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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-18/0918 of 2018/10/24

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® IWM III
Product family to which the above construction product belongs:	Fire Stopping and Sealing with high performance intumescent material used in penetration seals.
Manufacturer:	J. van Walraven Holding B.V. Industrieweg 5 NL-36415 RK Mijdrecht Tel. + 45 4637 0510 Internet www.walraven.com
Manufacturing plant:	Walraven Factory S2
This European Technical Assessment contains:	29 pages including 8 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:	European Assessment Document (EAD) No. 350454-00-1104 "Fire Stopping and Fire Sealing Products”, September 2017
This version replaces:	-

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product
The Pacifyre® IWM III consists of the high performance intumescent material „ Pacifyre® IM2“according to the ETA – 10/0117, with a width of 50 mm and a thickness of 2 mm, which is wrapped in one or more layers around the pipe or the insulation. The Pacifyre® IWM III is installed in openings in fire classified walls or floors around pipes through walls made from concrete, aerated concrete, masonry, light weight partition structures, shaft wall constructions or concrete floors. The system must be inserted into the annular gap flush with the surface. In the event of a fire, the intumescent material expands with high pressure and thus seals the opening hermetically against flames and smoke. The required thickness of the wrap depending on the fire resistance and pipe diameter is established by the number of wrap layers.

Specification of the intended use in accordance with the applicable European Assessment Document
The construction products The Pacifyre® IWM III with “Pacifyre® IM2 “, is intended for use as components with a fire protection effect in walls made from concrete, aerated concrete, masonry, light weight partition, shaft wall constructions or concrete floors structures that are subject to requirements related to fire protection. Their fire-resistant capability prevents heat transmission and fire spreading in the event of fire. See annex 1 for a detailed specification of the intended use.

Table 1 – components of the verified penetration seals

Product type	Trade name
Flexible intumescent strip with a nominal thickness of 2 mm and a width of 50 mm	Pacifyre® IWM III
Mineral wool board “Hardrock 040” or “Hardrock II” pre-coated with 0,5 mm (dry layer thickness) Pacifyre® IWS/IWP airless on the visible surface. minimum apparent density of 150 kg/m^3 and a melting point ≥ 1000^0 C, thickness ≥ 50 mm	Pacifyre® MP
Ablative fire stop coating	Pacifyre® MP coating
Insulations	
Closed cell flexible polyethylene foam insulation in form of tubes, thickness ≤ 4 mm, density ≥ 30 kg /m^3 ≤ 40 kg / m^3	Thermaflex Thermacompact TF or equal products
Closed cell, flexible elastomeric foam (FEF) insulation in form of tubes, thickness 7 mm – 31,5 mm, tolerances + - 2,5 mm	Armacell Armaflex AF, Kaiflex or equal products

Detailed information and data on the verified penetration seals are given in Annexes 1 to 9

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 The Pacifyre® IWM III.

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
3.2 Safety in case of fire (BWR 2)	
Reaction to fire	The components of Pacifyre® IWM III and its detail products has been tested or classified for reaction to fire, in accordance with EN 13501-1
Resistance to fire	The Pacifyre® IWM III used in penetrations seals as described in annex 1-9 in at least 100 mm thick walls made from concrete, aerated concrete, masonry or light weight partition or shaft wall constructions structures is classified as EI 60-120 in accordance with EN 13501-2 The Pacifyre® IWM III used in penetrations seals as described in annex 1-8 in at least 150 mm thick slabs made from concrete is classified as EI 60-240 in accordance with EN 13501-2
3.3 Hygiene, health and the environment (BWR 3)	
Influence on air quality	The product does not contain/release dangerous substances specified in TR 034, dated March 2012
3.7 Sustainable use of natural resources (BWR 7)	No Performance Determined

components	Class according to 13501 - 1
Pacifyre® IM2	E
Pacifyre® MP	F
Mineral fibre panel with a nominal density of 150 kg / m^3	A1

*) See additional information in section 3.9 – 3.12.

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.

3.9 General aspects

The verification of durability is part of testing the essential characteristics. The Pacifyre® IWM III with mineral fibre panels may be used in end-use applications according to the provisions for use category Y_2 and the Pacifyre® IWM III without mineral fibre panels may be used in end-use applications according to the provisions for use category X without expecting significant changes of the characteristics relevant for fire protection.

Products that meet the requirements for type Y_2 also meet the requirements for type Z_1 and Z_2

It is assumed that:

- damages to the penetration seal are repaired accordingly,
- the installation of the penetration seal does not affect the stability of the adjacent building element – even in case of fire,
- the installations are fixed to the adjacent building element in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal.
- The support of the installations is maintained for the required period of the fire resistance and
- Pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

This European Technical Assessment does not address any risks associated with the emission of dangerous liquids or gases caused by failure of pipes in case of fire nor does it prove the prevention of the transmission of fire through heat transfer via the medium in the pipes.

The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this European Technical Assessment (see EN 1366-3:2009, clause 1)

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

The assessment does not cover the avoidance of the destruction of the penetration seal or of the adjacent building elements by forces caused by temperatures changes in case of fire. This has to be considered when designing the piping system.

The European technical Assessment is issued for the product on the basis of agreed data /information, deposited with the ETA-Danmark. Changes to the product or production process, which could result in this deposited data / information being incorrect, should be notified to the ETA Danmark before the changes are introduced.

The ETA-Danmark will decide whether or not such changes affect the European Technical Assessment and if so whether further assessment or alterations to the European Technical Assessment, shall be necessary.

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.

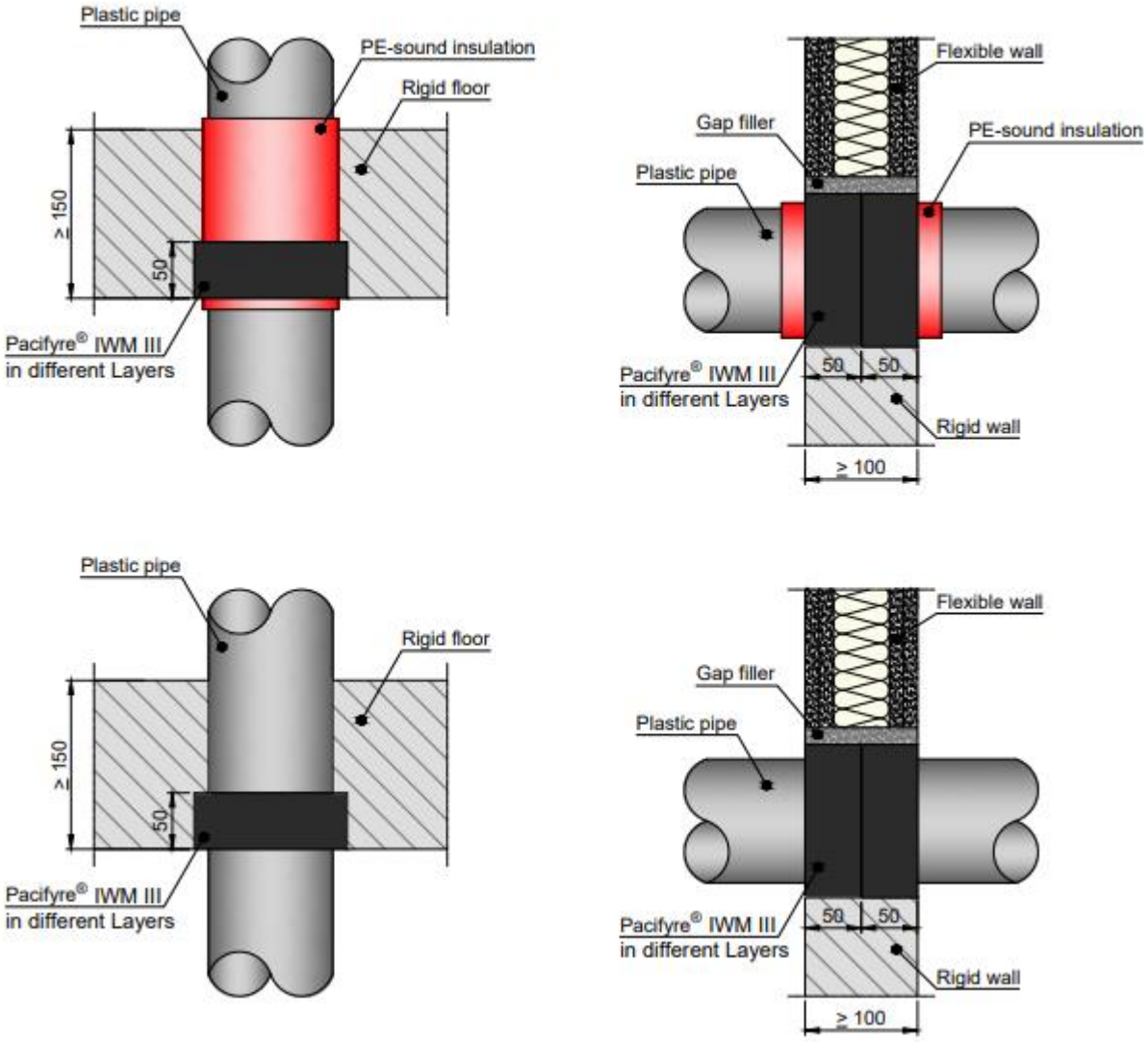
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

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 the product

Issued in Copenhagen on 2018-10-24 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex 1
Product details, definitions and specification of intended use



The Pacifyre® IWM III

Product and performance of the Pacifyre® IWM III:

Manufacturer	Description	
Walraven Factory S2	Pacifyre® IM2	
Property	Parameter	Method
Density	1200 kg/m^3 + - 10 %	
Content of non-volatile components	< 1 %	
Weight loss due to heating	49,0 to 63 %	(testet at 550^{0}C over 30 min
Dimensions	Thickness 1,0 - 8,0 mm, width 5 – 3200 mm	
Expansion ratio	18 – 38 (nominal thickness 1,5)	Tested at 550^0 C for 30 min with a top load

Product and performance of the Pacifyre® MP

Intended use:
The pipe penetration seal "Pacifyre® IWM III" is intended to be used to temporarily or permanently reinstate the fire resistance performance of flexible wall constructions, rigid wall constructions, shaft wall constructions and rigid floor constructions where they have been provided with apertures which are penetrated by various plastic pipes.

The pipe penetration seal "Pacifyre® IWM III" can be installed only in the types of separating elements as specified in the following table.

Separating element	**Construction**
Flexible walls	• Steel studs or timber studs lined on both faces with minimum 2 layers of boards (minimum Thickness 12,5 mm) • For timber stud walls there shall be a minimum distance of 100 mm of penetration seal to any timber stud. The cavity between the penetration seal and the timber stud must be closed with a minimum 100 mm of insulation with classification A1 or A2 according to EN 13501 – 1 • Minimum density 550 kg/m³ • Minimum thickness 94 mm • Classification according to EN13501 – 2: ≥ EI 90 • This European technical assessment does not cover sandwich panel constructions and flexible walls were the lines does not cover studs on both sides. Penetrations in such constructions shall be tested on a case by case basis.
Rigid walls	• Aerated concrete, concrete, masonry • Minimum thickness 100 mm • The rigid wall shall be classified in accordance with EN 13501 – 2 for the required fire resistance period.
Shaft walls	• Steel studs lined on one face with minimum 2 layers of boards (minimum Thickness 20 mm) • Minimum thickness 2 x 20 mm • Classification according to EN13501 – 2: ≥ EI 90
Rigid floors	• Aerated concrete, concrete, masonry • Minimum density 550 kg/m^3 • Minimum thickness 150 mm • The rigid wall shall be classified in accordance with EN 13501 – 2 for the required fire resistance period.

The Pipe penetration seal "Pacifyre® IWM III" can only be configured as specified in the following tables. Other parts or service support constructions shall not penetrate the penetration seal.

Penetrating element	**Construction characteristics for installation of the penetrating element in flexible walls and rigid walls**
Plastic pipes	• PVC – U pipes according to EN ISO 1452-1 or EN ISO 15493 and DIN 8061 / DIN 8062 with diameters and wall thicknesses as defined in the following annexes of the ETA • PE – HD pipes according to EN 1519 – 1 or EN ISO 15494 and DIN 8074 / DIN 8075 with diameters and wall thicknesses as defined in the following annexes of the ETA • PP pipes according to EN ISO 15494 and DIN 8077 / DIN 8078 with diameters and wall thicknesses as defined in the following annexes of the ETA • Wavin Si Tech pipes from manufacturer "Wavin GmbH" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA • Alpex F 50 Profi and Alpex L Pipes from manufacturer "Fränkische Rohrwerke Geb. Kirchner GmbH & Co KG" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA • Uponor MLC pipe white (old name Unipipe Mehrschichtverbundrohr) pipes from manufacturer "Uponor GmbH" or equal product with diameters and wall thicknesses as defined the following annexes of the ETA

	• aquatherm green pipe MS (old name Fusiotherm Stabiverbund) pipes from manufacturer "aquatherm GmbH" or equal product with diameters and wall thicknesses as defined the following annexes of the ETA

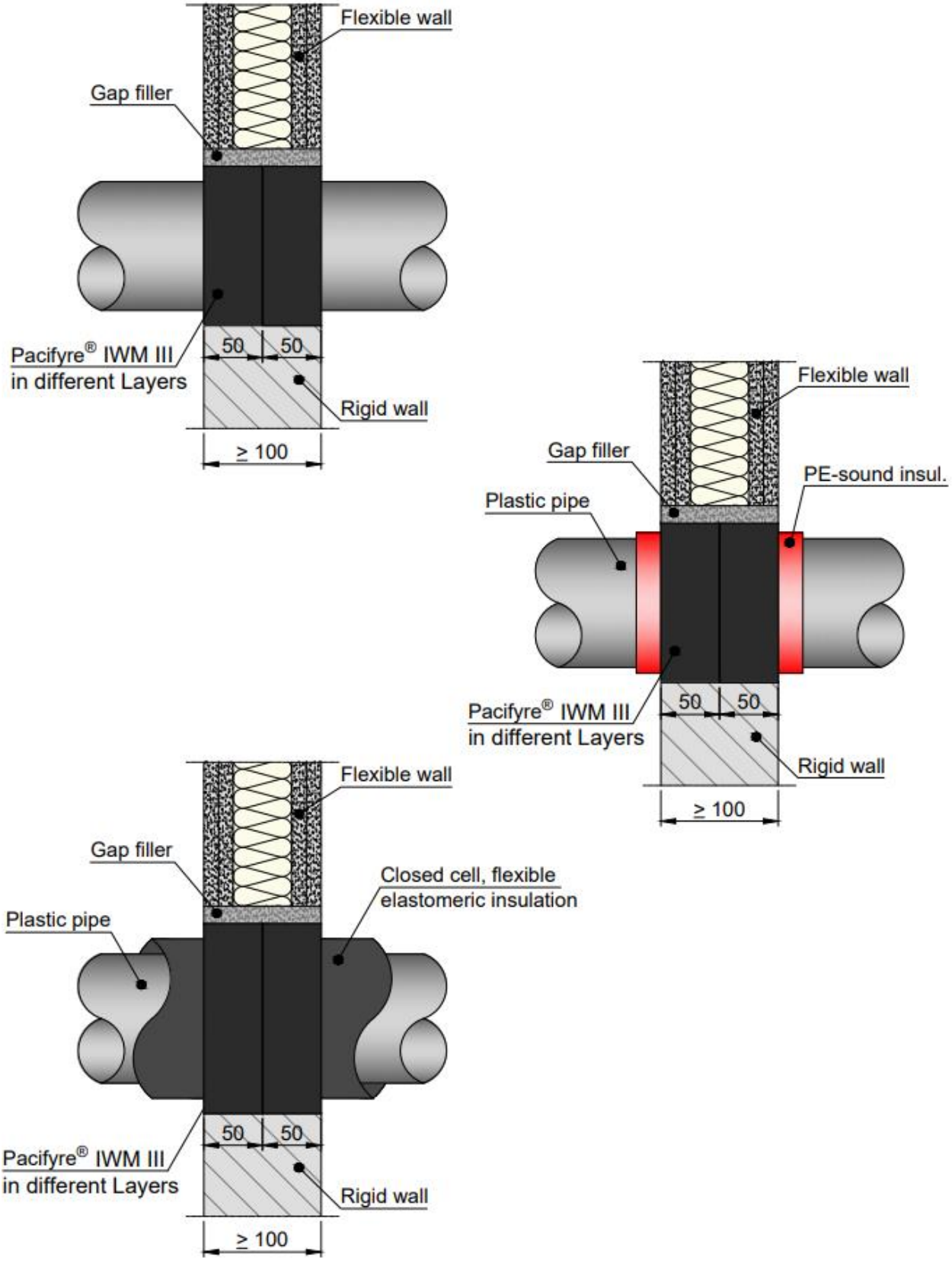
Penetrating element	**Construction characteristics for installation of the penetrating element in mineral fibre board**
Plastic pipes	• PVC – U pipes according to EN ISO 1452-1 or EN ISO 15493 and DIN 8061 / DIN 8062 with diameters and wall thicknesses as defined in the following annexes of the ETA • PE – HD pipes according to EN 1519 – 1 or EN ISO 15494 and DIN 8074 / DIN 8075 with diameters and wall thicknesses as defined in the following annexes of the ETA • PP pipes according to EN ISO 15494 and DIN 8077 / DIN 8078 with diameters and wall thicknesses as defined in the following annexes of the ETA

Penetrating element	**Construction characteristics for installation of the penetrating element in shaft wall constructions**
Plastic pipes	• PVC – U pipes according to EN ISO 1452-1 or EN ISO 15493 and DIN 8061 / DIN 8062 with diameters and wall thicknesses as defined in the following annexes of the ETA • PE – HD pipes according to EN 1519 – 1 or EN ISO 15494 and DIN 8074 / DIN 8075 with diameters and wall thicknesses as defined in the following annexes of the ETA • PP pipes according to EN ISO 15494 and DIN 8077 / DIN 8078 with diameters and wall thicknesses as defined in the following annexes of the ETA

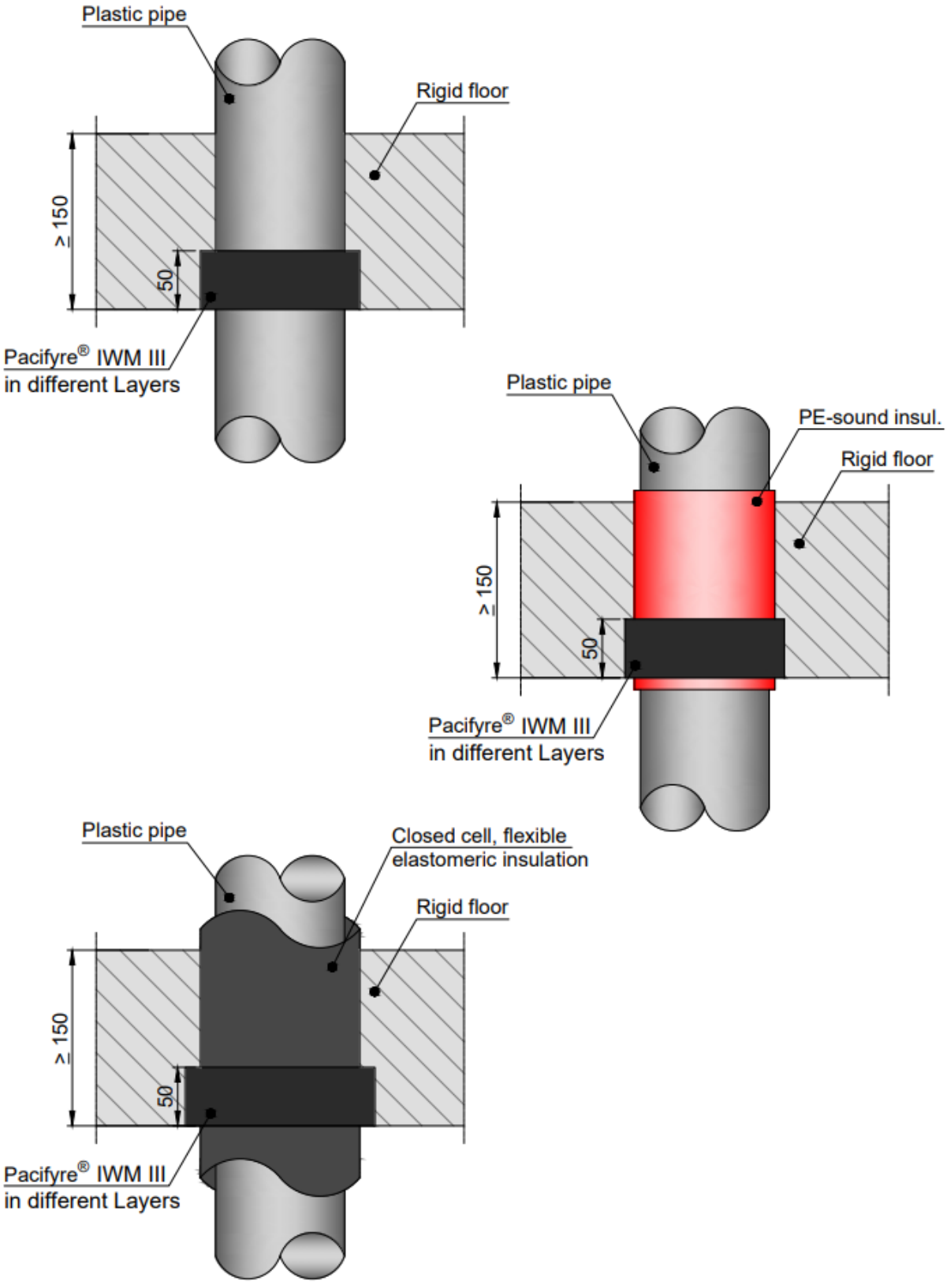
Penetrating element	**Construction characteristics for installation of the penetrating element in rigid floors**
Plastic pipes	• PVC – U pipes according to EN ISO 1452-1 or EN ISO 15493 and DIN 8061 / DIN 8062 with diameters and wall thicknesses as defined in the following annexes of the ETA • PE – HD pipes according to EN 1519 – 1 or EN ISO 15494 and DIN 8074 / DIN 8075 with diameters and wall thicknesses as defined in the following annexes of the ETA • PP pipes according to EN ISO 15494 and DIN 8077 / DIN 8078 with diameters and wall thicknesses as defined in the following annexes of the ETA • Wavin Si Tech pipes from manufacturer "Wavin GmbH" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA • Geberit Silent PP pipes from manufacturer "Geberit Vertriebs GmbH" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA • Polokal NG pipes from manufacturer "Poloplast GmbH & Co KG" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA • Rehau Raupiano pipes from manufacturer "Rehau AG & CO" or equal product with diameters and wall thicknesses as defined in Annex …. of the ETA • Alpex F 50 Profi and Alpex L Pipes from manufacturer "Fränkische Rohrwerke Geb. Kirchner GmbH & Co KG" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA • Uponor MLC pipe white (old name Unipipe Mehrschichtverbundrohr) pipes from manufacturer "Uponor GmbH" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA • Aquatherm green pipe MS (old name Fusiotherm Stabiverbundrohr) pipes from manufacturer "aquatherm GmbH" or equal product with diameters and wall thicknesses as defined in the following annexes of the ETA

Annex 2
Detailed information for the confirmation of fire resistance

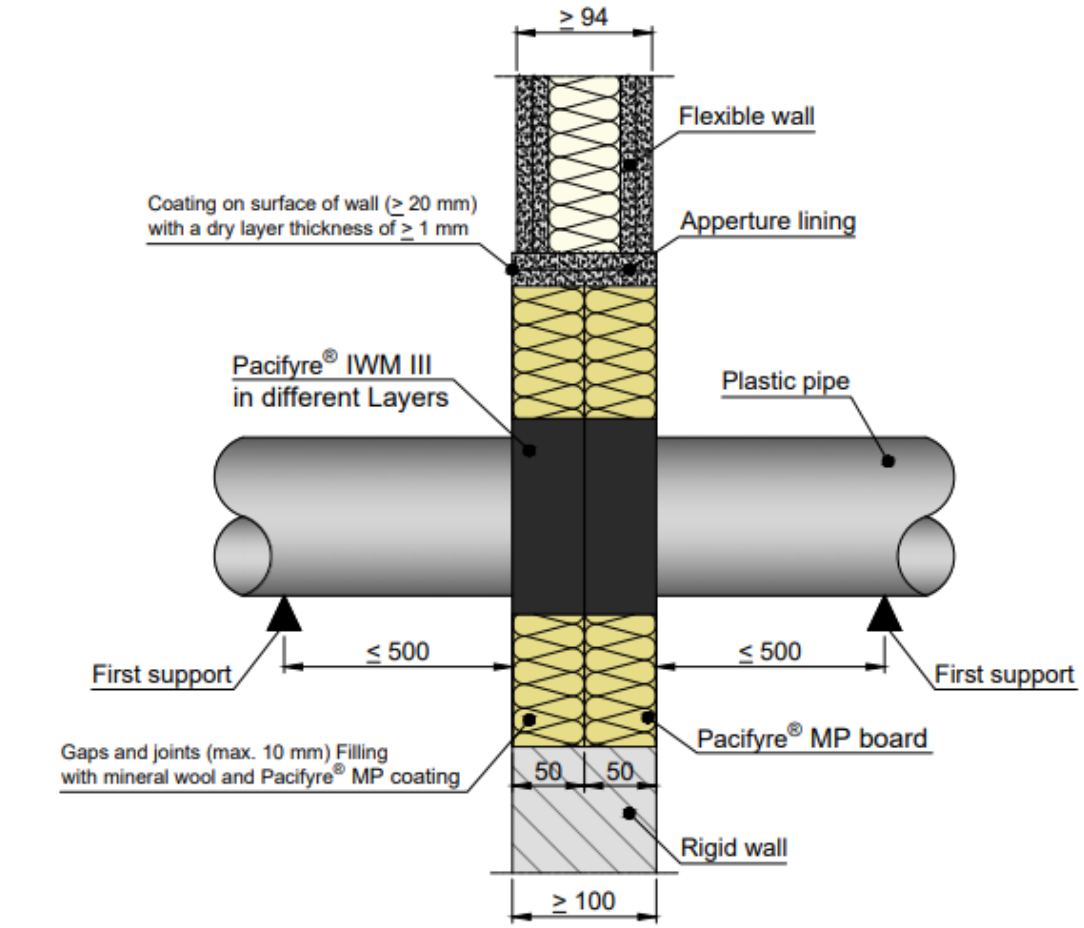
Installation in lightweight partitions or in concrete walls with or without additional pipe insulation

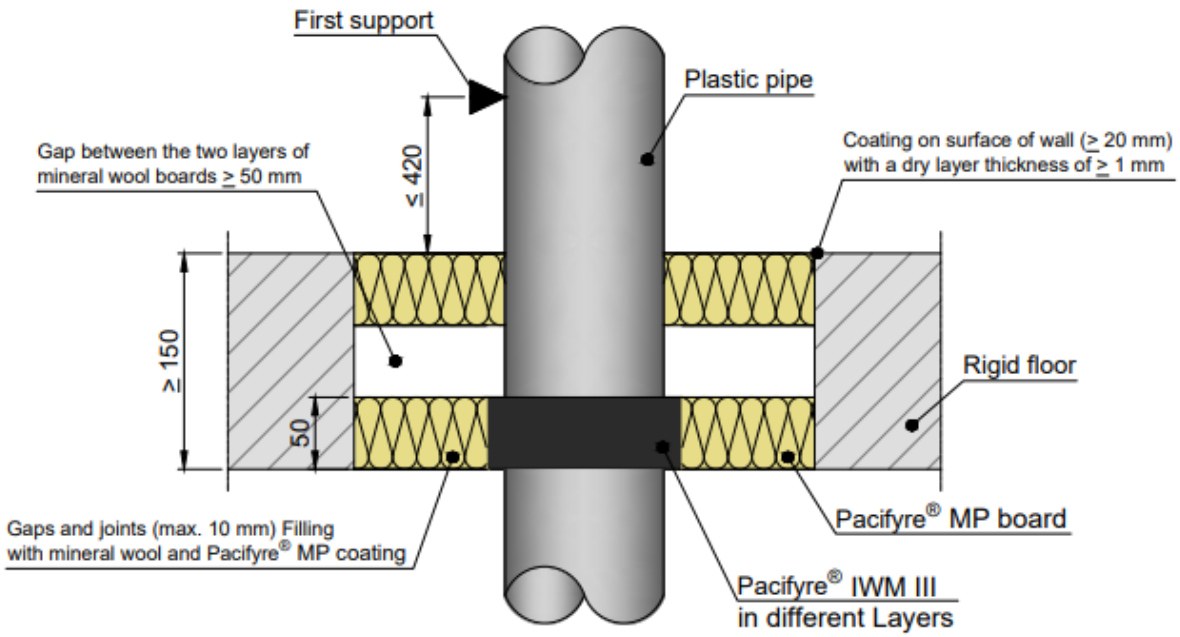


Installation in concrete floors with and without additional pipe insulation

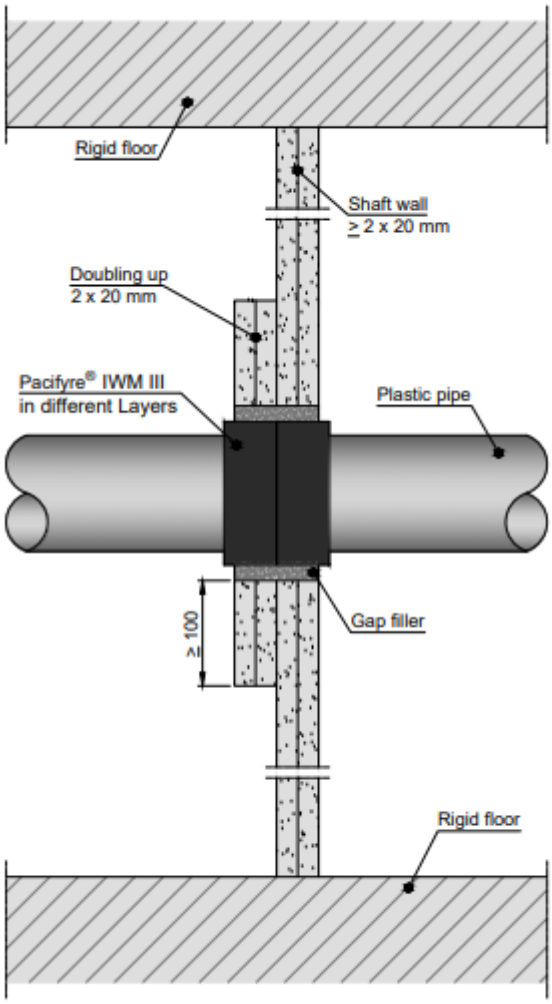


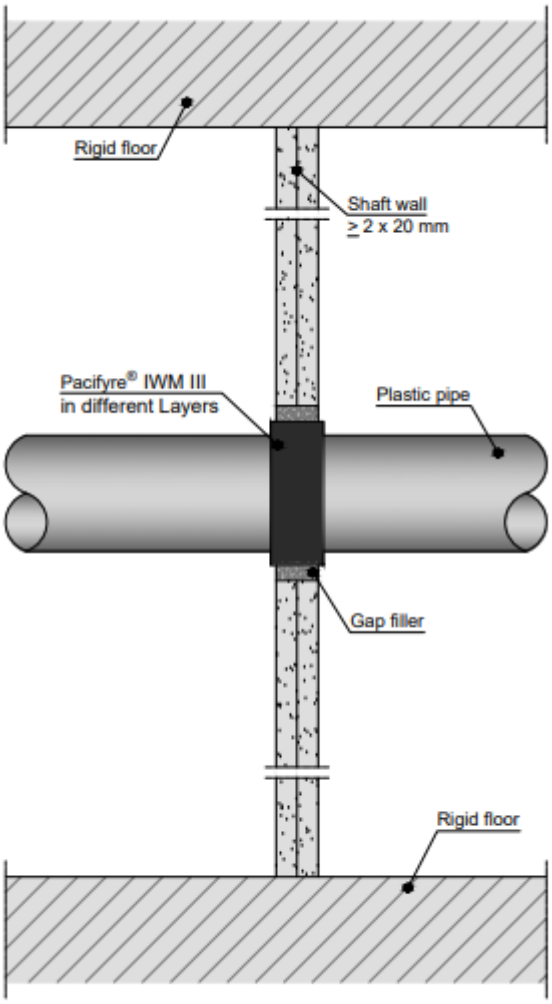
Installation in mineral wool sealants without additional pipe insulation





Installation in shaft wall partitions with or without additional pipe insulation





Annex 3
Description of the installations for the confirmation of fire resistance in at least 100 mm walls

The below applies to seals in walls with the following specifications:

The wall must be classified according to EN 13501-2

The wall shall be at least 100 mm thick

The walls shall be made from concrete, aerated concrete, bricks or a lightweight partition

For lightweight partitions, the number of boards on each side shall be at least 2 and the total thickness of the boards on each side shall be at least 25 mm

Lightweight partitions made with timber frame shall have at least two boards on each side, and the total thickness of the boards on each side shall be at least 25 mm. No penetration must be closer than 100 mm to a timber batten. The void between the penetration and the timber batten shall be filled with an insulation material with reaction to fire class A1 or A2 according to EN 13501-1

The pipes shall penetrate the walls perpendicular to the walls

The penetrations shall be made as single penetrations

The pipe insulation made from AF/Armaflex shall cover the pipes out to a distance of 350 mm from the surface of the wall on each side

The pipe insulation shall be continuous through the penetration.

The gap between the pipe and the wall shall be between 10 mm and 50 mm wide

The pipes may be covered with a PE foam based pipe insulation with a maximum thickness of 4 mm

Type of installation	Description
Pipes	**PVC-U pipes according to EN 1452-1**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation thickness (mm)	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	1,8 - 5,6	2x2	without	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8 - 12,3	2x3		EI 120 - U/C	E 120 - U/C
≤ 50	1,8 - 5,6	2x3	4 mm PE	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-≤2,2	2x4		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	2,2-12,3	2x3		EI 120 - U/C	E 120 - U/C
Insulation synthetic rubber like AF Armaflex in the thickness groups AF 1 - AF 5					
≤ 50	1,8-5,6	2x3	up to 9,5 mm	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	5,6-12,3	2x3		EI 120 - U/C	E 120 - U/C
≤ 50	1,8-5,6	2x3	up to 31,5 mm	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-2,7	2x3	17- 18 mm	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-12,3	2x4	up to 31,5 mm	EI 120 - U/C	E 120 - U/C

Tolerances Armaflex AF: AF 1 – AF 2 + - 1,0 mm; AF 3 – AF 4 + - 1,5 mm; AF 5 + - 2,5 mm

Type of installation	Description
Pipes	**PE-HD pipes according to EN 1519-1**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF) Synthetic rubber like AF/Armaflex AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	1,8	2x2	without	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-10	2x3		EI 120 - U/C	E 120 - U/C
≤ 50	1,8	2x3	4 mm PE	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-10	2x3		EI 120 - U/C	E 120 - U/C
Insulation synthetic rubber like AF Armaflex in the thickness groups AF 1 - AF 5					
≤ 50	1,8	2x3	up to 9,5 mm	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-10	2x3		EI 120 - U/C	E 120 - U/C
≤ 110	1,8-10	2x4	up to 31,5 mm	EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**PP pipes according to EN ISO 15494**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. – Thermacompact TF) Synthetic rubber like AF/Armaflex AF-1 to ... AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	1,8	2x2	without	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-10	2x3		EI 120 - U/C	E 120 - U/C
≤ 50	1,8	2x2	4 mm PE	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-10	2x3		EI 120 - U/C	E 120 - U/C
Insulation synthetic rubber like AF Armaflex in the thickness groups AF 1 - AF 5					
≤ 50	1,8	2x3	up to 9,5 mm	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 75	1,8-10	2x3		EI 120 - U/C	E 120 - U/C
≤ 110	1,8-10	2x4	up to 31,5 mm	EI 120 - U/C	E 120 - U/C

Tolerances Armaflex AF: AF 1 – AF 2 + - 1,0 mm; AF 3 – AF 4 + - 1,5 mm, AF 5 + - 2,5 mm

Type of installation	Description
Pipes	**Wavin SiTECH pipes**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. Thermacompact TF)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	2,0	2x2	4 mm PE sound insulation like Thermacompact TF	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 75	2,0-2,55	2x3		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 90	2,0-3,05	2x4		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	2,0-3,7	2x5		EI 120 - U/C	E 120 - U/C

According to EN 1366-3 section E.2.7.4 the following applies

The classification for PVC-U pipes according to EN 1453-1, EN 1329-1 or EN 1452-1, also applies to PVC-C pipes according to EN 1566-1

Classification for PE-HD pipes according to EN 1519-1 and EN 12666-1 also applies to PE pipes according to EN 12201-2, EN 1519-1 and EN 12666-1 and to ABS pipes according to EN 1455-1 and SAN+PVC pipes according to EN 1565-1

Type of installation	Description
Pipes	**Aquatherm green pipe MS (old name: Fusiotherm Stabiverbund)**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 40	5,6	2x2	without, with PE insulation or with synthetic rubber like AF Armaflex up to 31,5 mm	EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 75	5,6-10,4	2x3		EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 110	10,4-≤15,2	2x4		EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**Uponor MLC pipe white (old name: Unipipe multilayer pipe)**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 40	5,6	2x2	without, PE or synthetic rubber like Armaflex AF	EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 75	5,6-10,4	2x3	without	EI 90 - U/C	E 120 - U/C
		2x4		EI 120 - U/C	E 120 - U/C
		2x3	4 mm PE	EI 120 - U/C	E 120 - U/C
		2x3	up to 31,5 mm	EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 110	10,4-≤15,2	2x4	without	EI 90 - U/C	E 120 - U/C
		2x5		EI 120 - U/C	E 120 - U/C
		2x4	4 mm PE	EI 120 - U/C	E 120 - U/C
		2x4	up to 31,5 mm	EI 120 - U/C	E 120 - U/C
120 mm wall thickness					
> 40 ─ ≤ 110	10,4- ≤ 15,2	2x4	without	EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**Alpex Duo multilayer pipes**
Insulation (were stipulated in table)	**PE sound insulation or Armaflex AF thickness group AF 1 – AF 5**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 40	3,5	2x2	without, PE or with synthetic rubber like Armaflex AF	EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 75	3,5-5,0	2x3	without	EI 120 - U/C	E 120 - U/C
		2x3	up to 9,5 mm	EI 90 - U/C	E 120 - U/C
		2x4	12,5 to 18 mm	EI 90 - U/C	E 120 - U/C
		2x4	25 to 31,5 mm	EI 120 - U/C	E 120 - U/C
		2x5	up to 31,5 mm	EI 120 - U/C	E 120 - U/C

Annex 4
Description of the installations for the confirmation of fire resistance in 150 mm concrete slabs

The below applies to seals in 150 mm thick concrete slab

The below applies to seals in floors with the following specifications:

The floor must be classified according to EN 13501-2

The floor shall be at least 150 mm thick

The floor shall be made from concrete or aerated concrete with a density of at least 550 kg/m^3

The distance between two single Ø110 mm penetrations shall be at least 100 mm

PVC pipes and multilayer pipes Unipipe, Alpex Duo and Fusiotherm Stabigverbund may be installed with less than 100 mm or zero relative distance in a linear distribution. In this case the requirements in the table regarding zero distance shall be observed.

The pipes shall penetrate the floor perpendicular to the floor

The pipe insulation made from AF/Armaflex shall cover the pipes out to a distance of 350 mm from the surface of the floor on each side

The pipe insulation shall be continuous through the penetration.

The gap between the pipe and the floor shall be between 10 mm and 50 mm wide, and shall be filled with an insulation material with reaction to fire class A1 or A2 according to EN 13501-1 or with cement or gypsum based mortar

The pipes may be covered with a PE foam based pipe insulation with a maximum thickness of 4 mm

Type of installation	Description
Pipes	**PVC-U pipes according to EN 1452-1**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex thickness group AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	1,8 - 5,6	2	without	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8 - 12,3	3		EI 120 - U/C	E 120 - U/C
50	3,7	2		EI 240 - U/C	E 240 - U/C
≤ 110	1,8 - 12,3	3	4 mm PE	EI 120 - U/C	E 120 - U/C
≤ 110	1,8-12,3	3	up 9,5 mm	EI 90 - U/C	E 90 - U/C
≤ 110	12,3	3	up to 18 mm	EI 90 - U/C	E 90 - U/C
≤ 110	1, 8-<12,3	4	up to 23 mm	EI 90 - U/C	E 90 - U/C
110	12,3	4	15,5 - 23 mm	EI 120 - U/C	E 120 - U/C
≤ 110	1, 8-<12,3	5	12,5 - 31,5 mm	EI 90 - U/C	E 90 - U/C
≤ 110	12,3	5		EI 120 - U/C	E 120 - U/C
≤ 160	4,7	6	without	EI 240 - U/C	E 240 U/C

Type of installation	Description
Pipes	**PE-HD pipes according to EN 1519-1**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex thickness group AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	1,8	2	without	EI 120 - U/C	E 120 - U/C
> 50 – ≤ 110	1,8-10	3		EI 120 - U/C	E 120 - U/C
≤ 50	1,8	3	4 mm PE	EI 120 - U/C	E 120 - U/C
> 50 – ≤ 110	1,8-10	3		EI 120 - U/C	E 120 - U/C
≤ 50	1,8	3	up to 9,5 mm	EI 120 - U/C	E 120 - U/C
> 50 – ≤ 75	1,8-1,9	3		EI 120 - U/C	E 120 - U/C
50	4,6	2	without	EI 240 - U/C	E 240 - U/C
> 75 – ≤ 110	1,9-10	3	up to 9,5 mm	EI 90 - U/C	E 90 - U/C
110	10	3		EI 90 - U/C	E 120 - U/C
110	10	4		EI 90 - U/C	E 120 - U/C
110	10	3	9,5 - 18 mm	EI 120 - U/C	E 120 - U/C
≤110	1,8-10	4	9,5 - 31,5 mm	EI 120 - U/C	E 120 - U/C
110	6,3	4	without	EI 240 - U/C	E 240 - U/C

Type of installation	Description
Pipes	**PP pipes according to EN ISO 15494**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex thickness groups AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	1,8	2	without	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8 - 10	3		EI 120 - U/C	E 120 - U/C
≤ 50	1,8	2	4 mm PE	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-10	3		EI 120 - U/C	E 120 - U/C
≤ 110	1,8-10	3	up to 9,5 mm	EI 120 - U/C	E 120 - U/C
≤ 110	1,8-10	4	up to 31,5 mm	EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**Wavin SiTECH pipes**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	2,0	2	4 mm PE sound insulation	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 75	2,0-2,55	3		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 90	2,0-3,05	4		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	2,0-3,7	5		EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**POLO-KAL NG pipes**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	2,0	2	4 mm PE sound insulation	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 75	2,0-2,5	3		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 90	2,0-2,9	4		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	2,0-3,4	5		EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**Geberit Silent PP pipes**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	2,0	2	4 mm PE sound insulation	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 75	2,0-2,5	3		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 90	2,0-3,1	4		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	2,0-3,6	5		EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**Rehau Raupiano pipes**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 50	1,8	2	4 mm PE sound insulation	EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 75	1,8-2,1	3		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 90	1,8-2,4	4		EI 120 - U/C	E 120 - U/C
> 50 ─ ≤ 110	1,8-2,7	5		EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**PVC pipes and multilayer pipes like Unipipe, Alpex Duo, Uponor MLC pipe white and Aquatherm green pipe MS (old name: Fusiotherm Stabiverbund) with zero relative distance**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF) Synthetic rubber like AF/Armaflex thickness group AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification PVC Pipes is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 110	1,8-12,3	2	without / 4 mm PE / Armaflex AF up to 9,5 mm	EI 90 - U/C	E 90 - U/C
≤ 110	1,8 - 12,3	3	Armaflex AF 9,5 - 31,5 mm		

The classification of multilayer pipes is declared under the following conditions:

Maximum achieved classification	
E = Integrity and I = Insulation	E = Integrity
EI 90 - U/C	E 90 - U/C

Type of installation	Description
Pipes	**Aquatherm green pipe MS (old name Fusiotherm Stabiverbund)**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex thickness group AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 40	5,6	2	Without / PE / synthetic rubber like Armaflex AF	EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 75	5,6-10,4	3		EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 110	10,4-≤15,2	4		EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**Uponor MLC pipe white (old name: Unipipe multilayer pipe)**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex thickness group AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 40	5,6	2	Without / PE / synthetic rubber like Armaflex AF	EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 75	5,6-10,4	3		EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 110	10,4-≤15,2	4		EI 120 - U/C	E 120 - U/C

Type of installation	Description
Pipes	**Alpex Duo multilayer pipes**
Insulation (were stipulated in table)	**4 mm PE sound insulation (e.g. - Thermacompact TF)** **Synthetic rubber like AF/Armaflex thickness group AF-1 to AF-5 (up to 31,5 mm thickness, tolerances + - 2,5 mm)**

The classification is declared under the following conditions:

Pipe ø (mm)	Wall thickness (mm)	Numbers of layers Pacifyre® IM2	Insulation	Maximum achieved classification	
				E = Integrity and I = Insulation	E = Integrity
≤ 40	3,5	2	without	EI 120 - U/C	E 120 - U/C
> 40 ─ ≤ 75	3,5-5,0	3	without	EI 120 - U/C	E 120 - U/C
		3	4 mm PE	EI 90 - U/C	E 120 - U/C
		5		EI 120 - U/C	E 120 - U/C
		3	Armaflex AF up to 9,5 mm	EI 120 - U/C	E 120 - U/C
		4	Armaflex AF up to 31,5 mm	EI 120 - U/C	E 120 - U/C

Annex 5
Description of the installations for mineral fibre sealants in at least 100 mm walls

The below applies to seals in walls with the following specifications:

The wall must be classified according to EN 13501-2

The wall shall be at least 100 mm thick

The walls shall be made from concrete, aerated concrete, bricks or a lightweight partition

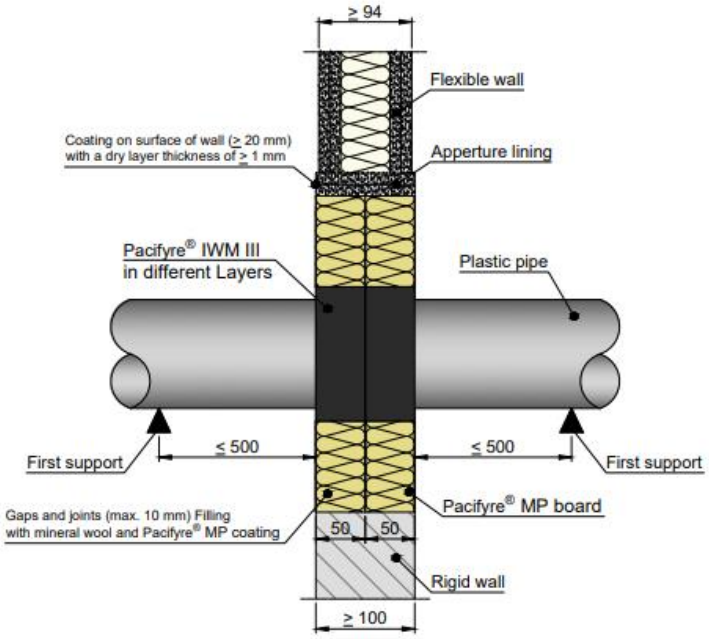
For lightweight partitions, the number of boards on each side shall be at least 2 * 12,5mm plasterboards according to EN520, the total thickness of the boards on each side shall be at least 25 mm.

For lightweight partitions the void between the boards shall be filled with 50 mm mineral wool with reaction to fire Euroclass A1 (100 kg/m^3) according to EN 13501-1.

Lightweight partitions made with timber frame shall have at least two boards on each side, and the total thickness of the boards on each side shall be at least 25 mm. No penetration must be closer than 100 mm to a timber batten. The void between the penetration and the timber batten shall be filled with an 100mm insulation material with reaction to fire class A1 or A2 according to EN 13501-1

The Thickness of the mineral fibre sealant must be at least 2 x 50 mm (according to the ETA -15/0014)

The pipes shall penetrate the walls perpendicular to the walls



The classification is declared under the following conditions:

The Pacifyre® IWM III wrapped around the following pipes in combination with the mineral fibre sealant Pacifyre® MP in wall construction:		
Pipe type and number of layers of the wrap Pacifyre® IWM III	**E = Integrity and I = Insulation**	**E = Integrity**
PVC ø 50 x 2,4 mm – 2 layers	EI 120 U / U	E 120 U / U
PVC ø 75 x 3,6 mm – 3 layers	EI 120 U / U	E 120 U / U
PVC ø 110 x 5,3 mm – 4 layers	EI 120 U / U	E 120 U / U
PP ø 50 x 2,9 mm – 2 layers	EI 120 U / U	E 120 U / U
PP ø 75 x 4,3 mm – 3 layers	EI 120 U / U	E 120 U / U
PP ø 160 x 9,1 mm – 6 layers	EI 120 U / U	E 120 U / U

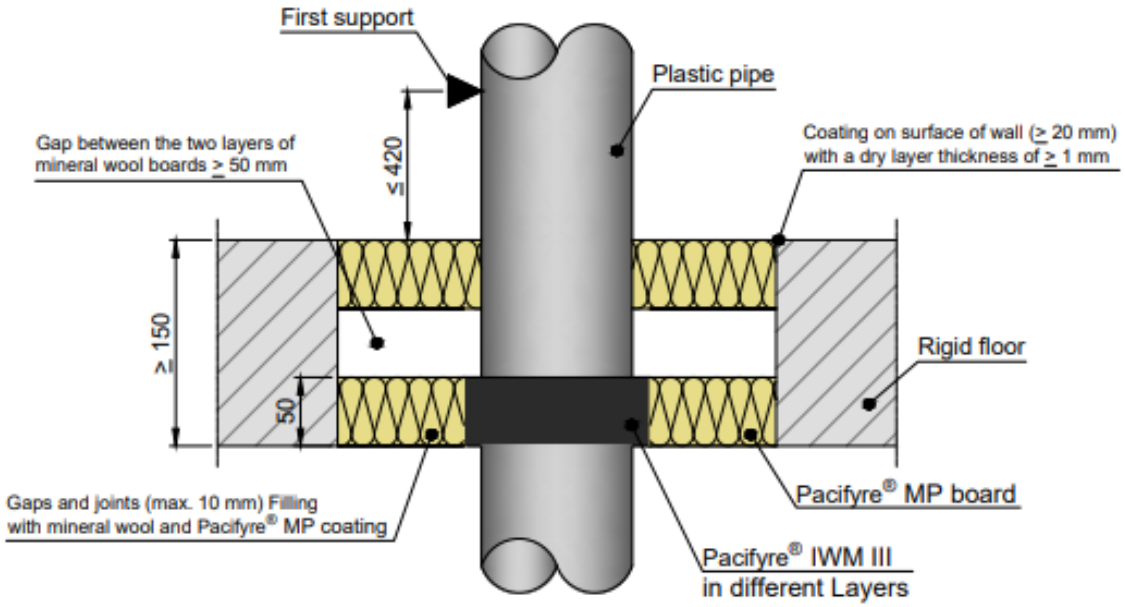
Annex 6
Description of the installations for mineral fibre sealants in at least 150 mm concrete floors

The below applies to seals in 150 mm thick concrete floors (≥ 650 kg/m^3)

The below applies to seals in floors with the following specifications:

The floor must be classified according to EN 13501-2
The floor shall be at least 150 mm thick
The floor shall be made from concrete or aerated concrete with a density of at least 650 kg/m^3
The pipes shall penetrate the floor perpendicular to the floor
The Thickness of the mineral fibre sealant must be at least 2 x 50 mm (according to the ETA – 15/0014)

The classification is declared under the following conditions:



The classification is declared under the following conditions:

The Pacifyre® IWM III wrapped around the following pipes in combination with the mineral fibre sealant Pacifyre® MP in floor construction:		
Pipe type and number of layers of the wrap Pacifyre® IWM III	**E = Integrity and I = Insulation**	**E = Integrity**
PVC ø 50 x 2,4 mm – 2 layers	EI 60 U / U	E 120 U / U
PVC ø 75 x 3,6 mm – 3 layers	EI 120 U / U	E 120 U / U
PVC ø 110 x 5,3 mm – 4 layers	EI 90 U / U	E 120 U / U
PVC ø 160 x 7,7 mm – 6 layers	EI 90 U / U	E 120 U / U
PP ø 50 x 2,9 mm – 2 layers	EI 60 U / U	E 120 U / U
PP ø 75 x 4,3 mm – 3 layers	EI 120 U / U	E 120 U / U
PP ø 110 x 6,3 mm – 4 layers	EI 90 U / U	E 120 U / U
PP ø 160 x 9,1 mm – 6 layers	EI 120 U / U	E 120 U / U

Annex 7
Description of the installations for the confirmation of fire resistance in shaft walls of ≥ 2 x 20 mm thickness

The below applies to seals in walls with the following specifications:

The shaft wall must be classified according to EN 13501-2

The shaft wall shall be at least 2 x 20 mm thickness

For the divided shaft wall, the number of boards shall be at least 2 * 20 mm plasterboards according to EN15283, the total thickness of the boards shall be at least 40 mm.

For the shaft wall the CW50 profiles shall be mounted with max. c/c 1000mm distance.

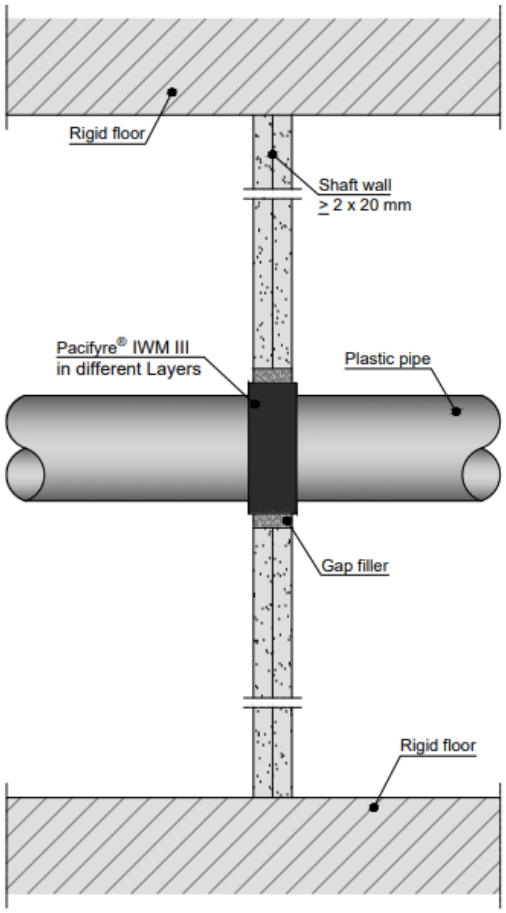
The pipe penetration distance to the nearest mounting must be max. 300 mm

The pipe penetration to other cables etc. must be min. 100 mm

The pipes shall penetrate the walls perpendicular to the walls

The pipe wrap will be only in the middle of the shaft wall

The shaft wall was tested from both sides during the official test in the test laboratory.



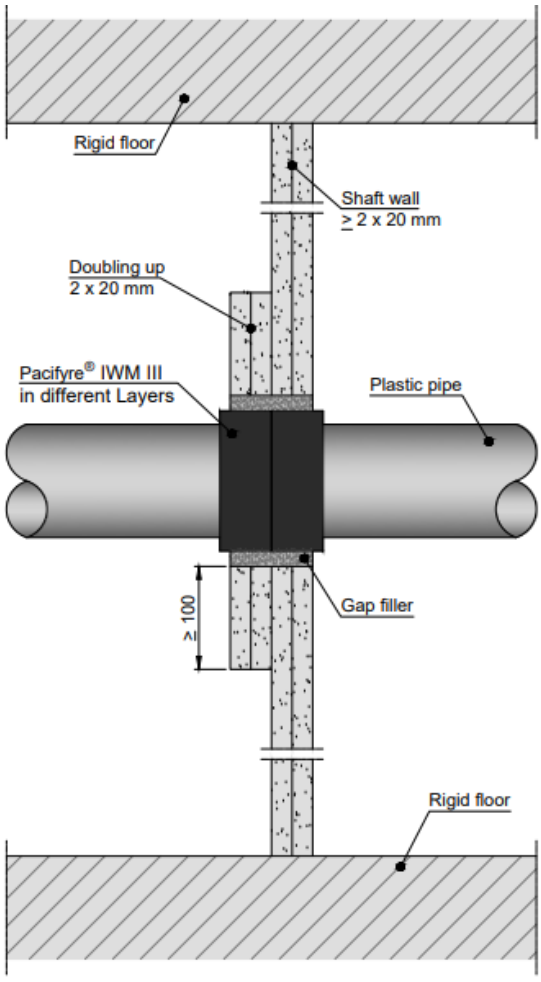
The classification is declared under the following conditions:

Pipe type and number of layers of the wrap Pacifyre® IWM III	E = Integrity and I = Insulation	E = Integrity
PE ø 110 x 6,3 mm – 4 layers	EI 90 U / C	E 90 U / C
PP ø 110 x 6,3 mm – 4 layers	EI 90 U / C	E 90 U / C
PVC ø 110 x 5,3 mm – 4 layers	EI 90 U / C	E 90 U / C
PE ø 50 x 4,6 mm – 2 layers	EI 90 U / U	E 90 U / U
PP ø 50 x 4,6 mm – 2 layers	EI 90 U / U	E 90 U / U
PVC ø 50 x 3,7 mm – 2 layers	EI 90 U / U	E 90 U / U

Annex 8
Description of the installations for the confirmation of fire resistance in shaft walls of ≥ 2 x 20 mm thickness with a doubling up of 2 x 20 mm

The below applies to seals in walls with the following specifications:

The shaft wall must be classified according to EN 13501-2
The shaft wall shall be at least 2 x 20 mm thickness and a doubling up around the pipe of 2 x 20 mm
For the divided shaft wall, the number of boards shall be at least 2 * 20 mm plasterboards according to EN15283, the total thickness of the boards shall be at least 40 mm.
For the shaft wall the CW50 profiles shall be mounted with max. c/c 1000mm distance.
The pipe penetration distance to the nearest mounting must be max. 300 mm
The pipe penetration to other cables etc. must be min. 100 mm
The pipes shall penetrate the walls perpendicular to the walls
The pipe wrap will be only in the middle of the shaft wall
The shaft wall was tested from both sides during the official test in the test laboratory.



The classification is declared under the following conditions:

Pipe type and number of layers of the wrap Pacifyre® IWM III	**E = Integrity and I = Insulation**	**E = Integrity**
PE ø 110 x 6,3 mm – 4 layers	EI 120 U / C	E 120 U / C
PP ø 110 x 6,3 mm – 4 layers	EI 120 U / C	E 120 U / C
PVC ø 110 x 5,3 mm – 4 layers	EI 120 U / C	E 120 U / C