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Authorised and notified according  
to Article 29 of the Regulation (EU)  
No 305/2011 of the European  
Parliament and of the Council of 9  
March 2011

MEMBER OF EOTA



## European Technical Assessment ETA-22/0023 of 2023/08/21

### General Part

#### Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the  
construction product:

Pacifyre® G – Fire Protection Graphite Sealant

Product family to which the  
above construction product  
belongs:

Fire Stopping and Sealing Product -  
Pipe and cable penetration seal

Manufacturer:

J. van Walraven Holding B.V.  
Industrieweg 5  
NL-3641 RK Mijdrecht  
Tel. + 31 297 23 30 00  
Internet [www.walraven.com](http://www.walraven.com)

Manufacturing plant:

Walraven Factory S7

This European Technical  
Assessment contains:

27 pages including 24 annexes which form an integral  
part of the document

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

EAD 350454-00-1104: "Fire stopping and Fire Sealing  
Products, Penetration Seals"

This version replaces:

The ETA with the same number, issued on 2022-02-17

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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## II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

### 1 Technical description of product

Pacifyre® G – Fire Protection Graphite Sealant is a fire retardant sealant - one component, water based acrylic dispersion with elastoplastic properties.

Detailed information about the components used in combination with the Pacifyre® G – Fire Protection Graphite Sealant are given in annex A1.

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

### 2 Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

The Pacifyre® G – Fire Protection Graphite Sealant is intended to be used as to provide a fire resistant and smoke tight seal around cables, plastic-, multi-layer & metallic pipe penetrations or open cavities. It has to be used in combination with a stone wool backfilling.

The specific elements of construction for which Pacifyre® G – Fire Protection Graphite Sealant may be used are described in Annex A-2.

Wall or floor constructions	
Separating element	Construction
Flexible walls	With a minimum thickness of 100 mm and a classification according to EN 13501-2: $\geq$ EI 90
Rigid walls	With a minimum thickness of 100 mm and a classification according to EN 13501-2: for the required fire resistance period
Rigid floors	With a minimum thickness of 150 mm and a classification according to EN 13501-2: for the required fire resistance period

Table 1: Wall or floor constructions according to Annex A-2

In some cases, a single sided penetration is possible (see annex B-2 and C-1). Both, Pacifyre® G – Fire Protection Graphite Sealant and the backing, need to be installed just on one side of the separating element (for walls) or on the bottom or top side of the separating element depending on the required fire resistance (for floor).

Pacifyre® G – Fire Protection Graphite Sealant can be used as a penetration seal for:

- Single PE, PP and PVC pipes  $\varnothing \leq 50$  mm
- Single and multiple multi-layer pipes  $\varnothing \leq 32$  mm with and without FEF insulation
- Single and multiple copper or other metal pipes  $\varnothing \leq 35$  mm with FEF insulation
- Sheathed single ( $\varnothing \leq 21$  mm) and tied cable bundles of telecommunication cables  $\varnothing \leq 50$  mm
- Blank penetration

The first service support is located maximum 500 mm from the supporting construction.

#### Pipes:

- Single pipes can be installed in angles between 45° and 90° to the supporting construction.
- The pipes tested with pipe end configuration U/U cover U/C, C/U and C/C end situations as well.
- The pipes tested with pipe end configuration U/C cover C/U and C/C pipe end situations as well.
- Metal pipes with a thermal conductivity lower than the mentioned metal pipe materials are covered.

The detailed descriptions of these construction elements are given in Annex A-3 to C-8 of this ETA, which cover assemblies installed in accordance with the provisions given in the Annexes. Other intended uses may be supported by other means at national level but are not covered by this ETA.

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 the Pacifyre® G – Fire Protection Graphite Sealant, when installed in the works, provided that the penetration seal is subject to appropriate installations, in accordance with the manufacturer's recommendations.

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

Characteristic	Assessment of characteristic									
<b>3.2 Safety in case of fire (BWR 2)</b>										
Reaction to fire	The intumescent material of Pacifyre® G – Fire Protection Graphite Sealant is classified as <b>Euroclass E</b> in accordance with EN 13501-1 and Delegated Regulation 2016/364									
Resistance to fire	The Pacifyre® G – Fire Protection Graphite Sealant system is classified as described in the Annexes B-2 to C-8 in accordance with EN 13501-2									
<b>3.3 Hygiene, health, and the environment (BWR 3)</b>										
Air permeability	No performance assessed									
Water permeability	No performance assessed									
Content, emission and/or release of dangerous substances*	<table border="1"> <thead> <tr> <th></th> <th>3 days [µg/m<sup>3</sup>]</th> <th>28 days [µg/m<sup>3</sup>]</th> </tr> </thead> <tbody> <tr> <td>SVOC</td> <td>-</td> <td>&lt; 5</td> </tr> <tr> <td>TVOC</td> <td>≤ 10.000</td> <td>374</td> </tr> </tbody> </table>		3 days [µg/m <sup>3</sup> ]	28 days [µg/m <sup>3</sup> ]	SVOC	-	< 5	TVOC	≤ 10.000	374
	3 days [µg/m <sup>3</sup> ]	28 days [µg/m <sup>3</sup> ]								
SVOC	-	< 5								
TVOC	≤ 10.000	374								
<b>3.4 Safety and accessibility in use (BWR 4)</b>										
Mechanical resistance and stability	No performance assessed									
Resistance to impact/movement	No performance assessed									
Adhesion	No performance assessed									
Durability	Use Category: Type <b>Z<sub>2</sub></b>									
<b>3.5 Protection against noise (BWR 5)</b>										
Airborne sound insulation	No performance assessed									
<b>3.6 Energy Economy and heat retention (BWR 6)</b>										
Thermal properties	No performance assessed									
Water vapour permeability	No performance assessed									

See additional information in section 3.7

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

### 3.7 General aspects

#### Durability and serviceability:

The verification of durability and serviceability is part of testing the essential characteristics. The Pacifyre® G – Fire Protection Graphite Sealant fulfils the requirements according to EAD 350454-00-1104 – for use **Category type: Z<sub>2</sub>**.

Although a fire penetration seal is intended for indoor applications only, the construction process may result in it being subjected to more exposed conditions for a period before the building is closed. For this case provisions shall be made to protect temporarily exposed fire penetration seals according to the ETA-holder's installation instructions.

The proof and its assessment concerning applicability under climate conditions were carried out in accordance with EAD 350454-00-1104; intended for uses in internal conditions with humidity lower than 85% RH excluding temperatures below 0° C, without exposure to rain or UV.

The European Technical Assessment is issued for the product based on agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide if such changes affect the ETA and consequently the validity of the CE marking based on the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

The Pacifyre® G – Fire Protection Graphite Sealant are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

## **4 Assessment and verification of constancy of performance (AVCP)**

### **4.1 AVCP system**

According to the decision 1999/454/EC of the European Commission, as amended by 2001/596/EC, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2023-08-21 by



Thomas Bruun  
Managing Director, ETA-Danmark

<b>Pacifyre® G – Fire Protection Graphite Sealant</b>	
<b>Component name</b>	<b>Characteristics</b>
Pacifyre® G	A one component fire retardant sealant based on water based acrylic dispersion with plasto-elastic properties.

<b>Backing</b>	
<b>Component name</b>	<b>Characteristics</b>
Stone wool board	Stone wool with a reaction to fire class A1 according to EN 13501-1 and a density $\geq 150$ kg/m <sup>3</sup> with a thickness of $\geq 50$ mm.

<b>Insulations</b>	
<b>Component name</b>	<b>Characteristics</b>
AF/Armaflex	Closed cell, flexible elastomeric foam (FEF) insulation in form of (slotted) tubes which can be provided with a self-adhesive layer. Manufactured by "Armacell GmbH".

The Pacifyre® G Fire Protection Graphite Sealant is intended to be used as a pipe or a cable penetration seal to temporarily or permanently reinstate the fire resistance performance of flexible wall constructions, rigid wall constructions and rigid floor constructions, where they have been provided with apertures which are penetrated by various pipes or cables.

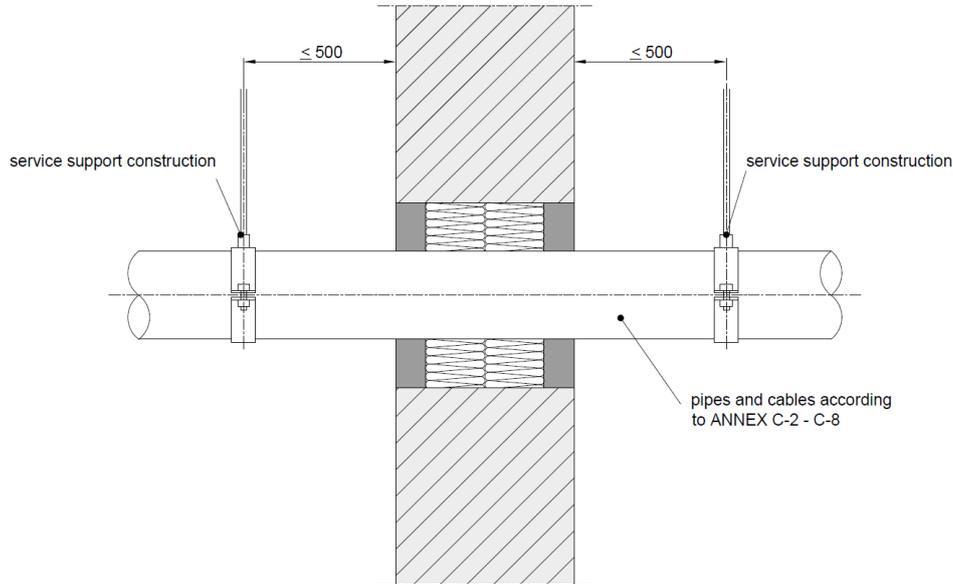
The Pacifyre® G Fire Protection Graphite Sealant can be installed in the forms of separating elements as specified in the following table:

<b>Wall or floor constructions</b>	
<b>Separating element</b>	<b>Construction</b>
Flexible walls	<ul style="list-style-type: none"> <li>• Steel studs or timber studs lined on both faces with minimum 2 layers of boards (minimum thickness of 12,5 mm each) with a classification A2-s1, d0 or A1 according to EN 13501-1.</li> <li>• For timber stud walls there shall be a minimum distance of 100 mm of the penetration seal to any timber stud, this space has to be filled with min.100 mm of insulation with classification A1 or A2 according to EN 13501 -1</li> <li>• Minimum thickness of 100 mm</li> <li>• Classification according to EN 13501-2: <math>\geq</math> EI90</li> </ul>
Rigid walls	<ul style="list-style-type: none"> <li>• Aerated concrete, concrete or masonry</li> <li>• Minimum thickness of 100 mm</li> <li>• Classification according to EN 13501-2: for the required fire resistance period</li> </ul>
Rigid floors	<ul style="list-style-type: none"> <li>• Aerated concrete, concrete or masonry</li> <li>• Minimum density of 550 kg/m<sup>3</sup></li> <li>• Minimum thickness of 150 mm</li> <li>• Classification according to EN 13501-2: for the required fire resistance period</li> </ul>

**Service support construction in walls**

**WALL Application**

All pipes and cables – in both flexible and rigid walls – have to be supported on both sides of the separating element by service support constructions. This construction can be made by pipe clamps, profiles, studs, bolts etc. made of metal with a melting or decomposition point greater than 1049°C (for instance stainless steel or zinc-plated steel.)

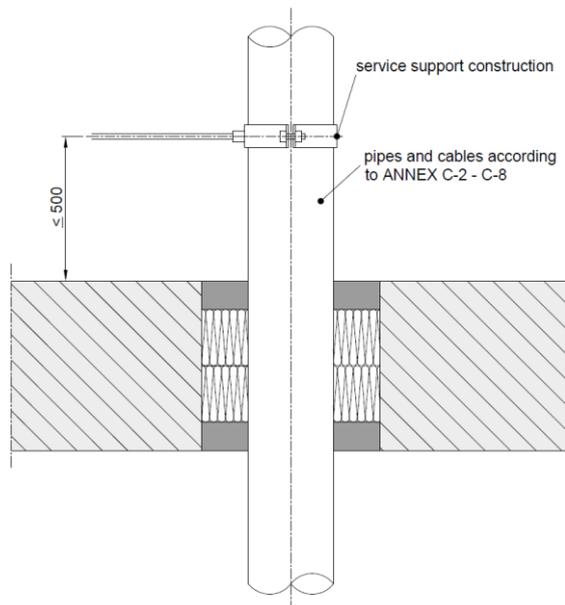


The first support for all types of penetrations has to be at a maximum distance of 500 mm (measured from the surface of the wall).

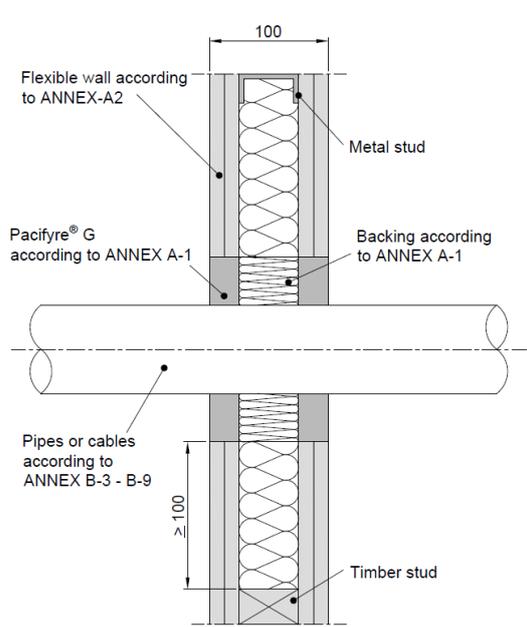
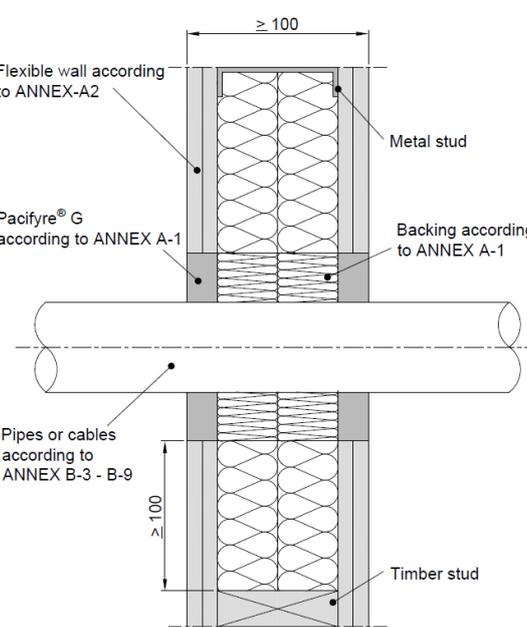
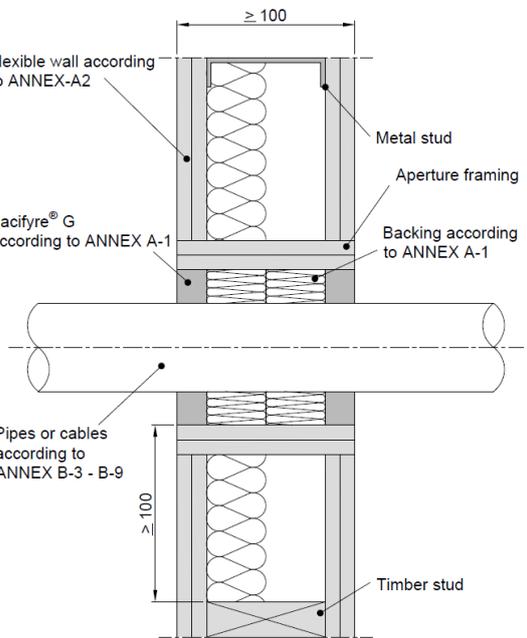
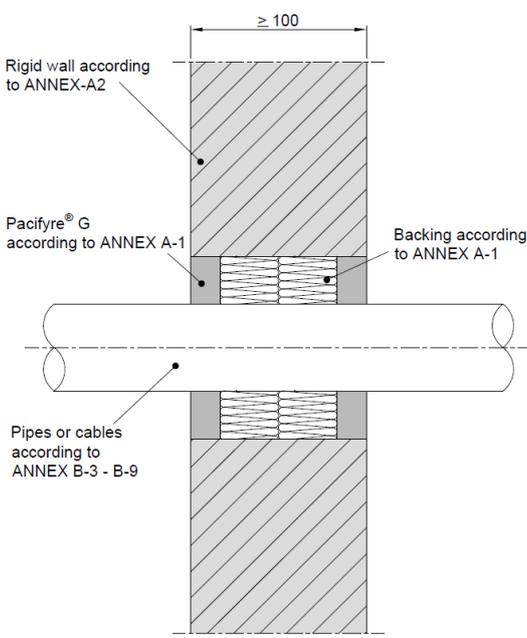
**Service support construction in floors**

**FLOOR Application**

All pipes and cables – in rigid floors – have to be supported on the unexposed (top) side of the separating element by service support constructions. This construction can be made by pipe clamps, profiles, studs, bolts etc. made of metal with a melting or decomposition point greater than 1049°C (for instance stainless steel or zinc-plated steel.)

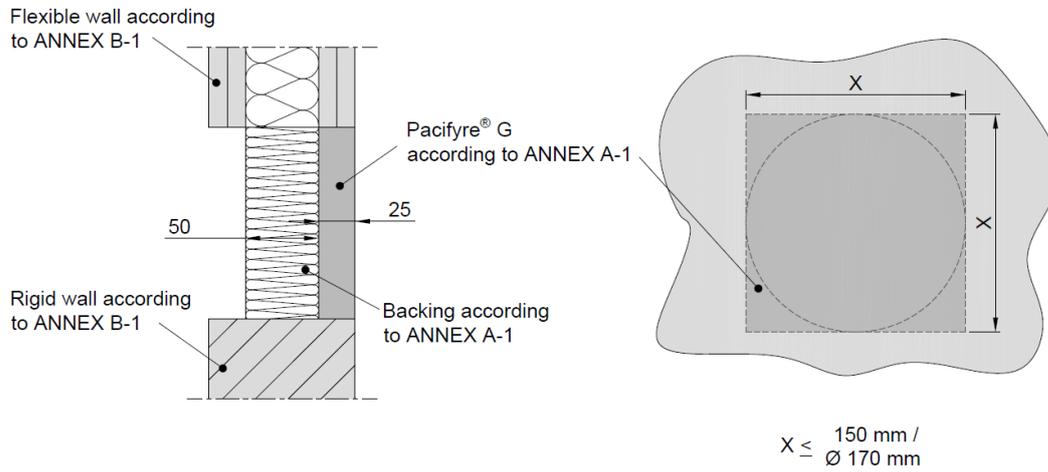


The first support for all types of penetrations has to be at a maximum distance of 500 mm (measured from the surface of the floor).

<p><b>Double-sided flexible wall construction type a)</b></p>	<p><b>Double-sided flexible wall construction type b)</b></p>
 <p>Flexible wall according to ANNEX-A2</p> <p>Metal stud</p> <p>Pacifyre® G according to ANNEX A-1</p> <p>Backing according to ANNEX A-1</p> <p>Pipes or cables according to ANNEX B-3 - B-9</p> <p>Timber stud</p> <p>100</p> <p>≥ 100</p> <p>Flexible wall constructions with <math>\geq 2</math> board layers with an overall lining thickness of <math>\geq 25</math> mm (2x12,5 mm) on each side of the wall and a stone wool insulation of 50 mm.</p>	 <p>Flexible wall according to ANNEX-A2</p> <p>Metal stud</p> <p>Pacifyre® G according to ANNEX A-1</p> <p>Backing according to ANNEX A-1</p> <p>Pipes or cables according to ANNEX B-3 - B-9</p> <p>Timber stud</p> <p><math>\geq 100</math></p> <p>≥ 100</p> <p>Flexible wall constructions with <math>\geq 2</math> board layers with an overall lining thickness of <math>\geq 25</math> mm (2x12,5 mm) on each side of the wall and a stone wool insulation of <math>\geq 50</math> mm.</p>
<p><b>Double-sided flexible wall construction type c)</b></p>	<p><b>Rigid wall construction type d)</b></p>
 <p>Flexible wall according to ANNEX-A2</p> <p>Metal stud</p> <p>Aperture framing</p> <p>Pacifyre® G according to ANNEX A-1</p> <p>Backing according to ANNEX A-1</p> <p>Pipes or cables according to ANNEX B-3 - B-9</p> <p>Timber stud</p> <p><math>\geq 100</math></p> <p>≥ 100</p> <p>Flexible wall constructions with <math>\geq 2</math> board layers with an overall lining thickness of <math>\geq 25</math> mm (2x12,5 mm) on each side of the wall and any type of insulation or uninsulated.</p> <p>With an aperture framing with at least 1 layer with an overall thickness of <math>\geq 25</math> mm or in case of circular apertures a dimensionally stable sleeve of materials of class A1 or A2.</p>	 <p>Rigid wall according to ANNEX-A2</p> <p>Pacifyre® G according to ANNEX A-1</p> <p>Backing according to ANNEX A-1</p> <p>Pipes or cables according to ANNEX B-3 - B-9</p> <p>Timber stud</p> <p><math>\geq 100</math></p> <p>Rigid wall construction.</p>
<p style="text-align: center;"><b>Pacifyre® G</b> - Installation in different types of flexible and rigid walls -</p> <p style="text-align: right;"><b>ANNEX B-1</b></p>	

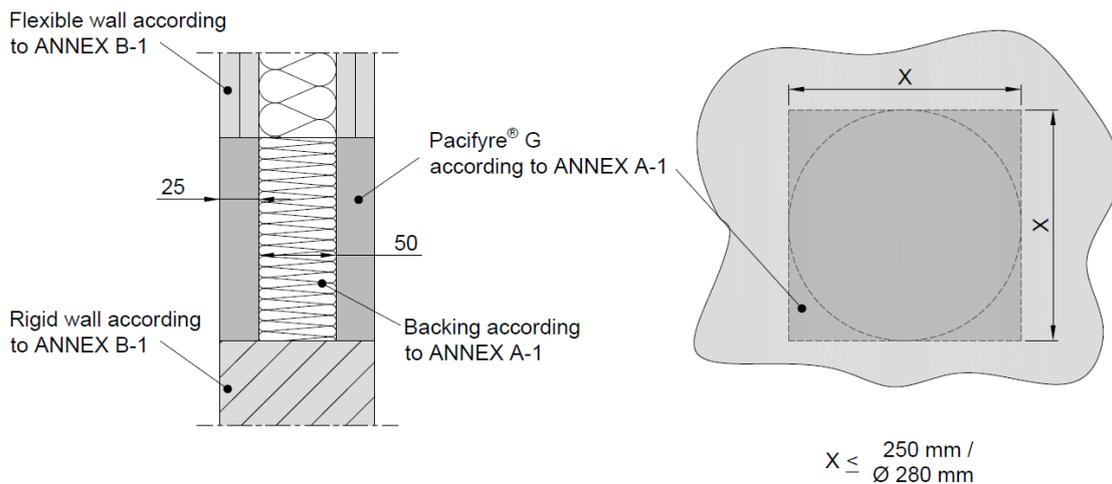
**Blank penetration seal | single sided**

**EI90 / E120**



**Blank penetration seal | double sided**

**EI120**



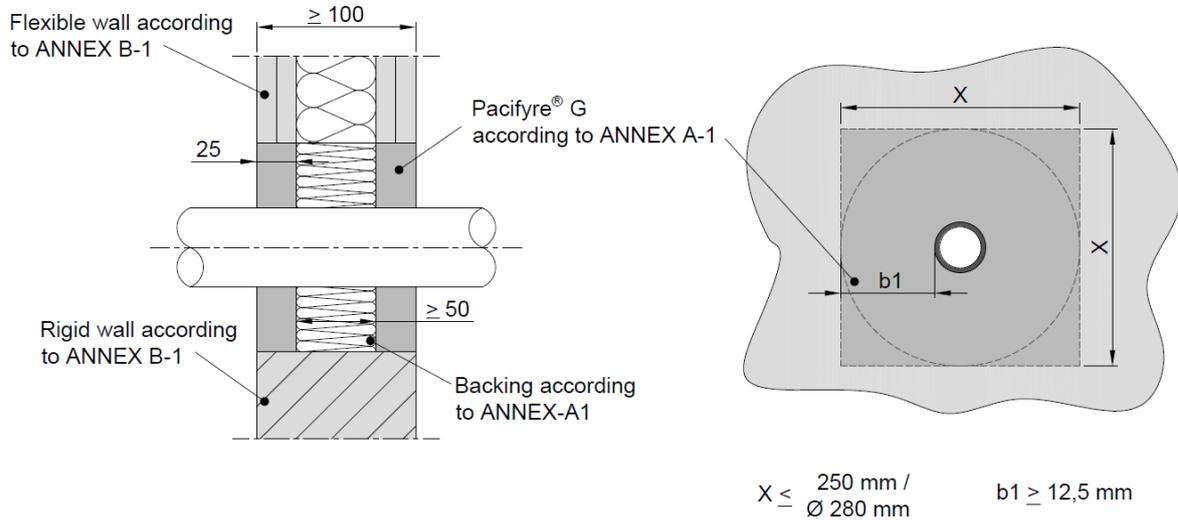
**Pacifyre® G**

**- Installation of blank penetration seals in flexible and rigid walls -**

**ANNEX B-2**

**Single plastic pipes** with intended use as rainwater pipe, sewage pipe (ventilated = U/U and unventilated = U/C) and gas, drinking water and heating pipe made out of the below material and dimension:

**WALL Application**



**Single plastic pipes in flexible and rigid walls according to ANNEX B-1**

Pipe material	Outer-Ø	t <sub>pipe</sub>	Classifications	
<b>PP-H</b> in accordance with DIN 8077/78.	≤ 50 mm	2,0 – 4,6 mm	EI 120 U/U	E 120 U/U
<b>PE</b> in accordance with EN-1519-1, EN 12666-1, EN 12201-2 and EN ISO 15494 and <b>PE-X</b> pipes in accordance with EN ISO 15785-2, <b>ABS</b> pipes in accordance with EN 1455-1 and EN ISO 15493 as well as <b>SAN+PVC</b> pipes in accordance with ISO 19220.	≤ 50 mm	1,8 – 4,6 mm	EI 120 U/U	E 120 U/U
<b>PVC-U</b> in accordance with EN-1329-1, EN 1453-1, EN ISO 15493 and EN ISO 1452-2 and <b>PVC-C</b> pipes in accordance with EN 1566-1, EN ISO 15493 and EN ISO 15877-2.	≤ 50 mm	1,8 – 5,6 mm	EI 120 U/C	E 120 U/C

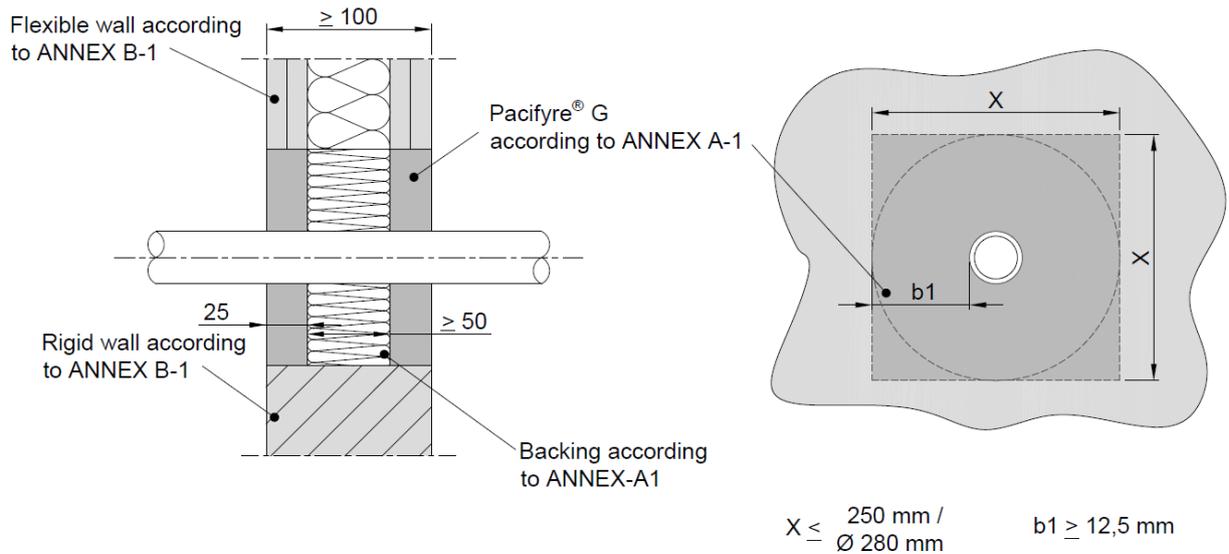
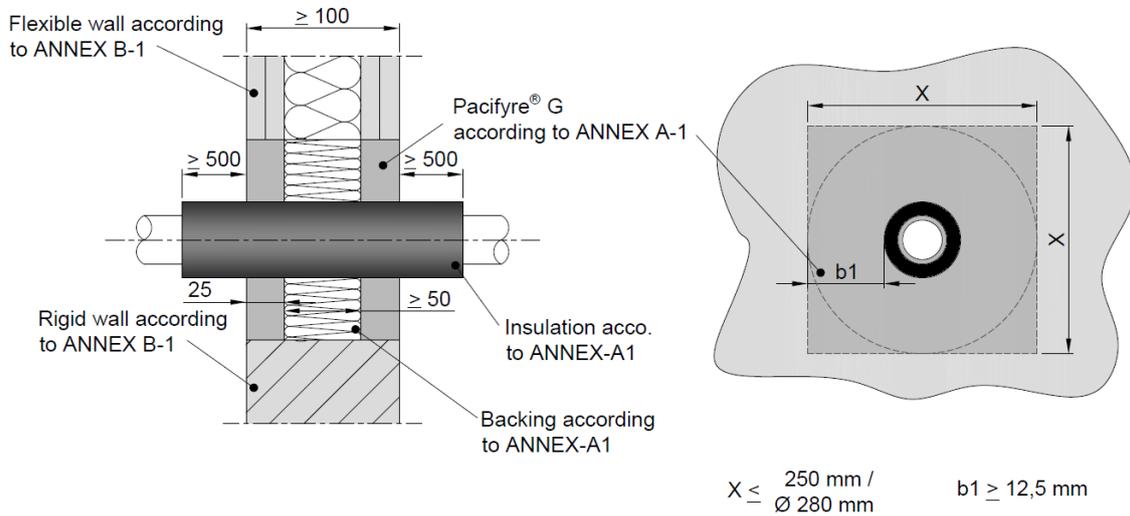
**Pacifyre® G**

- Installation of plastic pipes in different types of flexible and rigid walls -

**ANNEX B-3**

**Single Multi-Layer pipes** with intended use as gas, drinking water and heating pipe (insulated and non-insulated) made out of the below material and dimension:

**WALL Application**



**Single Multi-Layer pipes in flexible and rigid walls according to ANNEX B-1**

Pipe material	Outer-Ø	t <sub>pipe</sub>	t <sub>insul</sub>	Classifications	
Fränkische Alpex F50 PROFi or L Pipes (PE-Xb / AL / PE-HD)	$\leq \text{Ø } 32 \text{ mm}$	3,0 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C
Uponor Unipipe MLCP pipes (PE-Xb / AL / PE-HD)	$\leq \text{Ø } 32 \text{ mm}$	4,5 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C

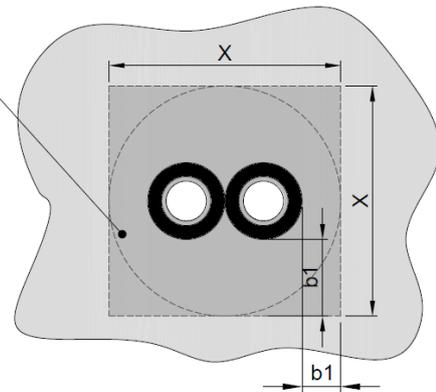
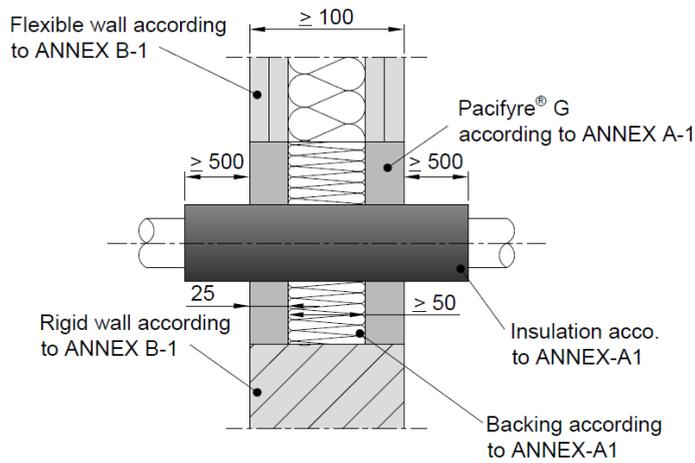
**Pacifyre® G**

- Installation of single Multi-Layer pipes in different types of flexible and rigid walls -

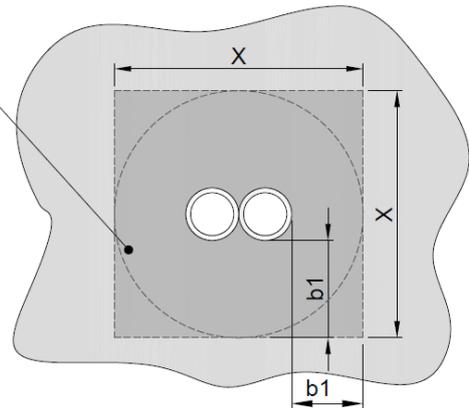
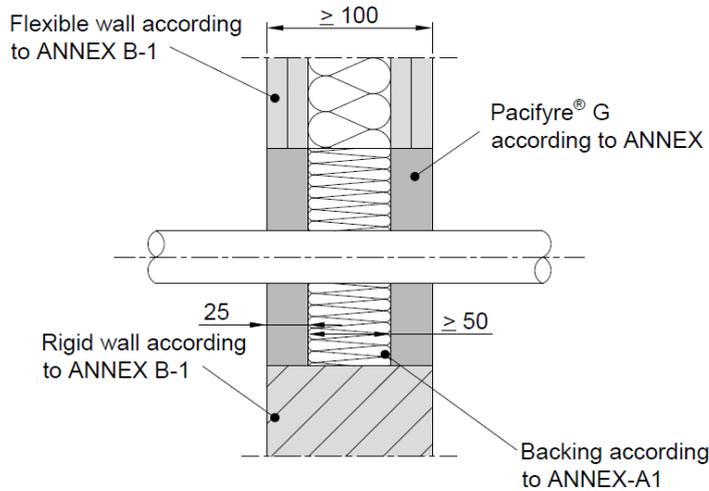
**ANNEX B-4**

**Double (zero distance) Multi-Layer pipes** with intended use as gas, drinking water and heating pipe (insulated and non-insulated) made out of the below material and dimension:

**WALL Application**



$$X \leq \frac{250 \text{ mm}}{\varnothing 280 \text{ mm}} \quad b1 \geq 12,5 \text{ mm}$$



$$X \leq \frac{250 \text{ mm}}{\varnothing 280 \text{ mm}} \quad b1 \geq 12,5 \text{ mm}$$

Double (zero distance) Multi-Layer pipes In flexible and rigid walls according to ANNEX B-1					
Pipe material	Outer-Ø	t <sub>pipe</sub>	t <sub>insul</sub>	Classifications	
Fränkische Alpex F50 PROF1 or L Pipes (PE-Xb / AL / PE-HD)	≤ Ø 32 mm	3,0 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C
Uponor Unipipe MLCP pipes (PE-Xb / AL / PE-HD)	≤ Ø 32 mm	4,5 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C

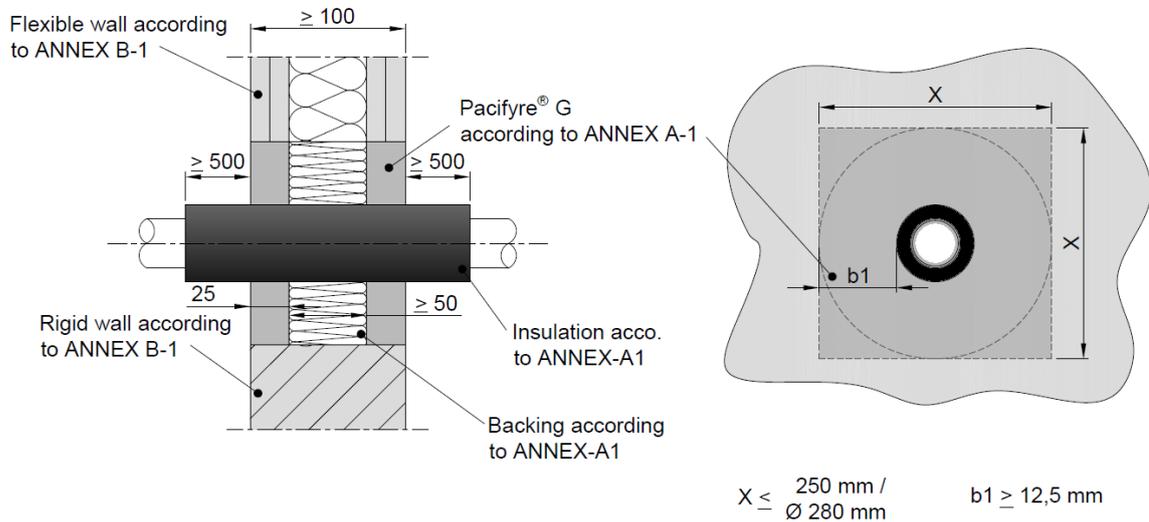
**Pacifyre® G**

- Installation of double (zero distance) Multi-Layer pipes in different types of flexible and rigid walls -

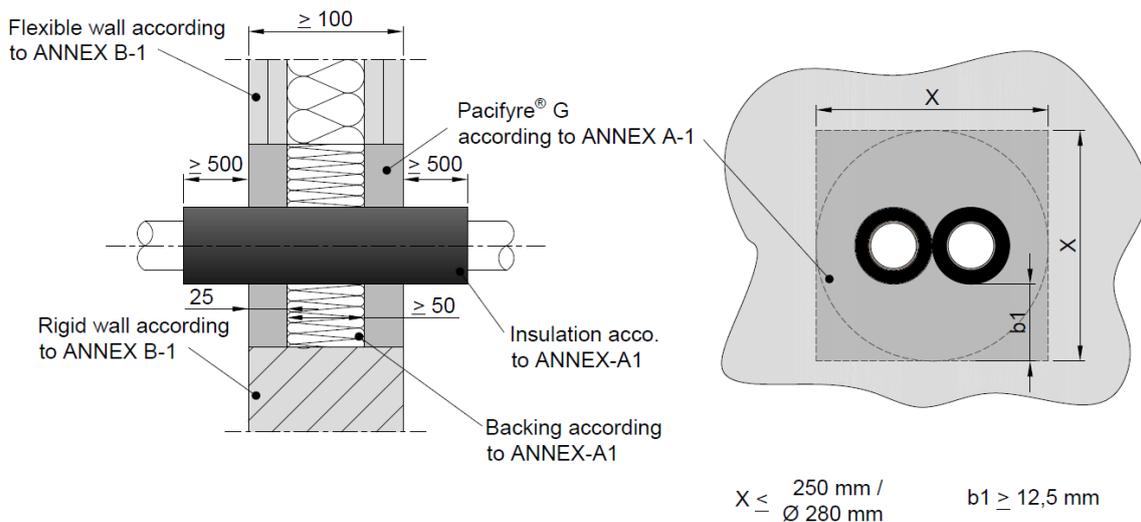
**ANNEX B-5**

**Single and double (zero distance) metal pipes** with intended use as gas, drinking water and heating pipe (insulated) made out of the below material and dimension:

**WALL Application**



Multiple penetration of metal pipes with synthetic-rubber Insulation:



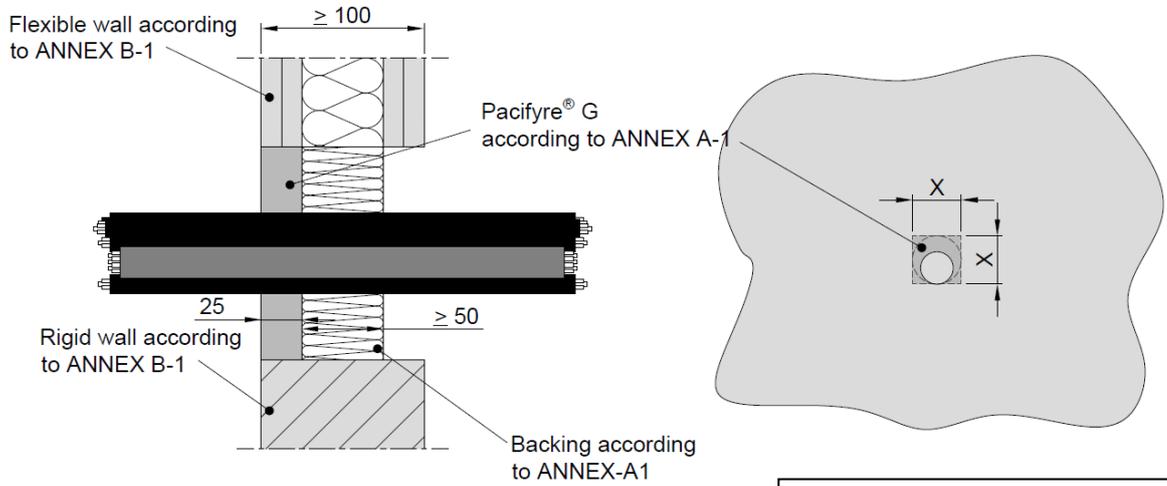
Single and double (zero distance) metal pipes In flexible and rigid walls according to ANNEX B-1					
Pipe material	Outer-Ø	t <sub>pipe</sub>	t <sub>insul</sub>	Classifications	
Copper / Steel / Stainless steel	≤ 18 mm	1,0 – 14,2 mm	7,5 – 33,5 mm	EI 120 C/U	E 120 C/U
	≤ 22 mm	1,0 – 14,2 mm	8,5 – 33,5 mm	EI 120 C/U	E 120 C/U
	≤ 35 mm	1,2 – 14,2 mm	9,0 – 35 mm	EI 120 C/U	E 120 C/U

**Pacifyre® G**  
 - Installation of single and double (zero distance) metal pipes in different types of flexible and rigid walls -

**ANNEX B-6**

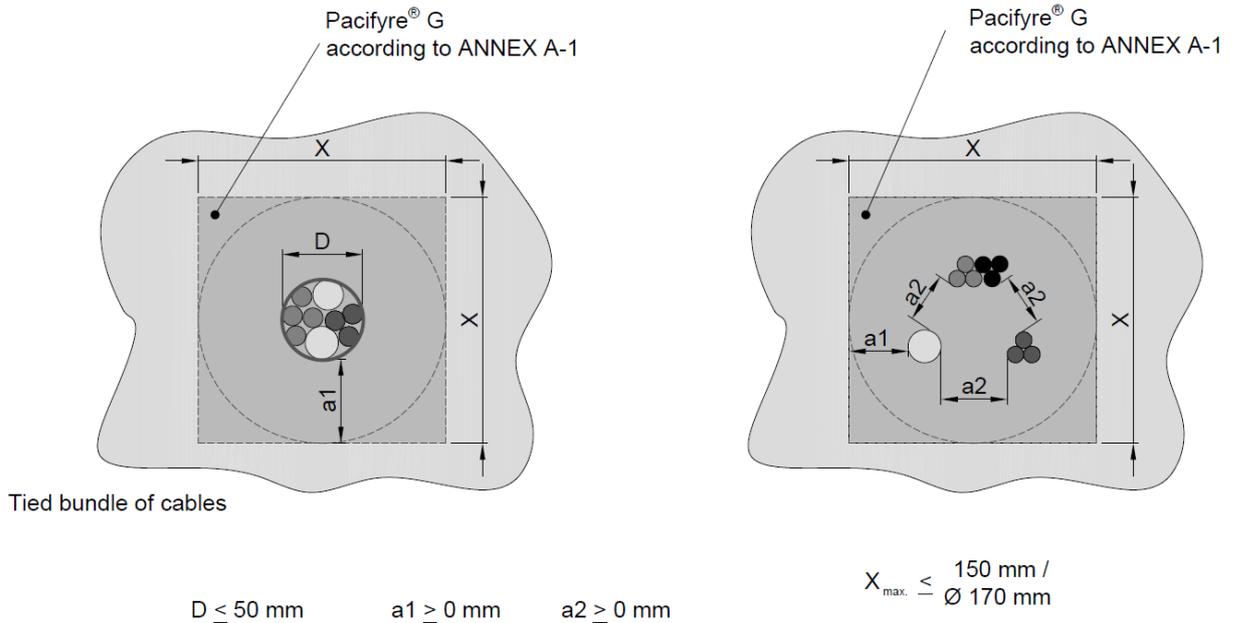
Single and bundled cable penetration of sheathed cables up to  $\varnothing 21$  mm | EI 30 / E 120

WALL Application



The total amount of cross sections of the cables does not exceed **60 %** of the penetration.

EI 30 / E 120

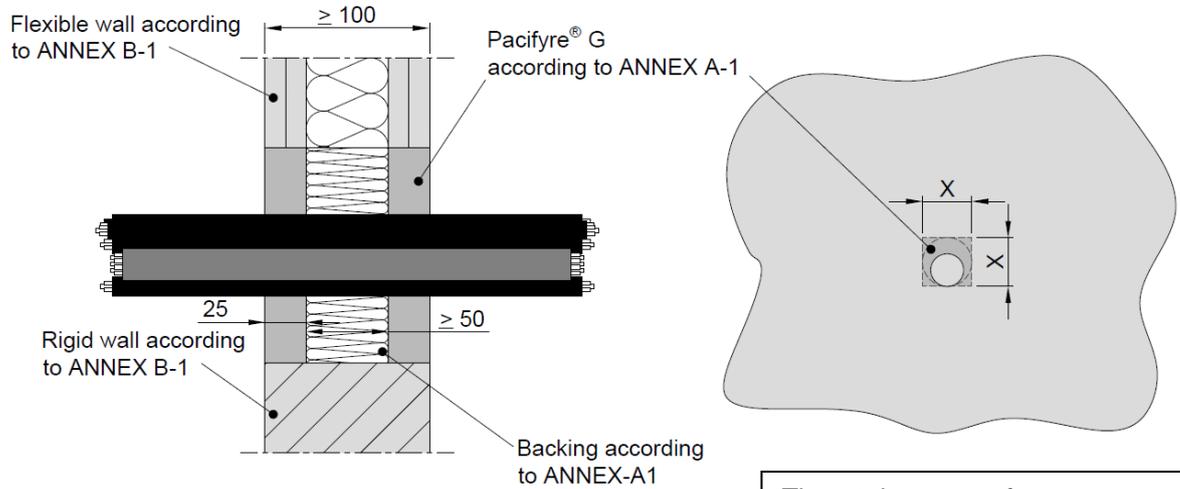


**Pacifyre® G**  
 - Installation of single and bundled cables in different types of flexible and rigid walls | EI 30 / E 120 -

**ANNEX B-7**

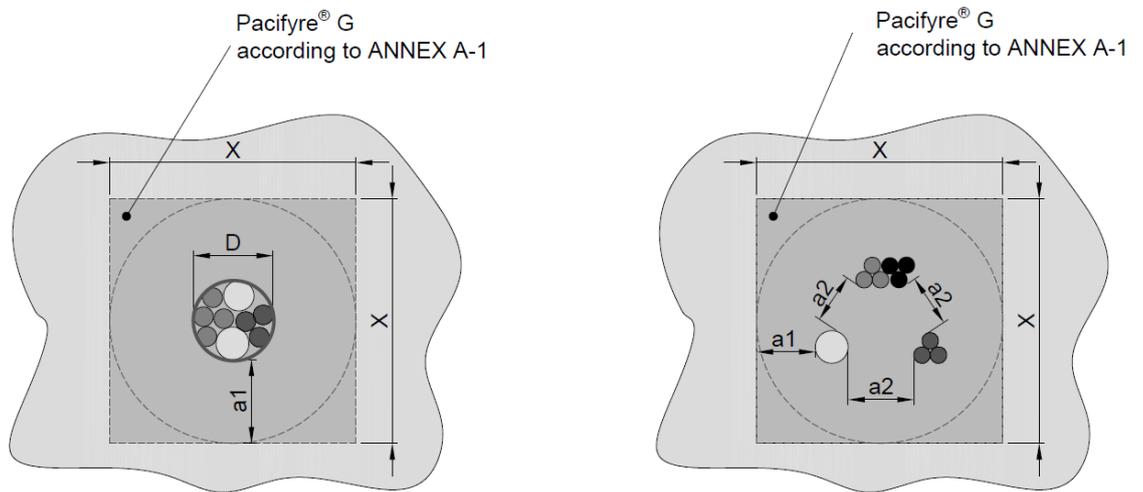
**Single and bundled cable penetration of sheathed cables up to  $\varnothing$  21 mm | EI 90 / E120**

**WALL Application**



The total amount of cross sections of the cables does not exceed **60 %** of the penetration.

**EI 90 / E120**



Tied bundle of cables

$D \leq 50 \text{ mm}$        $a1 \geq 0 \text{ mm}$        $a2 \geq 0 \text{ mm}$

$X_{\text{max}} \leq 250 \text{ mm} / \varnothing 280 \text{ mm}$   
 $X_{\text{min}} \geq 30 \text{ mm} / \varnothing 33 \text{ mm}$

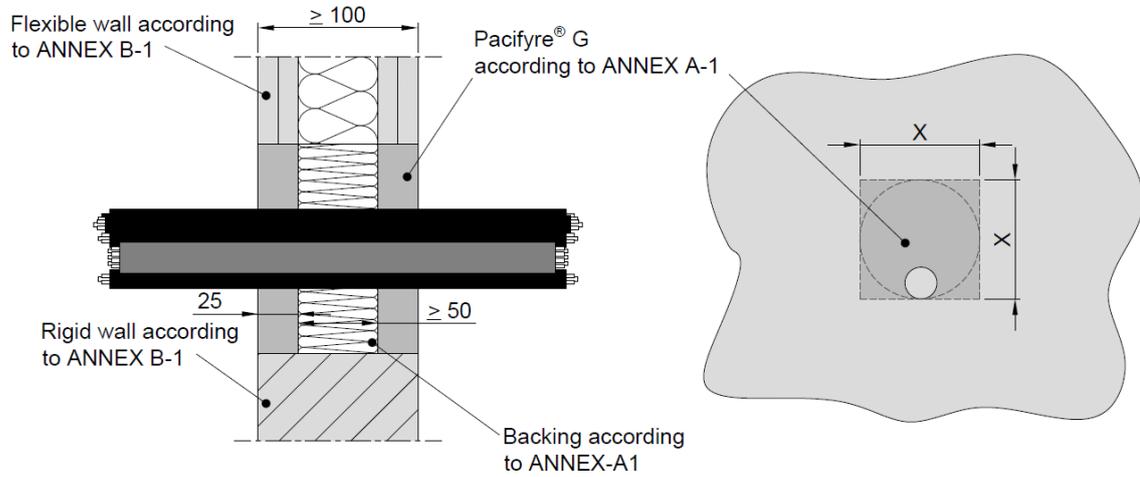
**Pacifyre® G**

- Installation of single and bundled cables in different types of flexible and rigid walls | EI 90 / E120 -

**ANNEX B-8**

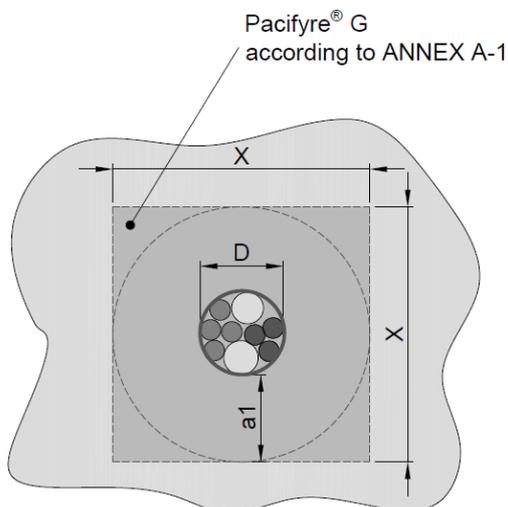
Single and bundled cable penetration of sheathed cables up to  $\varnothing 21$  mm | EI 120

WALL Application



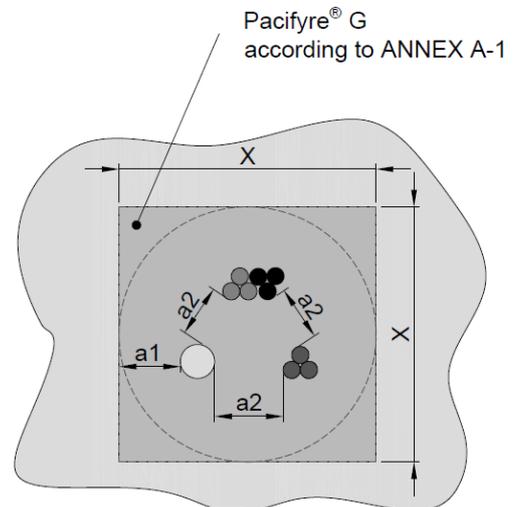
The total amount of cross sections of the cables does not exceed **60 %** of the penetration.

EI 120



Tied bundle of cables

$D \leq 50$  mm       $a1 \geq 0$  mm       $a2 \geq 0$  mm



$X_{max.} \leq 250$  mm /  $\varnothing 280$  mm  
 $X_{min.} \geq 75$  mm /  $\varnothing 85$  mm

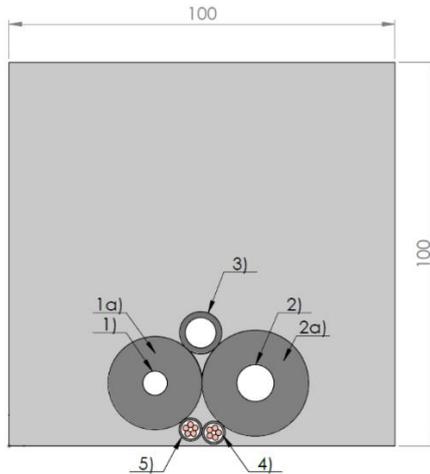
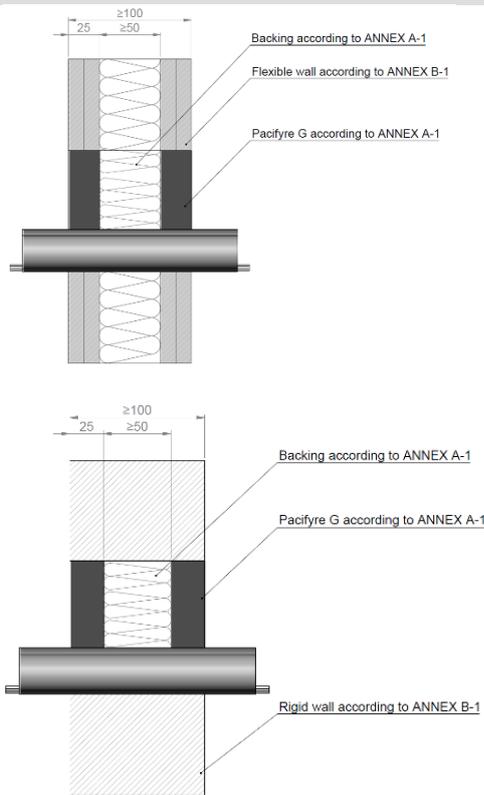
**Pacifyre® G**

- Installation of single and bundled cables in different types of flexible and rigid walls | EI 120 -

**ANNEX B-9**

**Bundle of air-conditioning services | Wall application**

**EI 120**



Conduits for air conditioning units:

- 1) Copper-Pipe  $\varnothing$  6.35 mm
- 1a) PE Insulation
- 2) Copper-Pipe  $\varnothing$  9.65 mm
- 2a) PE Insulation
- 3) PVC hose  $\leq$  11 mm
- 4) Electrical cable A1 (EN 1366-3)
- 5) Electrical cable A2 (EN 1366-3)

Max. seal size:  
100 x 100 mm

PVC hose:  $\leq$  11  
mm x 1,5 mm

PE insulation  
thickness for pipes  
 $\leq$  9 mm

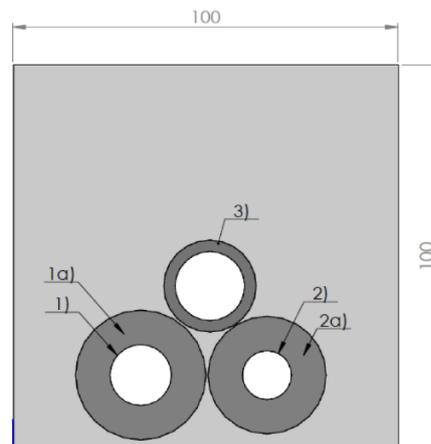
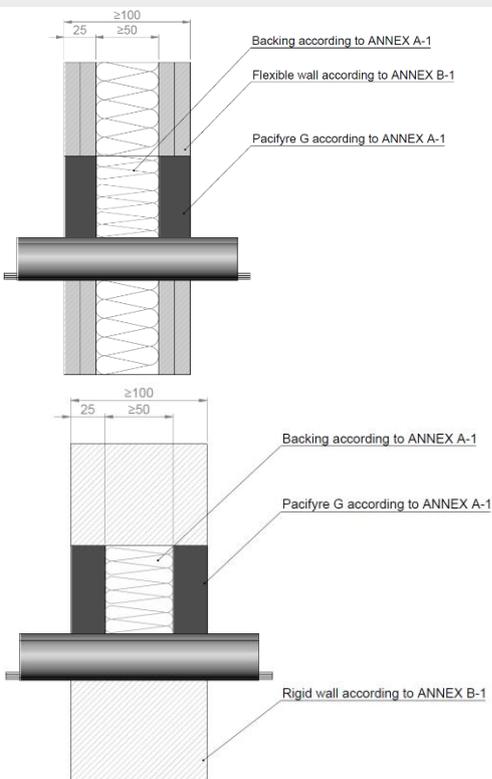
Insulation method:  
CS

Applicable capping for services:

- Copper pipes: C/U
- PVC hose: U/C

Any sheathed cable (max. 13 mm and  
max. 14 mm) with 5 x 1,5 mm conductors

**EI 60**



Conduits for air conditioning units:

- 1) Copper-Pipe  $\varnothing$  15.87 mm
- 1a) PE Insulation
- 2) Copper-Pipe  $\varnothing$  12.70 mm
- 2a) PE Insulation
- 3) PVC hose  $\leq$  24 mm

Max. seal size:  
100 x 100 mm

PVC hose:  $\leq$  24  
mm x 3 mm

PE insulation  
thickness for pipes  
 $\leq$  9 mm

Insulation method:  
CS

Applicable capping for services:

- Copper pipes: C/U
- PVC hose: U/C

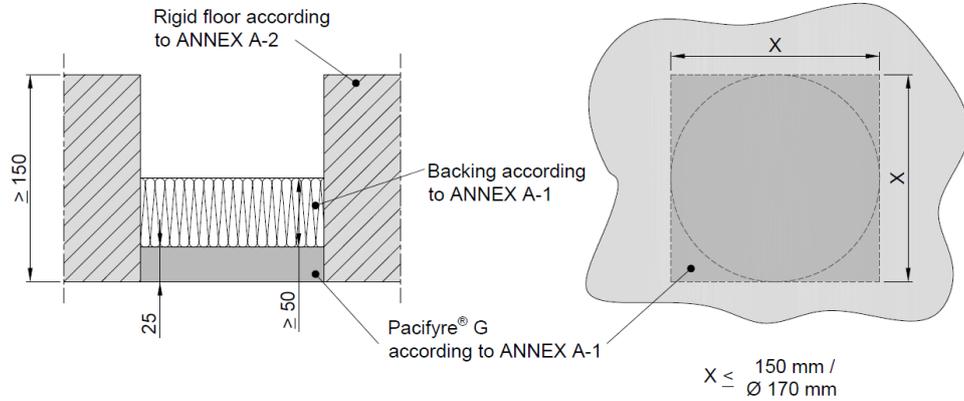
**Pacifyre® G**

**- Installation of a bundle of air-conditioning services in different types of flexible and rigid walls -**

**ANNEX B-10**

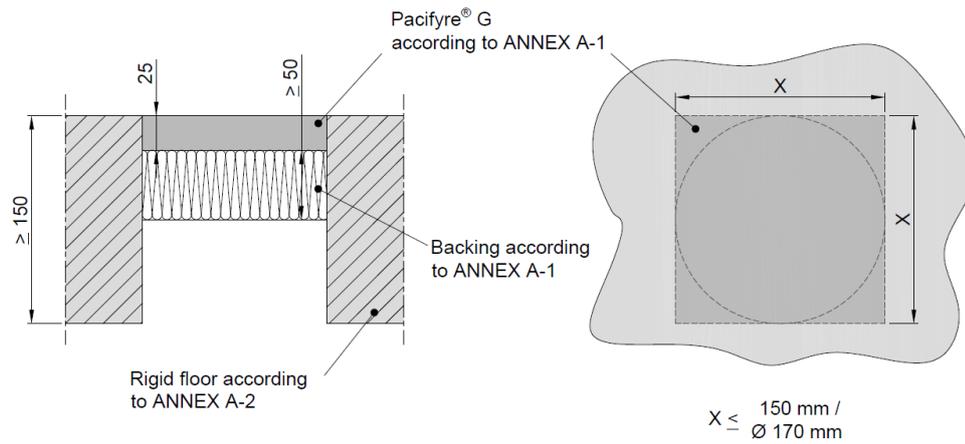
**Blank penetration seal | single sided bottom**

**EI90 / E120**



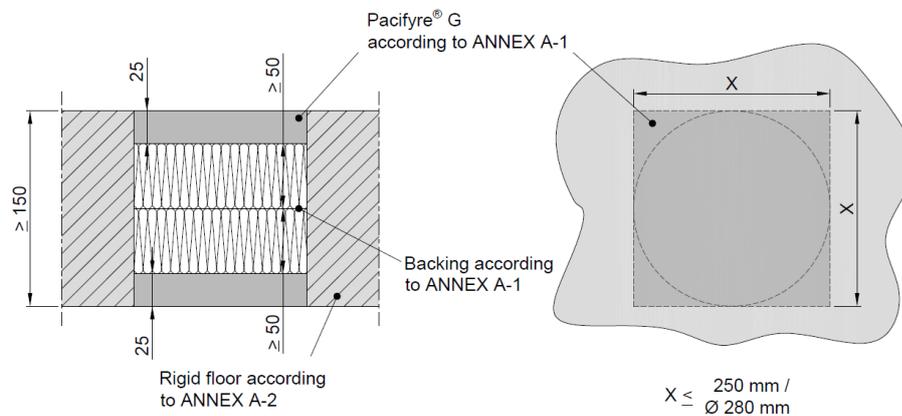
**Blank penetration seal | single sided top**

**EI120**



**Blank penetration seal | double sided**

**EI120**

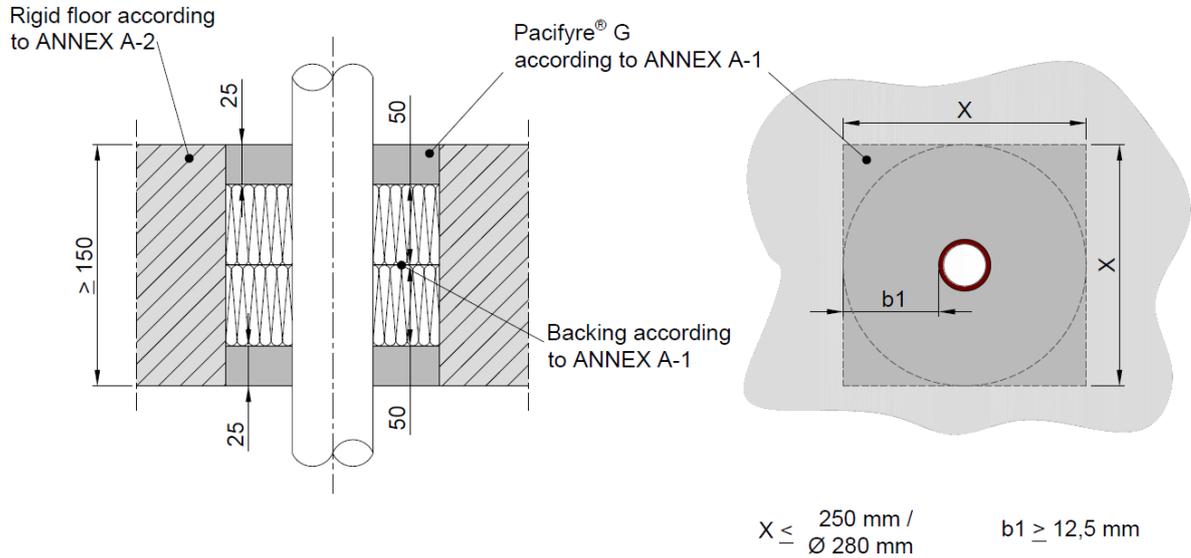


**Pacifyre® G**  
**- Installation of blank penetration seals in rigid floors -**

**ANNEX C-1**

**Single plastic pipes** with intended use as rainwater pipe, sewage pipe (ventilated = U/U and unventilated = U/C) and gas, drinking water and heating pipe made out of the below material and dimension:

**FLOOR Application**



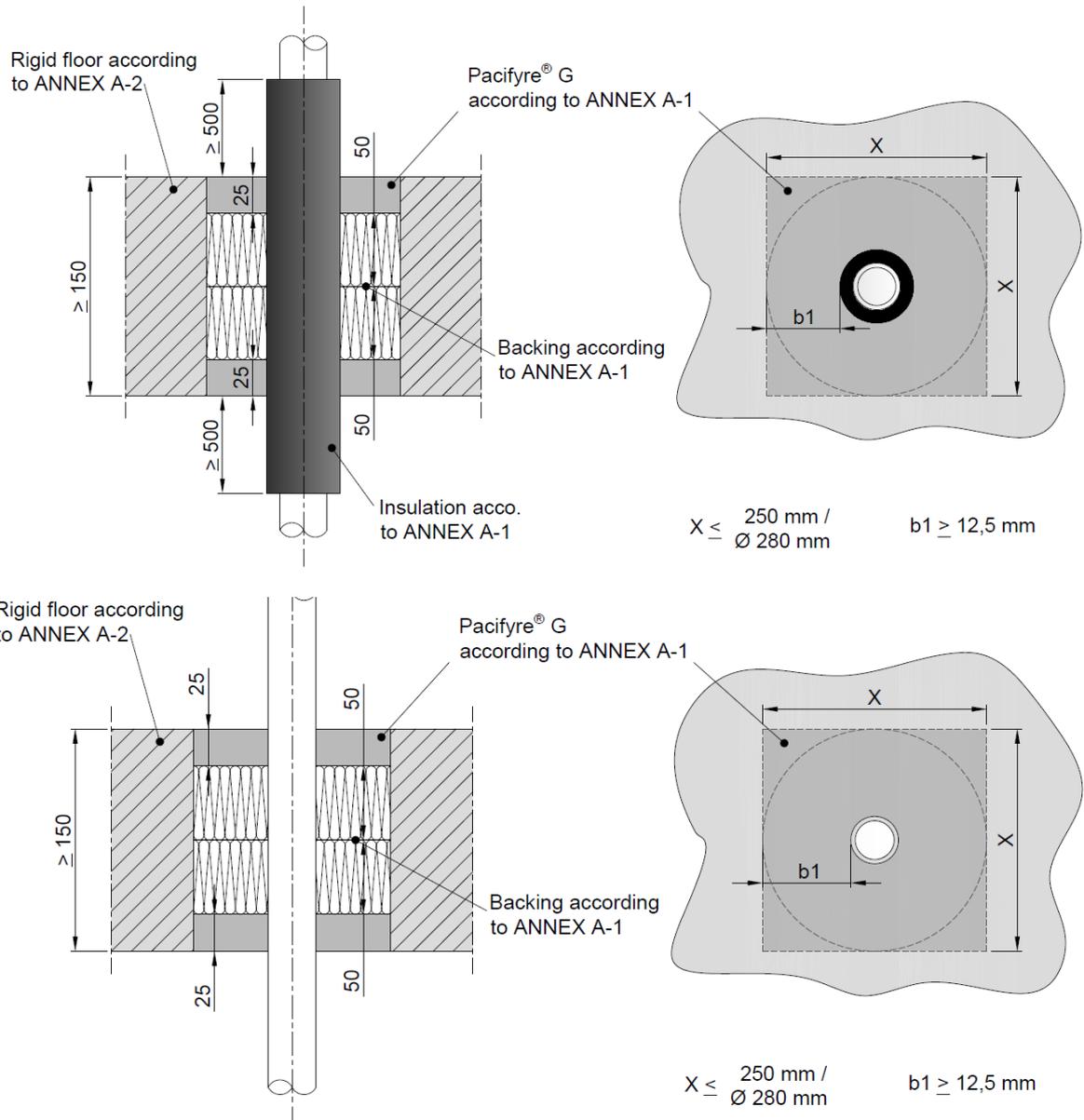
Single plastic pipes in rigid floors according to ANNEX A-2				
Pipe material	Outer-Ø	t <sub>pipe</sub>	Classifications	
<b>PP-H</b> in accordance with DIN 8077/78.	≤ 50 mm	2,0 – 4,6 mm	EI 120 U/U	E 120 U/U
<b>PE</b> in accordance with EN-1519-1, EN 12666-1, EN 12201-2 and EN ISO 15494 and <b>PE-X</b> pipes in accordance with EN ISO 15785-2, <b>ABS</b> pipes in accordance with EN 1455-1 and EN ISO 15493 as well as <b>SAN+PVC</b> pipes in accordance with ISO 19220.	≤ 50 mm	1,8 – 4,6 mm	EI 120 U/U	E 120 U/U
<b>PVC-U</b> in accordance with EN-1329-1, EN 1453-1, EN ISO 15493 and EN ISO 1452-2 and <b>PVC-C</b> pipes in accordance with EN 1566-1, EN ISO 15493 and EN ISO 15877-2.	≤ 50 mm	1,8 – 5,6 mm	EI 120 U/C	E 120 U/C

**Pacifyre® G**  
- Installation of plastic pipes rigid floors -

**ANNEX C-2**

**Single Multi-Layer pipes** with intended use as gas, drinking water and heating pipe (insulated and non-insulated) made out of the below material and dimension:

**Floor Application**



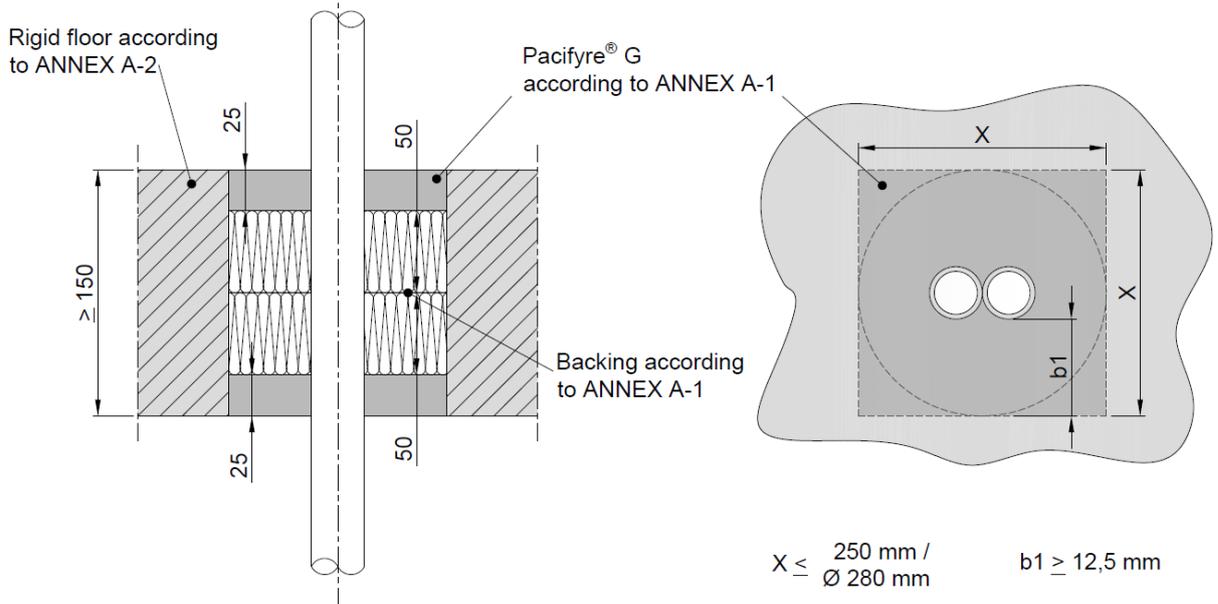
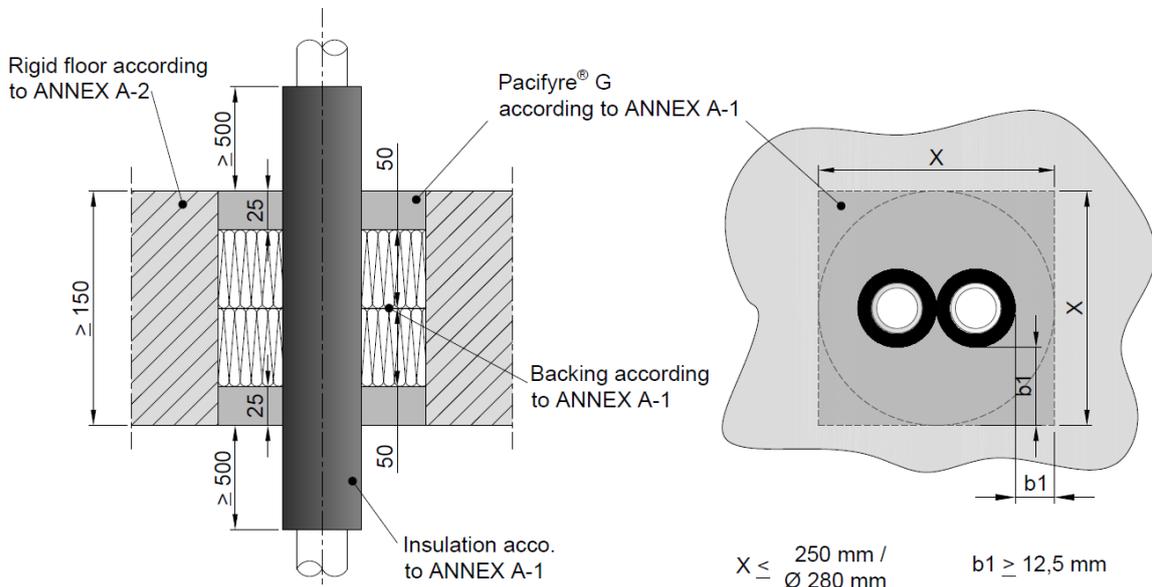
Single Multi-Layer pipes in rigid floors according to ANNEX A-2					
Pipe material	Outer-Ø	t <sub>pipe</sub>	t <sub>insul</sub>	Classifications	
Fränkische Alpex F50 PROF1 or L Pipes (PE-Xb / AL / PE-HD)	≤ Ø 32 mm	3,0 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C
Uponor Unipipe MLCP pipes (PE-Xb / AL / PE-HD)	≤ Ø 32 mm	4,5 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C

**Pacifyre® G**  
- Installation of single Multi-Layer pipes in rigid floors -

**ANNEX C-3**

**Double (zero distance) Multi-Layer pipes** with intended use as gas, drinking water and heating pipe (insulated and non-insulated) made out of the below material and dimension:

**FLOOR Application**



**Double (zero distance) Multi-Layer pipes in rigid floors according to ANNEX A-2**

Pipe material	Outer-Ø	t <sub>pipe</sub>	t <sub>insul</sub>	Classifications	
Fränkische Alpex F50 PROFIL or L Pipes (PE-Xb / AL / PE-HD)	≤ Ø 32 mm	3,0 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C
Uponor Unipipe MLCP pipes (PE-Xb / AL / PE-HD)	≤ Ø 32 mm	4,5 mm	-	EI 120 U/C	E 120 U/C
			9 – 19,5 mm	EI 120 U/C	E 120 U/C

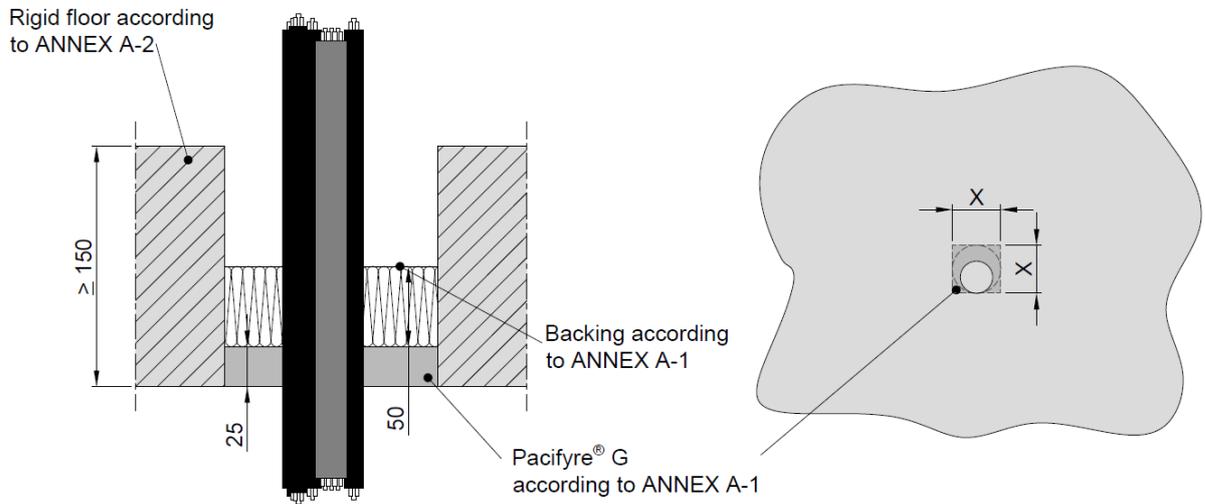
**Pacifyre<sup>®</sup> G**  
- Installation of double (zero distance) Multi-Layer pipes in rigid floors -

**ANNEX C-4**



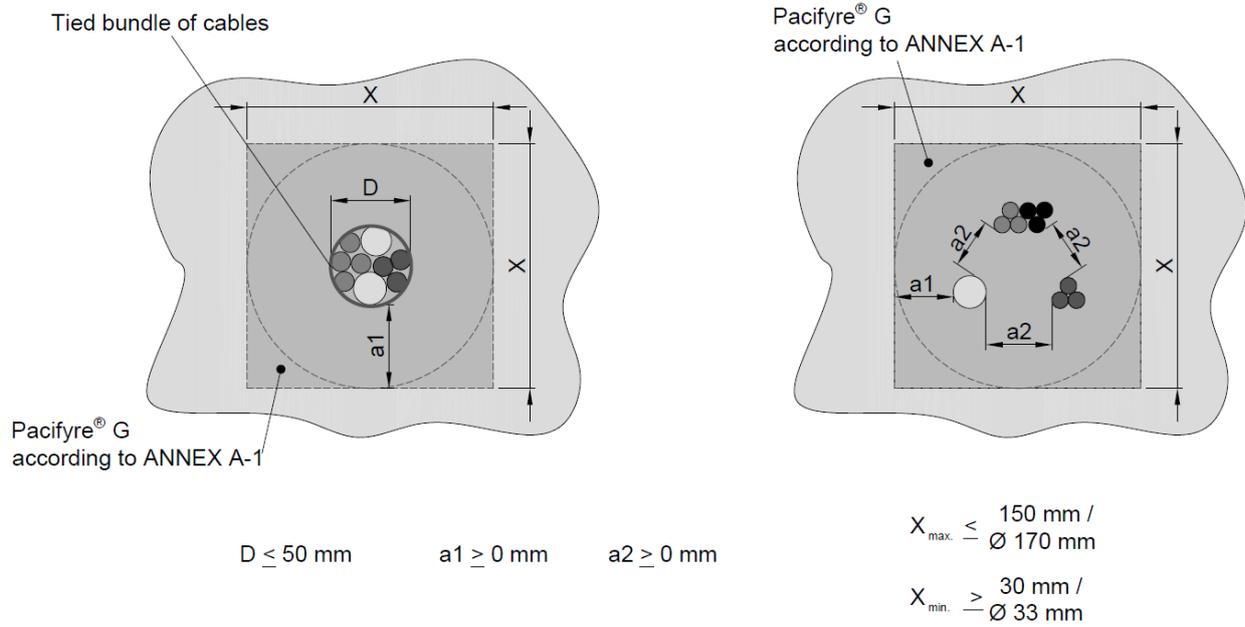
**Single and bundled cable penetration** of sheathed cables up to  $\varnothing 21$  mm | EI 30 / E120

**FLOOR Application**



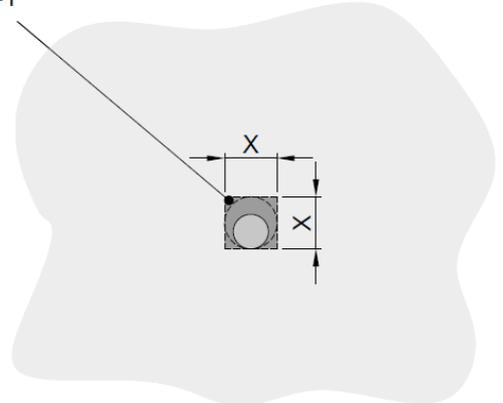
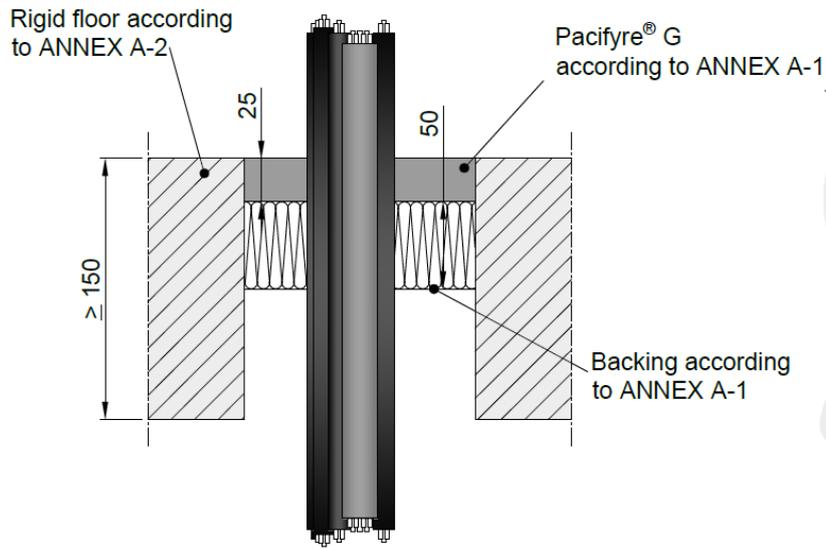
sections of the cables do not exceed **60 %** of the penetration.

**EI 30 / E 120**



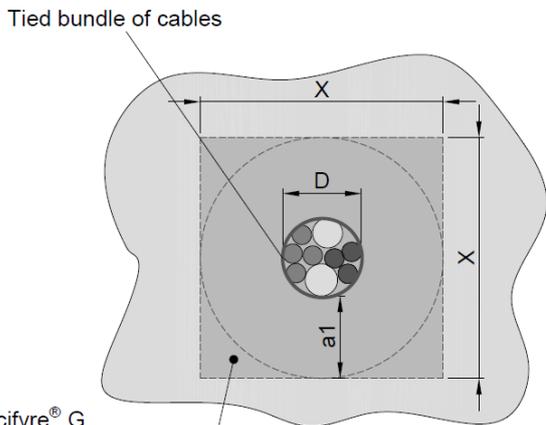
**Single and bundled cable penetration** of sheathed cables up to  $\varnothing 21$  mm | EI 30 / E120

**FLOOR Application**



The total amount of cross sections of the cables does not exceed **60 %** of the penetration.

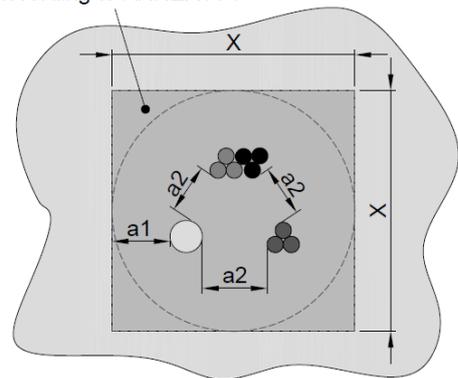
**EI 30 / E 120**



Pacifyre® G according to ANNEX A-1

$$D \leq 50 \text{ mm} \quad a1 \geq 0 \text{ mm} \quad a2 \geq 0 \text{ mm}$$

Pacifyre® G according to ANNEX A-1



$$X_{\text{max.}} \leq 150 \text{ mm} / \varnothing 170 \text{ mm}$$

$$X_{\text{min.}} \geq 30 \text{ mm} / \varnothing 33 \text{ mm}$$

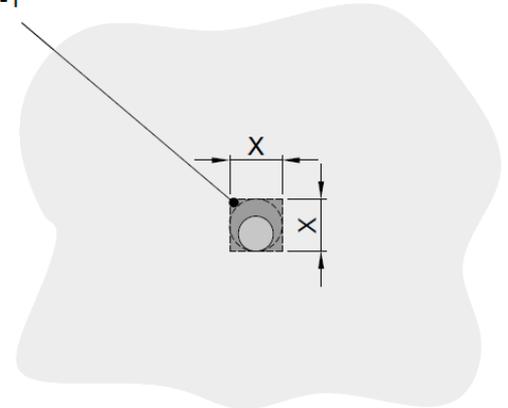
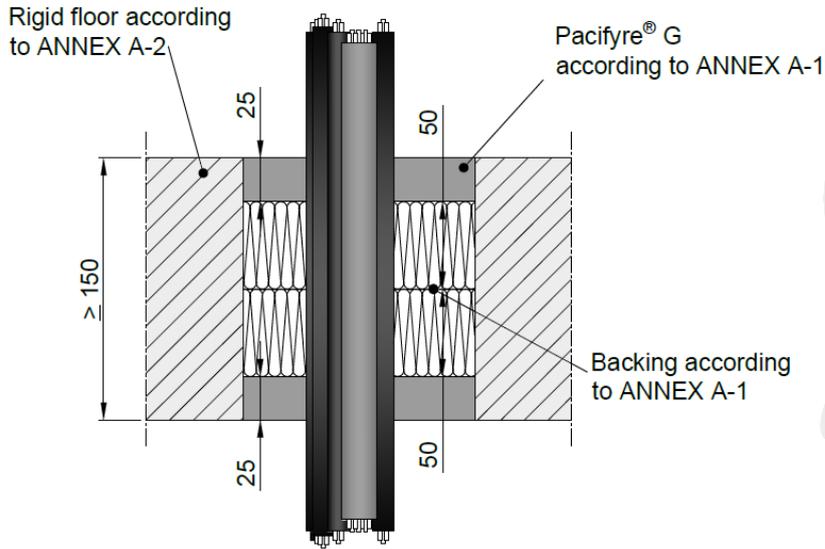
**Pacifyre® G**

- Installation of single and bundled cables in rigid floors | EI 30 / E 120 -

**ANNEX C-7**

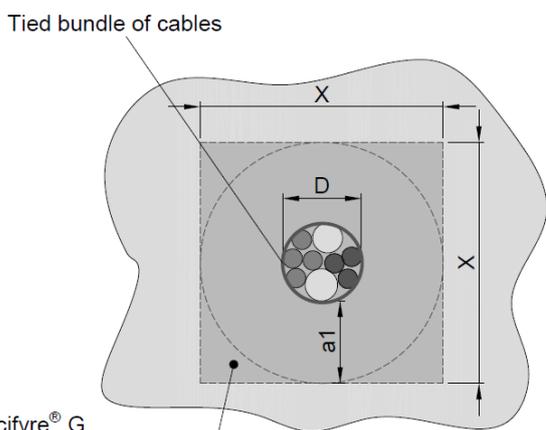
**Single and bundled cable penetration** of sheathed cables up to  $\varnothing 21$  mm | EI 120

**FLOOR Application**



The total amount of cross sections of the cables does not exceed **60 %** of the penetration.

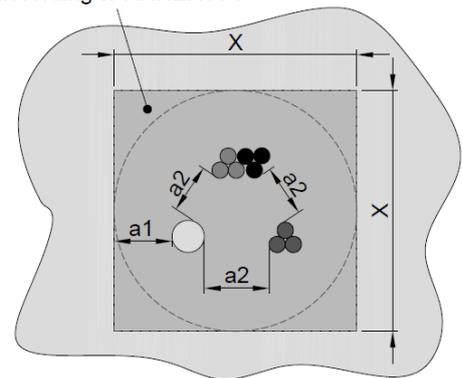
**EI 120**



Pacifyre® G according to ANNEX A-1

$D \leq 50$  mm       $a1 \geq 0$  mm       $a2 \geq 0$  mm

Pacifyre® G according to ANNEX A-1



$X_{max.} \leq 150$  mm /  $\varnothing 170$  mm

$X_{min.} \geq 30$  mm /  $\varnothing 33$  mm

**Pacifyre® G**

- Installation of single and bundled cables in rigid floors | EI 120 -

**ANNEX C-8**