resistance classes specified in the annexes with the endings -U/U (plastic pipes) cover the classes of the same fire resistance duration, but with the other possible endings in accordance with EN 13501-2. The fire resistance classes specified in the annexes with the endings -C/U (metal pipes) cover the classes -C/C of the same fire resistance duration.

2.4 Emission of dangerous substances

The ablative components "PYRO-SAFE FLAMMOTECT-A" and "SIBRILAT AS" and the intumescent component "PYRO-SAFE DG-CR" 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.

For the mineral fibre boards "Hardrock 040" and the pipe shells "ProRox PS 960" manufacturer´s declarations, that these products do not contain dangerous substances specified in Directive 67/548/EEC or Regulation (EC) N° 1272/2008 or the Indicative List on Dangerous Substances were made available to the Deutsches Institut für Bautechnik.

For pipe shells "Armaflex Protect" see ETA-11/0454.

For pipe shells "Kaiflex ST"

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 "PYRO-SAFE FLAMMOTECT-A" or "SIBRALIT AS " the intumescent material "PYRO-SAFE DG-CR" 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 and external weathering, 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 ablative and intumscent components

According to Decision 1999/454/EG, amended by Decision 2001/596/EC of the European Commission[9], 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".

[9] Official Journal of the European Communities 178/52, 14 July 1999

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-13/0903 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.[10]

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:

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: Internal use with and without moisture loads

2. Construction of the penetration seal including the necessary components and additional products with clear indications whether they are generic or specific.

Installation instruction:
- Installation method (e.g. preparation of the supporting structure before installation of the penetration seal)
- The sequence of working steps to be followed
- Procedure in case of retrofitting

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-13/0903 issued on 28. June 2013.

[10] 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.

3.2.2 Tasks for the approved body

The approved body 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 body 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 packagings / cartridges of the ablative components and 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),
- declaration of any dangerous substances or "no dangerous substances",
- "see ETA-13/0903 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.),
- the installation of the penetration seal does not affect the stability of the adjacent building elements – even in the case of fire,
- the lintel or floor above the penetration seal is designed structurally and in terms of fire protection such that no additional mechanical load (other than its own weight) is imposed on the seal,
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire (for sealing off plastic pipes),
- the installations are fixed to the adjacent building elements (not to the seal) in accordance with the relevant regulations in such a manner that, in case of fire, no additional mechanical load is imposed on the seal and
- 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 This European technical approval does not prove the prevention of destruction of adjacent building elements with fire separating function or of the pipes themselves due to distortion forces caused by extreme temperatures. These risks shall be accounted for by taking appropriate measures when designing or installing the pipe work.

The mounting or hanging of the pipes or the layout of the pipe work shall be implemented in such a way that the pipes and the fire resistant building elements shall remain functional within a period of time which corresponds to the fire resistance period required.

4.1.4 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).

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

4.1.6 It is assumed that to avoid injuries provisions are taken to prevent persons to step or fall onto the penetration seal (e. g. covering with a wire mesh).

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 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 ablative components 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 ablative components 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

5.2.1 In general, no maintenance work is necessary. Repair can be implemented by installing peaces of mineral fibre boards and ablative materials and/or restoring damaged measures (i. e. local insulation or coating) on the installations in accordance with Appendix 3.

5.2.2 If individual installations are removed or added, the mineral fibre board plane shall be sealed again in accordance with Appendix 3 and measures in accordance with Appendix 3 shall be taken for the added installations.

Prof. Gunter Hoppe
Head of Department

beglaubigt:
Racinowski

Deutsches Institut für Bautechnik DIBt

Type / Manufacturer	Description
"PYRO-SAFE DG-CR" svt Brandschutz Vertriebsgesellschaft mbH International 21217 Seevetal GERMANY	**Intumescent material** in form of mats according to ETA-13/0100: Reaction to fire class according to EN 13501-1: Class E
"PYRO-SAFE FLAMMOTECT-A" and "SIBRALIT AS" svt Brandschutz Vertriebsgesellschaft mbH International 21217 Seevetal GERMANY	**Ablative material**, filled in cartridges or buckets Reaction to fire class according to EN 13501-1: Class E Density (condition on delivery): 1.340 kg/m³ - 1.480 kg/m³ Content of non-volatile components*: 66,0 % - 86,0 % Mass loss through heating*: 38,0 % - 48,0 % LOI*: 55 % ± 3 % (tested with approx. 1,5 mm thick samples) Flexibility*: ≥ 5 mm tested 1,5 mm thick
"Hardrock 040" ("Hardrock II") Deutsche Rockwool Mineralwoll GmbH 45966 Gladbeck GERMANY	**Mineral fibre board** in accordance EN 13162 Thickness ≥ 60 mm Nominal gross density 150 kg/m³ Reaction to fire class according to EN 13501-1: Class A1
"ProRox PS 960" (RS 880) Deutsche Rockwool Mineralwoll GmbH 45966 Gladbeck GERMANY	**Pipe shell** made of concentrically wound rock wool non film laminate in accordance with EN 14303 Nominal gross density 100 kg/m³ - 120 kg/m³ Reaction to fire class according to EN 13501-1: Class $A1_L$ Length (on both sides of the mineral fibre boards plane): see Annex 15) Thickness (depending on the pipe material and pipe dimensions): see Annexes 21 and 22
"Klimarock" Deutsche Rockwool Mineralwoll GmbH 45966 Gladbeck GERMANY	**Rock wool mat** with meshed aluminium foil according to allgemeine bauaufsichtliche Zulassung Z-23.14-1115 Nominal gross density: 40 kg/m³ - 50 kg/m³ Reaction to fire class according EN 13501-1: $A2_L$ - s1,d0 Length: according to Annex 17 Thickness: 30 mm

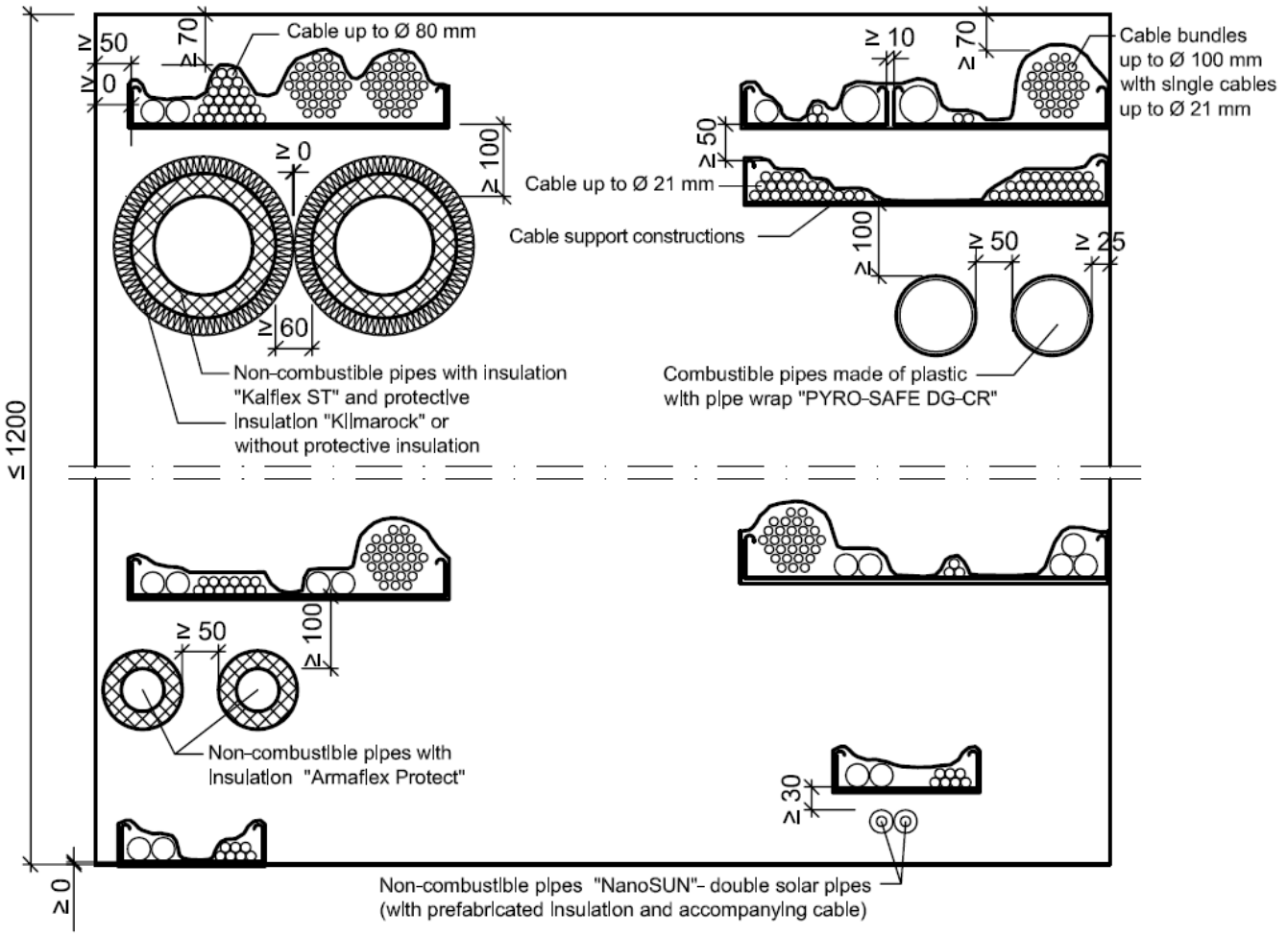
"PYRO-SAFE Flammotect - Double layer"

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Description of the components of the product

Annex 1

Deutsches Institut für Bautechnik DIBt

Penetration sealing system with two mineral fibre board for wall installation
- Maximum sealing system dimension 1.5 m²
- Variant 1: cable support constructions/cables with cable wrap



Distances a:

a1 ≥ 50 mm: between cables/cable support constructions and lateral seal edge for cable-Ø > 21 mm
a1.1 ≥ 0 mm: between cables/cable support constructions and lateral seal edge for cable-Ø ≤ 21 mm and cable bundles up to Ø 100 mm with single cables up to Ø 21 mm
a2 ≥ 10 mm: between cable support constructions lateral to each other
a3 ≥ 0 mm: between cables/cable support constructions and lower seal edge
a4 ≥ 70 mm: between cables/cable support constructions and upper seal edge
a4.1 ≥ 70 mm: between cable bundles/cable support constructions and upper seal edge
a5 ≥ 50 mm: between cables/cable support constructions among each other
a6 ≥ 100 mm: between plastic pipes and cables/cable support constructions
a7 ≥ 100 mm: between non-combustible pipes and cables/cable support constructions
a8 ≥ 30 mm: between non-combustible pipes "NanoSUN²" and cables/cable support constructions
a9 ≥ 100 mm: between non-combustible pipes with various types of insulation or plastic pipes, measured from pipe surface

Pipes with linear arrangement, no clusters

Dimensions in mm

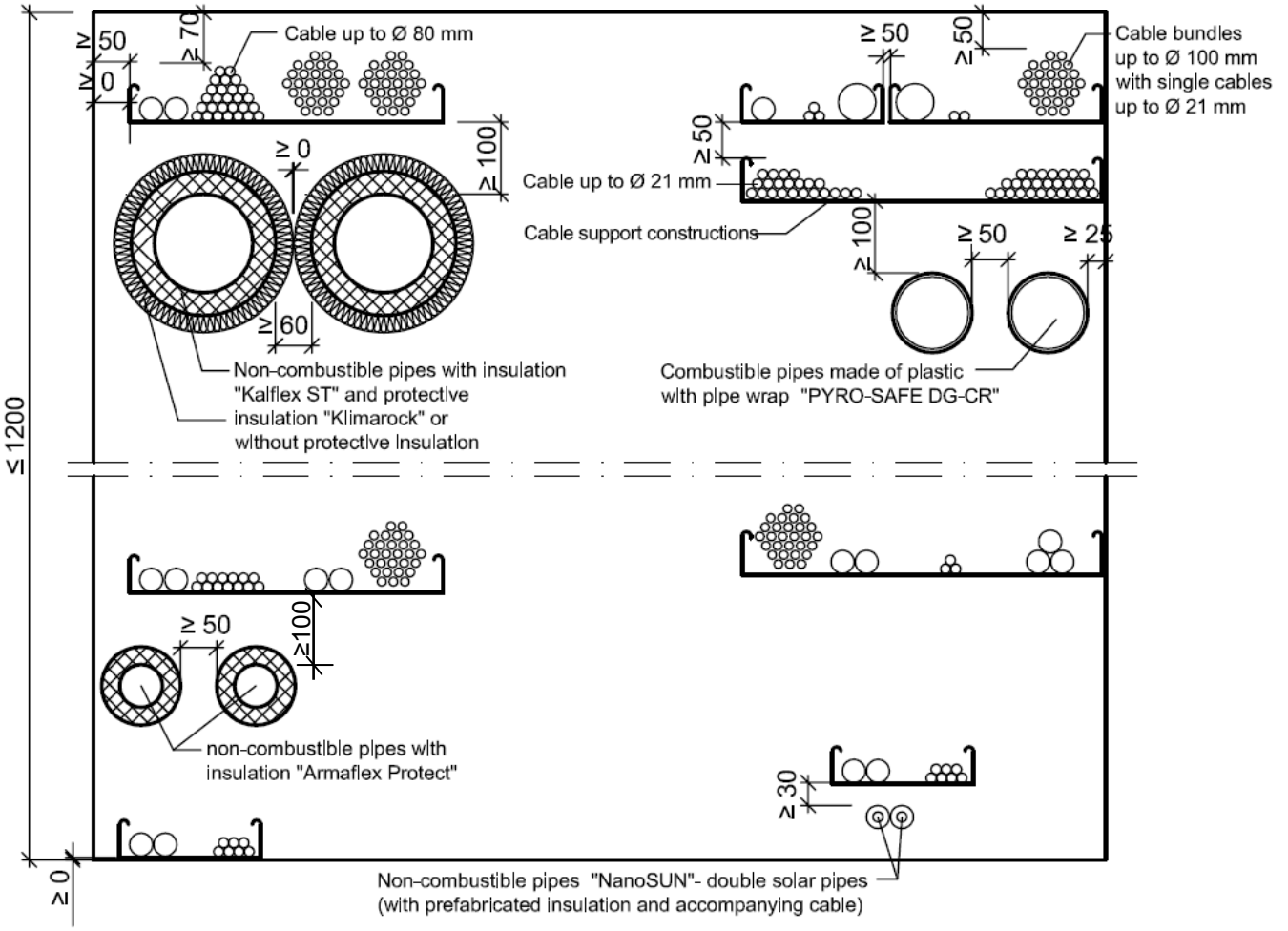
"PYRO-SAFE Flammotect - Double layer"

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for wall installation; Elevation; Distances- Variant 1

Annex 2

Deutsches Institut für Bautechnik DIBt

Penetration sealing system with two mineral fibre boards for wall installation
- Maximum sealing system dimension 1.5 m²
- Variant 2: cable support constructions/cables with cable coating



Distances a:

a1 ≥ 50 mm: between cables/cable support constructions and lateral seal edge for cable-Ø > 21 mm
a1.1 ≥ 0 mm: between cables/cable support constructions and lateral seal edge for cable-Ø ≤ 21 mm and cable bundles up to Ø 100 mm with single cables up to Ø 21 mm
a2 ≥ 50 mm: between cable support constructions lateral to each other
a3 ≥ 0 mm: between cables/cable support constructions and lower seal edge
a4 ≥ 70 mm; between cables/cable support constructions and upper seal edge
a4.1 ≥ 50 mm: between cable bundles/cable support constructions and upper seal edge
a5 ≥ 50 mm: between cables/cable support constructions or among each other
a6 ≥ 100 mm: between plastic pipes and cables/cable support constructions
a7 ≥ 100 mm: between non-combustible pipes and cables/cable support constructions
a8 ≥ 30 mm: between non-combustible pipes "NanoSUN²" and cables/cable support constructions
a9 ≥ 100 mm: between non-combustible pipes with various types of insulation or plastic pipes, measured from pipe surface

Pipes with linear arrangement, no clusters

Dimensions in mm

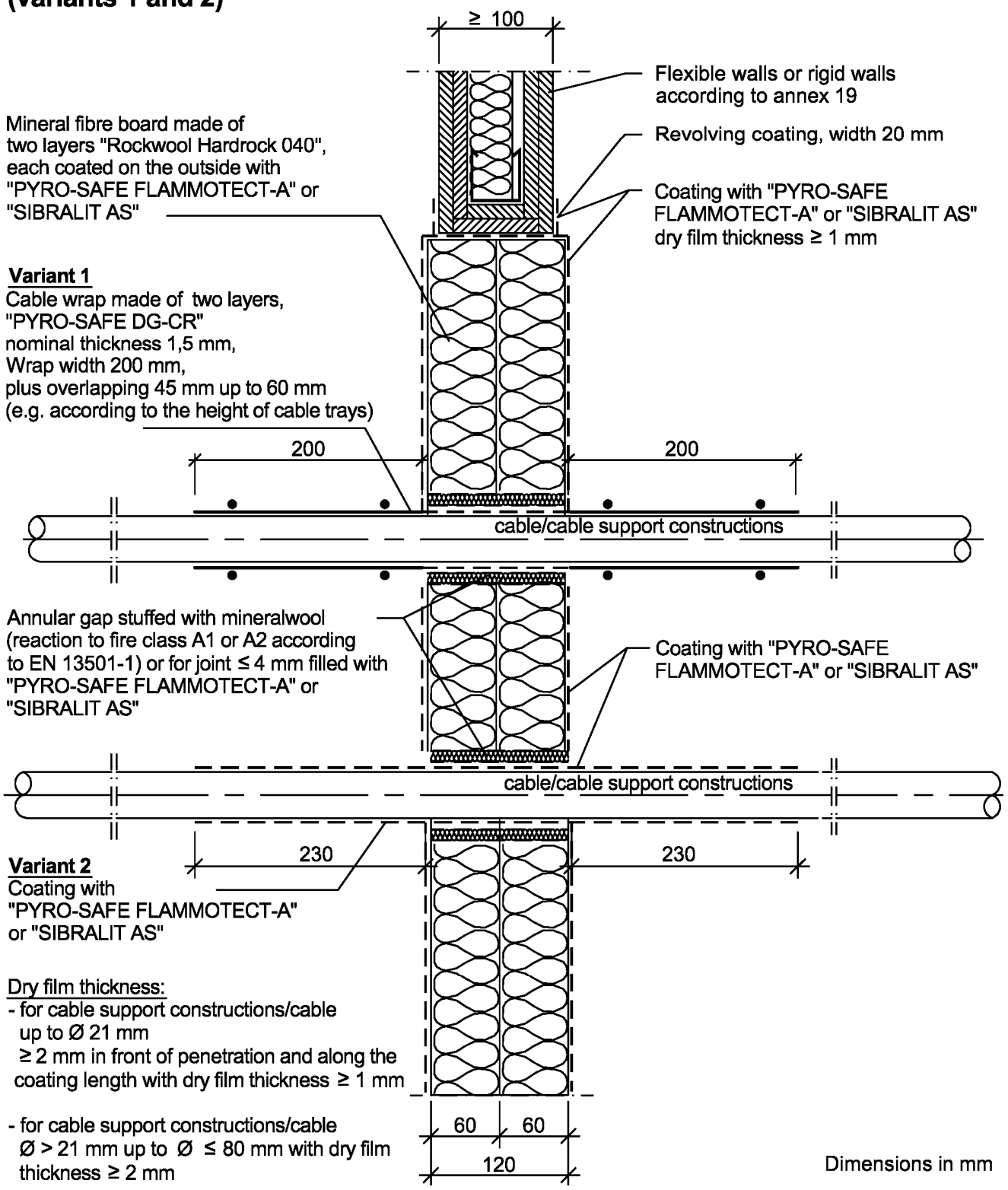
"PYRO-SAFE Flammotect - Double layer"

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for wall installation; Elevation; Distances- Variant 2

Annex 3

Deutsches Institut für Bautechnik DIBt

Section view: Measures on cables and cable support constructions (variants 1 and 2)



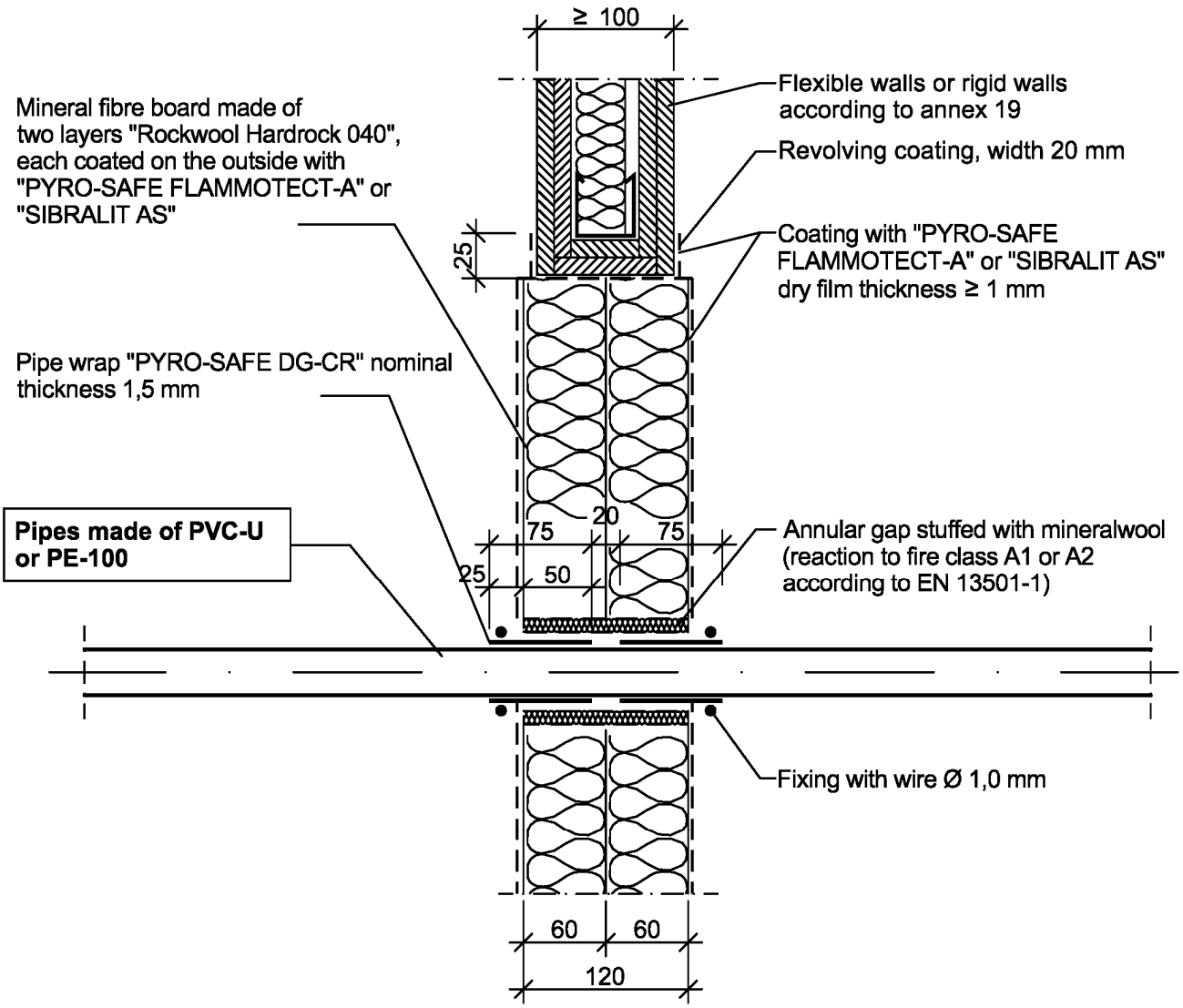
"PYRO-SAFE Flammotect - Double layer"

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for wall installation; Section view in the area of cables and cable support constructions (variants 1 and 2)

Annex 4

Deutsches Institut für Bautechnik DIBt

Section view: Measures on plastic pipes (pipe groups A and B) - with pipe wrap "PYRO-SAFE DG-CR"

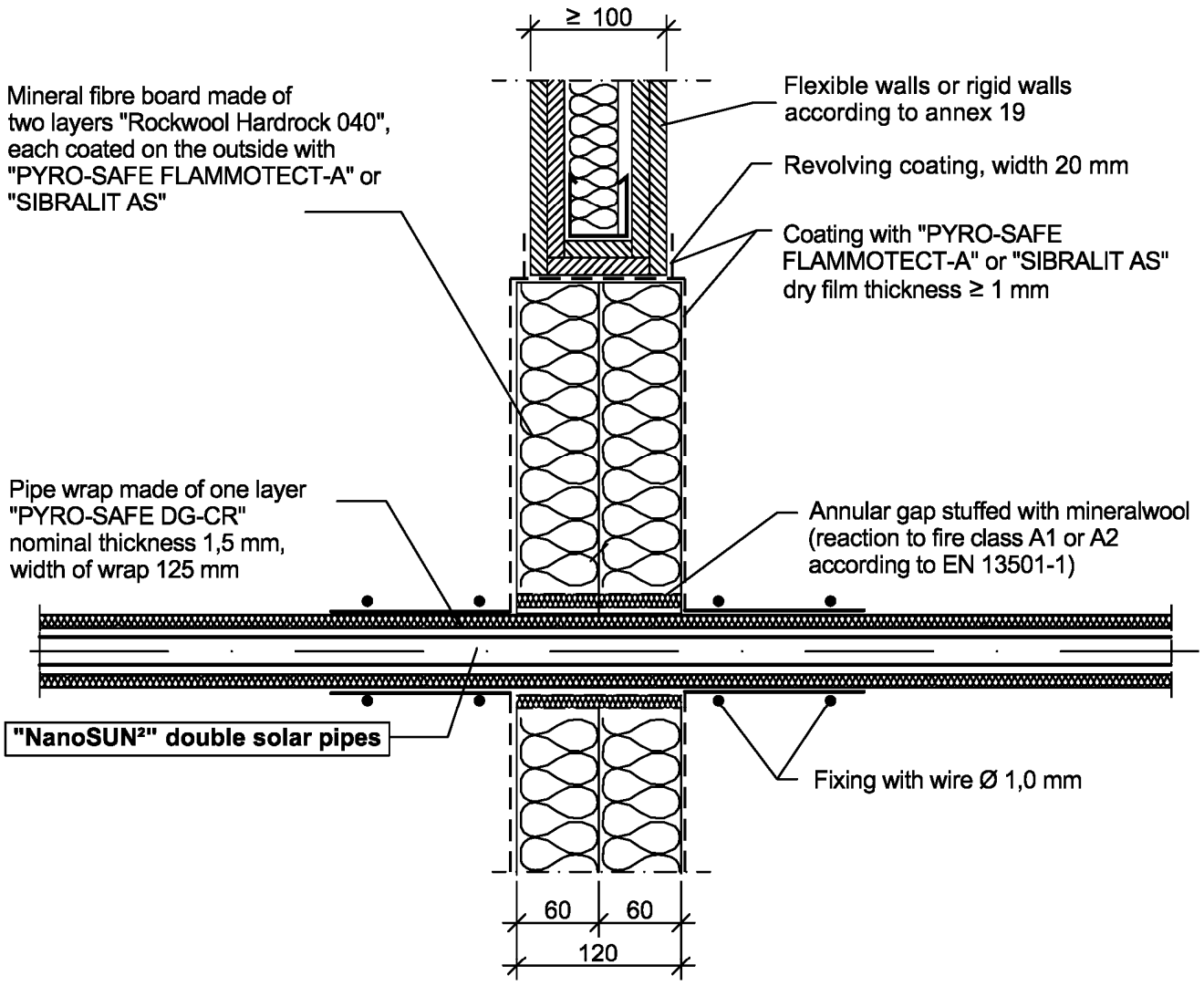


Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 5
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for wall installation; Section view in the area of plastic pipes	

Deutsches Institut für Bautechnik DIBt

Section view: Measures on non-combustible pipes - "NanoSUN²" double solar pipes



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 6
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for wall installation; Section view in the area of non-compustable pipes "NanoSUN²"- double solar pipes	

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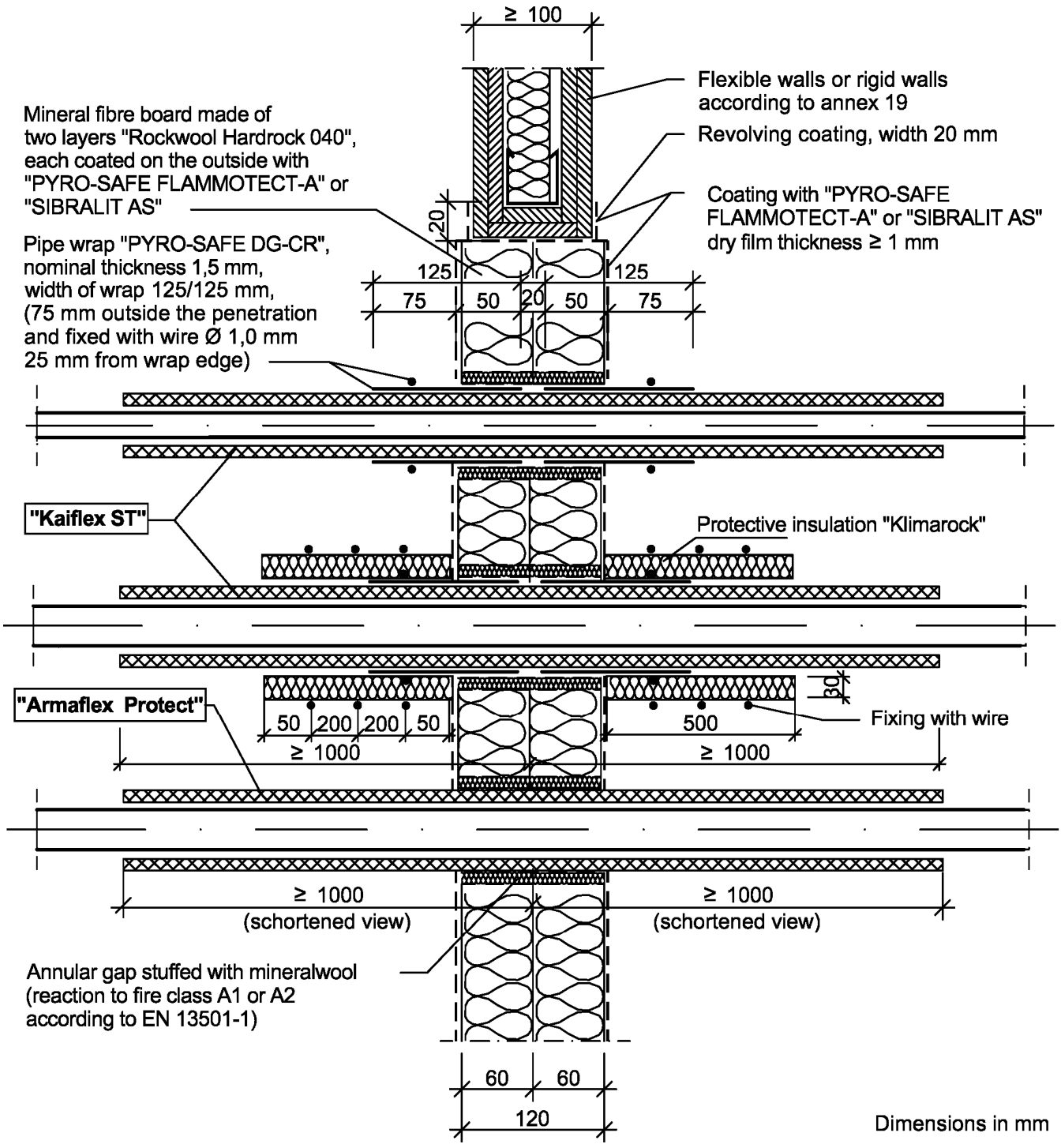
Section view: Measures on non-combustible pipes - with insulation "Kaiflex ST" or "Armaflex Protect"



"PYRO-SAFE Flammotect - Double layer"	Annex 7
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for wall installation; Section view in the area of non-compustable pipes with insulation "Kaiflex ST" or "Armaflex Protect"	

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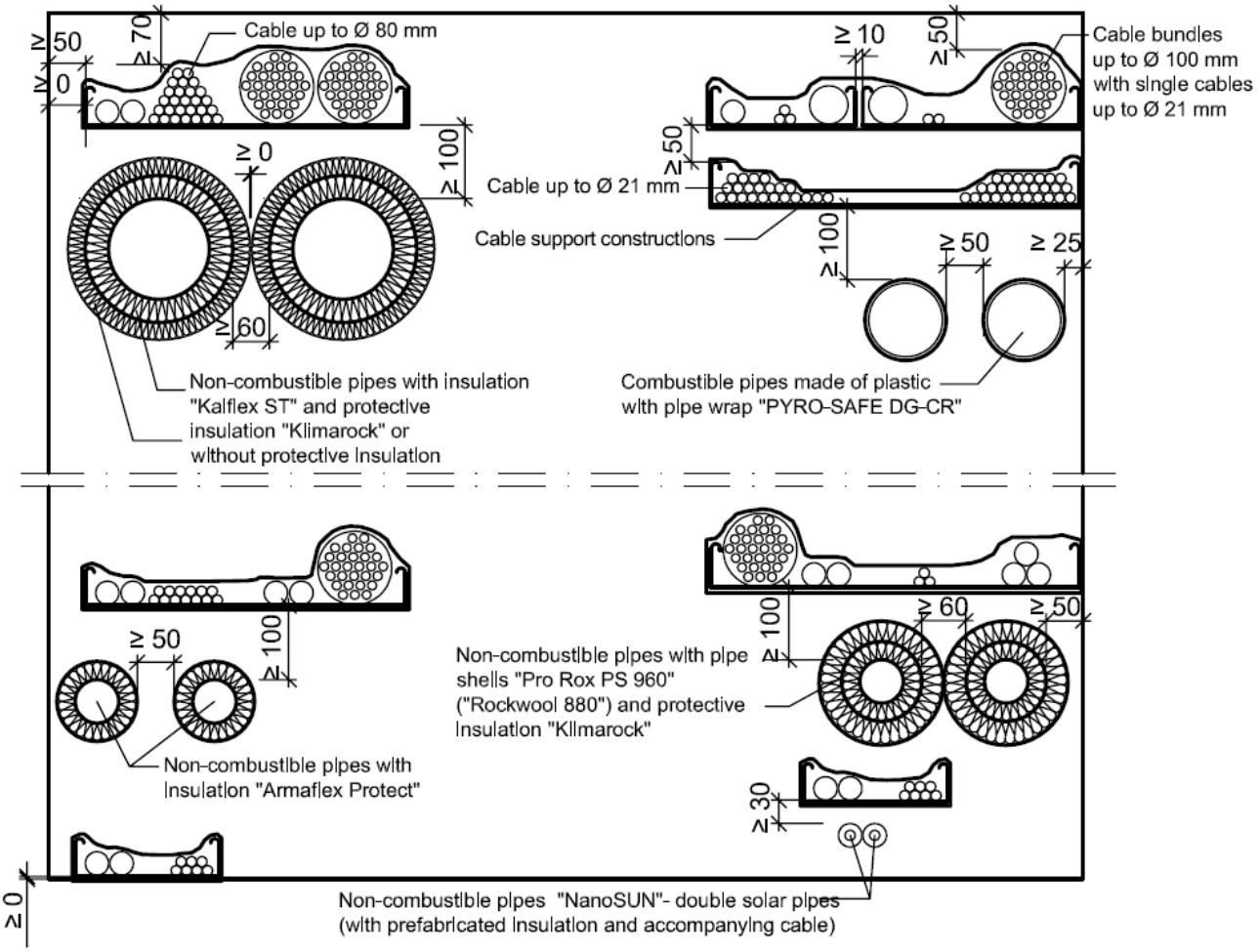
Penetration sealing system with two mineral fibre boards for floor installation
- Maximum sealing system dimension 1.5 m²
- Variant 1: cable support constructions/cables with cable wrap



Distances a:

a1 ≥ 50 mm: between cables/cable supporting constructions and lateral seal edge for cable-Ø > 21 mm
a1.1 ≥ 0 mm: between cables/cable supporting constructions and lateral seal edge for cable-Ø ≤ 21 mm and cable bundles up to Ø 100 mm with single cables up to Ø 21 mm
a2 ≥ 10 mm: between cable supporting constructions lateral to each other
a3 ≥ 0 mm: between cables/cable supporting constructions and lower seal edge
a4 ≥ 80 mm: between cables/cable supporting constructions and upper seal edge
a4.1 ≥ 50 mm: between cable bundles/cable support constructions and upper seal edge
a5 ≥ 50 mm: between cables/cable supporting constructions or among each other
a6 ≥ 100 mm: between plastic pipes and cables/cable supporting constructions
a7 ≥ 100 mm: between non-combustible pipes and cables/cable supporting constructions
a8 ≥ 25 mm: between non-combustible pipes "NanoSUN²" and cables/cable supporting constructions
a9 ≥ 100 mm: between non-combustible pipes with various types of insulation or plastic pipes, measured from pipe surface

Pipes with linear arrangement, no clusters

Dimensions in mm

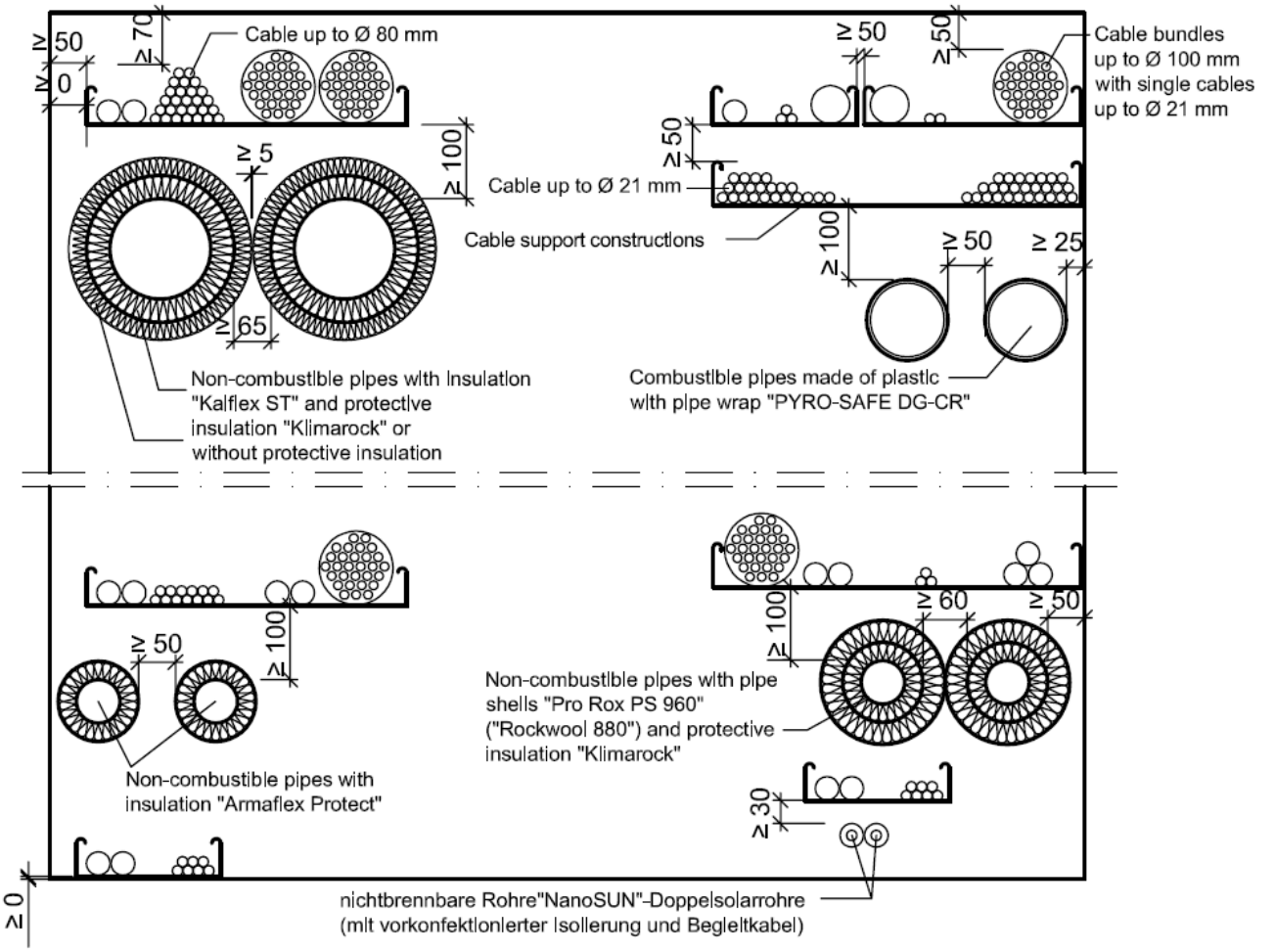
"PYRO-SAFE Flammotect - Double layer"

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for floor installation; Elevation; Distances – Variant 1

Annex 8

Deutsches Institut für Bautechnik DIBt

Penetration sealing system with two mineral fibre boards for floor installation
- Maximum sealing system dimension 1.5 m²
- Variant 2: cable support constructions/cables with cable coating



Distances a:

a1 ≥ 50 mm: between cables/cable supporting constructions and lateral seal edge for cable-Ø > 21 mm
a1,1 ≥ 0 mm: between cables/cable supporting constructions and lateral seal edge for cable-Ø ≤ 21 mm and cable bundles up to Ø 100 mm with single cables up to Ø 21 mm
a2 ≥ 50 mm: between cable supporting constructions lateral to each other
a3 ≥ 0 mm; between cables/cable supporting constructions and lower seal edge
a4 ≥ 75 mm: between cables/cable supporting constructions and upper seal edge
a4,1 ≥ 50 mm: between cable bundles/cable support constructions and upper seal edge
a5 ≥ 50 mm; between cables/cable supporting constructions or among each other
a6 ≥ 100 mm; between plastic pipes and cables/cable supporting constructions
a7 ≥ 100 mm; between non-combustible pipes and cables/cable supporting constructions
a8 ≥ 25 mm; between non-combustible pipes "NanoSUN²" and cables/cable supporting constructions
a9 ≥ 100 mm; between non-combustible pipes with various types of insulation or plastic pipes, measured from pipe surface

Pipes with linear arrangement, no clusters

Dimensions in mm

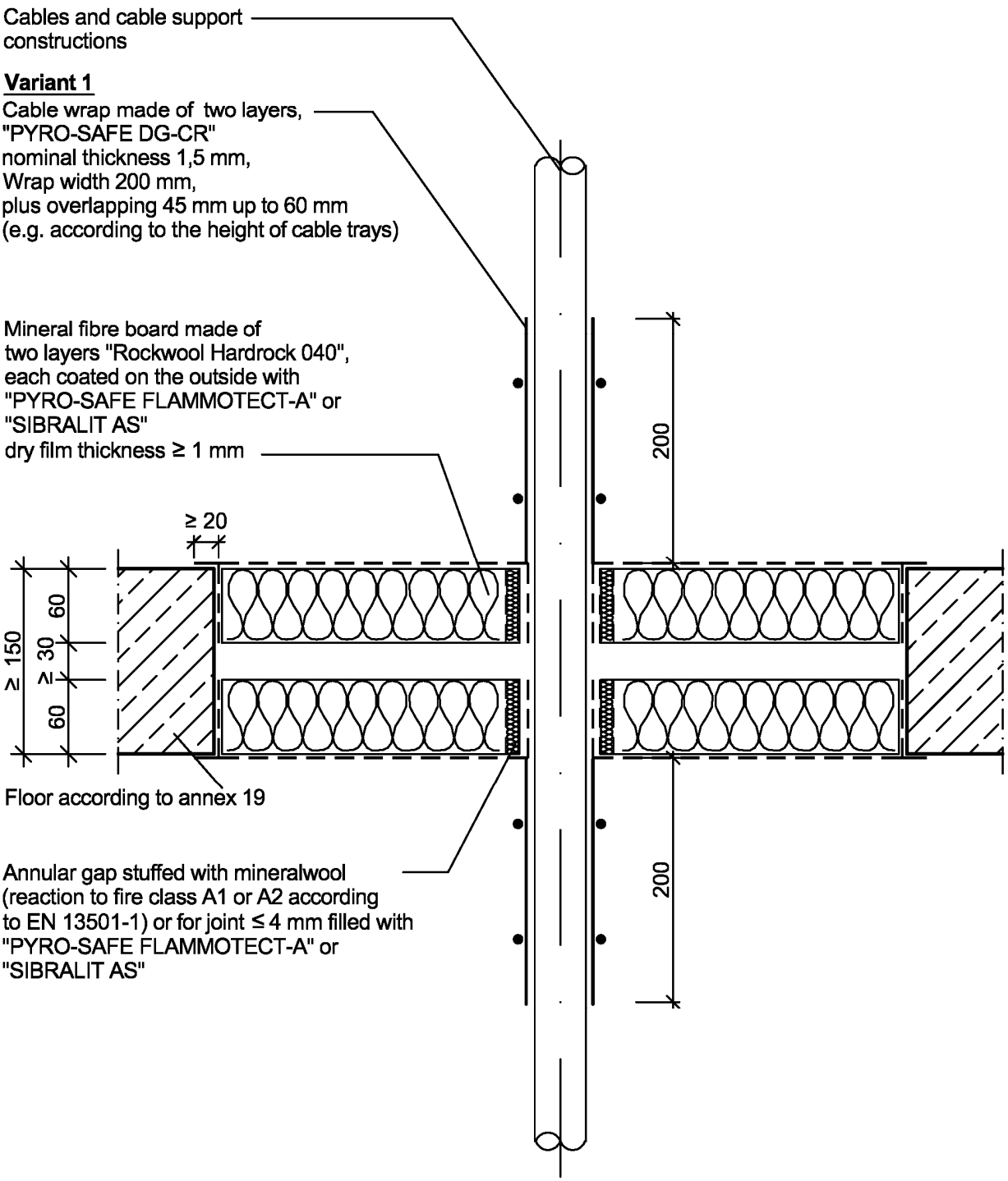
"PYRO-SAFE Flammotect - Double layer"

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for floor installation; Elevation; Distances – Variant 2

Annex 9

Deutsches Institut für Bautechnik DIBt

Section view: Measures on cables and cable support constructions - with cable wrap "PYRO-SAFE DG-CR" (variant 1)



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 10
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for floor installation; Section view in the area of cables and cable support constructions with cable wrap (variant 1)	

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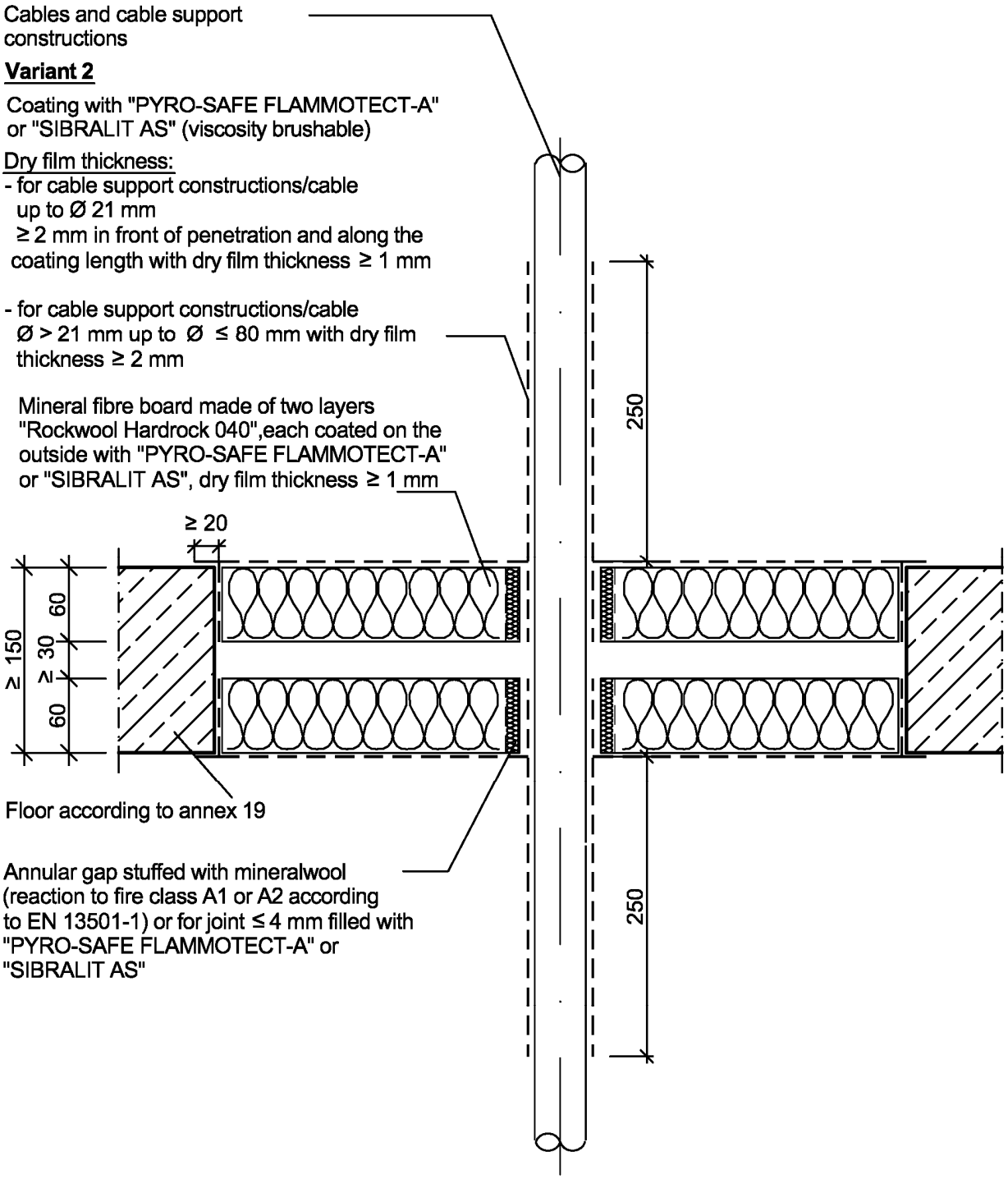
Section view: Measures on cables and cable support constructions - with cable coating (variant 2)



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 11
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for floor installation; Section view in the area of cables and cable support constructions with cable wrap (variant 2)	

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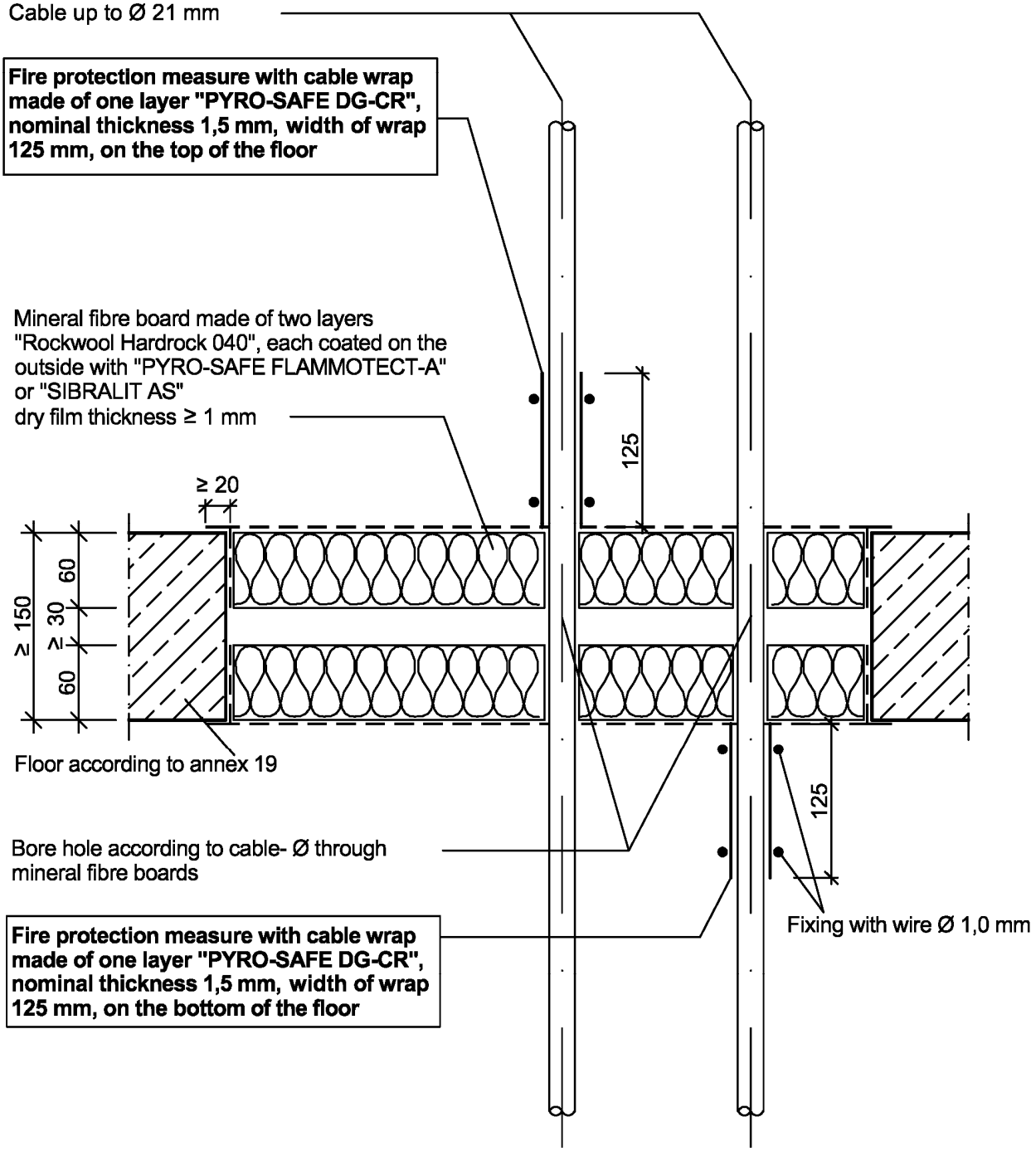
Section view: Measures on cables up to Ø 21 mm, e.g. for retrofitting - with cable wrap "PYRO-SAFE DG-CR"



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"

Annex 12

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for floor installation; Section view in the area of single cables up to Ø 21 mm

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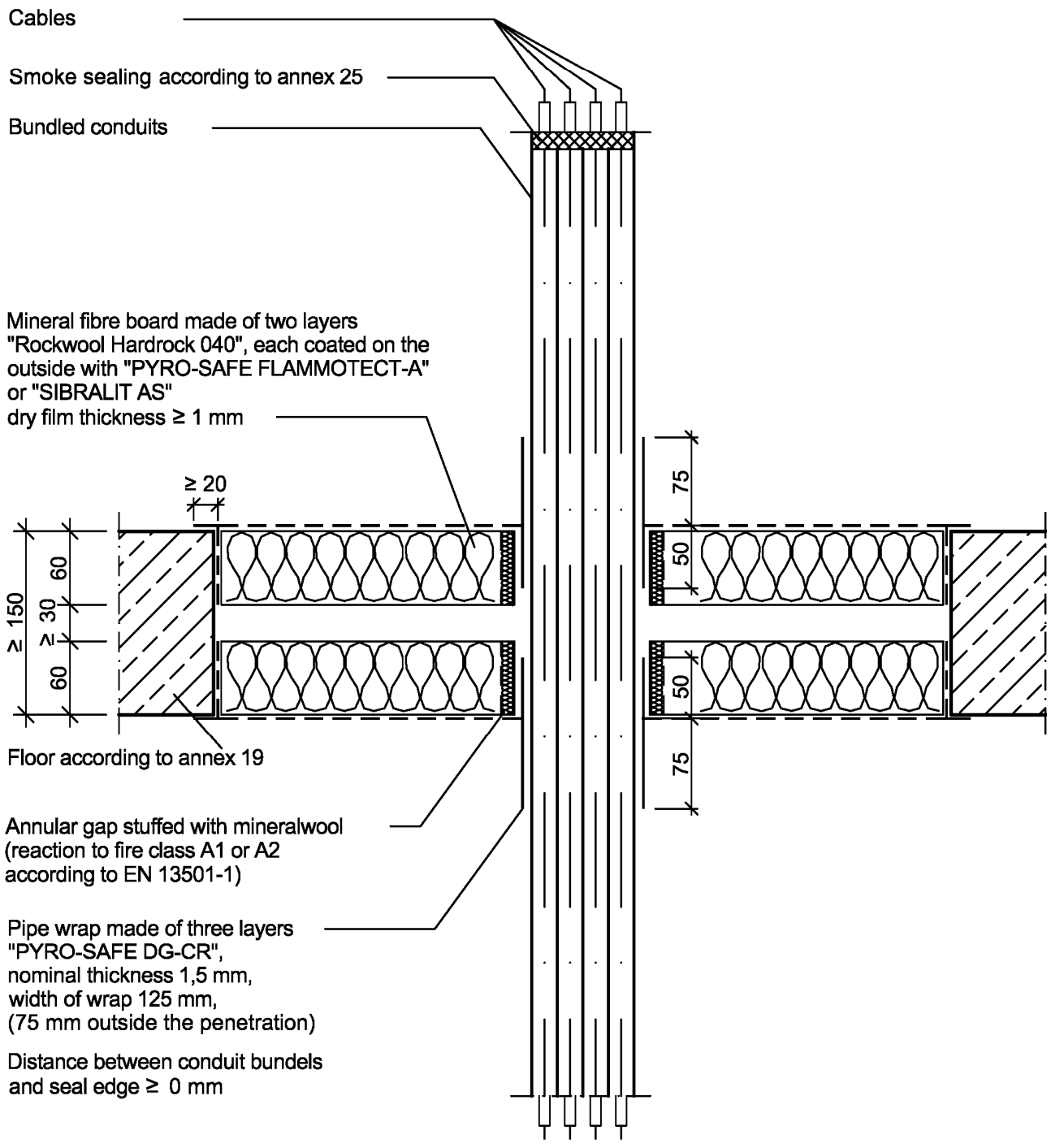
Section view: Measures on combustible conduits
- outer-Ø up to 32 mm bundled up to Ø 100 mm
- with cables or without cables



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for floor installation; Section view in the area of non combustable conduits

Annex 13

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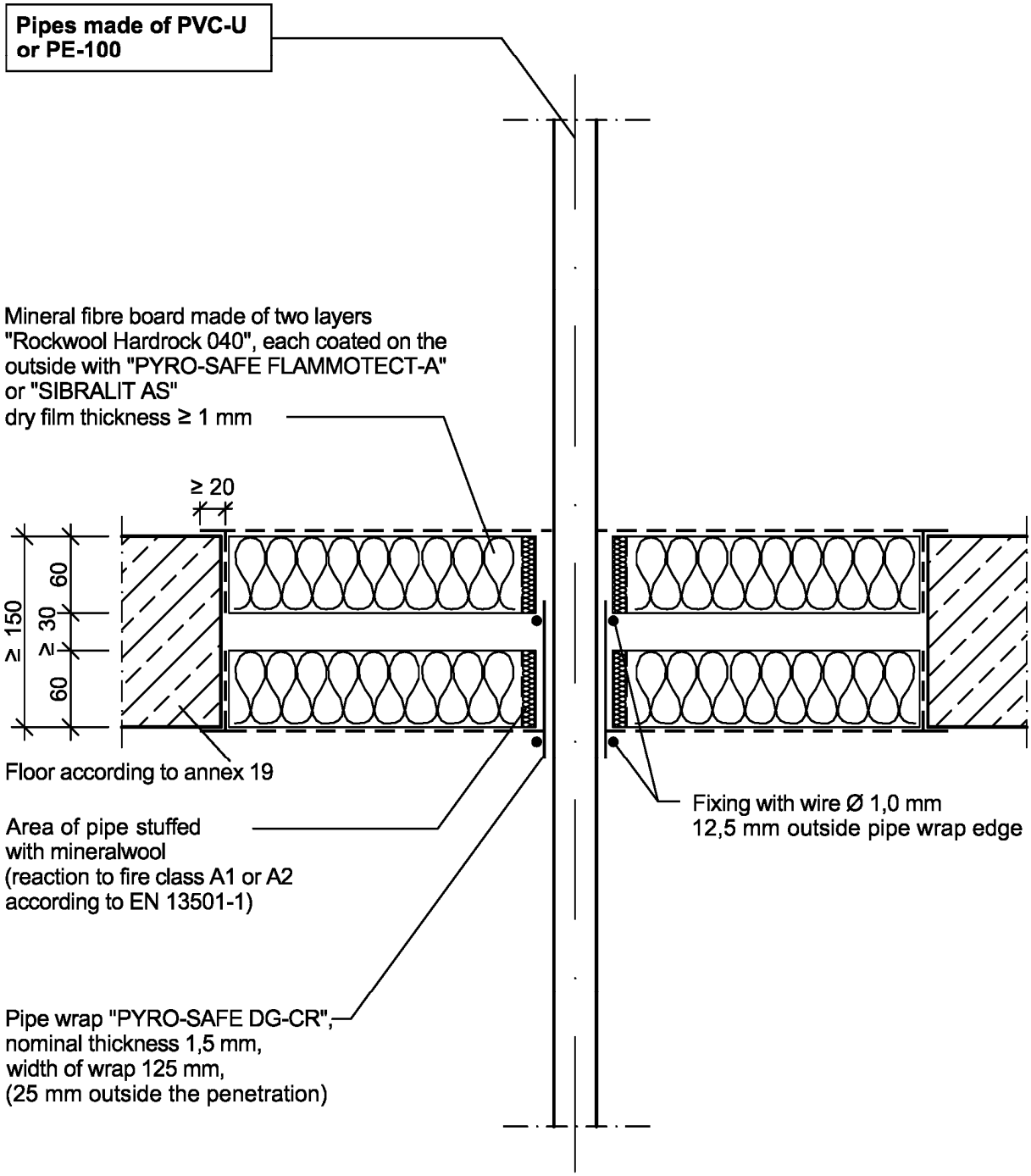
Section view: Measures on plastic pipes - with pipe wrap "PYRO-SAFE DG-CR"



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 14
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for floor installation; Section view in the area of plastic pipes	

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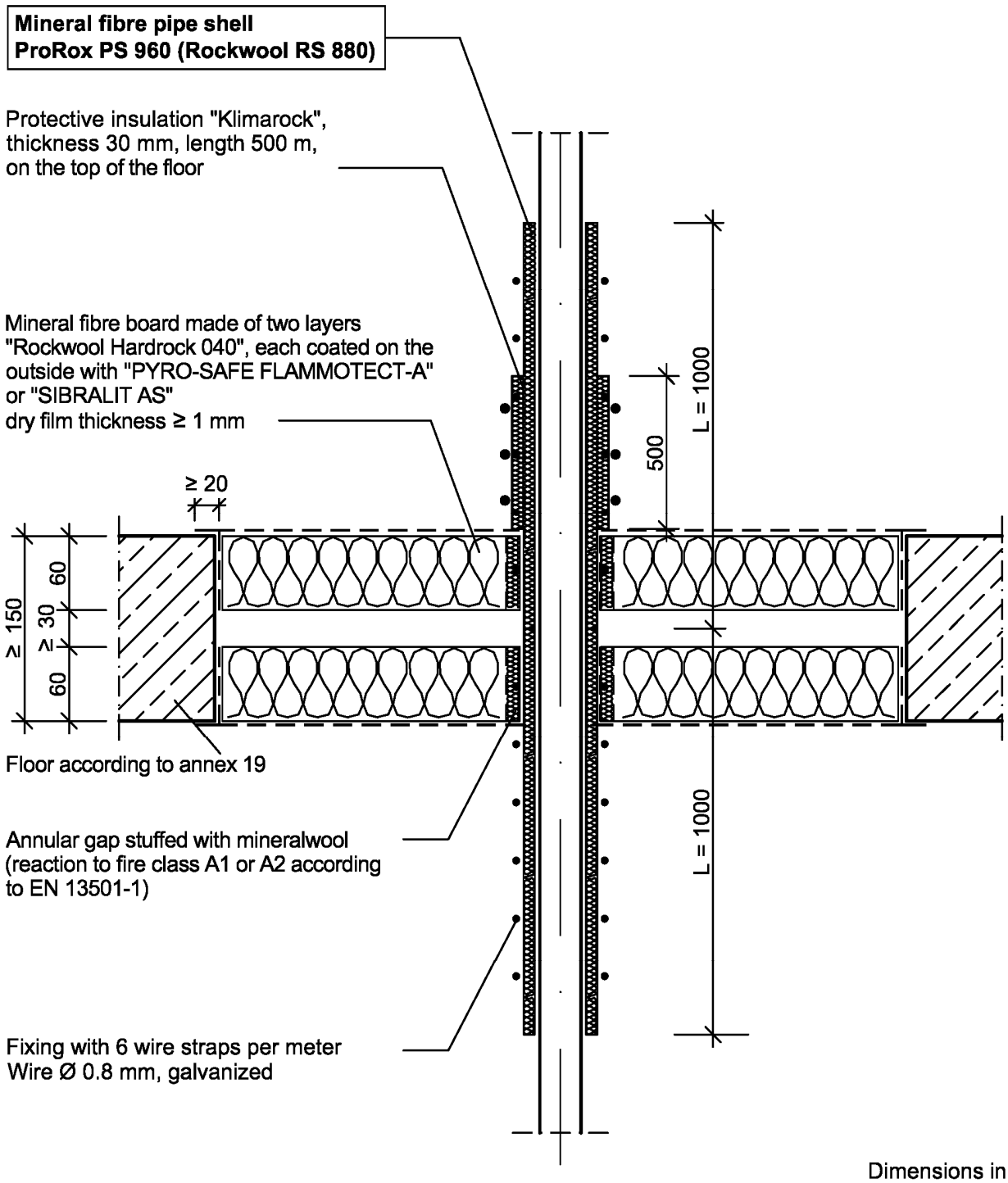
Section view: Measures on non-combustible pipes - with mineral fibre pipe shells "ProRox PS 960" (Rockwool"RS 880")



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 15
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for floor installation; Section view in the area of non-combustable pipes with mineral fibre pipe shells "ProRox PS 960"	

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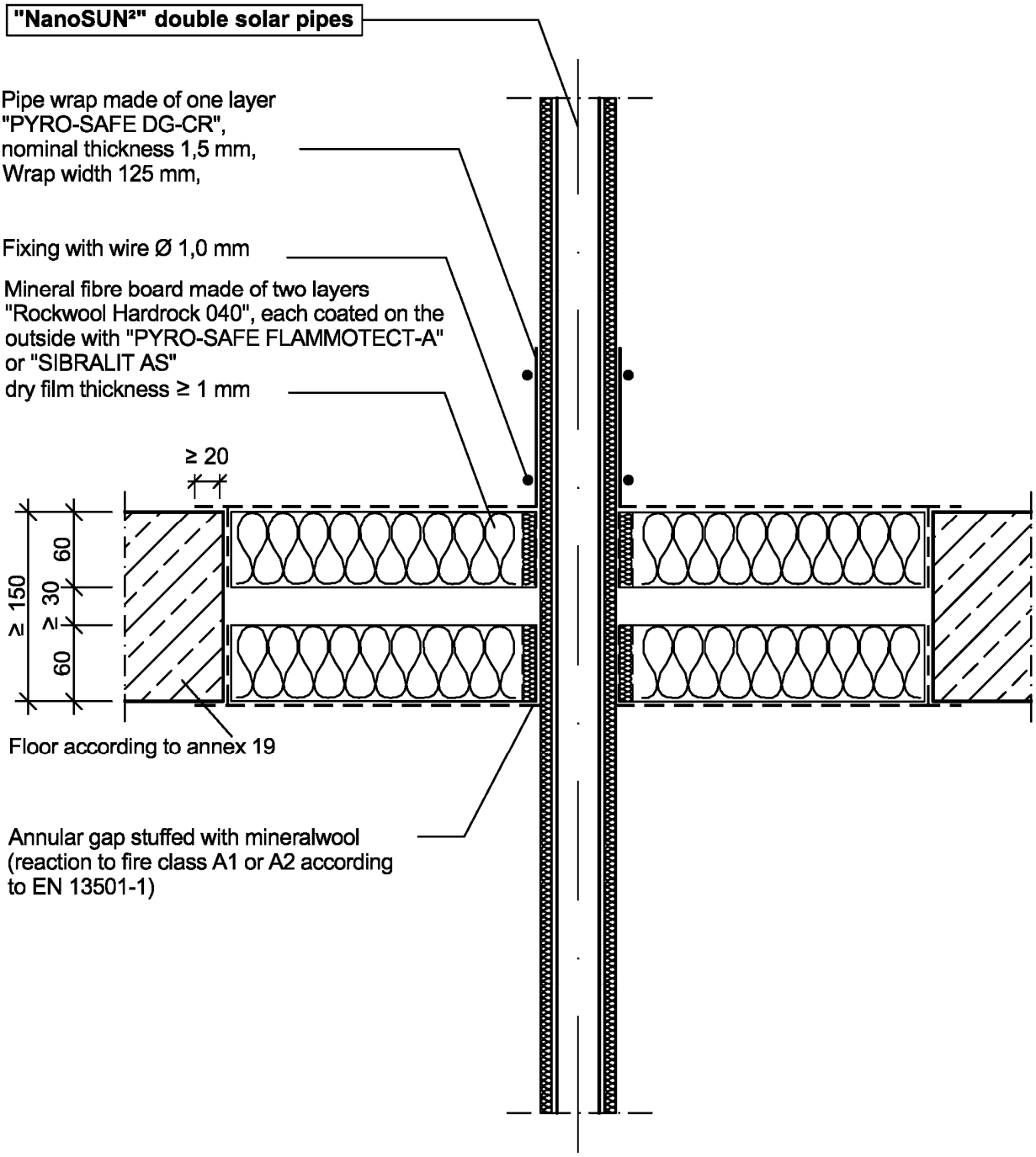
Section view: Measures on non-combustible pipes - "NanoSUN²" double solar pipes



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 16
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for floor installation; Section view in the area of non-combustable pipes "NaoSUN²"- double solar pipes	

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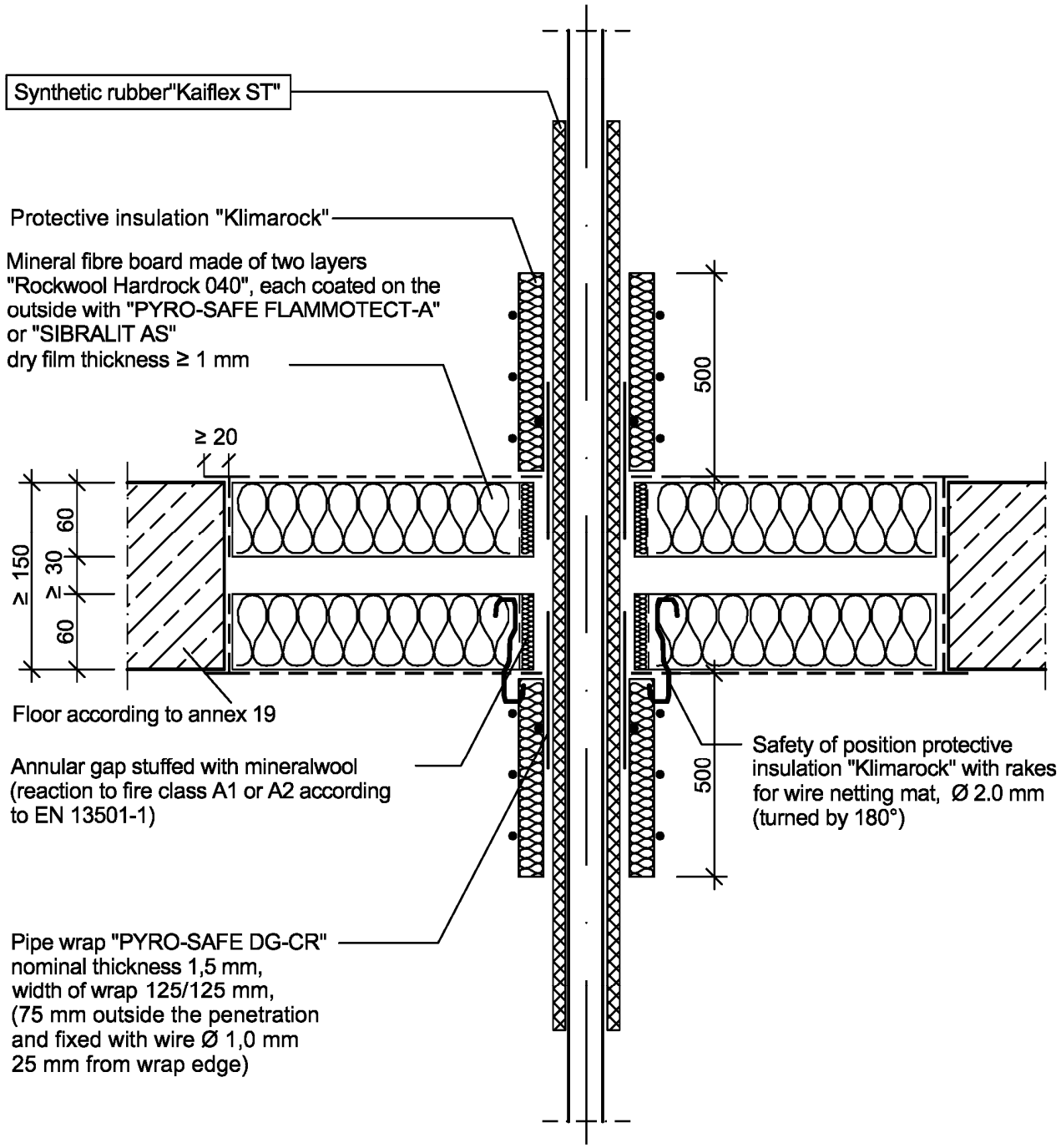
Section view: Measures on non-combustible pipes - with insulation "Kaiflex ST"



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"	Annex 17
APPENDIX 1 – DESCRIPRION OF THE PRODUCT Design of the mixed sealing system for floor installation; Section view in the area of non-combustable pipes with insulation Kaiflex ST"	

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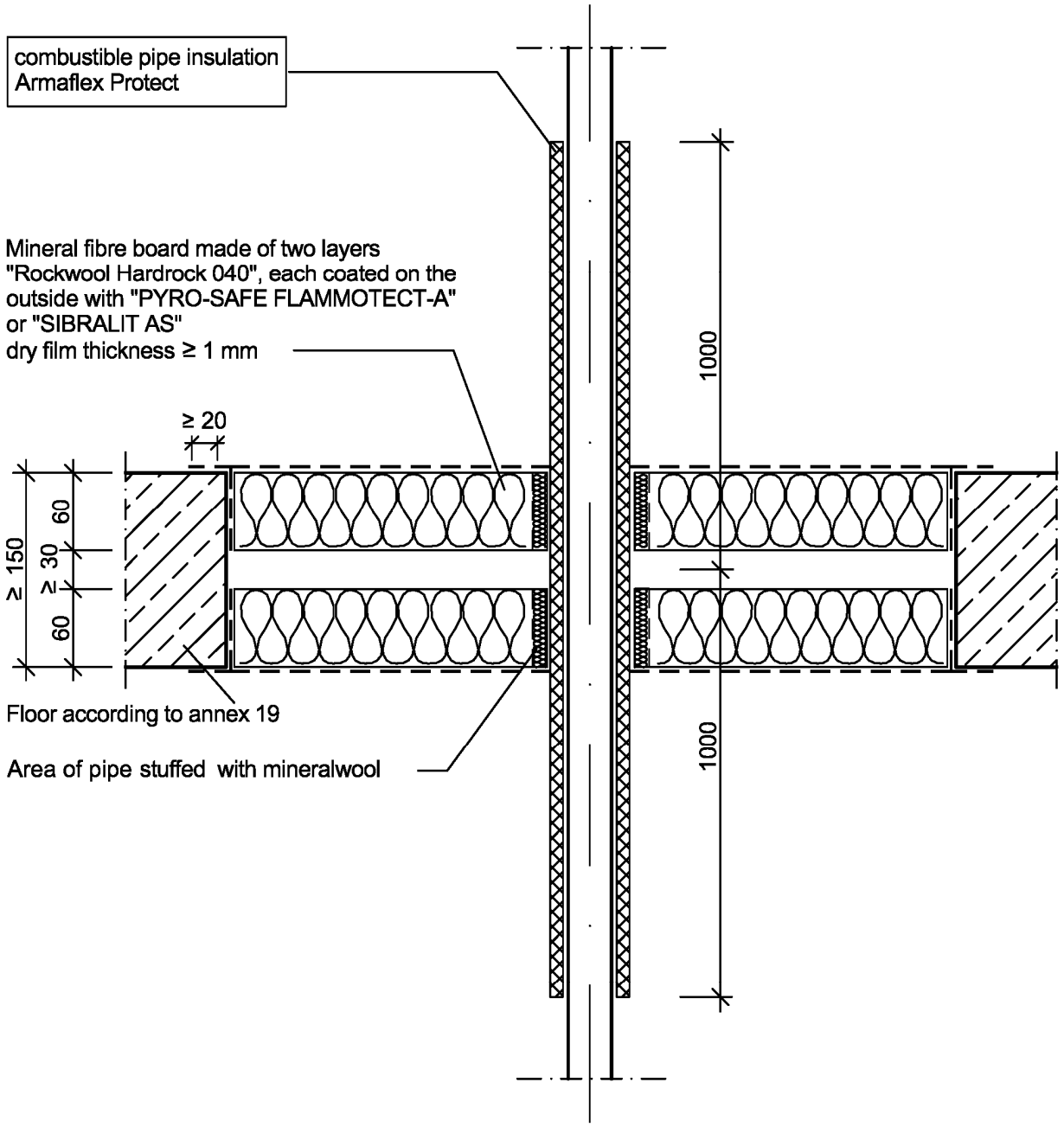
Section view: Measures on non-combustible pipes - with insulation "Armaflex Protect"



Dimensions in mm

"PYRO-SAFE Flammotect - Double layer"

Annex 18

APPENDIX 1 – DESCRIPRION OF THE PRODUCT
Design of the mixed sealing system for floor installation; Section view in the area of non-combustable pipes with insulation Armaflex Protect"

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The cable penetration seal may be used in

Rigid walls

- of masonry, concrete, reinforced concrete or aerated concrete
- density ≥ 630 kg/m³
- thickness ≥ 100 mm
- 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 cementations or gypsum based slabs with a fire reaction class A1 or A2 according to EN 13501-1.
- Wall posts and rails to be added to the post-and-beam structure so these will form the wall opening reveal for installation of the combination seal. The wall boarding shall be attached to these sheet-metal profiles in a suitable manner for the intended purpose.
- The opening reveal shall be protected as described below. 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 ≥ 100 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 ≥ 100 mm
- The walls shall be classified according to EN 13501-2 corresponding to the required fire resistance period.
- Protection for the opening reveal: An all-around reveal to be provided in the structural member opening (frame flush with the wall) that corresponds with the structure of the wall boarding (for walls without inside insulation) or at least consists of 2 x 12.5-mm thick cement- or gypsum-bonded building boards complying with fire reaction class A1 in accordance with EN 13501-1 (e. g. gypsum-fibre of calcium silicate boards) (for wall with inside insulation).

Rigid floors

- of masonry, concrete, reinforced concrete or aerated concrete
- density ≥ 630 kg/m³
- thickness ≥ 150 mm
- 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.

"PYRO-SAFE Flammotect - Double layer"	Annex 19
APPENDIX 2 – INTENDE USE Walls and floors	

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General

- The total permitted cross section of the installations (relative to the respective external dimensions; including cable support constructions) shall not exceed 60 % of the opening.
- The distances between the individual services and between the services and the opening reveals shall comply with the specifications in the Annexes 2 and 5, depending on the type of services.
- For wall application the distance from the first support on both sides of the penetration seal shall be
  - ≤ 150 mm for cables, cable support constructions and metal pipes
  - ≤ 500 mm for plastic pipes

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	➢ 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 ➢ ∅ ≤ 80 mm ➢ The cables may be grouped as layers and laid on cable support constructions ➢ 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 100 mm.
Cable support constructions	➢ Perforated or unperforated cable trays and cable ladders made of steel, with organic coatings if required (provided the overall fire reaction class complies with at least class A2 per EN 13501-1)
Plastic pipes	➢ **Pipe group A:** PE-HD pipes which comply with both EN 1519-1 and DIN 8074/8075 with dimensions (d_R, s) in accordance with Annex 21 and 23 ➢ **Pipe group B:** PVC-U pipes which comply with both EN 1452-1 and DIN 8061/8062 with dimensions (d_R, s) in accordance with Annex 21 and 23
Metal pipes	➢ Steel, stainless steel, cast iron or copper pipes and other metals whose heat transfer capacity is lower than that of steel or copper and with a melting point ≥ 842°C (EI 30), ≥ 945°C (EI 60) or ≥ 1006°C (EI 90) ➢ Pipe dimensions in accordance with Annex 21 to 23
Conduits	➢ Flexible or rigid conduit according to EN 61386 up to a diameter ∅ ≤ 63 mm ➢ Flexible and rigid conduits according to EN 61386-22 up to a diameter of 63 mm made from PE, PVC and Polyolefin and class 22322, 33412, 33532, 33532, 33541, 33411, 33521

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

"PYRO-SAFE Flammotect - Double layer"	Annex 20
APPENDIX 2 – INTENDE USE Overview installations	

Deutsches Institut für Bautechnik DIBt

Non flammable pipes with flammable insulation "Kaiflex ST", pipe wrap "PYRO-SAFE DG-CR", width of wrap 125/125 mm and protect insulation "Klimarock", Length ≥ 500 mm on each site of the seal						
Type of pipe	Pipe outer-diameter $Ø_A$ [mm]	Pipe wall thickness [mm]	Insulation thickness "Kaiflex ST" [mm]	Protect insulation "Klimarock" D x L 500 [mm]	Layer "PYRO-SAFE DG-CR"	Gloss
Copper, Steel, Stainless steel, Cast iron pipes	8,0	≥ 1,0 - 4,0	9 - 18	-	1	5, 6
	≤ 22,0	≥ 1,0 - 11,0	32	-	2	
	≤ 54,0	≥ 1,5 - 14,2	32	30	2	
	≤ 88,9	≥ 2,0 - 14,2	32	30	2	

Non flammable pipes with flammable insulation "Armaflex Protect", Length ≥ 1000 mm on each site of the seal				
Type of pipe	Pipe outer-diameter $Ø_A$ [mm]	Pipe wall thickness [mm]	Insulation thickness "Armaflex Protect" [mm]	Gloss
Copper, Steel, Stainless steel, Cast iron pipes	8,0	≥ 1,0 - 4,0	16	6
	≤ 22,0	≥ 1,0 - 11,0	20	
	≤ 35,0	≥ 1,5 - 14,2	25	

Plastic pipes with wraps of "PYRO-SAFE DG-CR", width of wrap each site ≥ 75 mm				
Type of pipe	Pipe diameter Ø [mm]	Pipe wall thickness [mm]	Layer "PYRO-SAFE DG-CR"	Gloss
PVC-U, PE 100	≤ 50	1,8 - 3,7 1,8 - 4,6	1	8
	≤ 63	1,9 - 4,2 2,1 - 5,3	2	
	≤ 75	2,2 - 4,7 2,3 - 5,7		
	≤ 90	2,3 - 5,2 2,7 - 6,3	3	
	≤ 110	2,6 - 5,7 3,0 - 7,3	4	
	≤ 125	2,8 - 6,4 3,3 - 7,9		
	≤ 140	2,8 - 6,8 3,7 - 8,2	5	
	≤ 160	3,2 - 7,7 4,0 - 9,5		

Special penetrations "NanoSUN²" double solar pipes with 1-layer pipe wrap "PYRO-SAFE DG-CR", length 125 mm				
	≥ DN 16 - DN 25		1	9

"PYRO-SAFE Flammotect - Double layer"

APPENDIX 2 – INTENDE USE
Overview pipes and insulations by installation in walls

Annex 21

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Non flammable pipes with non flammable insulation of mineral fibre-pipe shell "ProRox PS 960" (old RS 880) length ≥ 1000 mm from middle of the sealing to both sides, and an protect insulation on the top of the seal with "Klimarock"					
Type of pipe	Pipe outer-diameter $Ø_A$ [mm]	Pipe wall thickness [mm]	Thickness "ProRox PS 960" (RS 880) [mm]	Protect insulation "Klimarock" D x L 500 [mm]	Gloss
Steel, Stainless steel, Cast iron pipes	≥ 22,0 - 170,0	≥ 3,0 - 14,2	40	30	4
Copper, Steel, Stainless steel, Cast iron pipes	22,0	≥ 1,0 - 11,0			
	≤ 54,0	≥ 1,5 - 14,2			
	≤ 88,9	≥ 2,0 - 14,2			

Non flammable pipes with flammable insulation "Kaiflex ST", pipe wraps "PYRO-SAFE DG-CR" with wrap width 125/125 mm and protect insulation "Klimarock", length ≥ 500 mm each penetration side						
Type of pipe	Pipe outer-diameter $Ø_A$ [mm]	Pipe wall thickness [mm]	Thickness "Kaiflex ST" [mm]	Protect insulation "Klimarock" D x L 500 [mm]	Layer "PYRO-SAFE DG-CR", width 2 x 125 mm	Gloss
Copper, Steel, Stainless steel, Cast iron pipes	8,0	≥ 1,0 - 4,0	9 - 18	-	1	5, 6, 7
	22,0	≥ 1,0 - 11,0	9	30	2	
	54,0	≥ 1,5 - 14,2	9	30		
	88,9	≥ 2,0 - 14,2	9 - 32	30		
	54,0 - 90,0	≥ 2,0 - 14,2	9 - 32	30		

Non flammable pipes with flammable insulation "Armaflex Protect", length ≥ 1000 mm from middle of the seal				
Type of pipe	Pipe outer-diameter $Ø_A$ [mm]	Pipe wall thickness [mm]	Thickness "Armaflex Protect" [mm]	Gloss
Copper, Steel, Stainless steel, Cast iron pipes	8,0	≥ 1,0 - 4,0	16	6
	≤ 15,0	≥ 1,0 - 7,5	19	
	≤ 22,0	≥ 1,0 - 11,0	20	
	≤ 28,0	≥ 1,0 - 14,0	25	
	≤ 35,0	≥ 1,5 - 14,2	25	

"PYRO-SAFE Flammotect - Double layer"

APPENDIX 2 – INTENDE USE
Overview pipes and insulations by installation in floors

Annex 22

Deutsches Institut für Bautechnik DIBt

Plastic pipes with wraps of "PYRO-SAFE DG-CR", width of wrap 125 mm on each site (100 mm within sealing and 25 mm outside)				
Type of pipe	Pipe outer-diameter $Ø_A$ [mm]	Pipe wall thickness [mm]	Layer "PYRO-SAFE DG-CR" 125 mm breit	Gloss
PVC-U, PE 100	≤ 50	1,8 - 3,7	1	8
		1,8 - 4,6		
	≤ 63	1,9 - 4,2	2	
		2,1 - 5,3		
	≤ 75	2,2 - 4,7		
		2,3 - 5,7		
	≤ 90	2,3 - 5,2	3	
		2,7 - 6,3		
	≤ 110	2,6 - 5,7	4	
		3,0 - 7,3		
	≤ 125	2,8 - 6,4		
		3,3 - 7,9		
	≤ 140	2,8 - 6,8	5	
		3,7 - 8,2		
	≤ 160	3,2 - 7,7		
		4,0 - 9,5		

Special penetrations "NanoSUN^2" double solar pipes with 1-layer pipe wrapp "PYRO-SAFE DG-CR", length 125 mm		
Pipe diameter	Layer "PYRO-SAFE DG-CR" width 125 mm	Gloss
≥ DN 16 - DN 40	1	9

"PYRO-SAFE Flammotect - Double layer"

APPENDIX 2 – INTENDE USE
Overview pipes and insulations by installation in floors

Annex 23

Deutsches Institut für Bautechnik DIBt

Footers:

1 "PYRO-SAFE DG-CR" cable wrap, wrap width 200 mm, 2 layers plus 45 mm - 60 mm overlap

2 "PYRO-SAFE FLAMMOTECT-A" or "SIBRALIT AS" coating on the cables and cable systems: dry film thickness ≥ 2.0 mm in front of the penetration seal surface, decreasing to ≥ 1.0 mm along the cable/cable system length.

3 Mineral fibre boards coated with "PYRO-SAFE FLAMMOTECT-A" or "SIBRALIT AS": dry film thickness ≥ 2.0 mm

4 Fixed with Ø ≥ 0.8 mm steel wire, 6 fixing points/m, uniformly distributed; spaced ≈ 50 mm from ends. First pipe support to be provided ≤ 1,000 mm in front of the structural member opening.

5 "PYRO-SAFE DG-CR" pipe wrap, wrap width 125 mm (without overlap), projecting 75 mm from both structural member openings; fixed centrally in front of the structural member opening with Ø 1.0 mm steel wire.

6 Fixing of the inner insulation, thickness 13 mm, 6 fixing points/m. First pipe support to be provided ≤ 1,000 mm in front of the structural member opening.

7 "Klimarock" insulation to be connected with the seal surfaces for a flush fit; fixed with Ø 1.0 mm steel wire or steel strip.

8 The "PYRO-SAFE DG-CR" pipe wrap, wrap width 2 x 75 mm, shall project 25 mm from the penetration seal on both sides (wall installation) and be fixed once with Ø 1.0 mm steel wire or steel strip in front of the penetration seal. When installed in floors, the pipe wrap is 125 mm wide and only projects 25 mm from the member opening on the floor underside. First support for the plastic pipes to be provided ≤ 675 mm in front of the member opening.

9 When installed in walls, the wrap width shall be 125 mm plus ≥ 25 mm overlap on either side of the penetration seal. Wrap to be fixed ≈ 25 mm on both sides with Ø 1.0 mm steel wire or steel strip. When installed in floors, the wrap shall only be provided on the upper side of the floor penetration seal, and one wire fixture is sufficient. First pipe support to be provided ≤ 550 mm in front of the member opening

"PYRO-SAFE Flammotect - Double layer"	Annex 24
APPENDIX 2 – INTENDE USE Overview pipes and insulations by installation in floors - footers	

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1. General

1.1 Before installing the mixed 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 mineral fibre board plane

2.1 The mineral fibre boards shall be cut into individual pieces which shall be precisely and tightly installed into all openings between the installations and between the installations and the reveal of the opening. The mineral fibre board pieces shall be installed in two layers (each with a thickness of at least 60 mm) that with a thickness of 120 mm all openings are sealed as far as possible and the surface of the boards do not ride out of the surface of the wall no more than 10 mm (see Appendix 1). In the ceiling the mineral fibre boards should be arranged next to each other with a gap of at least 30 mm.

Up to 4 mm wide joints surrounding the pipes may remain unclosed.

2.2 After installing of the installations in the area of the mineral fibre boards according to section 3 to 7 all gaps, joints and pendentives (especially the ones between cables) have to be filled with mineral wool (fire behaviour class A1 or A2 according to EN 13501-1) to a depth of 60 mm or if the joint is smaller than 4 mm it has to be filled with the ablative material "PYRO-SAFE FLAMMOTECT-A" or "SIBRILAT AS". Cable bunches according to appendix 20 do not have to be filled inside with material.

2.3 The mineral fibre board plane shall be coated with an at least 1 mm thick layer (dry layer thickness) of "PYRO-SAFE FLAMMOTECT-A" bzw. "SIBRILAT AS" (see Annexes 4 to 7 and 10 to 18).

The transition area (butt joint) between the mineral fibre board plane and the adjacent building element shall be coated at least 1 mm thick (dry layer thickness) with "PYRO-SAFE FLAMMOTECT-A" or "SIBRILAT AS" respectively so that the layer extends at least 20 mm beyond the mineral fibre board plane (on the component reveal or the component surface) (see Annexes 4 to 7 and 10 to 18).

3. Measures on cables and cable support constructions

3.1 Variant 1

The cables and cable support constructions have to be wrapped twice on both sides of the mineral fibre board surface with a cable winding consisting of the material "PYRO-SAFE DG-CR" (nominal thickness: 1.5 mm, winding width: 200 mm). Remaining gaps and joints have to be spackled with the material "PYRO-SAFE FLAMMOTECT-A" or "SIBRILAT AS" or to be filled with mineral wool (see Annex 4, 10 and 11).

3.2 Variant 2

Cables with a diameter equal or less then 21 mm or cable bunches according to Annex 20 have to be provided with a sealing with a thickness of at least 2.0 mm (dry layer thickness) consisting of "PYRO-SAFE FLAMMOTECT-A" or "SIBRILAT AS" (see Annex 1) and be flanked on both sides to the mineral fibre board surface. The length of the sealing has to be at least 230 mm if build in a wall and 250 mm if build in the ceiling (see Annex 4 and 11). Cables with a diameter between 21 mm and 80 mm and cable support constructions have to be provided with an 2.0 mm sealing (dry layer thickness).

4. Measures on Conduits

The conduits are – on both sides of the floor respectively to contain into the mineral fibre boards – with cable wraps from the material "PYRO-SAFE DG-CR" (nominal thickness 1,5 mm, winding width 125 mm) three layer to wrap so that the wrap each 75 mm wide extend out of the plate. The wraps are secured with wire or metal band (see annex 13 and 20)

5. Measures on plastic pipes

Going through the mineral fiber boards are the combustible pipes wrapped with "PYRO-SAFE DG-CR" in accordance with annex 21 and 23. The wraps by passing through floors shall be affixed by wire on the

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underside of the mineral fibre board and by passing through walls shall be affixed by wire on each side of the mineral fibre boards in according to annex 5 and 14.

6. Measures on metal pipes

6.1 Variant 1: Section Insulation with "Armaflex Protect"

On the metal pipes are continuous, at least 1000 mm long (measured form the middle of the penetration) section insulation (case "LS" according to EN 1366-3) form "Armaflex Protect" to arrange. The thickness of the insulation must- depending on the pipe size and the type of component- has to in according to annexes 21 to 23. The insulation shall be equal on both sides beyond the mineral fibre board plane overlap (see annexes 7 and 18).

6.2 Variant 2: Section Insulation with "Kaiflex ST"

On the metal pipes are continuous, at least 1000 mm long (measured form the middle of the penetration) section insulation (case "LS" according to EN 1366-3) form "Kaiflex" to arrange. The thickness of the insulation must – depending on the pipe size and the type of component – have to in according to annex 21 and 22.

Metal pipes with contained section insulations – on both sides of the floor respectively to contain into the mineral fibre boards – with pipe wraps from the material "PYRO-SAFE DG-CR" (nominal thickness 1,5 mm winding width and the complement of layers in according to annex 21 and 22 depending of the dimensions of the pipes and the components) to be wrapped so that the wrap each 75 mm wide extend out of the plate. The wraps shall be affixed by wire (diameter 1.0 mm) or metal band. At least the insulations are to be designed by insulation "Klimarock" in according to annex 1 (dimensions in according to annex 22, depending of the dimensions of the pipes and the components. On both sides of the component on the surface of the mineral fibre board the pushed insulation shall be affixed by wire (diameter 1.0 mm) or metal band (see annex 7 and 17). By installation in floors the insulation "Klimarock" is on the top of the mineral fibre boards in addition with wire mesh mat hook to be affixed against slipping.

6.3 Variant 3: Section Insulation with mineral fibre for installation in floors

By installation of metal pipes in floors is to arrange a continuous at least 1000 mm long (measured from the middle of the penetration) section insulation (case "LS" according to EN 1366-3) from "ProRox PS 960" (old name "RS 880") in according to annex 1. The thickness of the insulation must – depending on the pipe size and the type of component – has to in according to annex 15 and 22. By installation in floors the insulation is to be affixed with wire loop (diameter ≥ 0.8 mm).

At least over the section insulation is to arrange insulation with "Klimarock" in according to annex 22 (dimensions in according to annex 22, depends of the dimensions of the pipes). The insulation shall be affixed with wire mesh mat hooks (in according to annex 15) against slipping.

7. Measures on "NanoSUN" pipes

On both sides on the mineral fibre boards special pipes are pushed by installation in walls and the on one side on the top of the mineral fibre boards pushed special pipes by installation in floors are to be wrapped by a one layer of "PYRO-SAFE DG-CR" (see annex 1). The endings of the insulation shall to be affixed by wire (diameter ≥ 1.0 mm) or metal band. On top of the penetration seal in floors shall be just on fixing.

8. Refitting of individual cables

By having exact drilled holes through the mineral fiber boards, cables can be refit ≤ 21 mm in the area of the cable wraps without extra sealing measures. In floor installations are light plastic sheathed cables ≤ 14.4 mm with a maximum of five cable veins ≤ 1.5 mm² and holes drilled to match the exact size for the cables to pass through the mineral fiber boards in which the single layer cable wrap plus 10 to 15 mm overlaps, ≥ 125 mm in width. Only the upper side of the mineral fiber board touches to wrap around the cable. The ends of the cable wraps are to be affixed with stainless steel wire on both sides at intervals of 25 mm. The same procedure can be used on the lower side of the penetration seal for cables ≤ 21 mm (see annex 12).

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CE XXXX	"CE"-Zeichen / "CE" marking Identifizierungsnummer der notifizierten Stelle (für Konformitätsbescheinigungssystem 1) / Identification number of notified certification body
svt Brandschutz Vertriebsgesellschaft mbH International 21217 Seevetal GERMANY	Name und Anschrift des Herstellers oder seines autorisierten Vertreters (verantwortliche juristische Person) / Name and address of the producer (legal entity responsible for the manufacturer)
xx	Die letzten beiden Ziffern des Jahres, in dem die CE-Kennzeichnung angebracht wurde / Two last digits of year of affixing CE marking
XXXX-CPD-XXXX	Nummer des EG-Konformitätszertifikats / Number of EC certificate of conformity
ETA-0903	Nummer der ETA / ETA number
ETAG 026 – Teil 2 / Part 2	Nummer der Leitlinie / ETAG number
Kombiabschottung / Mixed Penetration Seal "PYRO-SAFE Flammotect"	Produktbezeichnung (Handelsname) / Designation of the product (trade name)
Ablative und dämmschichtbildende Komponente / ablative and intumesscent component "PYRO-SAFE FLAMMO-TECT-A" or "SIBRILAT AS" and "PYRO-SAFE DG-CR"	Produktbezeichnung der Komponente (Handelsname) / Designation of the component (trade name)
Nutzungskategorie / use category X	Nutzungskategorie / use category

Für weitere relevante Produktmerkmale (z. B. Feuerwiderstandsklasse, Abgabe gefährlicher Stoffe) s. ETA-0903 / See ETA-0903 for other relevant characteristics (i. e. fire resistance class, dangerous substances)

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APPENDIX 4 – Installation of the penetration seal Example for CE- markering and ancillary informations	

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Abbreveations

FWKL: 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.

LTW: flexible wall according to annex 19

MW: rigid wall according to annex 19

D: rigid floor according to annex 19

d_W: wall thickness

d_D: floor thickness

d_A: outer pipe diameter (nominal diameter according to the standards)

d_i: thickness of the local insulation

s: pipe wall thickness (nominal value according to the standards)

∅: external diameter

U/U: pipe end configuration "uncapped/uncapped" (on both sides open pipe ends in the fire test)

U/C: pipe end configuration "uncapped/capped" (on the fire side open pipe ends and on the cold side capped pipe ends in the fire test)

Standards

EN 13501-2:2010-02	Fire classification of construction products and building elements – Part 2: Classification using test data from resistance to fire tests, excluding ventilation services
EN 13501-1:2007	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests
prEN 1366-3:2007-07	Document from CEN TC 127 for formal vote (document N 185); title see EN 1366-3:2009-07
EN 1366-3:2009-07	Fire resistance tests for service installations – Part 3: Penetration seals
EN 13162:2008	Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specification

Other documents

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