

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-14/0418**  
**of 4 December 2014**

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Trade name of the construction product

Product family  
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment  
contains

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

Deutsches Institut für Bautechnik

"PYRO-SAFE FLAMMOTECT-A"

Ablative fire stopping product used in penetration seals

svt Brandschutz  
Vertriebsgesellschaft mbH International  
Glüsinger Straße 86  
21217 Seevetal  
DEUTSCHLAND

svt Brandschutz Vertriebsgesellschaft mbH International  
Glüsinger Straße 86  
21217 Seevetal  
DEUTSCHLAND

38 pages including 33 annexes which form an integral part  
of this assessment

Guideline for European technical approval of "Fire  
Stopping and Fire Sealing Products", ETAG 026 Part 2:  
"Penetration Seals",  
used as European Assessment Document (EAD)  
according to Article 66 Paragraph 3 of Regulation (EU)  
No 305/2011.

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment into other languages shall fully correspond to the originally issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission according to Article 25 Paragraph 3 of Regulation (EU) No 305/2011.

## Specific Part

### 1 Technical description of the product

The construction product "PYRO-SAFE FLAMMOTECT-A" is an ablative coating material. It is delivered as liquids of white or grey colour and form on the surfaces to be protected layers which, when exposed to fire, consume energy or release matter through chemical or physical processes. In the process, they remain sufficiently stable and prevent the passage of heat, flame and/or smoke.

Detailed specifications for identification and performance criteria relevant for fire safety with regard to the construction products are given in Annex 1.

#### NOTE:

The characteristics listed can serve both for identifying the construction products as well as for performing the manufacturer's factory production control.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document

The construction products "PYRO-SAFE FLAMMOTECT-A" is intended for use as components with a fire protection effect in building elements, assembled systems or constructions that are subject to requirements related to fire protection. Their reactive effect prevents heat transmission and fire spreading in the event of fire.

Within the scope of this ETA, the fire resistance was demonstrated for mixed or cable penetration seals which consisted of the components listed in table 1. Mixed or cable penetration seals are used to seal off openings in fire resistant walls or floors, which are penetrated by cables and/or pipes, and serves to preserve the walls' or floors' fire resistance in the area of the penetrations.

Table 1 – components of the verified penetration seals

Product type	Trade name
Ablative coating	PYRO-SAFE FLAMMOTECT-A
Mineral fibreboards	Hardrock 040
Mineral fibre mats	KLIMAROCK
Mineral fibre pipe shells	ProRox PS 960
Intumescent material in mat form	PYRO-SAFE DG-CR
Mineral wool, loose stone wool	ProRox LF 970

Detailed information and data on the verified penetration seals are given in Annexes 2 to 33. The performances given in Section 3 exclusively relate to this penetration seals (e.g. with respect to the design and arrangement of the components of the penetration seals and the type and position of the services).

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of at least 10 years for "PYRO-SAFE FLAMMOTECT-A". The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.

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

#### 3.1 Intended use: use in penetration seals

Product type: "PYRO-SAFE FLAMMOTECT-A"		
BWR	Essential characteristic	Performance
2	Reaction to fire	Class E in accordance with EN 13501-1
	Fire resistance of a penetration seal (with mineral wool; see Annexes 1 and 17 to 22 for details) that incorporates the product <sup>1,2</sup>	Class EI 30 in accordance with EN 13501-2
	Fire resistance of a penetration seal (with mineral fibre board single-layer; see Annexes 1 and 2 for details) that incorporates the product <sup>1,2</sup>	Class EI 60 in accordance with EN 13501-2
	Fire resistance of a penetration seal (with mineral wool; see Annexes 1 and 23 to 27 for details) that incorporates the product <sup>1,2</sup>	Class EI 60 in accordance with EN 13501-2
	Fire resistance of a penetration seal (with mineral wool; see Annexes 1 and 28 to 32 for details) that incorporates the product <sup>1,2</sup>	Class EI 90 in accordance with EN 13501-2
	Fire resistance of a penetration seal (without mineral wool; see Annexes 1 and 33 for details) that incorporates the product <sup>1,2</sup>	Class EI 90 in accordance with EN 13501-2
	Fire resistance of a penetration seal (with mineral fibre boards double-layer; see Annexes 1 and 7 to 11 for details) that incorporates the product <sup>1,2</sup>	Class EI 120 in accordance with EN 13501-2
	Fire resistance of a penetration seal (with mineral fibre boards quadruple-layer; see Annexes 1 and 12 to 16 for details) that incorporates the product <sup>1,2</sup>	Class EI 240 in accordance with EN 13501-2
3	Release of dangerous substances	No dangerous substances <sup>3</sup>

#### 3.2 General aspects

The verification of durability is part of testing the essential characteristics. The ablative coating "PYRO-SAFE FLAMMOTECT-A" may be used in end-use applications according to the provisions for use category X (external use) without expecting significant changes of the characteristics relevant for fire protection.

If the ablative coating according to this ETA is to be exposed to specific stresses, further tests are necessary.

<sup>1</sup> The fire resistance depends on the construction/installation of the penetration seal and on the other components incorporated in the penetration seal. Details on penetration seals for which the fire resistance indicated was demonstrated are given in Annex 1.

<sup>2</sup> Technical provisions of the Member States relating to the execution of electrical cable systems and the admissibility of cable penetrations remain unaffected.

<sup>3</sup> According to the manufacturer's indications and the chemical composition deposited with DIBt

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

According to Commission Decision of 22 June 1999 (1999/454/EC) (OJ L 178 of 14 July 1999, p. 42), as amended by Commission Decision of 8 January 2001 (2001/596/EC) (OJ L 209 of 2 August 2001, p. 33), the system of assessment and verification of constancy of performance (see Annex V in conjunction with Article 65 Paragraph 2 of Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class (Resistance to fire)	System
Fire stopping and fire sealing products	for fire compartmentation (use in penetration seals)	any	1

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 4 December 2014 by Deutsches Institut für Bautechnik

Prof. Gunter Hoppe  
Head of Department

*beglaubigt:*

Lange



**Properties and Performance of components of the construction product "PYRO-SAFE FLAMMOTECT-A"**

	Properties	Parameter	test method
1	Density	1410 g/l $\pm$ 70 g/l	EN ISO 2811-1
2	Nonvolatile components	66,0 % to 86,0%	EN ISO 3251
3	Weight loss due heating	38,0 % to 48,0 %	EN ISO 3451-1/EOTA TR 24 (2009) on 400°C over 30 Minutes
4	LOI	55,0 % $\pm$ 3 %	ISO 4589 Sample thickness appr. 1,5 mm
5	Coating flexibility	$\geq$ 5 mm	EN ISO 1519 Sample thickness appr. 1,5 mm
6	Fire behavior	Class E	EN ISO 11925-2

The properties listed can be used both for identifying the construction products as well as for the implementation of the factory production control by the manufacturer.

Implementation details for the factory production control are included in the protocol.

**Description of additional tested components of the penetration seal**

Description / Manufacturer	Description
"PYRO-SAFE DG-CR" svt Brandschutz Vertriebsgesellschaft mbH International 21217 Seewetal GERMANY	<b>intumescent material</b> in mat form in accordance with ETA-13/0100: Class of Fire behavior in accordance with DIN EN 13501-1: Class E
"Hardrock 040" ("Hardrock II") Deutsche Rockwool Mineralwoll GmbH 45966 Gladbeck GERMANY	<b>mineral fibre board</b> in accordance with DIN EN 13162 thickness $\geq$ 60 mm density 150 kg/m <sup>3</sup> Class of Fire behavior in accordance with EN 13501-1: Class A1
"ProRox PS 960" (RS 880) Deutsche Rockwool Mineralwoll GmbH 45966 Gladbeck GERMANY	<b>pipe shell</b> of concentrically wrapped rockwool – unbacked in accordance with EN 14303 density: 100 kg/m <sup>3</sup> - 120 kg/m <sup>3</sup> Class of Fire behavior in accordance with EN 13501-1: Class A1 <sub>L</sub>
"Klimarock" Deutsche Rockwool Mineralwoll GmbH 45966 Gladbeck GERMANY	<b>rockwool</b> with grid strengthened and aluminium foil according to the general building supervisory board approval Z-23.14-1115 density: 40 kg/m <sup>3</sup> - 50 kg/m <sup>3</sup> Class of Fire behavior in accordance with EN 13501-1: Class A2 <sub>L</sub> - s1,d0; thickness: 30 mm
"ProRox LF 970" Deutsche Rockwool Mineralwoll GmbH 45966 Gladbeck GERMANY	<b>mineral wool</b> , loose, in accordance with EN 14303 density: 100 kg/m <sup>3</sup> Class of Fire behavior in accordance with EN 13501-1: Class A1

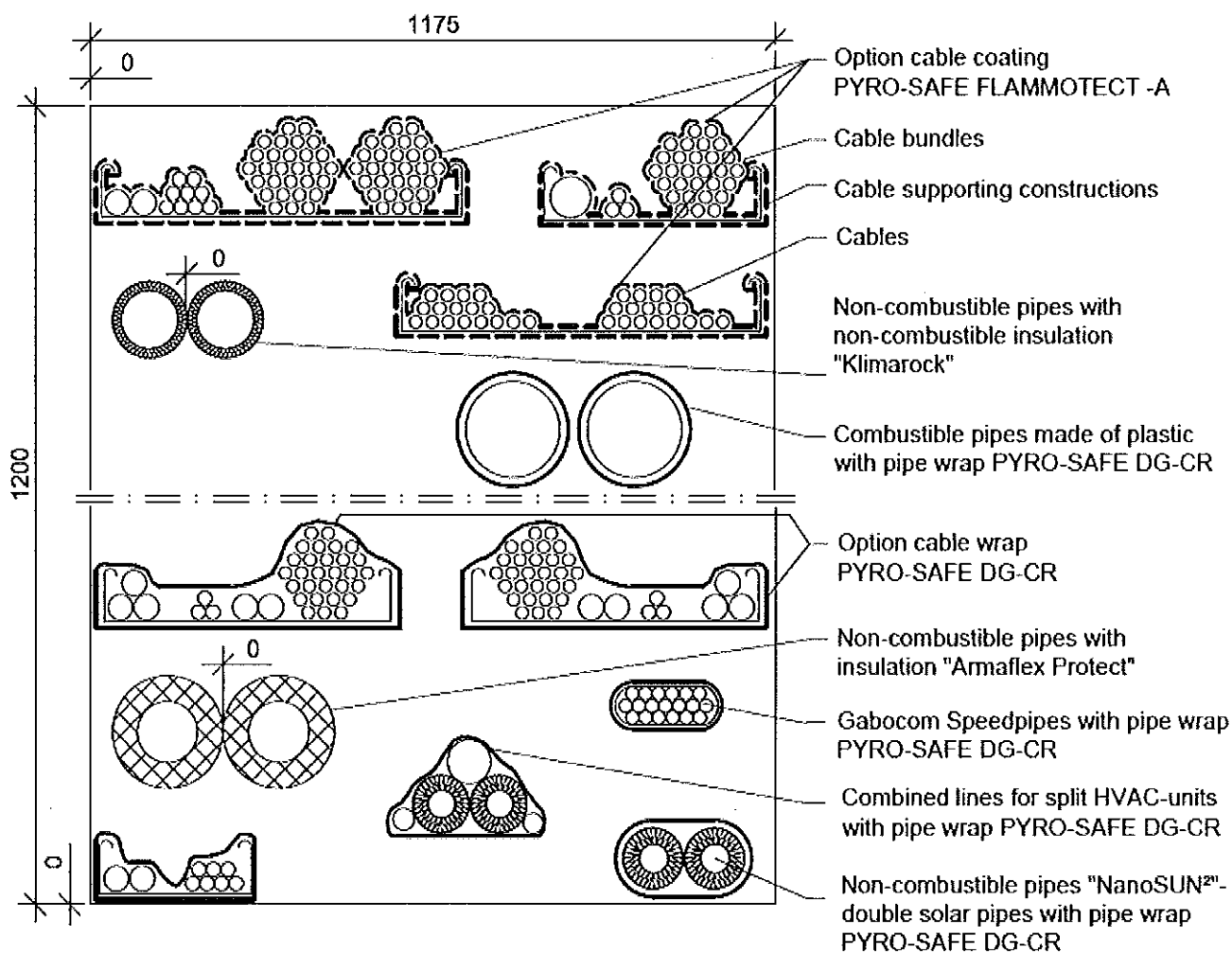
"PYRO-SAFE FLAMMOTECT-A"

Description of the construction products, properties and performances

Annex 1

Mixed penetration seal "PYRO-SAFE Flammotect" - Single layer

Details of the installation - see table annex 6



**Note:** Drawing of mixed penetration seal is allegorized.

Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal,

Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

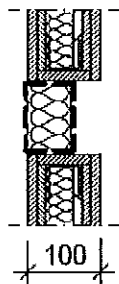
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 60  
Use as part of a mixed penetration seal with one layer of mineral fibre board;  
Wall installation - section view

Annex 2

# Mixed penetration seal "PYRO-SAFE Flammotect" - Single layer

## Arrangement:



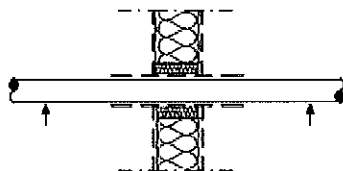
## Measures at passing through installations:

### Details of the installation - see table annex 6

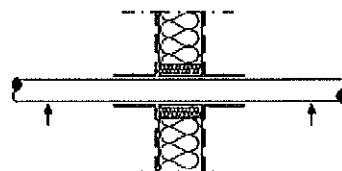
## Legend

- flexible wall
- Mineral fibre board  
Rockwool Hardrock 040, t = 60 mm
- Ablative coating  
PYRO-SAFE FLAMMOTECT-A
- Cable or pipe wrap  
PYRO-SAFE DG-CR
- First support
- Mineral wool stuffing  
(non-combustible) or sealing  
with PYRO-SAFE FLAMMOTECT-A
- Local sustained insulation made  
of "Klimarock"
- if necessary protective insulation  
made of "Klimarock"
- Synthetic rubber insulation  
"Armaflex Protect"

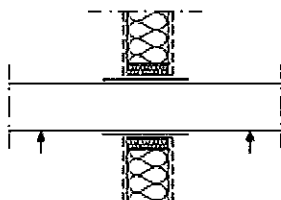
### Cables, cable supporting constructions



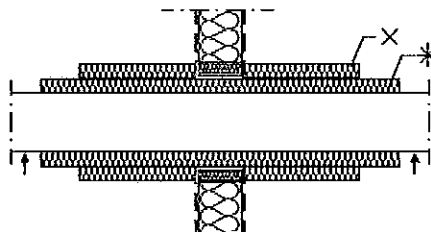
### Cables, cable supporting constructions



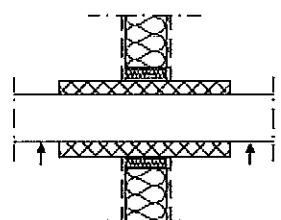
### Combustible pipe



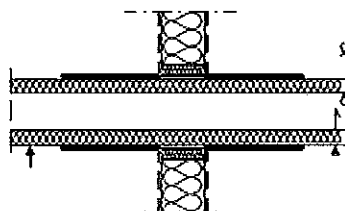
### Non-combustible pipe



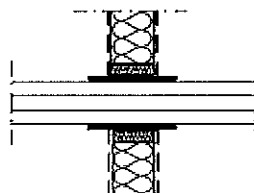
### Non-combustible pipe



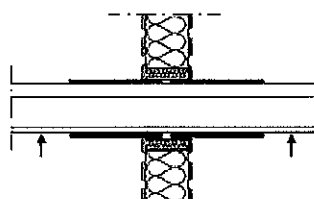
### "NanoSUN" - double solar pipe



### Speedpipes



### Combined lines for split HVAC-units



Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

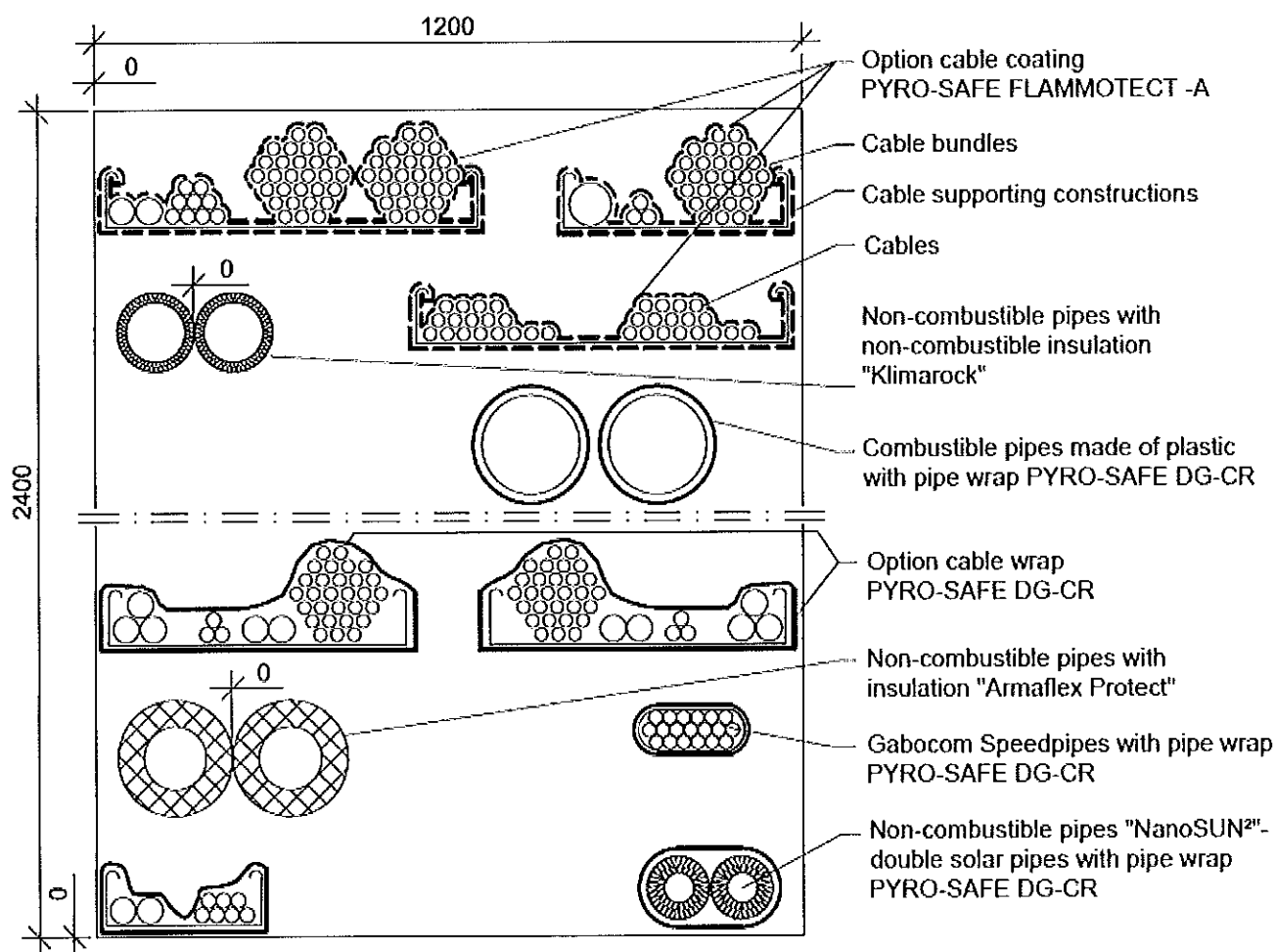
Detailed information for the confirmation of fire resistance EI 60  
Use as part of a mixed penetration seal with one layer of mineral fibre board;  
Floor installation - view

Annex 3



Mixed penetration seal "PYRO-SAFE Flammotect" - Single layer

Details of the installation - see table annex 6



**Note:** Drawing of mixed penetration seal is allegorized.

Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal,

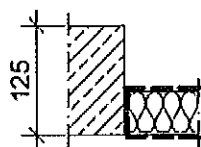
Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"	Annex 4
Detailed information for the confirmation of fire resistance EI 60 Use as part of a mixed penetration seal with one layer of mineral fibre board; Floor installation - section view	

# Mixed penetration seal "PYRO-SAFE Flammotect" - Single layer

## Arrangement:



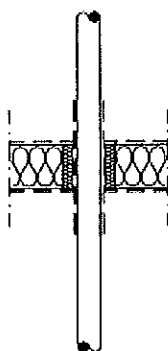
## Measures at passing through installations:

Details of the installation - see table annex 6

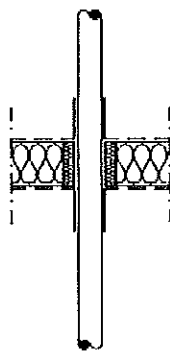
## Legend

- Rigid floor
- Mineral fibre board  
Rockwool Hardrock 040, t = 60 mm
- Ablative coating  
PYRO-SAFE FLAMMOTECT-A
- Cable or pipe wrap  
PYRO-SAFE DG-CR
- Mineral wool stuffing  
(non-combustible) or sealing  
with PYRO-SAFE FLAMMOTECT-A
- Local sustained insulation  
made of "Klimarock"
- if necessary protective insulation  
made of "Klimarock"
- Synthetic rubber insulation  
"Armaflex Protect"

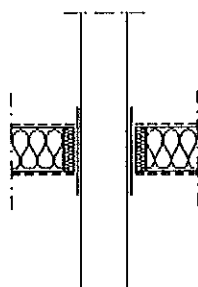
Cables, cable supporting constructions



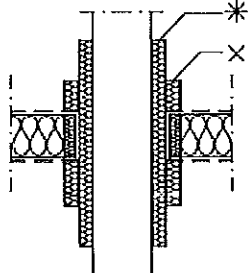
Cables, cable supporting constructions



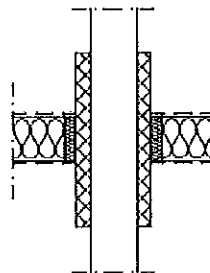
Combustible pipe



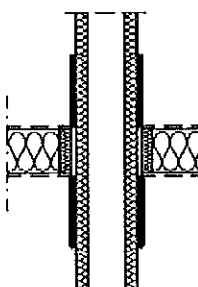
Non-combustible pipe



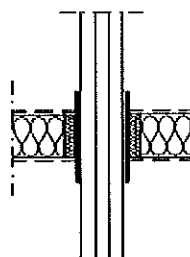
Non-combustible pipe



"NanoSUN" - double solar pipe



Speedpipes



Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 60  
Use as part of a mixed penetration seal with one layer of mineral fibre boards;  
Description of the passing through installations

Annex 5

Mixed penetration seal "PYRO-SAFE Flammotect" - Single layer

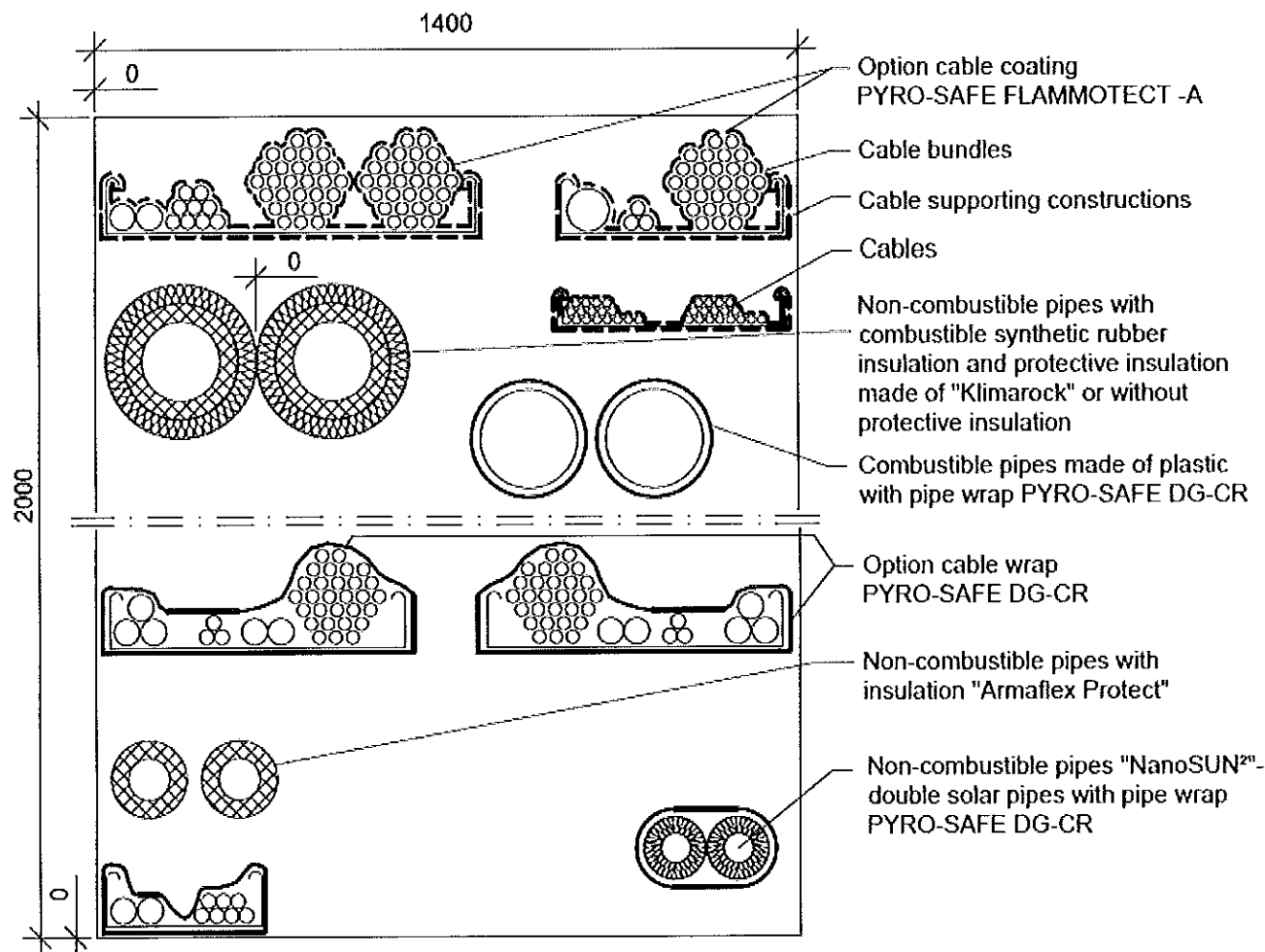
Scope	Type of installation	Short description
Flexible wall	Combined lines for split HVAC-units ("Tubolit DuoSplit", "Tubolit Split" produced by Armaceil Enterprise GmbH & Co. KG)	consisting of up to two copper pipes (U/U) with pipe insulation made of PE foam according to EN 14313, plastic pipes made of PVC-U according to EN 1329-1: 2004; DIN 8061/DIN 8062: 2009 (U/U) and two accompanying cables with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Non-combustible pipes with non-combustible insulation made of mineral fibre  (Local insulation case LS according to EN 1366-3:2009-07)	Pipes made of copper or steel up to 3 pipes (C/U) with non-combustible pipe insulation made of "Klimarock" (mineral fibre mat) according to EN 14303: 2009 + A1: 2013
Flexible wall or floor	Cable	Cables and cable bundles according to EN 1366-3: 2009-7 with "PYRO-SAFE FLAMMOTECT-A" (ablative coating) or with cable wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Cable supporting constructions	Perforated or non-perforated cable trays and ladders made of steel
	Combustible pipes made of plastic	Pipes made of PE-HD according to EN 1519-1:1999 and DIN 8074/ DIN 8075:2011, PVC-U according to EN 13291-1:2014; DIN 8061/ DIN 8062:2009, (U/U) with pipe wrap "PYRO-SAFE DG-CR"
	Non-combustible pipes with non-combustible insulation made of mineral fibre  (Local insulation case LS according to EN 1366-3:2009-07)	Pipes made of copper or steel (C/U) with non-combustible insulation made of "Klimarock" and if necessary additional protective insulation made of "Klimarock" according to EN 14303:2009 + A1:2013
	Non-combustible pipes with insulation "Armaflex Protect" produced by Armacell GmbH  (Local insulation case LS according to EN 1366-3:2009-07)	Pipes made of copper or steel (C/U)
	"NanoSUN"- double or single solar pipes produced by Aktarus Group SRL	Special pipes consisting of non-combustible pipes (U/U) with pre-assembled local sustained insulation and integrated accompanying cable, with pipe wrap "PYRO-SAFE DG-CR"
	"speed pipe®"- systems: pipe bundles "SRV 50", "SRV-i 50", Single pipes "speed pipe® ground", "speed pipe® indoor" produced by gabo Systemtechnik GmbH	Special installation pipe bundles or single pipes made of PE-HD according to EN 1519-1: 1999 and DIN 8074 / DIN 8075: 2011, with or without micro-and fibre optic cables with pipe wrap "PYRO-SAFE DG-CR"

Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"	Annex 6
Detailed information for the confirmation of fire resistance EI 60 Use as part of a mixed penetration seal with one layer of mineral fibre boards; Description of the passing through installations	

Mixed penetration seal "PYRO-SAFE Flammotect" - Double layer

Details of the installation - see table annex 11



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of  
penetration seal,  
Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

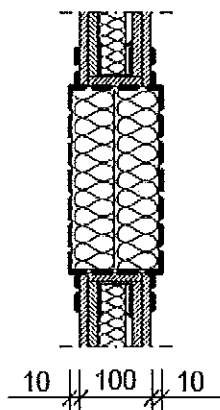
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 120  
Use as part of a mixed penetration seal with two layers of mineral fibre board;  
Wall installation - view









Annex 7

# Mixed penetration seal "PYRO-SAFE Flammotect" - Double layer

## Arrangement:



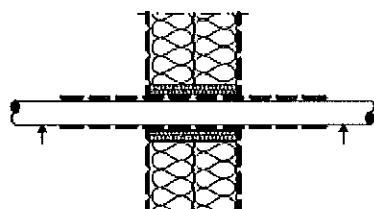
## Legend

-  flexible wall
-  Mineral fibre board  
Rockwool Hardrock 040, t = 60 mm
-  Ablative coating  
PYRO-SAFE FLAMMOTECT-A
-  Cable or pipe wrap  
PYRO-SAFE DG-CR
-  First support
-  Mineral wool stuffing  
(non-combustible) or sealing  
with PYRO-SAFE FLAMMOTECT-A
-  protective insulation made of  
"Klimarock"
-  Synthetic rubber insulation  
(combustible)

## Measures at passing through installations:

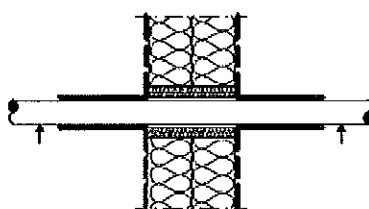
Details of the installation - see table annex 11

Cables, cable supporting constructions



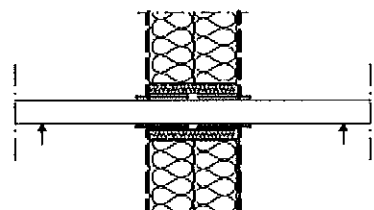
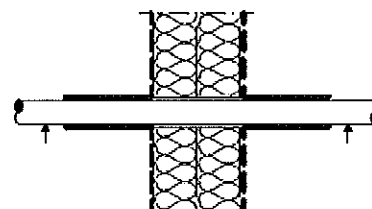
Combustible pipe

Cables, cable supporting constructions

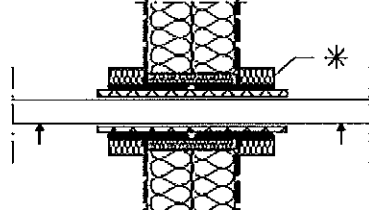


Non-combustible pipe

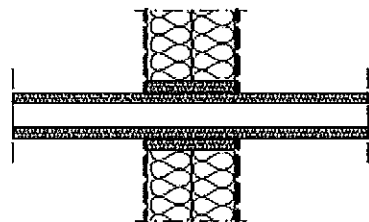
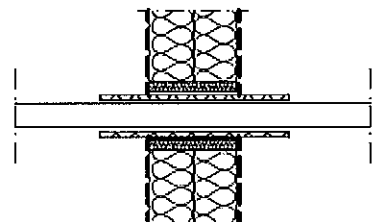
Cables subsequent installed through boreholes in area of existing cable wrap



Non-combustible pipe



"NanoSUN™" - double solar pipe



Construction details see installation instructions  
dimensions in mm

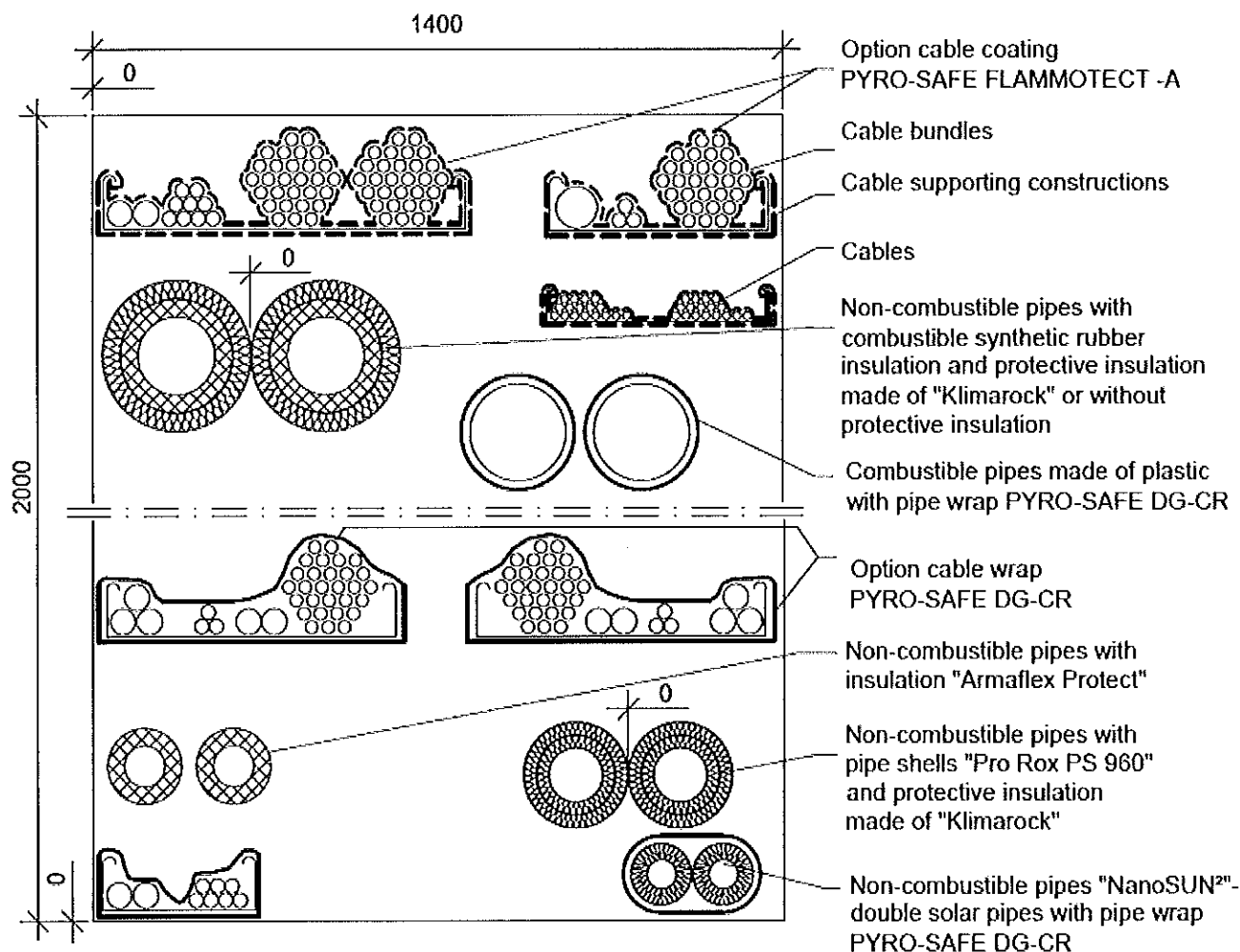
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 120  
Use as part of a mixed penetration seal with two layers of mineral fibre board;  
Wall installation - section view

Annex 8

# Mixed penetration seal "PYRO-SAFE Flammotect" - Double layer

Details of the installation - see table annex 11



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of  
penetration seal,  
Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

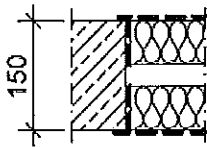
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 120  
Use as part of a mixed penetration seal with two layers of mineral fibre board;  
Floor installation - view

Annex 9

# Mixed penetration seal "PYRO-SAFE Flammotect" - Double layer

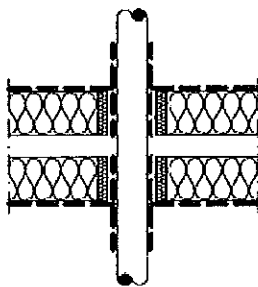
## Arrangement:



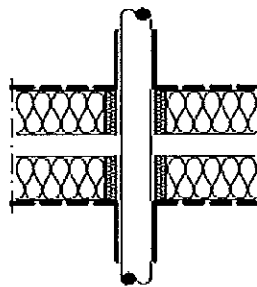
## Measures at passing through installations:

### Details of the installation - see table annex 11

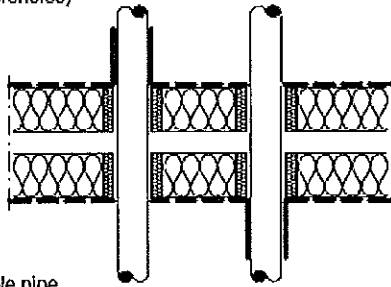
Cables, cable supporting constructions



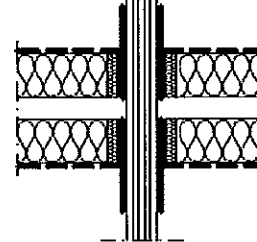
Cables, cable supporting constructions



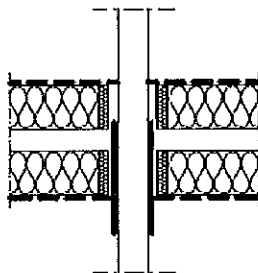
Cable lines (one-sided subsequent installation through boreholes)



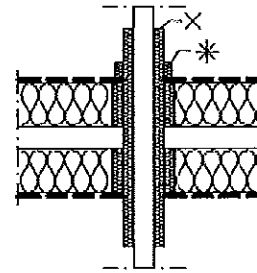
Conduit



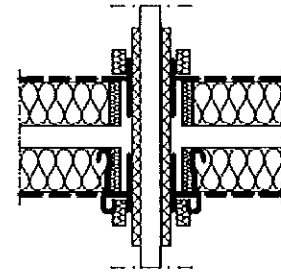
Combustible pipe



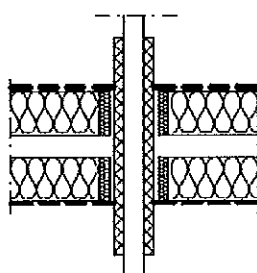
Non-combustible pipe



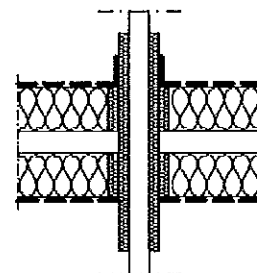
Non-combustible pipe



Non-combustible pipe



"NanoSUN" - double solar pipe



Construction details see installation instructions  
dimensions in mm

## Legend

- Rigid floor
- Mineral fibre board  
Rockwool Hardrock 040, t = 60 mm
- Ablative coating  
PYRO-SAFE FLAMMOTECT-A
- Cable or pipe wrap  
PYRO-SAFE DG-CR
- Mineral wool stuffing  
(non-combustible) or sealing  
with PYRO-SAFE FLAMMOTECT-A
- protective insulation made of  
"Klimarock"
- pipe shells "Pro Rox PS 960"
- Synthetic rubber insulation  
(combustible)
- Fastener of wired mat

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 120  
Use as part of a mixed penetration seal with two layers of mineral fibre board;  
Floor installation - section view

Annex 10

Mixed penetration seal "PYRO-SAFE Flammotect" - Double layer

Scope	Type of installation	Short description
Flexible wall or floor	Cables	Cables and cable bundles according to EN 1366-3: 2009-7 with "PYRO-SAFE FLAMMOTECT-A" (ablative coating) or with cable wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Cable supporting constructions	Perforated or non-perforated cable trays and ladders made of steel
	Combustible pipes made of plastic	Pipes made of PE-HD according to EN 1519-1:1999 and DIN 8074/ DIN 8075:2011, PVC-U according to EN 13291-1:2014; DIN 8061/ DIN 8062:2009, (U/U) with pipe wrap "PYRO-SAFE DG-CR"
	Non-combustible pipes with combustible insulation made of Synthetic rubber "Kaiflex ST" produced by Kaimann GmbH  (Local insulation case LS according to EN 1366-3:2009-07)	Pipes made of copper or steel (C/U) with additional protective insulation made of "Klimarock" (mineral fibre mat) according to EN 14303:2009 + A1:2013 and with pipe wrap "PYRO-SAFE DG-CR"
	Non-combustible pipes with insulation "Armaflex Protect" produced by Armacell GmbH  (Local insulation case LS according to EN 1366-3:2009-07)	Pipes made of copper or steel (C/U)
	"NanoSUN"- double or single solar pipes produced by Aktarus Group SRL	Special pipes consisting of non-combustible pipes (U/U) with pre-assembled local sustained insulation and integrated accompanying cable, with pipe wrap "PYRO-SAFE DG-CR"
Flexible wall	Cable (subsequent installation)	Cable according to EN 1366-3: 2009-7 subsequent installed through boreholes in area of existing cable wrap (without coating of mineral fibre board and without mineral wool stuffing)
Floor	Conduits, flexible	Flexible conduits according to EN 61386-22:2004 + A11:2010 (U/U) made of PE-HD according to EN 1519-1:1999 and DIN 8074/DIN 8075:201, single or bundled, with cables or without cables, with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Non-combustible pipes with non-combustible insulation made of mineral fibre  (Local insulation case LS according to EN 1366-3:2009-07)	Pipes made of copper or steel with non-combustible insulation "ProRox 960" (mineral fibre shell) and protective insulation made of "Klimarock" (mineral fibre mat) on the top of floor according to EN 14303:2009 + A1: 2013
	Cables (subsequent installation one-sided from penetration seal)	Cables according to EN 1366-3:2009-7 in boreholes of mineral fibre board without coating the layers ) with cable wrap "PYRO-SAFE DG-CR", installed one-sided on the top or below of floor

Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

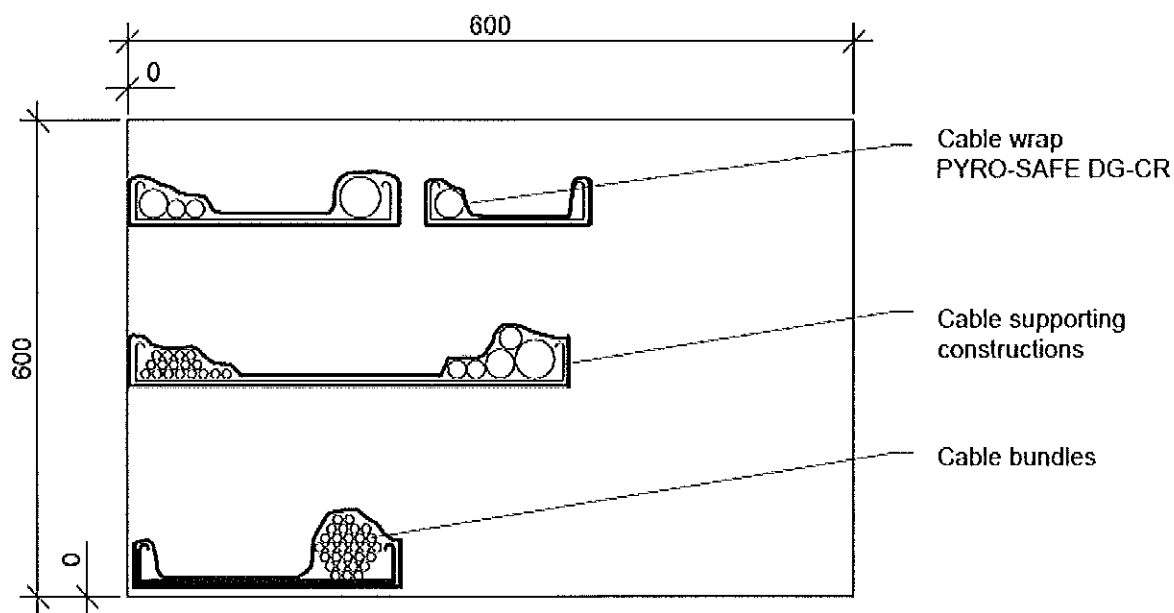
Detailed information for the confirmation of fire resistance EI 120  
Use as part of a mixed penetration seal with two layers of mineral fibre boards;  
Description of the passing through installations

Annex 11



# Cable penetration seal "PYRO-SAFE Flammotect" - Four layers

Details of the installation - see table annex 16



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal,  
Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

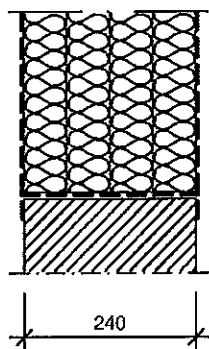
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance **EI 240**  
Use as part of a mixed penetration seal with four layers of mineral fibre board;  
Wall installation - view






Annex 12

# Cable penetration seal "PYRO-SAFE Flammotect" - Four layers

## Arrangement:



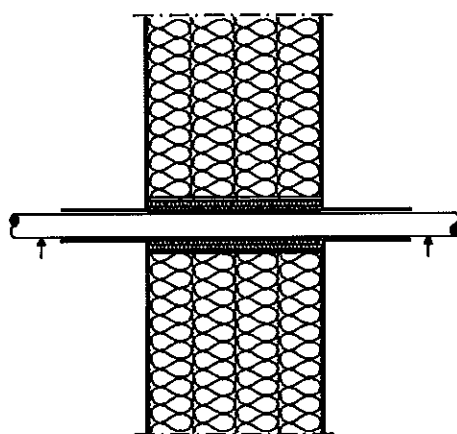
## Legend

-  Rigid wall
-  Mineral fibre board  
Rockwool Hardrock 040, t = 60 mm
-  Ablative coating  
PYRO-SAFE FLAMMOTECT-A
-  Cable wrap  
PYRO-SAFE DG-CR
-  Mineral wool stuffing  
(non-combustible) or sealing  
with PYRO-SAFE FLAMMOTECT-A

## Measures at passing through installations:

## Details of the installation - see table annex 16

Cables, cable trays



Construction details see installation instructions  
dimensions in mm

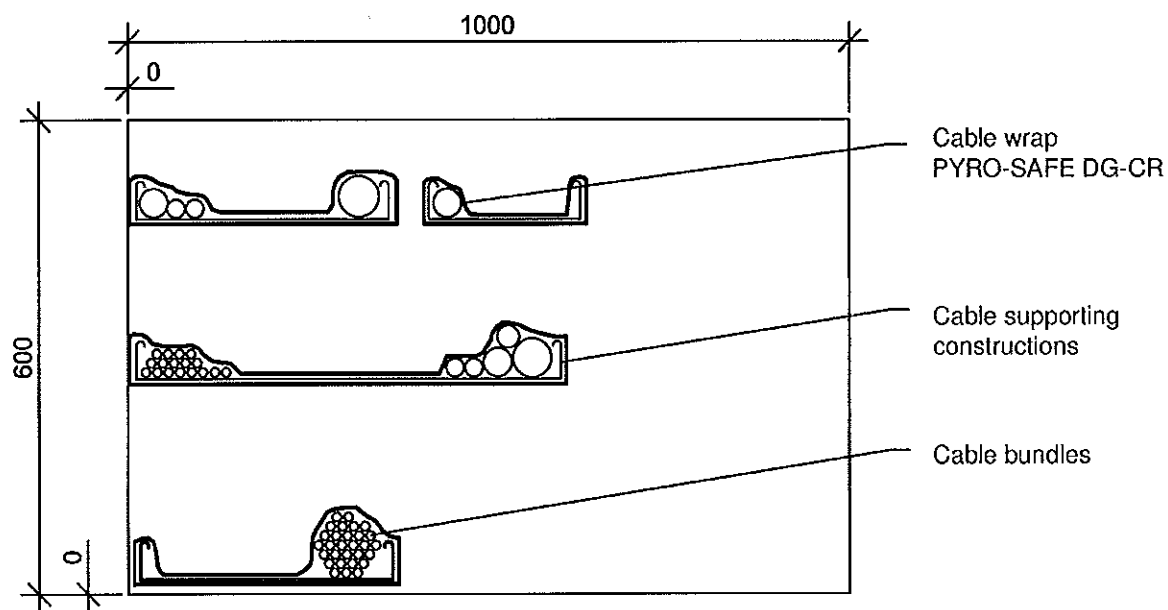
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance **EI 240**  
Use as part of a mixed penetration seal with four layers of mineral fibre board;  
Wall installation - section view

Annex 13

# Cable penetration seal "PYRO-SAFE Flammotect" - Four layers

Details of the installation - see table annex 16



**Note:** Drawing of mixed penetration seal is symbolic.

Detailed information e.g. to type and arrangement of the cables/pipes and to construction of penetration seal,

Construction details see e. g. manufacturer installation instructions for construction products

dimensions in mm

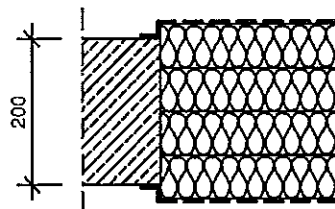
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance **EI 240**  
Use as part of a mixed penetration seal with four layers of mineral fibre board;  
Floor installation - view






Annex 14

# Cable penetration seal "PYRO-SAFE Flammotect" - Four layers

## Arrangement:



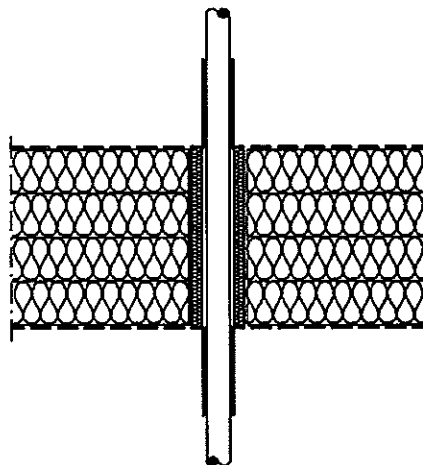
## Legende

-  Rigid floor
-  Mineral fibre board  
Rockwool Hardrock 040, d= 60 mm
-  Ablative coating  
PYRO-SAFE FLAMMOTECT-A
-  Cable wrap  
PYRO-SAFE DG-CR
-  Mineral wool stuffing  
(non-combustible) or sealing  
with PYRO-SAFE FLAMMOTECT-A

## Measures at passing through installations:

## Details of the installation - see table annex 16

Cables, cable trays



Construction details see Installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 240  
Use as part of a mixed penetration seal with four layers of mineral fibre board;  
Floor installation - section view

Annex 15

Cable penetration seal "PYRO-SAFE Flammotect" - Four layers

Scope	Type of installation	Short description
Rigid wall/ rigid floor	Cables	Cables and cable bundles according to EN 1366-3: 2009-7 with "PYRO-SAFE FLAMMOTECT-A" (ablative coating) or with cable wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Cable supporting constructions	Perforated or non-perforated cable trays and ladders made of steel

Construction details see installation instructions  
dimensions in mm

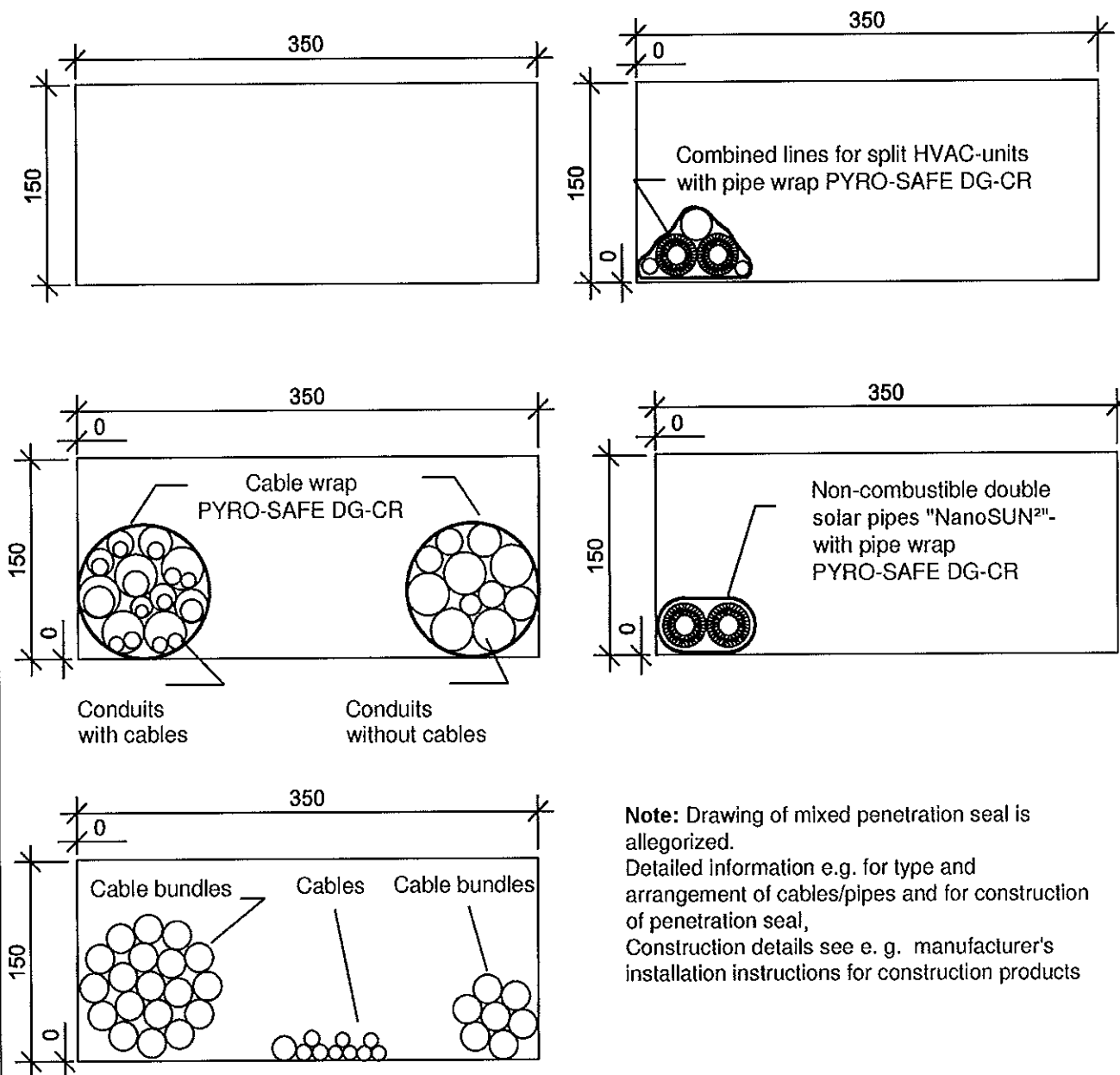
"PYRO-SAFE FLAMMOTECT-A"

Annex 16

Detailed information for the confirmation of fire resistance **EI 240**  
Use as part of a mixed penetration seal with four layers of mineral fibre boards;  
Description of the passing through installations

# Cable penetration seal "PYRO-SAFE ES"

Details of the installation - see table annex 22



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal, Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

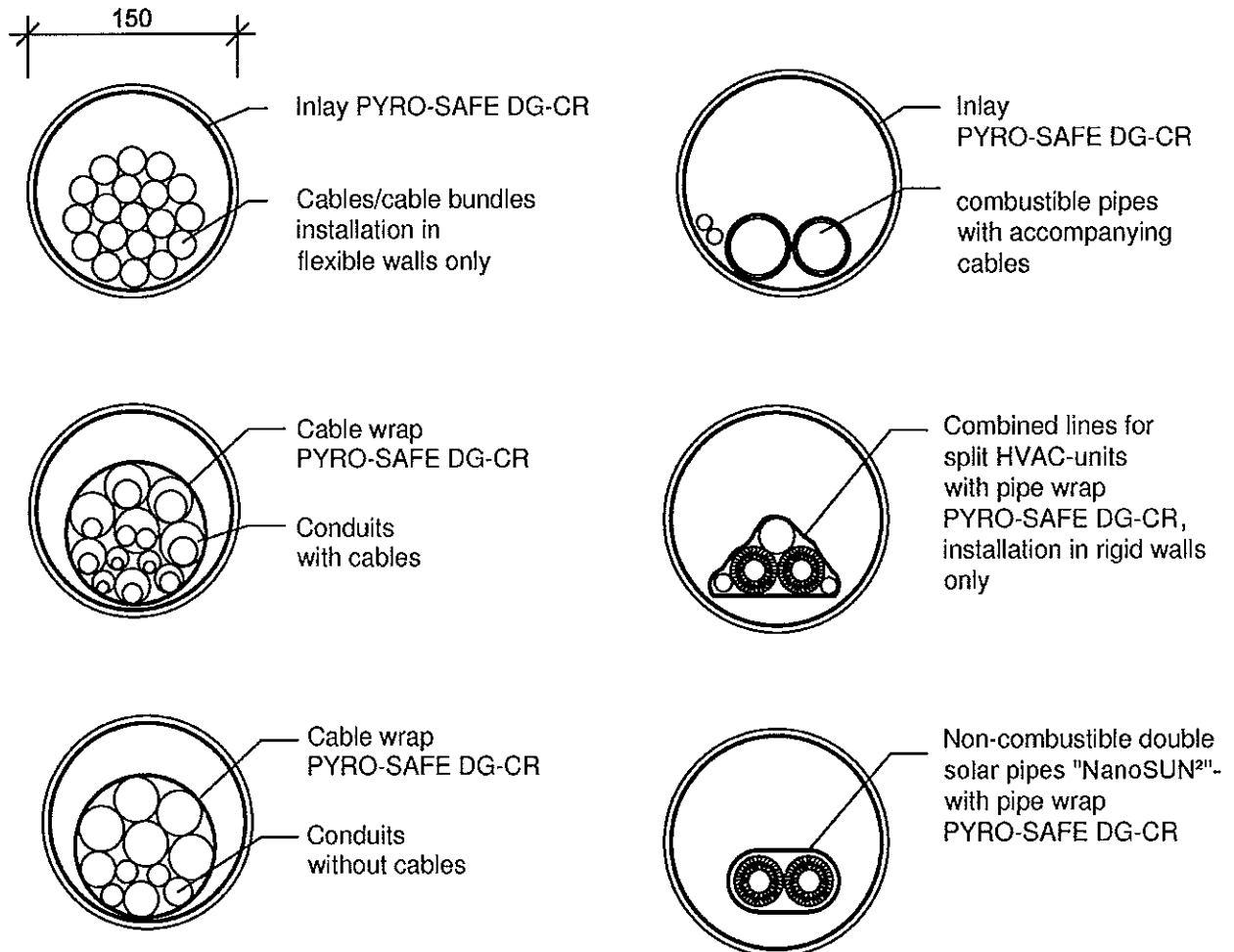
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 30  
Use as part of a cable penetration seal with mineral wool;  
Wall installation - view

Annex 17

# Cable penetration seal "PYRO-SAFE ES"

Details of the installation - see table annex 22



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal,  
Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

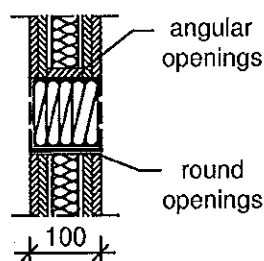
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance **EI 30**  
Use as part of a cable penetration seal with mineral wool;  
Wall installation - view

Annex 18

# Cable penetration seal "PYRO-SAFE ES"

## Arrangement:



## Legend

- flexible wall
- Mineral wool stuffing  
(average density approx. 200 kg/m³)
- Ablative coating  
PYRO-SAFE FLAMMOTECT-A
- reveal or  
cable/pipe wrap PYRO-SAFE DG-CR
- First support

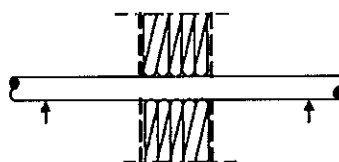
## Measures at passing through installations:

Details of the installation - see table annex 22

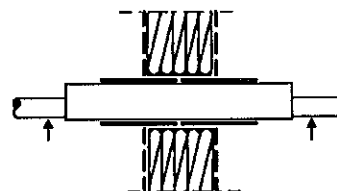
Blank penetration seal



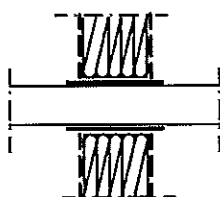
Cables, cable bundle



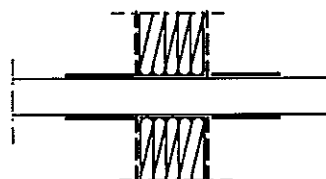
Conduits



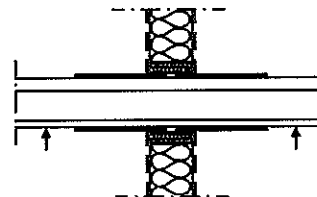
Combustible pipe



NanoSUN² - double solar pipe



Combined lines for split HVAC-units



Construction details see installation Instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

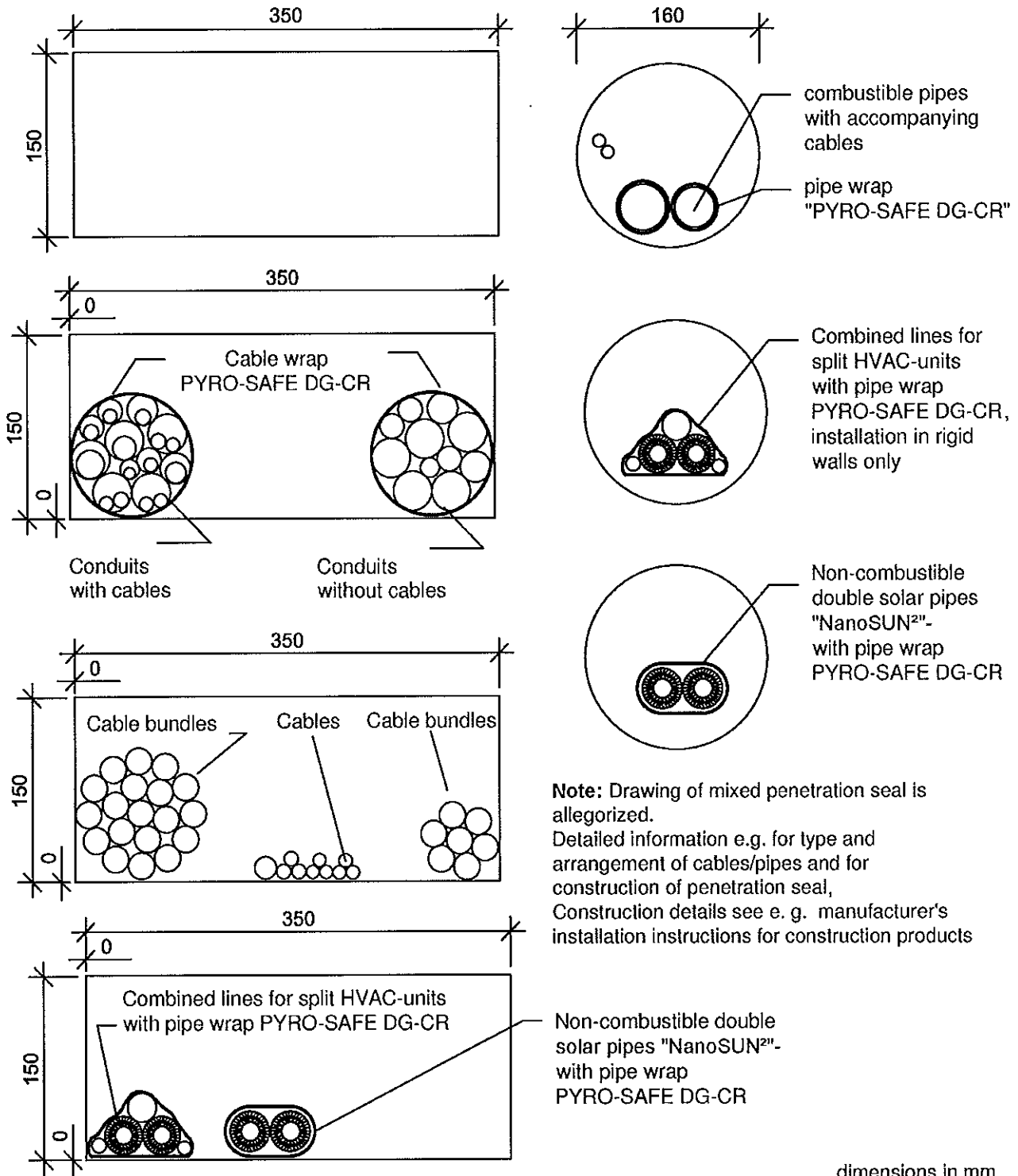
Detailed information for the confirmation of fire resistance EI 30  
Use as part of a cable penetration seal with mineral wool;  
Wall installation - section view

Annex 19



Cable penetration seal "PYRO-SAFE ES"

Details of the installation - see table annex 22



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal, Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

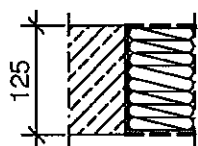
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance **EI 30**  
Use as part of a cable penetration seal with mineral wool;  
Floor installation - view





Annex 20

# Cable penetration seal "PYRO-SAFE ES"

## Arrangement:



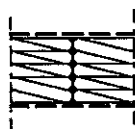
## Legend

-  Rigid floor
-  Mineral wool stuffing  
(average density  
approx. 200 kg/m³)
-  Ablative coating  
PYRO-SAFE FLAMMOTECT-A
-  Cable or pipe wrap  
PYRO-SAFE DG-CR

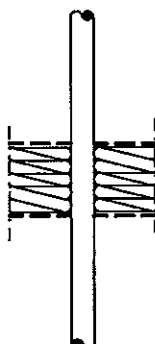
## Measures at passing through installations:

Details of the installation - see table annex 22

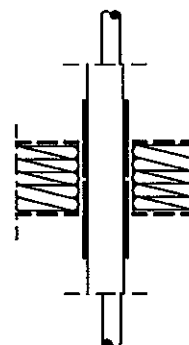
Blank penetration seal



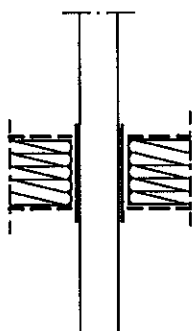
Cable, cable bundle



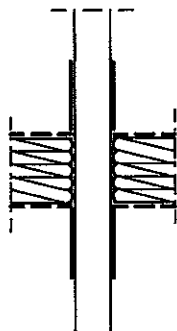
Conduits



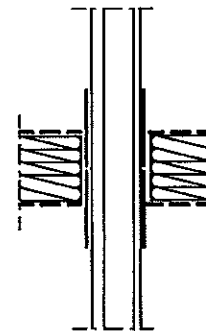
Combustible pipe



NanoSUN² - double solar pipe



Combined lines for split HVAC-units



Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 30  
Use as part of a cable penetration seal with mineral wool;  
Floor installation - section view

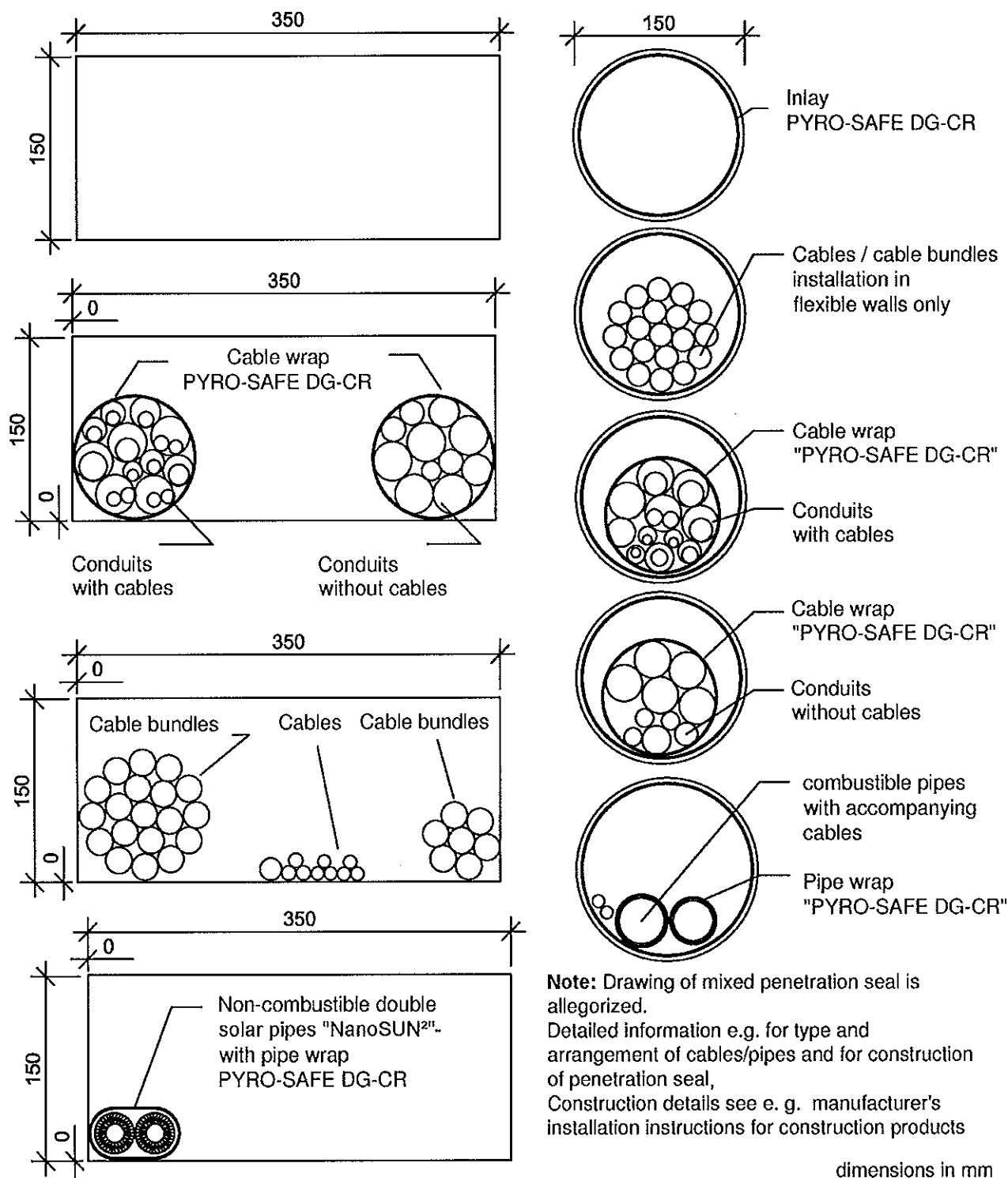
Annex 21

Cable penetration seal "PYRO-SAFE ES"

Scope	Type of installation	Short description
Flexible wall or floor	Cables	Cables and cable bundles according to EN 1366-3: 2009-7
	Conduits, flexible	Flexible conduits according to EN 61386-22:2004 + A11:2010 (U/U) made of PE-HD according to EN 1519-1:1999 and DIN 8074/DIN 8075:201, single or bundled, with cables or without cables, with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Conduits, rigid	rigid conduits according to EN 61386-21:2004 + A11:2010 (U/U), made of any plastics, with cables or without cable
	Combustible pipes made of plastic	Pipes made of PVC-U according to EN 13291-1:2014; DIN 8061/ DIN 8062:2009 (U/U), with pipe wrap "PYRO-SAFE DG-CR"
	"NanoSUN"- double or single solar pipes produced by Aktarus Group SRL	Special pipes consisting of non-combustible pipes (U/U) with pre-assembled local sustained insulation and integrated accompanying cable, with pipe wrap "PYRO-SAFE DG-CR"
	Combined lines for split HVAC-units ("Tubolit DuoSplit", "Tubolit Split" produced by Armacell Enterprise GmbH & Co. KG)	consisting of two copper pipes (U/U) with pipe insulation made of PE foam according to EN 14313, plastic pipe made of PVC-U according to EN 1329-1: 2004; DIN 8061/DIN 8062: 2009 (U/U) and up to two accompanying cables with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)

Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"	Annex 22
Detailed information for the confirmation of fire resistance EI 30 Use as part of a cable penetration seal with mineral wool; Description of the passing through installations	

**Details of the installation - see table annex 27**

**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal,  
Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

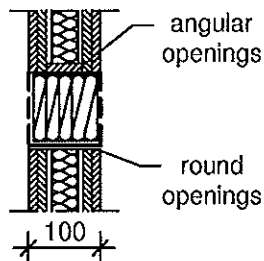
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance **EI 60**  
Use as part of a cable penetration seal with mineral wool;  
Wall installation - view






Annex 23

# Cable penetration seal "PYRO-SAFE ES"

## Arrangement:



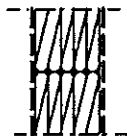
## Legend

-  Flexible wall
-  Mineral wool stuffing  
(average density  
approx. 200 kg/m³)
-  Ablative coating  
PYRO-SAFE FLAMMOTECT-A
-  reveal or  
cable/pipe wrap PYRO-SAFE DG-CR
-  First support

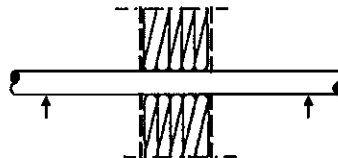
## Measures at passing through installations:

Details of the installation - see table annex 27

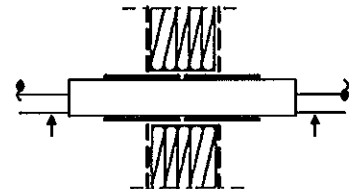
Blank penetration seal



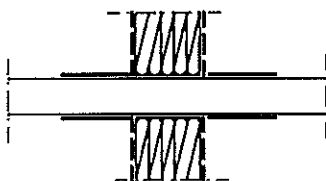
Cables, cable bundle



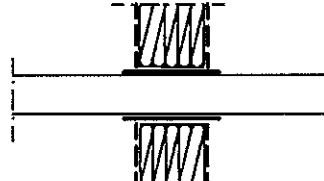
Conduits



NanoSUN² - double solar pipe



Combustible pipe



Construction details see installation instructions  
dimensions in mm

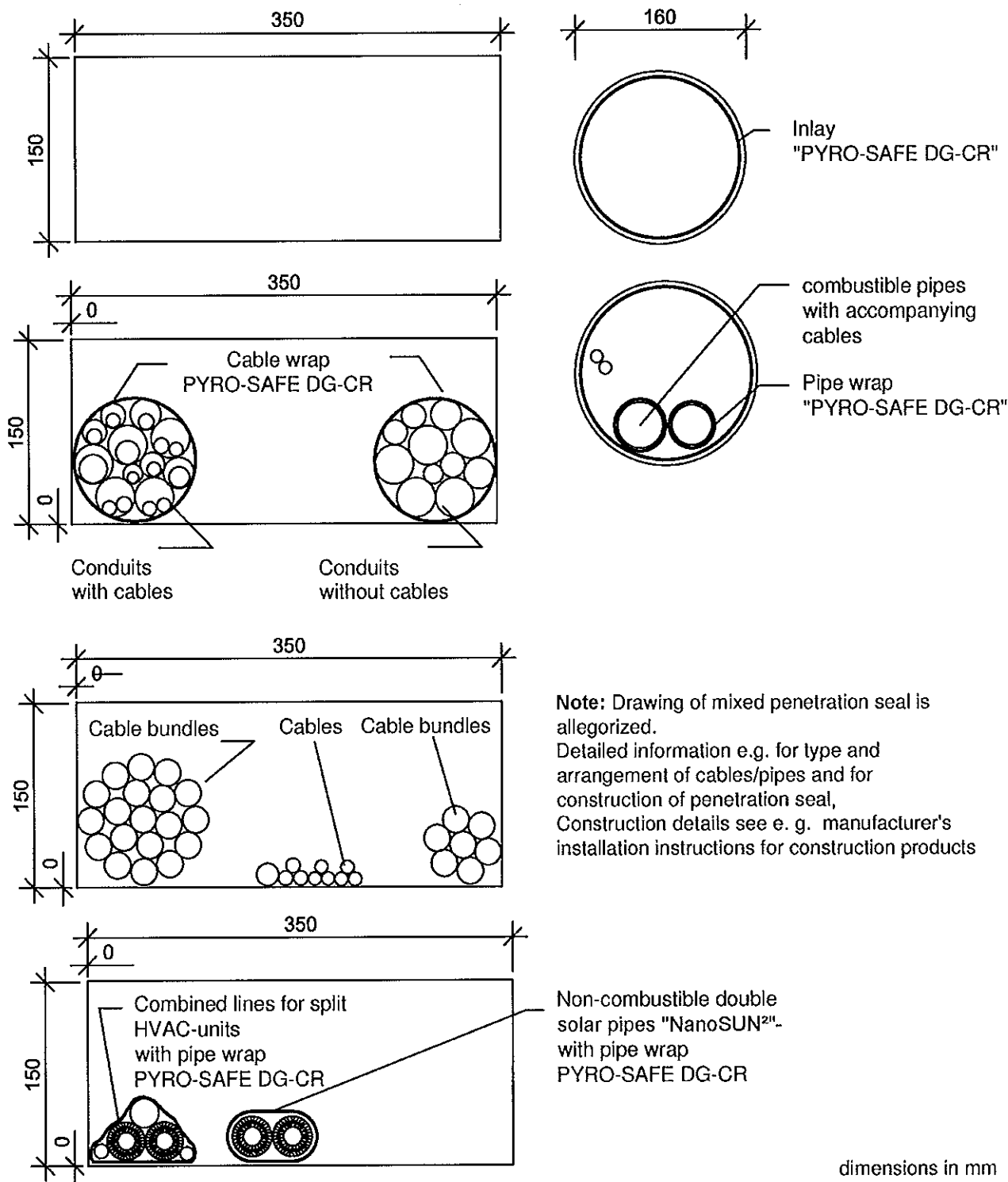
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 60  
Use as part of a cable penetration seal with mineral wool;  
Wall installation - section view

Annex 24

Cable penetration seal "PYRO-SAFE ES"

Details of the installation - see table annex 27



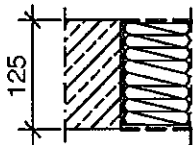
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 60  
Use as part of a cable penetration seal with mineral wool;  
Floor installation - view





Annex 25

# Cable penetration seal "PYRO-SAFE ES"

## Arrangement:



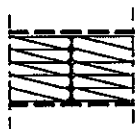
## Legend

-  Rigid floor
-  Mineral wool stuffing  
(average density  
approx. 200 kg/m³)
-  Ablative coating  
PYRO-SAFE FLAMMOTECT-A
-  Cable or pipe wrap PYRO-SAFE DG-CR

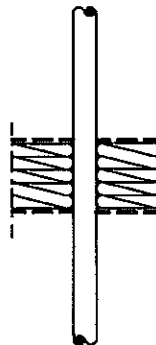
## Measures at passing through installations:

Details of the installation - see table annex 27

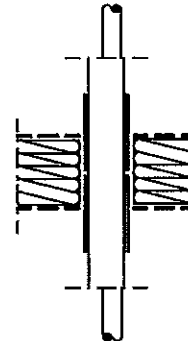
Blank penetration seal



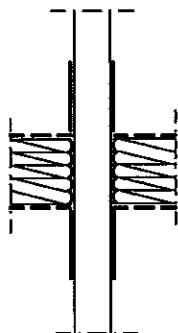
Cables, cable bundle



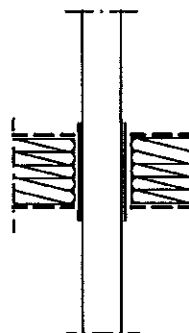
Conduits



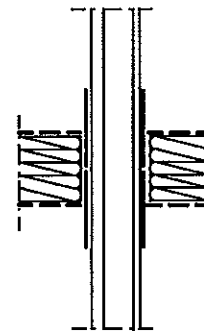
NanoSUN® - double solar pipe



Combustible pipe



Combined lines for split HVAC-units



Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 60  
Use as part of a cable penetration seal with mineral wool;  
Floor installation - section view

Annex 26

Cable penetration seal "PYRO-SAFE ES"

Scope	Type of installation	Short description
Flexible wall or floor	Cables	Cables and cable bundles according to EN 1366-3: 2009-7
	Conduits, flexible	Flexible conduits according to EN 61386-22:2004 + A11:2010 (U/U) made of PE-HD according to EN 1519-1:1999 and DIN 8074/DIN 8075:201, single or bundled, with cables or without cables, with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Conduits, rigid	rigid conduits according to EN 61386-21:2004 + A11:2010 (U/U), made of any plastics, with cables or without cable
	Combustible pipes made of plastic	Pipes made of PVC-U according to EN 13291-1:2014; DIN 8061/ DIN 8062:2009 (U/U), with pipe wrap "PYRO-SAFE DG-CR"
	"NanoSUN"- double or single solar pipes produced by Aktarus Group SRL	Special pipes consisting of non-combustible pipes (U/U) with pre-assembled local sustained insulation and integrated accompanying cable, with pipe wrap "PYRO-SAFE DG-CR"
Floor	Combined lines for split HVAC-units ("Tubolit DuoSplit", "Tubolit Split" produced by Armacell Enterprise GmbH & Co. KG)	consisting of two copper pipes (U/U) with pipe insulation made of PE foam according to EN 14313, plastic pipe made of PVC-U according to EN 1329-1: 2004; DIN 8061/DIN 8062: 2009 (U/U) and up to two accompanying cables with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)

Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

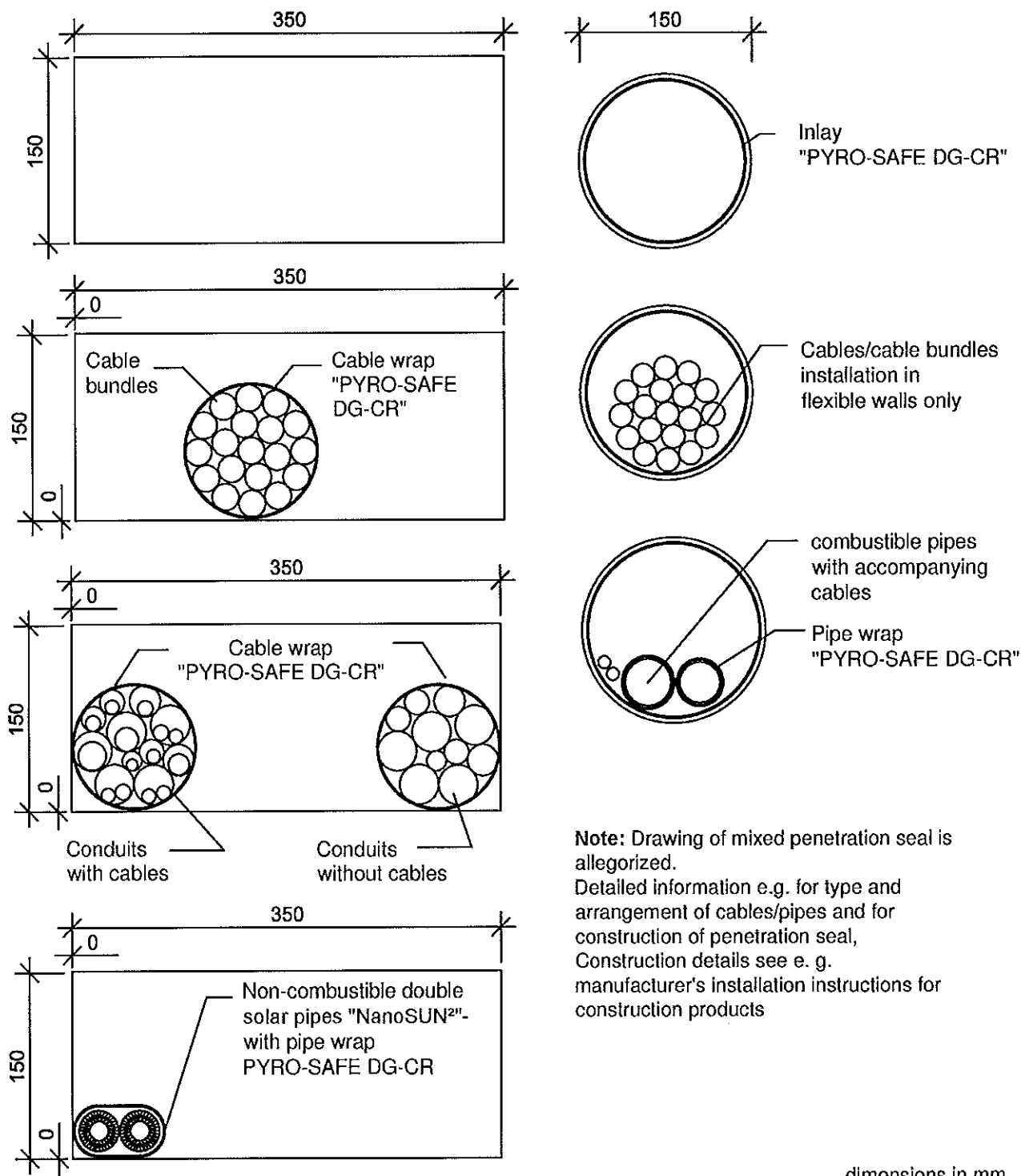
Detailed information for the confirmation of fire resistance EI 60  
Use as part of a cable penetration seal with mineral wool;  
Description of the passing through installations

Annex 27



# Cable penetration seal "PYRO-SAFE ES"

Details of the installation - see table annex 32



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal, Construction details see e. g. manufacturer's installation instructions for construction products

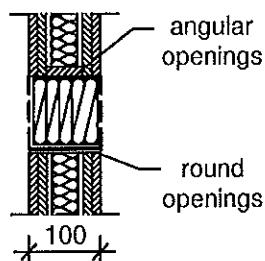
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 90  
Use as part of a cable penetration seal with mineral wool;  
Wall installation - view

Annex 28

# Cable penetration seal "PYRO-SAFE ES"

## Arrangement:



## Legend



Flexible wall



Mineral wool stuffing  
(average density  
approx. 200 kg/m³)



Ablative coating  
PYRO-SAFE FLAMMOTECT-A



reveal or  
cable/pipe wrap PYRO-SAFE DG-CR



First support

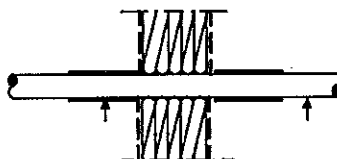
## Measures at passing through installations:

Details of the installation - see table annex 32

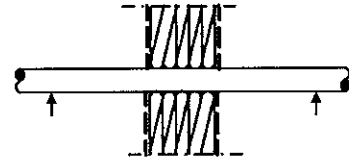
Blank penetration seal



Cables, cable bundle

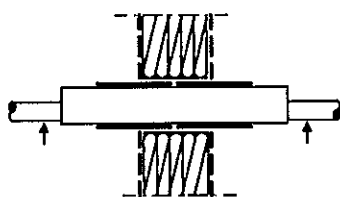


Conduits

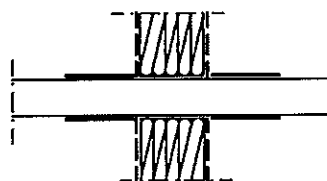


round opening in construction element

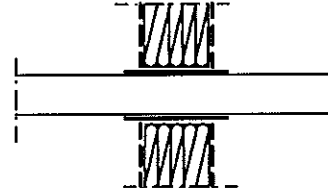
Conduits



NanoSUN<sup>®</sup> - double solar pipe



Combustible pipe



Construction details see installation instructions  
dimensions in mm

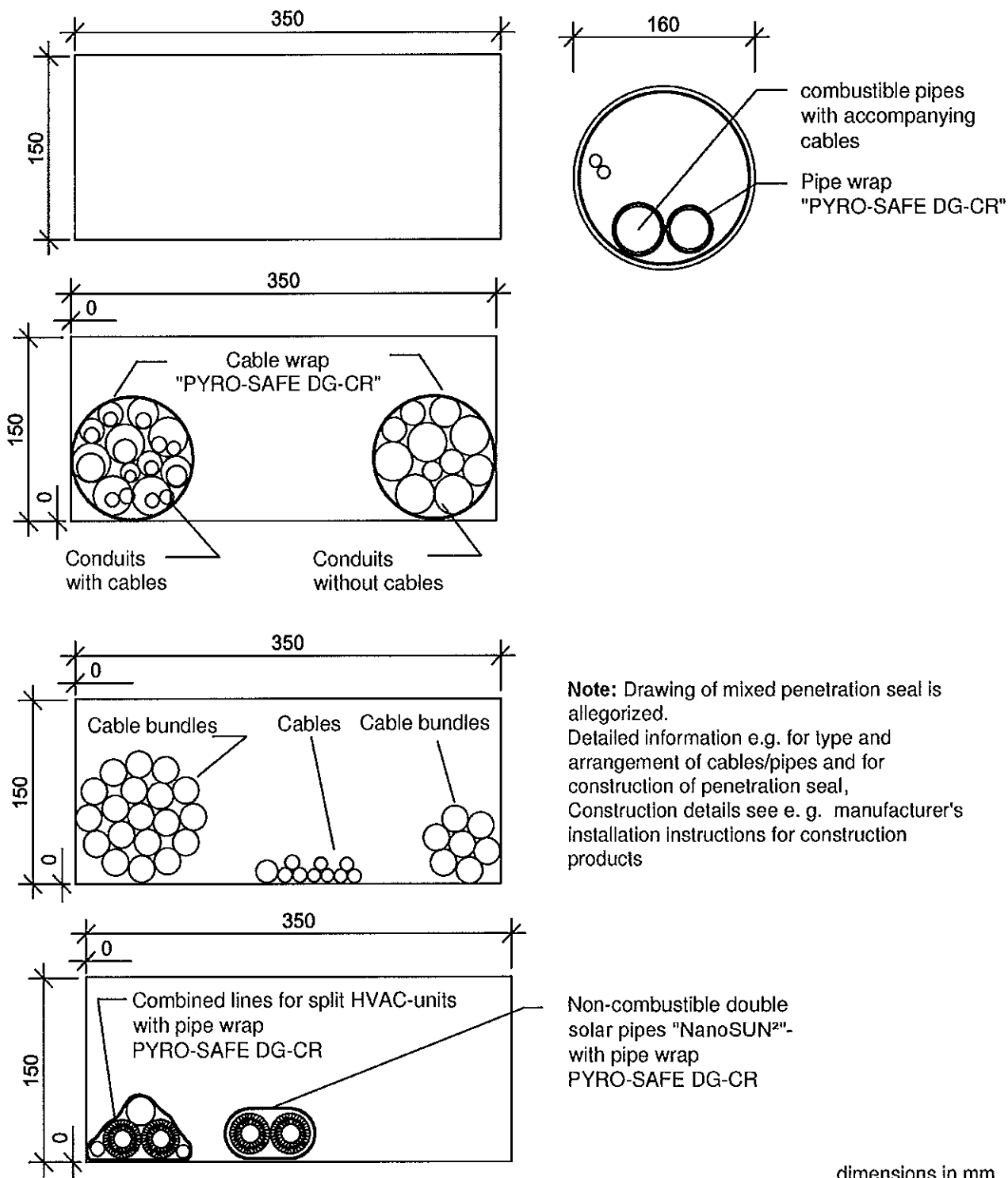
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 90  
Use as part of a cable penetration seal with mineral wool;  
Wall installation - section view

Annex 29

Cable penetration seal "PYRO-SAFE ES"

Details of the installation - see table annex 32



**Note:** Drawing of mixed penetration seal is allegorized.  
Detailed information e.g. for type and arrangement of cables/pipes and for construction of penetration seal, Construction details see e. g. manufacturer's installation instructions for construction products

dimensions in mm

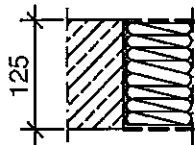
"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 90  
Use as part of a cable penetration seal with mineral wool;  
Floor installation - view

Annex 30

# Cable penetration seal "PYRO-SAFE ES"

## Arrangement:



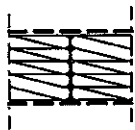
## Legend

- Rigid floor
- Mineral wool stuffing  
(average density approx. 200 kg/m³)
- Ablative coating  
PYRO-SAFE FLAMMOTECT-A
- Cable or pipe wrap PYRO-SAFE DG-CR

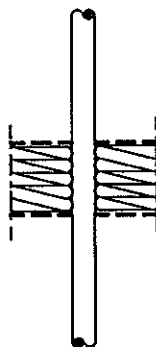
## Measures at passing through installations:

### Details of the installation - see table annex 32

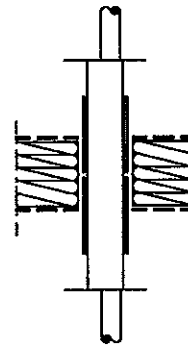
Blank penetration seal



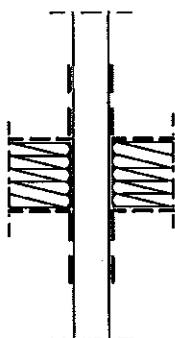
Cables, cable bundle



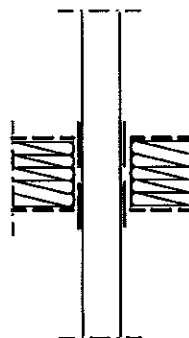
Conduits



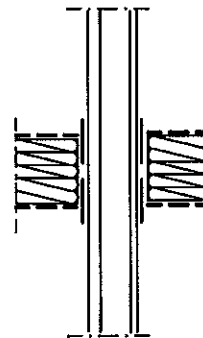
NanoSUN² - double solar pipe



Combustible pipe



\*Combined lines for split HVAC-units



Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 90  
Use as part of a cable penetration seal with mineral wool;  
Floor installation - section view

Annex 31

Cable penetration seal "PYRO-SAFE ES"

Scope	Type of installation	Short description
Flexible wall or floor	Cables	<b>Round openings:</b> Cable bundles according to EN 1366-3: 2009-7
		<b>Angular openings:</b> Cable bundles according to EN 1366-3: 2009-7 with "PYRO-SAFE FLAMMOTECT-A" (ablative coating) or with cable wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Conduits, flexible	Flexible conduits according to EN 61386-22:2004 + A11:2010 (U/U) made of PE-HD according to EN 1519-1:1999 and DIN 8074/DIN 8075:201, single or bundled, with cables or without cables, with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Conduits, rigid	rigid conduits according to EN 61386-21:2004 + A11:2010 (U/U), made of any plastics, with cables or without cable
	Combustible pipes made of plastic	Pipes made of PVC-U according to EN 13291-1:2014; DIN 8061/ DIN 8062:2009 (U/U), with pipe wrap "PYRO-SAFE DG-CR"
	"NanoSUN"- double or single solar pipes produced by Aktarus Group SRL	Special pipes consisting of non-combustible pipes (U/U) with pre-assembled local sustained insulation and integrated accompanying cable, with pipe wrap "PYRO-SAFE DG-CR"
Floor	Cables	Cables according to EN 1366-3: 2009-7
	"Klimasplit"- line combination ("Tubolit DuoSplit", "Tubolit Split" produced by Amacell Enterprise GmbH & Co. KG)	consisting of two copper pipes (U/U) with pipe insulation made of PE foam according to EN 14313, plastic pipe made of PVC-U according to EN 1329-1: 2004; DIN 8061/DIN 8062: 2009 (U/U) and up to two accompanying cables with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)
	Conduits, flexible	Flexible conduits according to EN 61386-22:2004 + A11:2010 (U/U), made of PE-HD according to EN 1519-1:1999 and DIN 8074/DIN 8075:201, single or bundled, with cables or without cables, with pipe wrap "PYRO-SAFE DG-CR" (intumescent fabric)

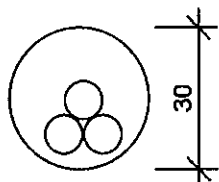
Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance **EI 90**  
Use as part of a cable penetration seal with mineral wool;  
Description of the passing through installations

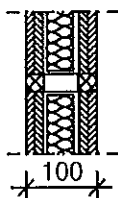
Annex 32

Cable penetration seal "PYRO-SAFE ES" (without mineral wool stuffing) in wall and floor

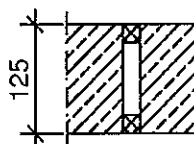


**Arrangement:**






Wall



Floor



**Legend**

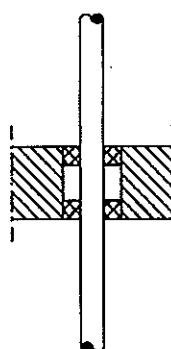
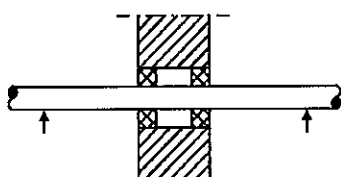
-  Flexible wall
-  Rigid wall
-  Rigid floor
-  Sealing with ablative coating  
PYRO-SAFE FLAMMOTECT-A
-  First support

**Measures at passing through installations:**

Wall

Floor

Cables



Scope	Type of installation	Short description
Wall/Floor	Cables	Cables according to EN 1366-3: 2009-7

Construction details see installation instructions  
dimensions in mm

"PYRO-SAFE FLAMMOTECT-A"

Detailed information for the confirmation of fire resistance EI 90  
Use as part of a cable penetration seal without mineral wool;  
View, section view, description of the passing through installations

Annex 33