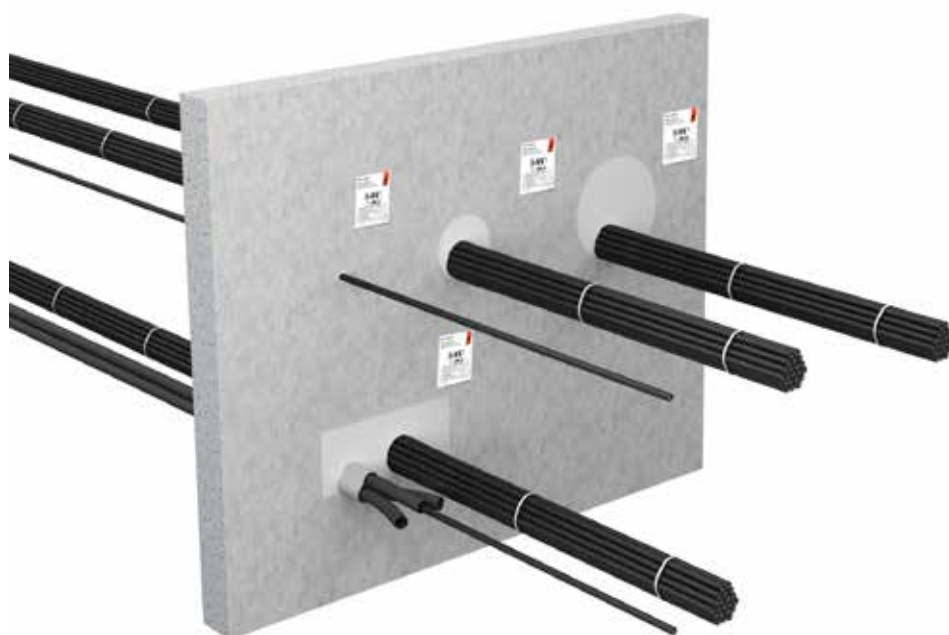


## PYRO-SAFE ES

### Instructions for installation

Easy-to-build cable penetration seal made of mineral wool and ablative coating for electrical cables  $\varnothing \leq 21$  mm and conduits  $\varnothing \leq 32$  mm and for many other services.

Rectangular and round versions. Fire resistance classes EI 30, EI 45, EI 60 and EI 90 in accordance with EN 13501-2 according to ETA-14/0418 as well as Classification Report No. 1913.3/13/Z00NP



### Contents

Subject		Page
<b>1.</b>	<b>Preliminary Remarks / Overview</b>	
1.1	Target group; Use of the manual; safety information	3
1.2	Field of application (Scope; Structural elements)	4 - 5
1.3	Fire resistance classes according to Classification report 1913.3/13/Z00NP	6 - 7
1.4	Field of application (structural elements and partitions thicknesses; dimensions)	8
<b>2.</b>	<b>Allowed configurations</b>	
2.1	cables, electrical conduits	9
2.2	combustible pipes	9
2.3	"NANOSUN 2" double solar pipes, HVAC split line combinations	9
<b>3</b>	<b>Spacing regulations in walls and floors</b>	
3.1	cables, electrical conduits	10
3.2	combustible pipes	10
3.3	"NANOSUN 2" double solar pipes, HVAC split line combinations	11
<b>4</b>	<b>Used products</b>	12
<b>5</b>	<b>Regulations and variants</b>	13
5.1	Rules over the first support	13
<b>6</b>	<b>Fire protection measures / Installation procedure in walls</b>	
6.1	cables and electrical conduits	14 - 18
6.2	combustible pipes	19 - 22
6.3	"NANOSUN 2" double solar pipes, HVAC split line combinations	23 - 26
<b>7</b>	<b>Fire protection measures / Installation procedure in floors rectangular and round</b>	
7.1	cables and electrical conduits	27 - 28
7.2	combustible pipes	29
7.3	"NANOSUN 2" double solar pipes, HVAC split line combinations	30
	<b>Declaration of performance</b>	31

## PYRO-SAFE ES

### 1. Preliminary Remarks / Overview

#### 1.1 Target group

- The installation instructions are aimed exclusively at personnel trained in fire protection.

#### 1.1 Use of the manual

- Read these installation instructions completely before starting work. Observe the following safety instructions.
- The approval holder assumes no liability for damage caused by non-observance of these instructions.
- The pictures are only examples. The installation may differ visually.

#### 1.1 Safety information

Read the safety data sheets when working with the penetration seal components.



##### Personal protective equipment:



In case of short-term or low-level exposure: P2 particle filter.  
In case of intensive or long-term exposure: use self-contained breathing apparatus.  
Only use respirators in compliance with international/national standards.



Hand protection  
Use chemical-resistant gloves.  
Recommended material: butyl rubber, nitrile rubber, fluorinated rubber, PVC.



Eye protection  
Wear protective goggles, safety glasses



Body protection  
Wear protective clothing and non-slip shoes



Safety information for installation of floor penetration seals:

- The area below the floor penetration seal must be cordoned during the installation (warning tape, or sign: danger - falling objects; keep off this area; sealing work underway in the floor above!
- The installer shall inform the client in writing (to be forwarded to the building owners or their agents) that, after the installation, the penetration seal shall be secured against any loading with suitable measures, in particular the access shall be inhibited (e.g. with safety fence or grating).

## PYRO-SAFE ES

### 1.2 Field of application - Scope

The usefulness of the PYRO-SAFE ES penetration seal was determined according to ETAG 026-2 regarding the features „fire performance“, „fire resistance“, „release of dangerous substances“ and „durability and fitness for use“.

#### Reaction to fire

The ablative „PYRO-SAFE FLAMMOTECT-A“ component complies with Reaction to fire class E of EN 13501-1; the intumescent „PYRO-SAFE DG-CR“ material complies with Reaction to fire class B-s1,d0 of EN 13501-1; the „Hardrock 040“ mineral-fibre boards and the „Klimarock“ mineral-fibre mats comply with Reaction to fire class A1 and A2-s1,d0, respectively, of EN 13501-1.

#### Fire resistance

The highest requirements that the PYRO-SAFE ES system complies with are those of class EI 90 (extension -U/U for plastic pipes) in accordance with EN 13501-2.

Fire resistance class EI 60-U/U for plastic pipes covers also all other Suitable ends of pipe in accordance with EN 13501-2. If installed in walls/floors with a lower fire resistance time, the fire resistance time of the penetration seal is also reduced to the fire resistance class of the wall or floor.

#### Release of dangerous substances

The ablative „PYRO-SAFE FLAMMOTECT-A“ component and the intumescent „PYRO-SAFE DG-CR 1,5“ fabric do not contain any substances that are identified as dangerous in the list of the European Commission.

The loose Mineralwool do not contain any dangerous substances listed in Directive 67/548/EC or Regulation (EC) No. 1272/2008 or the Indicative List on Dangerous Substances.

#### Durability and serviceability

The ablative „PYRO-SAFE FLAMMOTECT-A“ component and the intumescent „PYRO-SAFE DG-CR“ fabric comply with use category X in accordance with EOTA TR 024.

The fire safety characteristics of the PYRO-SAFE ES system is not affected in any significant way if exposed to indoor (moisture conditions) or outdoor atmospheric agents.

## PYRO-SAFE ES

### 1.2 Field of application - Structural elements

#### Plasterboard walls with steel frame

In studworks and double-sided lining with at least 2 layers of 12.5 mm thick cement or gypsum-based building slabs with a fire performance of Class A1 or A2 in accordance with EN 13501-1.

The floor structure shall be complemented by additional wall struts and bars to form the edge of the opening.

The walls must be classified with the required fire resistance rating in accordance with EN 13501-2.

#### Plasterboard walls with wood frame

In studworks and double-sided lining with at least 2 layers of 12.5 mm thick cement or gypsum-based building slabs with a fire performance of Class A1 or A2 in accordance with EN 13501-1.

The distance from the opening to the struts and bars shall be  $\geq 100$  mm and the hollow spaces between the linings of the wall, the struts and bars as well as the opening edge shall be stuffed down to a depth of  $\geq 100$  mm with mineral wool, fire resistance Class A1 or A2 in accordance with EN 13501-1.

The walls shall be classified with the required fire resistance rating in accordance with EN 13501-2.

#### Lining of opening soffit for plasterboard

Alongside the opening edge, there shall be at least a 12,5 mm thick layer of concrete or gypsum based slabs with a fire reaction class A1 or A2 according to EN 13501-1.

The inside edge of round openings shall be covered with a layer of PYRO-SAFE DG-CR 1,5, with the coated side toward the opening.

For openings with  $\varnothing \leq 30$  mm no additional measures are required.

#### Massive walls

made from masonry, concrete, reinforced concrete, aerated concrete, ceramic bricks, cellular bricks or honeycomb bricks with a density  $\geq 450$  kg/m<sup>3</sup>.

The walls shall be classified for the required fire resistance time in accordance with EN 13501-2.

#### Massive floors

made of concrete, reinforced concrete, with a density  $\geq 2,200$  ( $\pm 500$ ) kg/m<sup>3</sup>. The walls shall be classified for the required fire resistance time in accordance with EN 13501-2.

#### Applicability DIN 4102

DIN 4102-2 classification and DIN EN 13501-2, DIN EN 13501-3 and DIN EN 13501-5 classification can be alternatively applied for verification of the required fire resistance time of a structural element. (Bauregelliste A Part 1-Annex 0.1)

## 1.3 Fire resistance classes

Plasterboards and massive walls, thickness $\geq 100$ mm					
	Fire resistance class				
	EI 30	EI 45	EI 60	EI 90	E 90
<b>Cable</b>					
Single cable $\varnothing \leq 21$ mm without fire protection wrap	●	●	●	●	●
Cable bundle $\varnothing \leq 100$ mm with single cable $\varnothing \leq 22$ mm without fire protection wrap	●	●	●	●	●
<b>Electrical conduits (EWC) flexible (U/U)</b>					
Flexible and Inflexible EWC bundle $\varnothing \leq 100$ mm single EWC dia $16 \text{ mm} \leq \varnothing \leq 32$ mm with or without single cable $\varnothing \leq 22$ mm	●	●	●	●	●
<b>HVAC split line combinations (U/U)</b>					
Pipe 1/Pipe 2 outer $\varnothing 6 \text{ mm}/10 \text{ mm}$	●	-	-	-	●
<b>"NanoSUN<sup>2</sup>" (U/U)</b>					
DN16	●	●	●	●	●
DN40	●	-	-	-	●
<b>PVC- U Pipe (U/U)</b>					
$\varnothing 16 \text{ mm} \leq \varnothing \leq 32 \text{ mm}$	●	●	●	●	●

round opening ( $\leq \varnothing 30$ mm)					
	Fire resistance class				
	EI 30	EI 45	EI 60	EI 90	E 90
<b>Cable</b>					
Single cable $\varnothing \leq 21$ mm	●	●	●	●	●
$\leq 3$ cables $\varnothing \leq 14$ mm in zero distance to each other or $\leq 65\%$ $\varnothing$ of the installation	●	●	●	●	●

\* HVAC split line combinations with double or single copper pipe and 9 mm thick insulation, made from PE foam, according to EN 14313 and optionally with additional accessory lines (up to 5 wires, each with a cross section  $\leq 1,5 \text{ mm}^2$  and  $\varnothing \leq 14$  mm) without spacing.

# PYRO-SAFE ES

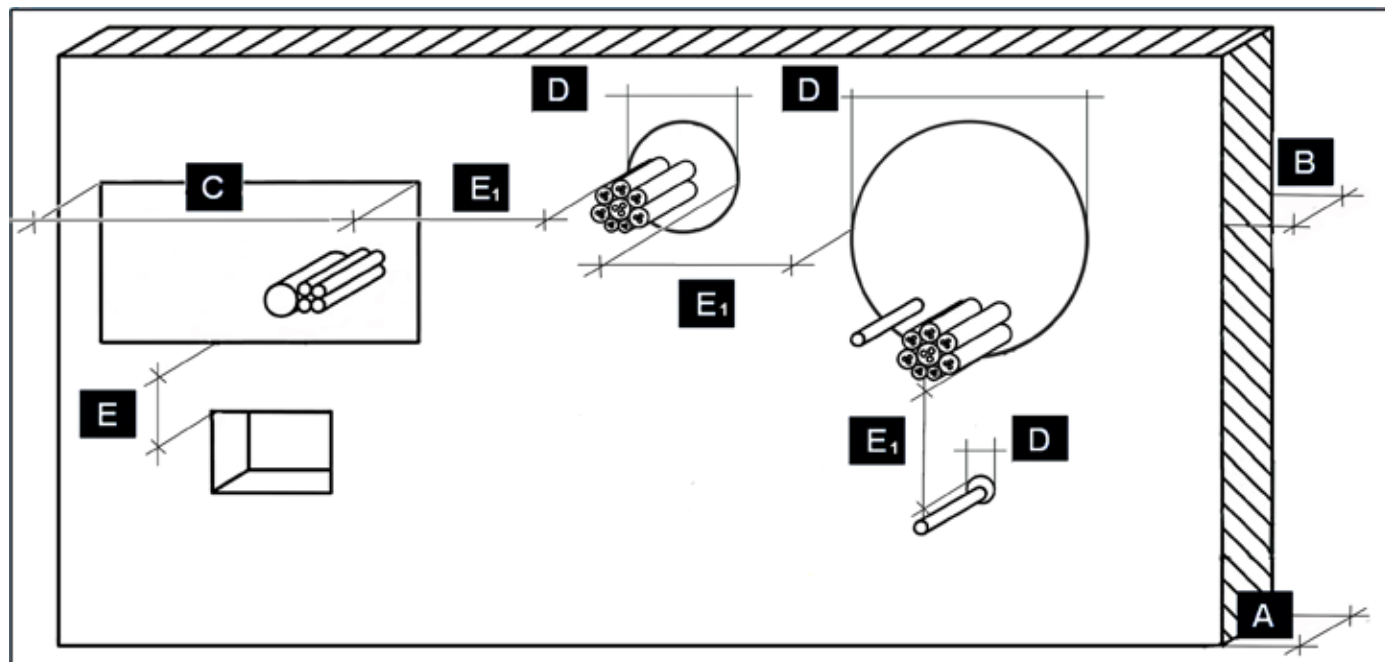
## 1.3 Fire resistance classes

floors					
	Fire resistance class				
	EI 30	EI 45	EI 60	EI 90	E 90
<b>Cable</b>					
Single cable $\varnothing \leq 21$ mm without fire protection wrap	●	●	●	●	●
Cable bundle $\varnothing \leq 100$ mm with single cable $\varnothing \leq 22$ mm without fire protection wrap	●	●	●	●	●
<b>Electrical conduits (EWC) flexible (U/U)</b>					
Flexible and Inflexible EWC bundle $\varnothing \leq 100$ mm single EWC dia $16 \text{ mm} \leq \varnothing \leq 32$ mm with or without single cable $\varnothing \leq 22$ mm	●	●	●	●	●
<b>HVAC split line combinations (U/U)</b>					
Pipe 1/Pipe 2 outer $\varnothing 6 \text{ mm}/10 \text{ mm}$	●	●	●	●	●
Pipe 1/Pipe 2 outer $\varnothing 6 - 10 \text{ mm}/10 - 18 \text{ mm}$	●	●	-	-	-
<b>“NanoSUN<sup>2</sup>” (U/U)</b>					
DN16	●	●	●	●	●
DN40	●	-	-	-	●
<b>PVC- U Pipe (U/U)</b>					
$\varnothing 16 \text{ mm} \leq \varnothing \leq 32 \text{ mm}$	●	●	●	●	●

round openings ( $\leq \varnothing 30 \text{ mm}$ ) in floors					
	Fire resistance class				
	EI 30	EI 45	EI 60	EI 90	E 90
<b>Cable</b>					
Single cable $\varnothing \leq 21 \text{ mm}$	●	●	●	●	●
$\leq 3$ cables $\varnothing \leq 14 \text{ mm}$ without spacing each other or $\leq 65\% \varnothing$ of the installation	●	●	●	●	●

#### 1.4 Field of application - structural elements and partitions thicknesses; dimensions

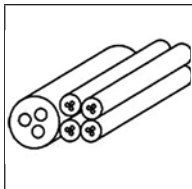
Dimensions			
Pos.	Definition	Wall [mm]	Floor [mm]
<b>A</b>	Thickness of structural element	≥ 100	≥ 125
<b>B</b>	Thickness of penetration seal	≥ 100	≥ 125
<b>C</b>	Maximum dimensions of the opening (width x height)	350 x 150	350 x 150
<b>D</b>	1. Maximum dimensions of the opening round	Ø ≤ 150	Ø ≤ 160
<b>E</b>	1. Distance to other PYRO-SAFE ES penetration seals 2. Distance to other openings or installations (sized ≤ 400 mm x 400 mm) 3. Distance to other openings or installations (sized ≤ 200 mm x 200 mm) 4. other distances	≥ 50 ≥ 100 ≥ 100 ≥ 200	≥ 100 ≥ 100 ≥ 100 ≥ 200

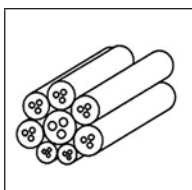


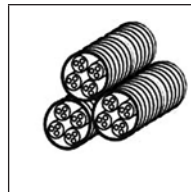


## PYRO-SAFE ES

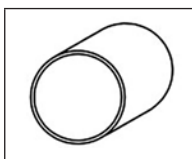
### 2.1 Allowed configurations - cables

	<b>Electrical cables and lines of all types (including optical fibre cables)</b> Single cable $\varnothing \leq 21$ mm
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	<b>Cable bundles</b> $\varnothing \leq 100$ mm, with single cable $\varnothing \leq 21$ mm. No filling needed for tightly compressed and tied bundles.
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	<b>Electrical conduits</b> Flexible conduits made of plastic, outside $\varnothing$ 16 mm to 32 mm; in bundles $\varnothing \leq 100$ mm, with our without cable allocation, single cable $\varnothing \leq 21$ mm. Rigid conduits made of PE according to EN 61386-22, outside $\varnothing$ 16 x 1,0 mm without cables.
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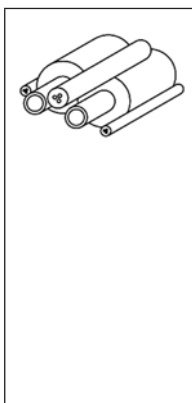
### 2.2 Allowed configurations - combustible pipes

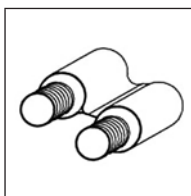
	<b>Combustible pipes</b> Outside $\varnothing \leq 32$ mm optionally with additional accessory lines (each $\varnothing \leq 14$ mm with up to 5 wires $\leq 1,5$ mm <sup>2</sup> without spacing)
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#### Allowed configurations in wall / floor penetration seals

Pipe materials	Outside $\varnothing$ [mm]	Thickness [mm]
Pipes made of PVC-U acc. to EN 1329-1, EN 1453-1, EN 1542-1, EN 15493 and DIN 8061/8062 or PVC-C acc. to EN 1566-1	$\leq 20$	1.5
	$> 20$ to $\leq 32$	2.4

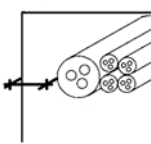
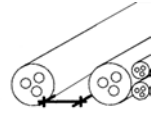
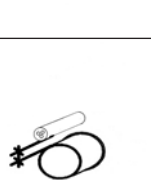
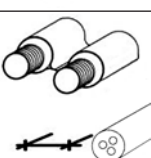
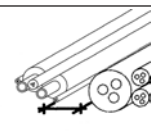
### 2.3 Further permissible configurations

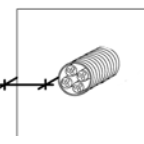

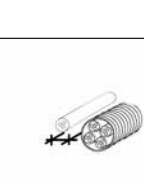

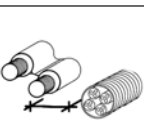
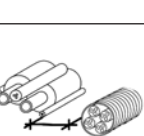
	<b>HVAC split line combinations</b> E.g. "Tubolit DuoSplit" or "Tubolit Split" by Armacell or any other manufacturer with same characteristics. Double or single copper pipe and 9 mm thick insulation made of PE foam according to EN 14313 with an accessory line (1,5 mm thick plastic pipe (U/U) made of PVC-U, outside $\varnothing$ 25 mm, according to EN 1453-1 or EN 1452-1 and to DIN 8061/DIN 8062 and up to 2 sheath cables with max. 5 wires with a surface $\leq 1,5$ mm <sup>2</sup> , $\varnothing \leq 14$ mm) without spacing.
--	---

	<b>"NanoSUN<sup>2</sup>" double solar pipes</b> Pipes for solar thermal applications made of corrugated stainless steel with insulation, an accessory line integrated in the insulation and a PVC sheath by Aktarus Group Srl according to DN 16 to DN 40 (DN 40 only for floors).
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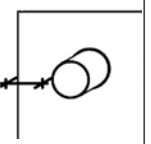
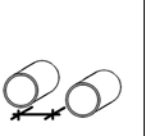
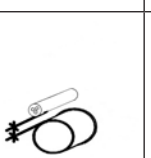
### 3 Regulations in walls and floors

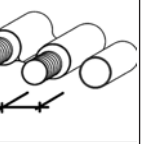
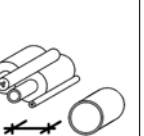
#### 3.1 Cables, electrical conduits

Cable / cable bundle	[mm]
 Distance to the side edge	$\geq 0$
 Distance to each other	$\geq 0$
 Distance to combustibile pipes (single cable)	$\geq 0$
 Distance to "Nano- SUN <sup>2</sup> " double solar pipes	$\geq 100$
 Distance to HVAC split line combinations	$\geq 100$

Electrical conduits	[mm]
 Distance to the side edge	$\geq 0$
 Distance to each other	$\geq 0$
 Distance to single cable	$\geq 0$
 Distance to cable bundle	$\geq 100$
 Distance to "Nano- SUN <sup>2</sup> " double solar pipes	$\geq 100$
 Distance combined lines for split HVAC-units in walls	$\geq 25$

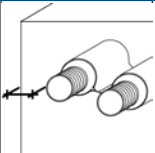
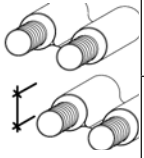

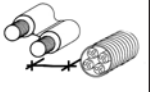
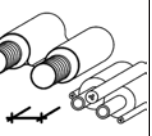
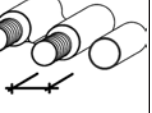
#### 3.2 Combustible pipes

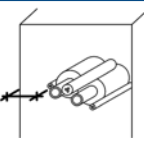
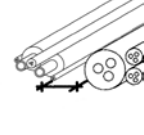
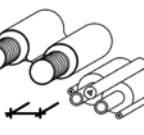
Combustible pipes	[mm]
 Distance to the side edge	$\geq 0$
 Distance to each other	$\geq 0$
 Distance to single cable	$\geq 0$

Combustible pipes	[mm]
 Distance to "Nano- SUN <sup>2</sup> " double solar pipes	$\geq 100$
 Distance to HVAC split line combinations	$\geq 100$


## PYRO-SAFE ES


### 3.3 “NanoSUN<sup>2</sup>” double solar pipes , HVAC split line combinations


“NANO SUN <sup>2</sup> ” double solar pipes		[mm]
	Distance to the side edge	≥ 0
	Distance to each other	≥ 0
	in floors	≥ 30
	Distance to cables and electrical conduits	≥ 100
	Distance to HVAC split line combinations	≥ 25
	Distance to combustible pipes	≥ 100


HVAC split line combinations		[mm]
	Distance to the side edge	≥ 0
	Distance to cables and electrical conduits	≥ 100
	Distance to “NanoSun <sup>2</sup> ” double solar pipes	≥ 100


### 4. Used products


	<p><b>PYRO-SAFE FLAMMOTECT- A Coating</b></p> <p>Reaction to fire class in accordance with EN 13501-1: class E 12.5-kg pail - product No. 01155101</p>
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	<p><b>PYRO-SAFE DG-CR 1,5</b></p> <p>Cable and pipe wrap in accordance with ETA-13/0100 Reaction to fire class in accordance with EN 13501-1: B-s1,d0 Intumescent material for wrapping cables and pipes of various widths</p>
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	<p><b>PYRO-SAFE FLAMMOTECT- A Solid emulsion</b></p> <p>Reaction to fire class in accordance with EN 13501-1: class E 12.5-kg pail - product No. 01155106</p>
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	<p><b>Mineral wool</b></p> <p>in acc. with abZ approval Z-23.15-1468 Reaction to fire class in accordance with EN 13501-1: class A1 Melting point &gt; 1,000 °C 10 kg bag - product No. 01183000</p>
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	<p><b>PYRO-SAFE FLAMMOTECT- A Filler</b></p> <p>Reaction to fire class in accordance with EN 13501-1: class E 12.5-kg pail - product No. 01155104</p>
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	<p><b>Label</b></p> <p>1 piece - Part No.</p>
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	<p><b>PYRO-SAFE FLAMMOTECT- A Filler</b></p> <p>Reaction to fire class in accordance with EN 13501-1: class E 310- cartridge - product No. 01155115</p>
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	<p><b>Recommended tools</b></p> <ul style="list-style-type: none"> <li>• Spatulas, brushes, masking tape</li> <li>• Possibly foil, folding ladder</li> <li>• Pliers, galvanized steel wire</li> </ul>
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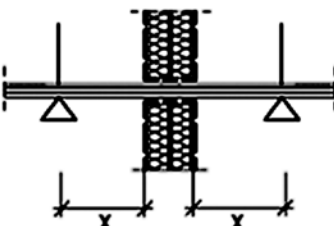
## PYRO-SAFE ES

### 5. Regulations and variants

- The cable penetration seal shall be used to seal openings without installations (so-called reserve partition).
- Penetration seals in floors shall be protected with suitable barriers or covered with grating by the installer in order to prevent them from being loaded or walked on.
- For rectangular openings in plasterboard, the inside edge shall be completely lined with an at least 12,5 mm thick layer of concrete or gypsum based slabs with a fire reaction class A1 or A2 according to EN 13501-1.
- For round openings ( $\varnothing = 150$  mm) in plasterboard, the inside edge shall be covered with a layer of PYRO-SAFE DG-CR 1,5, with the coated side toward the opening.
- The penetration seal surface shall be coated with a layer of PYRO-SAFE FLAMMOTECT-A, dry thickness  $\geq 3$  mm.
- The fire protection measures are shown on the following pages and apply also for post-installations.

### 5.1 Rules over the first cable/pipe support

- The core of the first supports before the installation shall be made of non-combustible material (fire resistance class A1 or A2 according to EN 13501-1) and the supports shall be placed at a distance according to the table below.

First supports for wall installations		X [mm]
	Cables, cable bundles	$\leq 300$
	Stiff Electrical conduits	
	Combustible pipes	
	"NanoSUN <sup>2</sup> " double solar pipes	
	HVAC split line combinations	

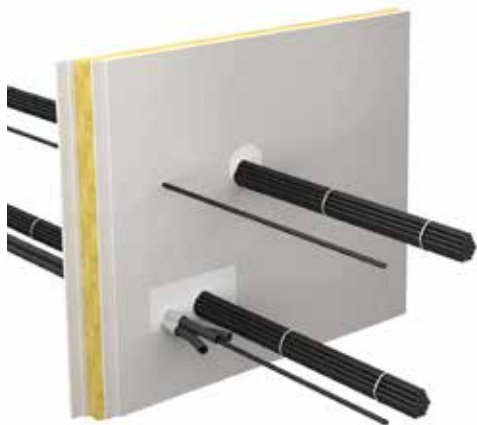
## PYRO-SAFE ES

### 6. Fire protection measures / Installation procedure in walls

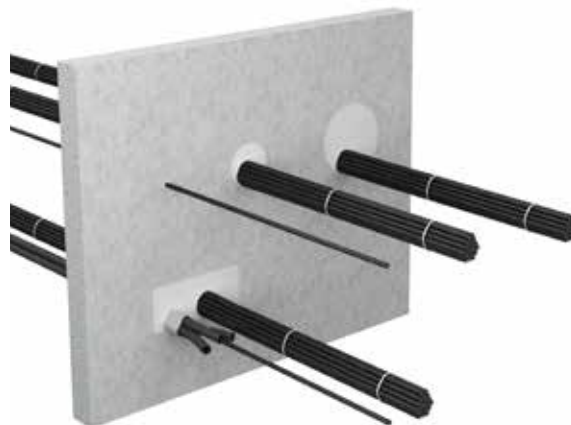
#### 6.1 Cables and electrical conduits

Suitable PYRO-SAFE ES penetration seals

##### PLASTERBOARDS

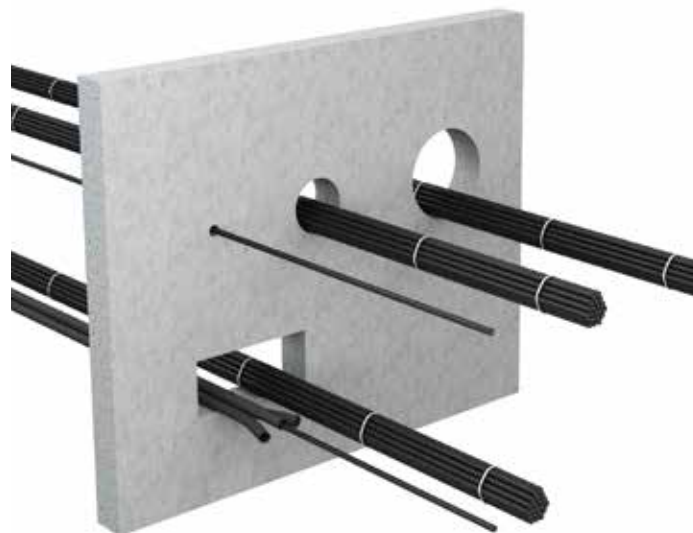
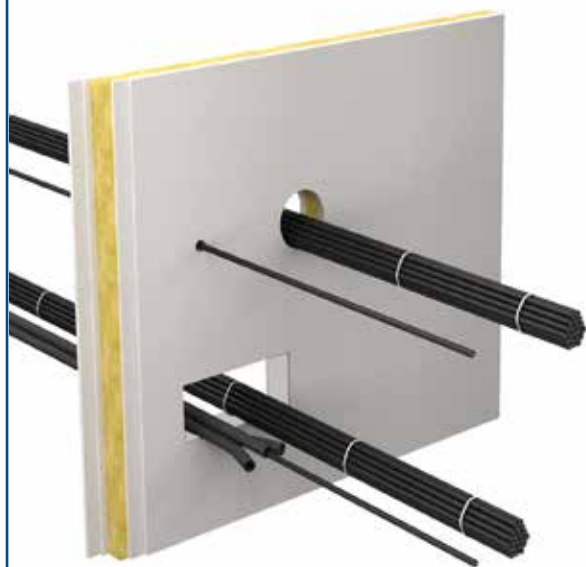


##### MASSIVE WALLS



rectangular ( 350 mm x 150 mm) and/or round  $\varnothing \leq 30 \text{ mm} \leq \varnothing 150 \text{ mm}$ .

#### 1. Opening with penetrations



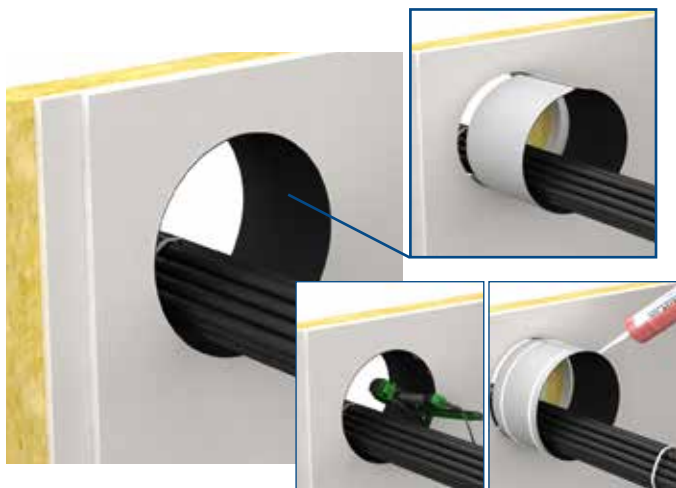


## PYRO-SAFE ES

### 6. Fire protection measures / Installation procedure

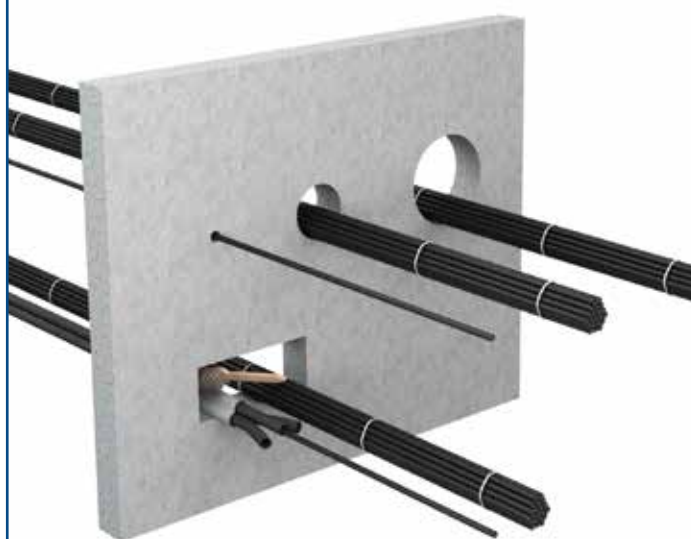
#### 6.1 Cables and electrical conduits

2. In round openings ( $\varnothing \leq 150$  mm) insert PYRO-SAFE DG-CR 1,5 with the coated side inwards



and either fix with staples or glue with PYRO-SAFE FLAMMOTECT-A filler.

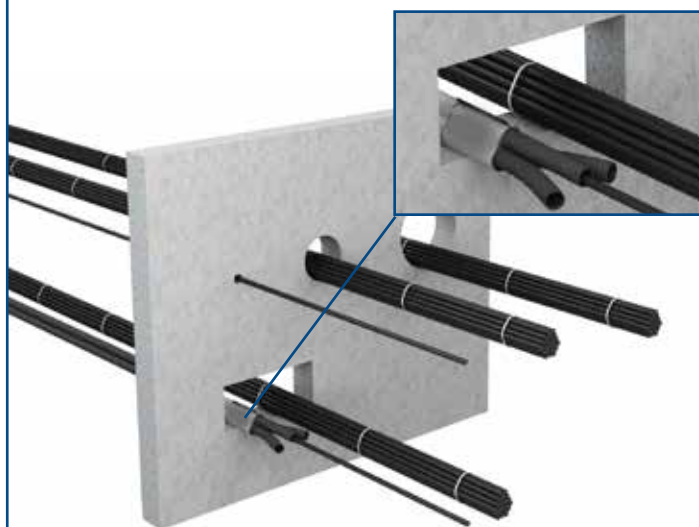
2. Clean the inside edges of the openings and place masking tape around the opening.



3. Clean the inside edges of the opening and in rectangular openings place masking tape around the opening (edge planking is not supplied by the manufacturer).



3. Wrap electrical conduits with PYRO-SAFE DG-CR 1,5 (see details at page 17).

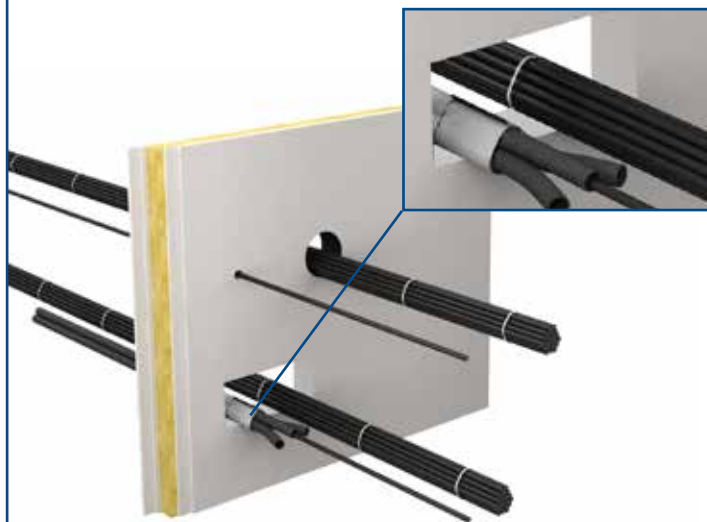


## PYRO-SAFE ES

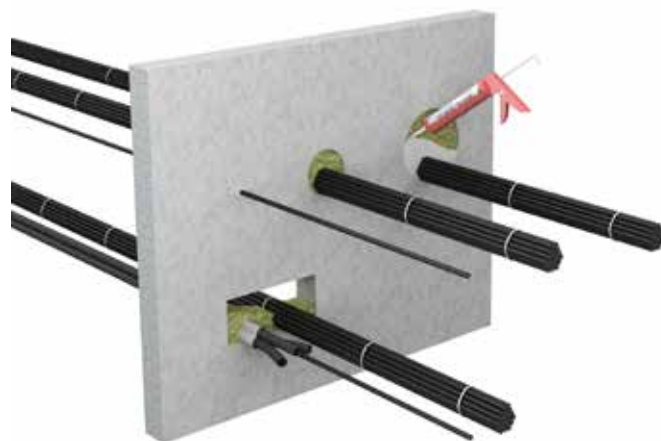
### 6. Fire protection measures / Installation procedure

#### 6.1 Cables and electrical conduits

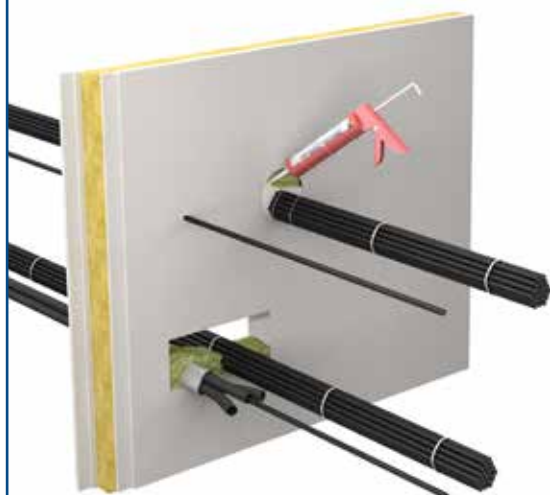
4. Wrap electrical conduits with PYRO-SAFE DG-CR 1,5 (see details at page 17).



4. Fill round ( $\varnothing \leq 150$  mm) and rectangular openings with mineral fibre wool and seal with PYRO-SAFE FLAMMOTECT-A filler, dry film thickness  $\geq 3$  mm (for round openings with  $\varnothing \leq 30$  mm seal 25 mm in depth).



5. Fill round ( $\varnothing \leq 150$  mm) and rectangular openings with mineral fibre wool and seal with PYRO-SAFE FLAMMOTECT-A filler, dry film thickness  $\geq 3$  mm (for round openings with  $\varnothing \leq 30$  mm seal 25 mm in depth).



5. If required or mandatory, fill the identification label and apply on the side or below (not over!) the installation.





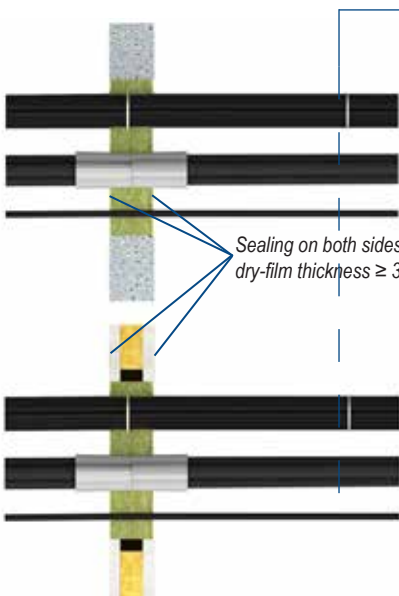
## PYRO-SAFE ES

### 6 Fire protection measures / Installation procedure

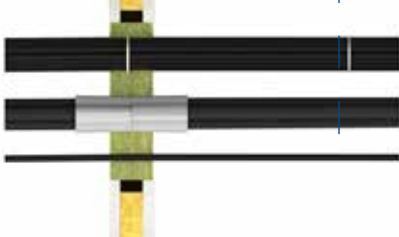
#### 6.1 Cables and electrical conduits

Fire protection measures - PYRO-SAFE ES

**MASSIVE WALLS**



**PLASTERBOARD**



First support at ≤ 300 mm; not provided by the manufacturer (for details see Page 14)

125-mm wrap, both sides, 50 mm inside/ 75 mm before seal surface

no measures needed for single cable/cable bundles

Sealing on both sides with PYRO-SAFE FLAMMOTECT-A filler  
dry-film thickness ≥ 3 mm

125-mm wrap, both sides, 50 mm inside/ 75 mm before seal surface

no measures needed for single cable/cable bundles

for details see table below

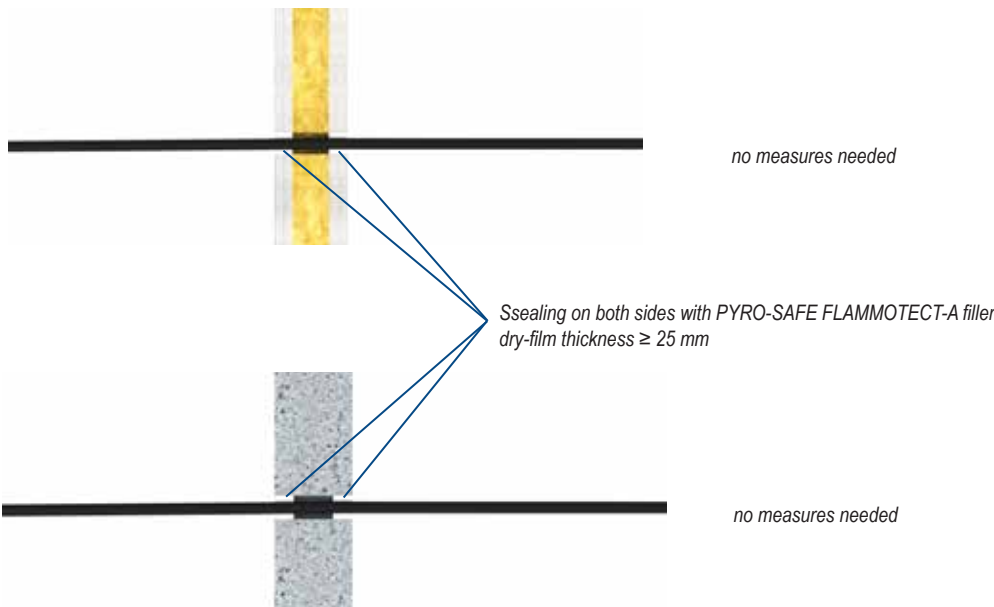
Measures in walls (per side)							
	max. fire resistance class	wrap width [mm]	Length inside / before seal surface [mm]		Layers	Overlap [mm]	Steel-wire fasteners (amount)
			Inside	before			
Cables, cable bundles							
Cable Ø ≤ 21 mm	EI 90 / E 90	-					
Cable bundle Ø ≤ 100 mm with cable Ø ≤ 22 mm	EI 90 / E 90	-					
Electrical conduits							
Flexible conduit dia ≤ 32 mm or conduit bundle dia ≤ 100 mm with conduit dia ≤ 32 mm each with/without cable dia ≤ 21 mm	EI 90 / E 90	125	50	75	3	-	-
Inflexible conduit outside Ø 16 x 1.0 mm without cable.	EI 90 / E 90	-					

PYRO-SAFE ES

6 Fire protection measures for cables in walls

6.1 cables in walls PYRO-SAFE ES round ≤ Ø 30 mm (Boreholes)

Measures - Boreholes ≤ Ø 30 mm



Measures in walls (Boreholes)					
	max. fire resitance class	Type	Dry film thickness [mm]	Length inside / before seal surface [mm]	
				Inside	before
<b>Cables</b>					
Cable Ø ≤ 21 mm	EI 90 / E 90	sealing with PYRO-SAFE FLAMMTECT-A filler	≥ 25 mm	≥ 25 mm	-
Up to 3 cables Ø ≤ 14 mm or cross-section of the services in the opening ≤ 65 % ; no spacing required			≥ 25 mm	≥ 25 mm	-

## PYRO-SAFE ES

### 6. Fire protection measures / Installation procedure in walls

#### 6.2 Combustible pipes

Suitable PYRO-SAFE ES penetration seals

##### PLASTERBOARDS

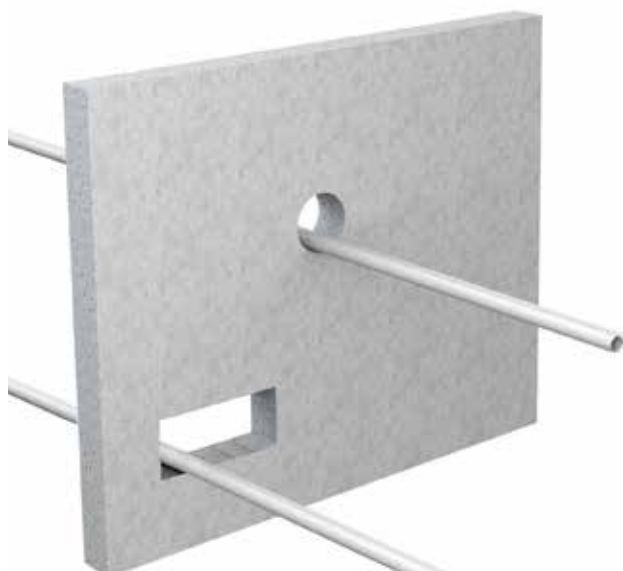
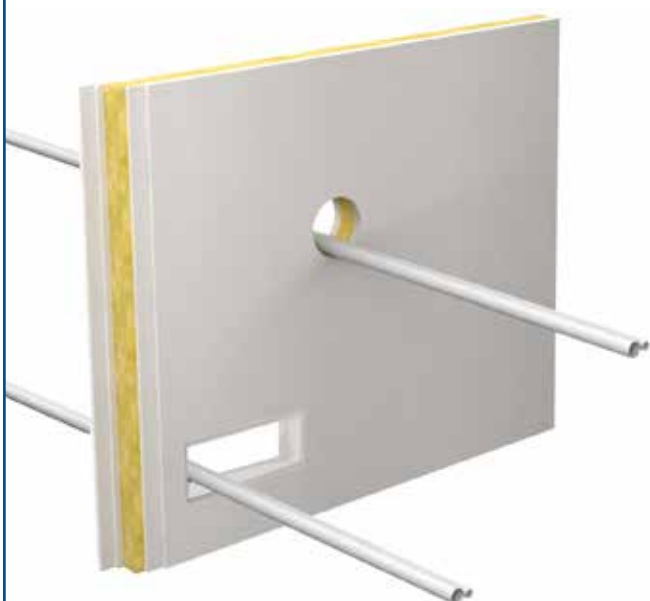


##### MASSIVE WALLS



rectangular ( 350 mm x 150 mm) and/or round  $\varnothing \leq 150$  mm

#### 1. Opening with penetrations

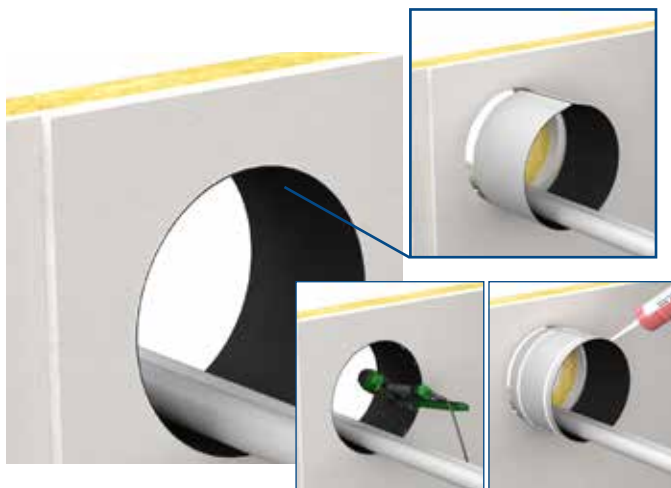


## PYRO-SAFE ES

### 6. Fire protection measures / Installation procedure in walls

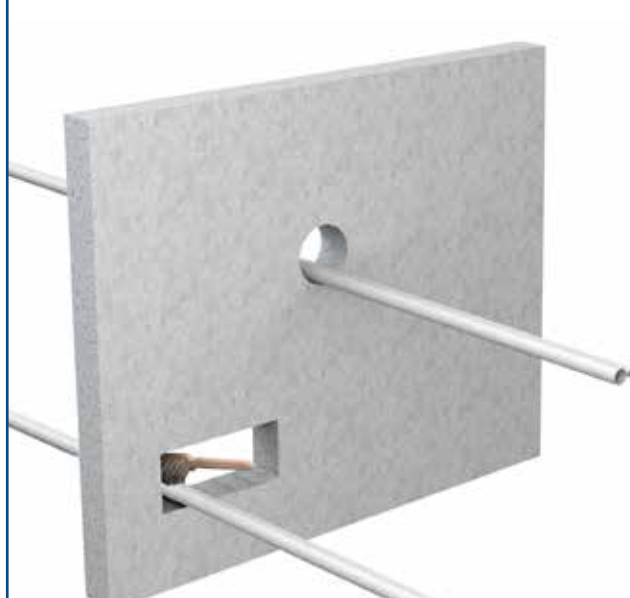
#### 6.2 Combustible pipes

2. In round openings ( $\varnothing \leq 150$  mm) insert PYRO-SAFE DG-CR 1,5 with the coated side inwards



and either fix with staples or glue with PYRO-SAFE FLAMMOTECT-A filler.

2. Clean the inside edges of the openings and place masking tape around the opening.



3. In rectangular and round openings install the PYRO-SAFE DG 1,5 wrap (for details see table page 22)



3. In rectangular and round openings install the PYRO-SAFE DG 1,5 wrap (for details see table page 22)



## PYRO-SAFE ES

### 6. Fire protection measures / Installation procedure in walls

#### 6.2 Combustible pipes

4. Fill the opening with mineral fibre wool.



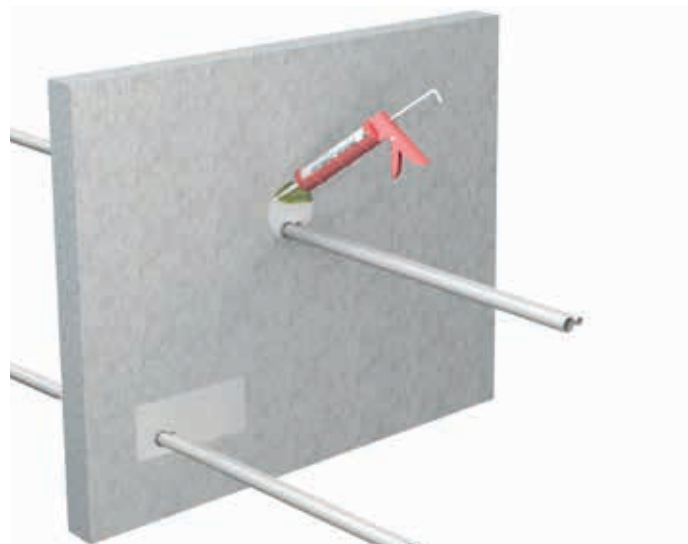
4. Fill the opening with mineral fibre wool.



5. Seal with PYRO-SAFE FLAMMOTECT-A filler, dry film thickness  $\geq 3$  mm.



5. Seal with PYRO-SAFE FLAMMOTECT-A filler, dry film thickness  $\geq 3$  mm.

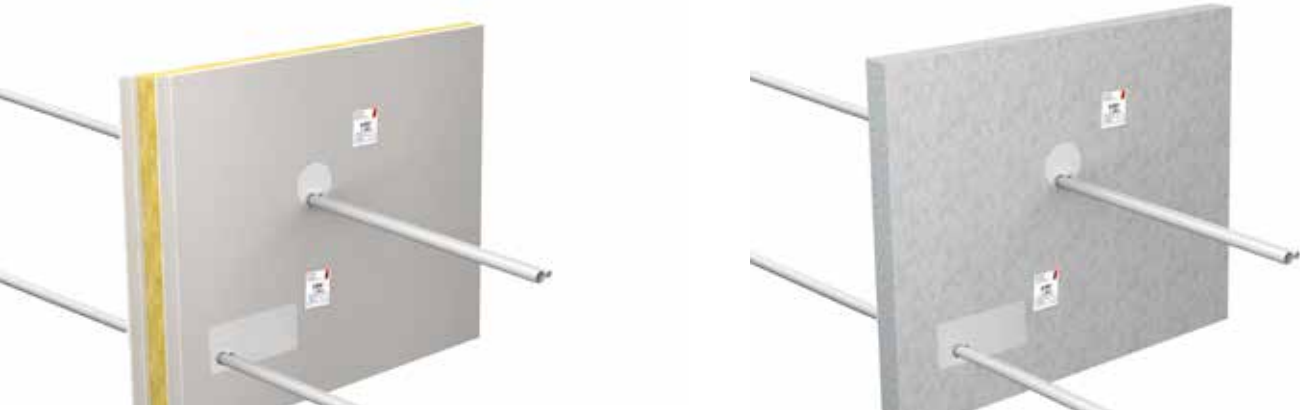


PYRO-SAFE ES

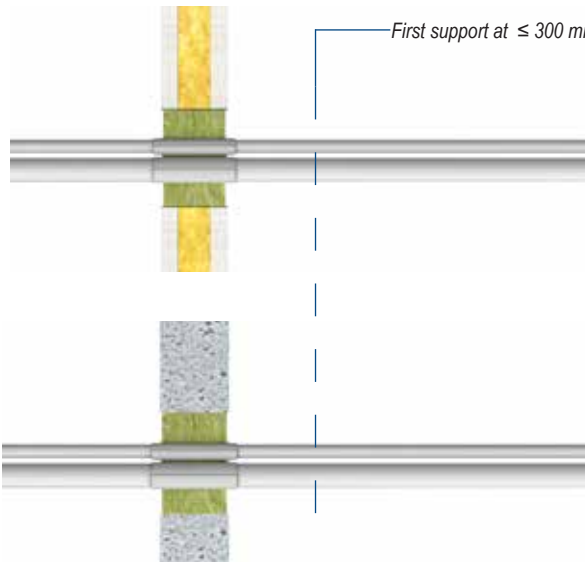
6. Fire protection measures / Installation procedure in walls

6.2 Combustible pipes

6. If required or mandatory, fill the identification label and apply on the side or below (not over!) the installation.



Fire protection measures



First support at  $\leq 300$  mm; not provided by the manufacturer (for details see Page 14)

Wrap each pipe with PYRO-SAFE DG 1.5 for a length of 125 mm in the middle of wall, overlapping  $\geq 25$  mm; no fastening

Wrap each pipe with PYRO-SAFE DG 1.5 for a length of 125 mm in the middle of wall, overlapping  $\geq 25$  mm; no fastening

for details see table below

Measures in walls (per side)							
	max. fire resitance class	wrap width [mm]	Length inside / before seal surface [mm]		Layers	Overlap [mm]	Steel-wire fasteners (amount)
			Inside	before			
<b>Combustible pipes</b>							
≤ 2 PVC-U or PVC-C pipes Outside Ø ≤ 32 mm with ≤ 2 accessory lines (Ø ≤ 14 mm, ≤ 5 x 1,5 mm²), no spacing.	EI 90	125	100	12,5 each side	1	≥ 25	-



## PYRO-SAFE ES

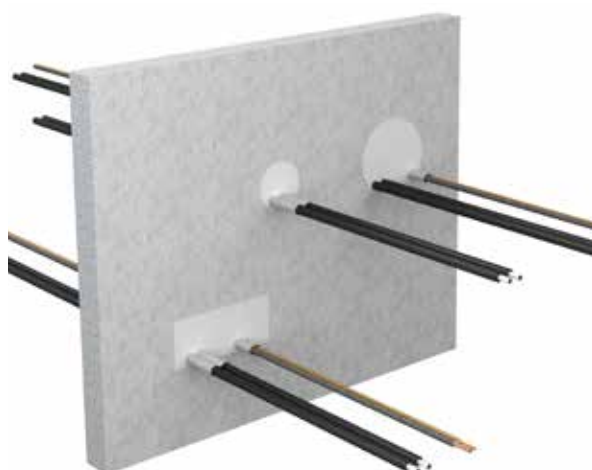
### 6. Fire protection measures / Installation procedure in walls 6.3 “NANOSUN 2” double solar pipes, HVAC split line combinations

Suitable PYRO-SAFE ES penetration seals

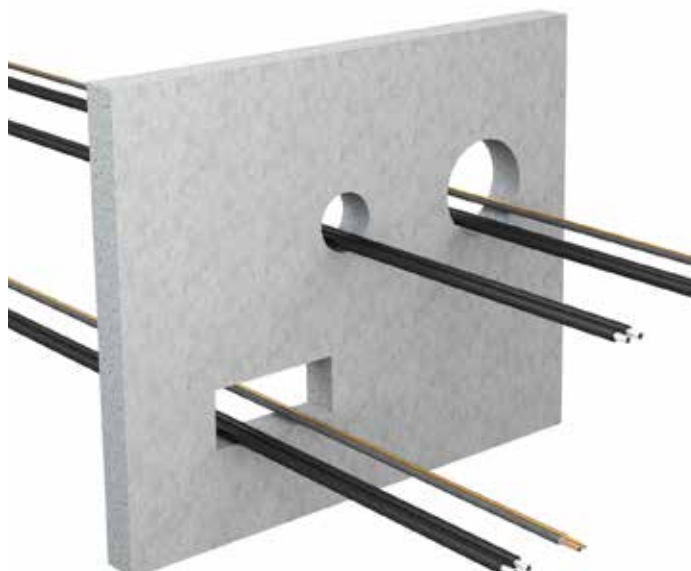
#### PLASTERBOARDS



#### MASSIVE WALLS



#### 1. Opening with penetrations

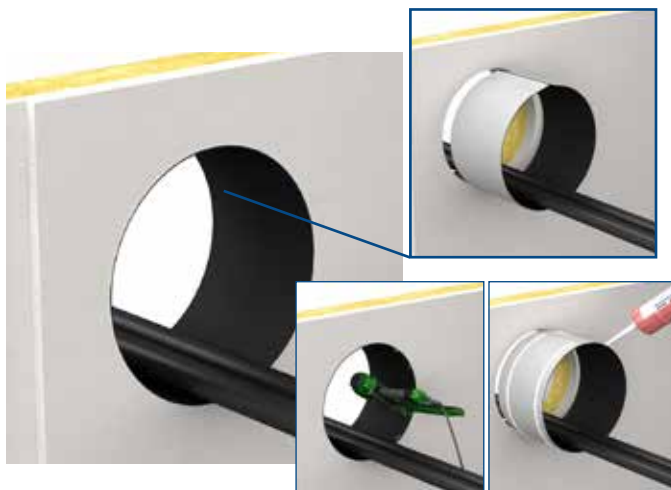


## PYRO-SAFE ES

### 6. Fire protection measures / Installation procedure in walls

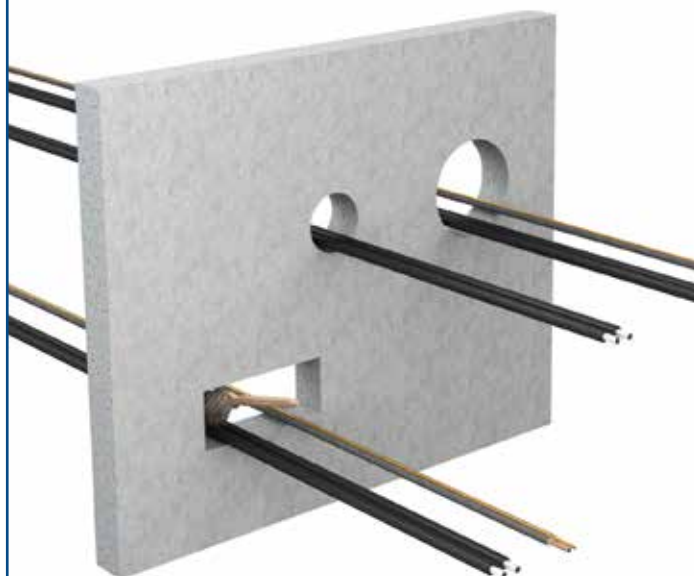
#### 6.3 "NANOSUN 2" double solar pipes, HVAC split line combinations

2. In round openings ( $\varnothing \leq 150$  mm) insert PYRO-SAFE DG-CR 1,5 with the coated side inwards

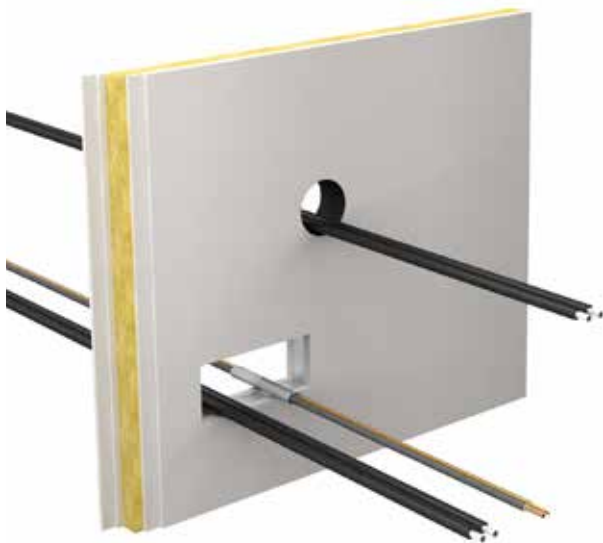


and either fix with staples or glue with PYRO-SAFE FLAMMOTECT-A filler.

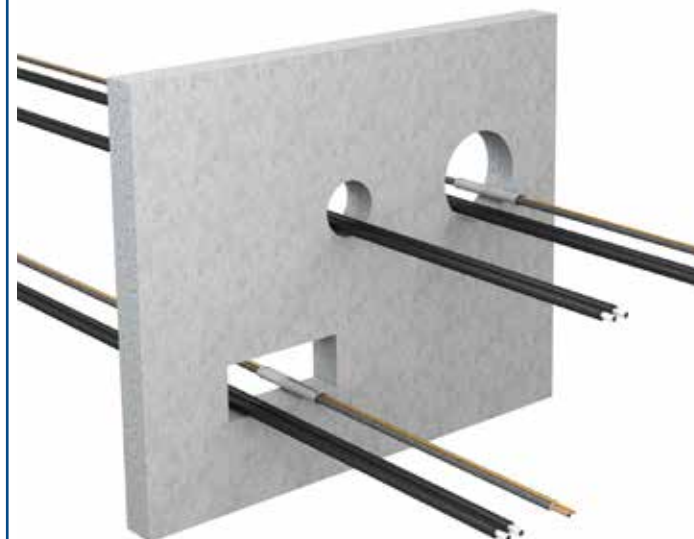
2. Clean the inside edges of the opening and place masking tape around the opening.



3. In rectangular openings clean the inside edges of the opening and place masking tape around the opening (edge planking is not supplied by the manufacturer); wrap HVAC split line combinations with PYRO-SAFE DG-CR 1,5 (see details at page 26)



3. Wrap the HVAC split line combinations with PYRO-SAFE DG-CR 1,5 (see details at page 26)



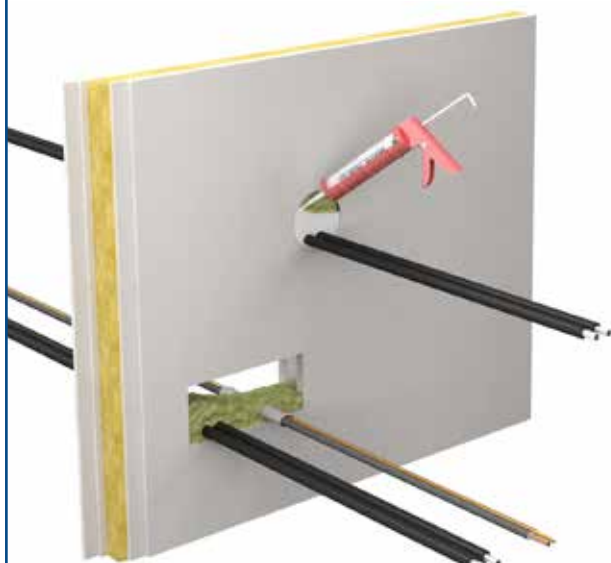


## PYRO-SAFE ES

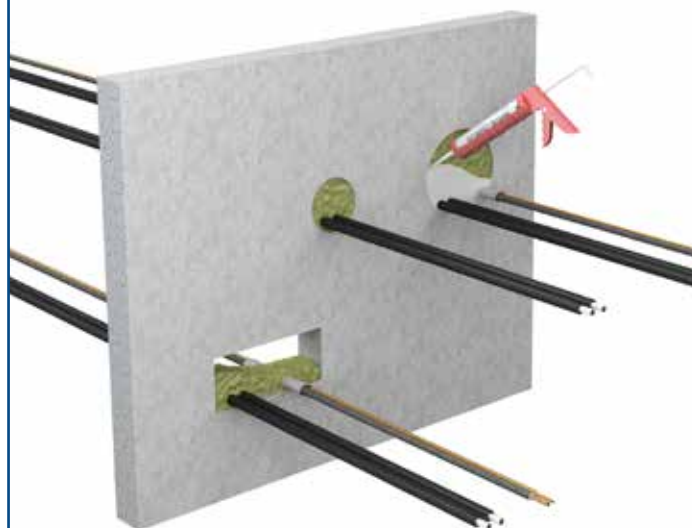
### 6. Fire protection measures / Installation procedure in walls

#### 6.3 "NANOSUN<sup>2</sup>" double solar pipes, HVAC split line combinations

4. Fill round ( $\varnothing \leq 150$  mm) and rectangular openings with mineral fibre wool and seal with PYRO-SAFE FLAMMOTECT-A filler, dry film thickness  $\geq 3$  mm.



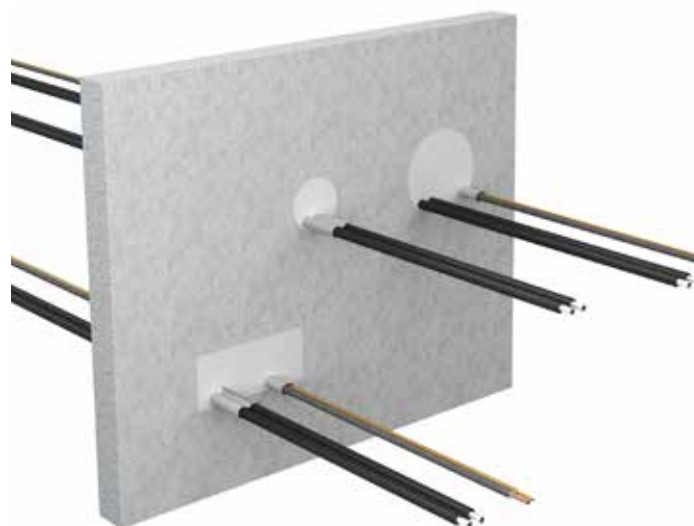
4. Fill round ( $\varnothing \leq 150$  mm) and rectangular openings with mineral fibre wool and seal with PYRO-SAFE FLAMMOTECT-A filler, dry film thickness  $\geq 3$  mm.



5. Wrap "NanoSUN<sup>2</sup>" double solar pipes with PYRO-SAFE DG-CR 1,5 (see details at page 26).



5. Wrap "NanoSUN<sup>2</sup>" double solar pipes with PYRO-SAFE DG-CR 1,5 (see details at page 26).



# PYRO-SAFE ES

## 6. Fire protection measures / Installation procedure

### 6.3 “NANOSUN 2” double solar pipes, HVAC split line combinations in walls

5. If required or mandatory, fill the identification label and apply on the side or below (not over!) the installation.

Fire protection measures

First support at  $\leq 300\text{ mm}$  ; not provided by the manufacturer (for details see Page 14)

Wrap twice per side with PYRO-SAFE DG-CR 1.5 wrap for a length of 125 mm

Wrap twice per side with PYRO-SAFE DG-CR 1.5 wrap for a length of 125 mm

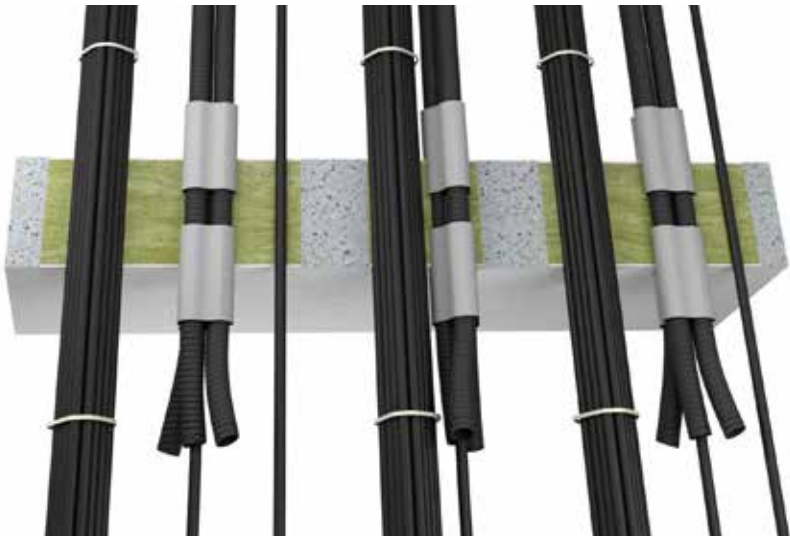
for details see table below

Measures in walls (per side)							
	max. fire resitance class	wrap width [mm]	Length inside / before seal surface [mm]		Layers	Overlap [mm]	Steel-wire fasteners (amount)
			Inside	before			
HVAC split line combinations (only rectangular and round Ø≤ 258 mm)							
Pipe 1/Pipe 2 outer Ø 6 - 10 mm/10 - 18 mm	EI 30 / E 90	125	50	75	2	-	2
“NanoSUN” <sup>2c</sup> (u/u)							
DN16	EI 90 / E 90	125	-	125	1	≥ 25	2
DN40	EI 30 / E 90						

PYRO-SAFE ES

7. Fire protection measures / Installation procedure in floors  
7.1 Cables

Fire protection measures



for details see table below

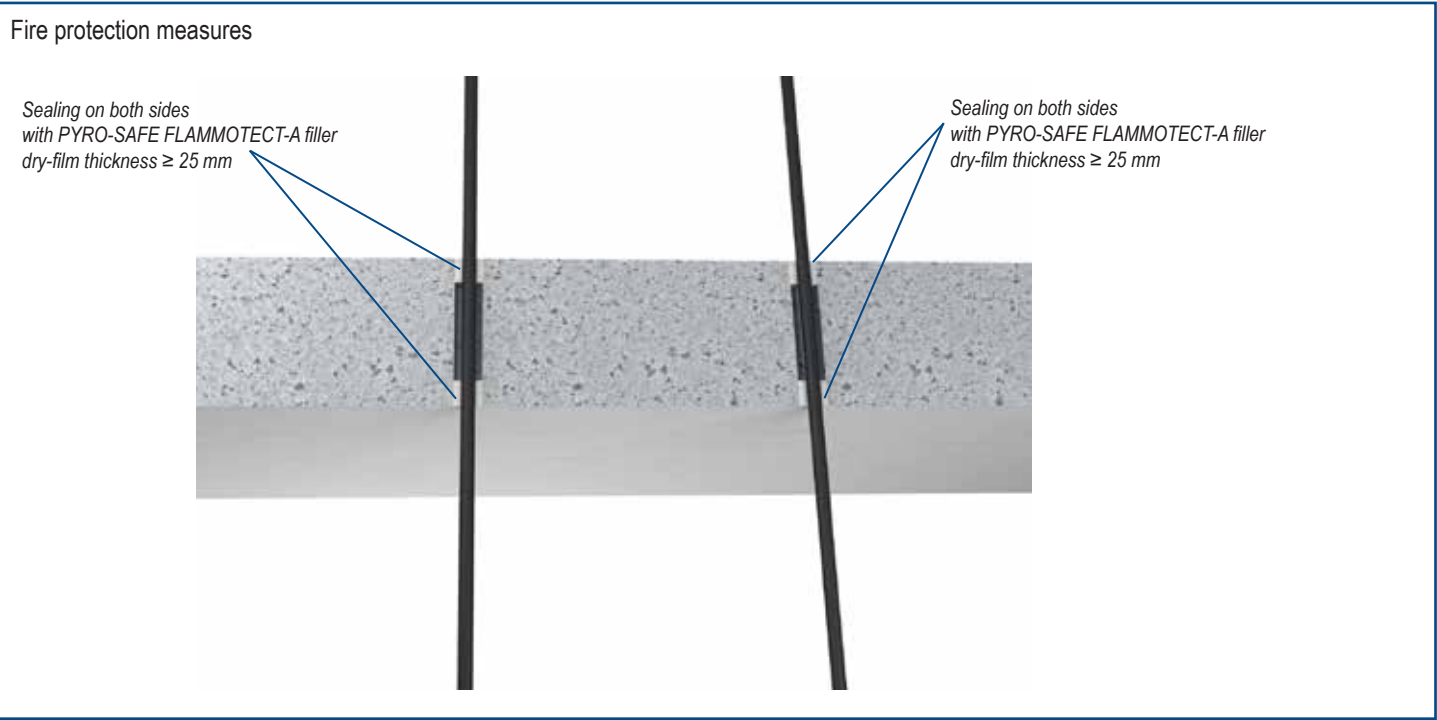
Wrap both sides with PYRO-SAFE DG-CR1.5 for a length of 125 mm, 50 mm inside/ 75 mm before seal surface

Measures in floors (per side)							
	max. fire resitance class	wrap width [mm]	Length inside / before seal surface [mm]		Layers	Overlap [mm]	Steel-wire fasteners (amount)
			Inside	before			
Cables, cable bundles							
Cable Ø ≤ 21 mm	EI 90 / E 90	-					
Cable bundle Ø ≤ 100 mm with cable Ø ≤ 21 mm		-					
Electrical conduits flexible							
Conduit Ø ≤ 32 mm or conduit bundle Ø ≤ 100 mm with conduit Ø ≤ 32 mm each with/without Cable Ø ≤ 21 mm	EI 90 / E 90	125	50	75	3	-	-

PYRO-SAFE ES

7 Fire protection measures / Installation procedure in floors

7.1 Cables in floors PYRO-SAFE ES round ≤ Ø 30 mm (Boreholes)

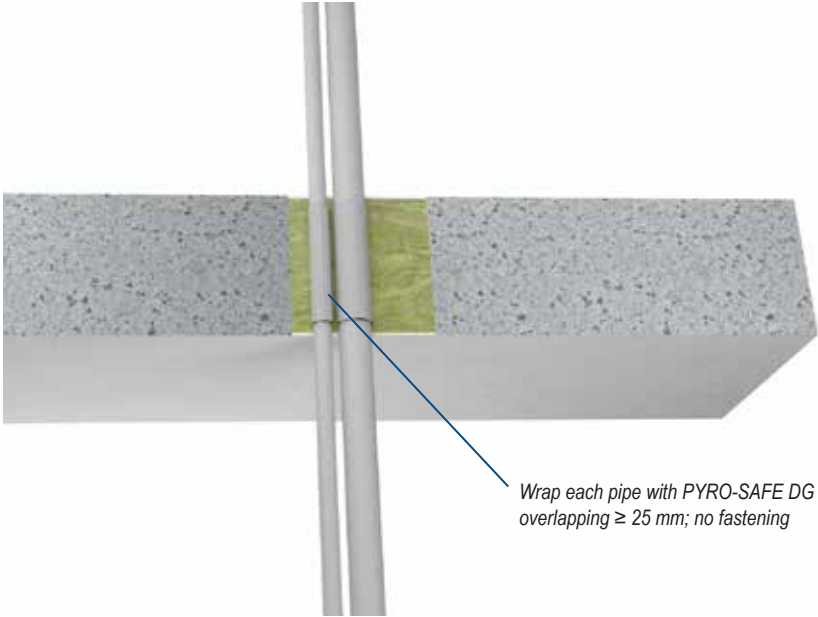


Measures in floor - Boreholes					
	max. fire resistance class	Type	Dry film thickness [mm]	Length inside / before seal surface [mm]	
				Inside	before
<b>Cables</b>					
Cable Ø ≤ 21 mm	EI 90 / E 90	sealing with PYRO-SAFE FLAMMTECT-A filler	≥ 25 mm	≥ 25 mm	-
≤ 3 cables Ø ≤ 14 mm or cross-section of the services in the opening ≤ 65 % ; no spacing required			≥ 25 mm	≥ 25 mm	-

PYRO-SAFE ES

7. Fire protection measures / Installation procedure in floors  
7.2 Combustible pipes

Fire protection measures



Wrap each pipe with PYRO-SAFE DG 1.5 for a length of 125 mm in the middle of wall, overlapping ≥ 25 mm; no fastening

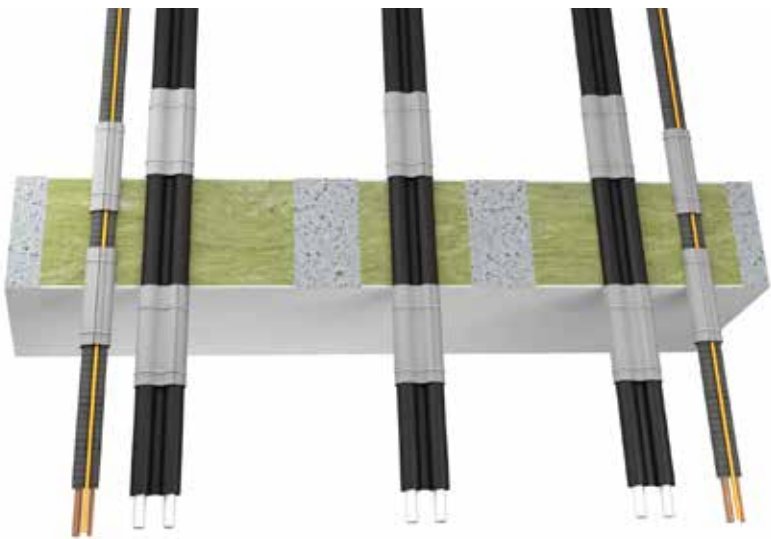
for details see table below

Measures for floor penetration seals (only one wrap)							
	fire resistance class	wrap width [mm]	Length inside / before seal surface [mm]		Layers	Overlap [mm]	Steel-wire fasteners (amount)
			Inside	before			
Combustible pipes							
≤ 2 PVC-U or PVC-C pipes Outside Ø ≤ 32 mm with ≤ 2 accessory lines(Ø ≤ 14 mm, ≤ 5 x 1,5 mm²), no spacing.	EI 90 / E 90	125	100	12,5 each side	1	≥ 25	-

PYRO-SAFE ES

7 Fire protection measures / Installation procedure in floors  
7.3 “NANOSUN<sup>2</sup>” double solar pipes, HVAC split line combinations

Fire protection measures



Wrap twice per side with PYRO-SAFE DG-CR 1.5 wrap for a length of 125 mm

Measures in floors (per side)							
	max. fire resitance class	wrap width [mm]	Length inside / before seal surface [mm]		Layers	Overlap [mm]	Steel-wire fasteners (amount)
			Inside	before			
HVAC split line combinations (only rectangular and round Ø ≤ 258 mm)							
Pipe 1/Pipe 2 outside Ø 6 - 10 mm/10 - 18 mm	EI 30 / E 90	125	50	75	2	-	2
“NanoSUN <sup>2</sup> ” (u/u)							
DN16	EI 90 / E 90	125	-	125	1	≥ 25	2
DN40	EI 30 / E 90						

# Declaration of Performance

## N° 01155-PYRO-SAFE-FLAMMOTECT-A

### PYRO-SAFE FLAMMOTECT-A

Date: 27.01.2015  
Rev. 02  
Page 1 of 1

Unique identification code of the product type  
**PYRO-SAFE FLAMMOTECT-A**

Intended use:  
**Ablative fire stopping product used in penetration seals**

Producer  
**svt Brandschutz Vertriebsgesellschaft mbH International**  
**Gluesinger Strasse 86**  
**D - 21217 Seevetal**  
**Germany**

System for assessing and verifying constancy of performance  
**System 1**

European Assessment Document  
**ETAG 026-2:2011-10-14**

European Technical Assessment  
**ETA-14/0418 of 04.12.2014**

Technical Assessment Body  
**Deutsches Institut für Bautechnik (DIBt), Berlin**

The notified body  
**Materialprüfanstalt für das Bauwesen Braunschweig, code number 0761**

#### Declared performance

Essential characteristics	Performance	Harmonised technical specification
Reaction to fire	<b>Class E</b>	EN 13501-1
Fire resistance	<b>Class EI 30</b> of a penetration seal (with mineral wool; see Annexes 1 and 17-22 of ETA-14/0418 for details)	EN 13501-2
	<b>Class EI 60</b> of a penetration seal (with mineral fibre board single-layer; see Annexes 1 and 2-6 of ETA-14/0418 for details)	
	<b>Class EI 60</b> of a penetration seal (with mineral wool; see Annexes 1 and 23-27 of ETA-14/0418 for details)	
	<b>Class EI 90</b> of a penetration seal (with mineral wool; see Annexes 1 and 28-32 of ETA-14/0418 for details)	
	<b>Class EI 90</b> of a penetration seal (without mineral wool; see Annexes 1 and 33 of ETA-14/0418 for details)	
	<b>Class EI 120</b> of a penetration seal (with mineral fibre boards double-layer; see Annexes 1 and 7-11 of ETA-14/0418 for details)	
	<b>Class EI 240</b> of a penetration seal (with mineral fibre boards quadruple-layer; see Annexes 1 and 12-16 of ETA-14/0418 for details)	
Emission of dangerous substances	no dangerous substances	ETAG 026-2
Durability and serviceability	Use category type X	EOTA TR 024

The performance of the product identified above is in conformity with the set of declared performances. This declaration of performance is issued, in accordance with Regulation (EU) No. 305/2011, under the sole responsibility of the manufacturer identified above

DoP online available at [www.svt.de](http://www.svt.de).

Signed for and on behalf of the manufacturer by:



i.V. Christian Meyer-Korte  
Head of Product Management



i.V. Andree Schober  
Head of chemical department

