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Authorized and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
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MEMBER OF EOTA



European Technical Assessment ETA-21/1024 of 2021/12/09

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:

ArmaProtect FC1 Firestop Collar

Product family to which the
above construction product
belongs:

Firestopping and Sealing with penetration seals for
pipes in walls and floors.

Manufacturer:

Armacell GmbH
Robert-Bosch-Strasse 10
DE-48153 Münster
Tel.: +49 251 76030
Internet: www.armacell.com

Manufacturing plant:

Armacell GmbH
Manufacturing Plant 10

This European Technical
Assessment contains:

16 pages including 3 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 –
Penetration seals.

This version replaces:

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

The ArmaProtect FC1 Firestop Collar pipe penetration seal, pipe collar with straps for plug fixing or embedding in mortar, gypsum. The ArmaProtect FC1 Firestop Collar pipe penetration seal consists of a metal casing of steel with a minimum thickness of 0,60 mm sufficiently protected against corrosion, and a fire protection lining located inside the housing. The lining consists of a 2 mm thick and 40 mm wide intumescent building material ArmaProtect IWFC1 with a density of approx. $1210 \pm 10 \text{ kg/m}^3$.

The collars have an outer diameter of 61,2 mm up to 187,2 mm. The ArmaProtect FC1 Firestop Collar pipe penetration seal is permitted in lightweight partition walls and solid walls with a thickness of at least 100 mm and in solid floors with a thickness of at least 150 mm. The radial clearance between the penetrating plastic pipes – including insulation – and the vertical or horizontal building part closing off the room has to be filled completely with mineral building materials.

Detailed specifications for identification and performance criteria relevant for fire safety with regard to the construction products are given in annexes 1-3.

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

The construction product ArmaProtect FC1 Firestop Collar pipe penetration seal is intended for use as components with a fire protection effect in walls made from concrete, aerated concrete, masonry or light weight partition 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.

Within the scope of this ETA, the fire resistance was demonstrated for pipes in penetration seals which consisted of the components listed in table 1.

Table 1 – components of the verified penetration seals

Product type	Trade name
Collar	ArmaProtect FC1 Firestop Collar
Intumescent	ArmaProtect IWFC1

Pipe penetration seals are used to seal off openings in fire resistant walls, which are penetrated by cables, and serves to preserve the walls' fire resistance in the area of the penetrations.

Detailed information and data on the verified penetration seals are given in Annexes 1-3.

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, see annexes 1-3

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 ArmaProtect FC1 Firestop Collar pipe penetration seal.

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
3.1 Safety in case of fire (BWR2)	
Reaction to fire	The collar housing made of steel is classified as Euroclass A1 in accordance with EN 13501-1 and EC Delegated regulation 2016/364/EU.
Resistance to fire	The intumescent material ArmaProtect IWFC1 is classified as Euroclass E in accordance with EN 13501-1 The ArmaProtect FC1 Firestop Collar pipe penetration seal used in penetrations seals as described in annex 3 in at Installation is permitted in lightweight partition walls and solid walls with a thickness of at least 100 mm and in solid ceilings with a thickness of at least 150 mm is classified as described in annex 3 in accordance with EN 13501-2
3.2 Hygiene, health and the environment (BWR3)	
Content, emission and/or release of dangerous substances	No dangerous substances ArmaProtect FC1 Firestop Collar and ArmaProtect IWFC1 do not contain dangerous substances detailed in Council Directive 67/548/EEC and Regulation (EC) no 1272/2008 above the acceptable limits
Air permeability (material property)	No performance assessed
Water Permeability (material property)	No performance assessed
3.3 Safety in use (BWR4)	
Mechanical resistance and stability	No performance assessed
Resistance to impact/movement	No performance assessed
Adhesion	No performance assessed
Durability	The product fulfils the provisions related to durability in EAD 35054-00-1104 for use condition Y1
Movement Capability	No performance assessed
Cycling of perimeter seals for curtain walls	No performance assessed
Compression set	No performance assessed
Linear expansion on setting	No performance assessed
3.4 Protection against noise (BWR5)	
Airborne sound insulation	No performance assessed
3.5 Energy Economy and heat retention (BWR6)	
Thermal insulation	No performance assessed
Water vapour permeability	No performance assessed

3.6 General aspects

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.

The verification of durability is part of testing the essential characteristics. The ArmaProtect FC1 Firestop Collar pipe penetration seal is intended for use at temperatures below 0 °C and with exposure to UV, but with no exposure to rain, and can therefore – according EAD 35054-00-1104 – be categorized as Type Y1. Since the requirements for Type Y1 are met, also the requirements for Type Y2, Z1 and Z2 are fulfilled.

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.

ArmaProtect FC1 Fire Stop Collar is 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

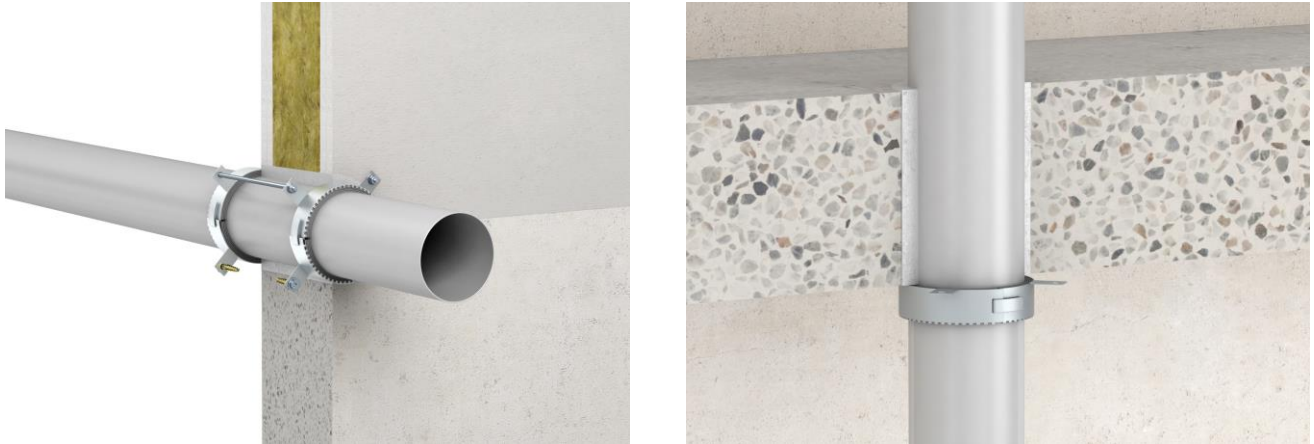
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2021-12-09 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex 1
Product details and definitions

Product and performance of the ArmaProtect FC1 Firestop Collar pipe penetration seal system and accessory components:



Product and performance of the ArmaProtect IWFC1:

Property	Parameter	Method
Weight loss on heating	52-62% (temperature 550 °C, 30 minutes)	TR 024 clause 3.1.8
Dimensions(thickness of the sheet)	2 mm ± 0,2mm	TR 024 clause 3.1.2
Density	1,02 -1,42 g/cm ³ (thickness 2 mm)	TR 024 clause 3.1.4
Expansion ratio	12-22,5 times	TR 024 clause 3.1.11
Expansion pressure	> 0,6 N/mm ²	TR 024 clause 3.1.12

Product and performance of the ArmaProtect FC1 Firestop Collar pipe penetration seal system:

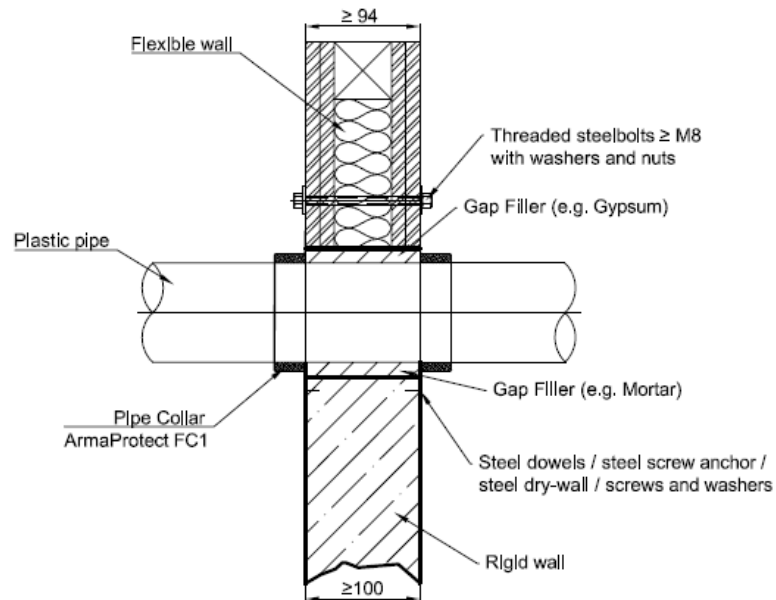
Manufacturer	Description
Armacell GmbH Robert-Bosch-Strasse 10 DE-48153 Münster	ArmaProtect FC1 Firestop Collar pipe penetration seal system. Pipe collar with straps for plug fixing or embedding in gypsum, mortar.

Annex 2

Detailed information and description of the test conditions under which the fire resistance performance was determined for the ArmaProtect FC1 Firestop Collar pipe penetration seal system

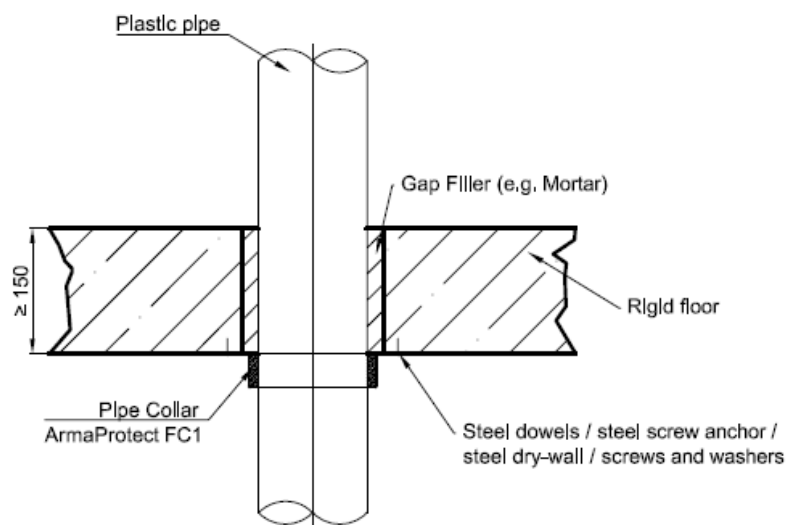
Penetration of pipes, wall installation - section view

Penetration of pipes, wall installation - section view



Penetration of pipes, floor installation - section view

Penetration of pipes, floor installation - section view



Annex 3

Description of the installations for the confirmation of fire resistance of penetration seal performance.

The below applies to the tested seals as indicated in Annex 1 and/or Annex 2 for **100 mm light weight wall** construction with a standard value for fire resistance of 90 min according to EN 1366-3 clause 7.2.2.1.2.

Wall penetrations for pipe material PVC-U . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	1,8 - 5,6	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
$> 50 - \leq 75$	1,8 - 8,4	2x3	EI 120 - U/C	E 120 - U/C	X	X			x
$> 75 - \leq 110$	1,8-12,3	2x4	EI 120 - U/C	E 120 - U/C	X	X			x
$> 110 - \leq 125$	2,2 - 12,2	2x5	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 160	3,2-11,9	2x6	EI 120 - U/C	E 120 - U/C	X	X			x

Wall penetrations for pipe material PE . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	1,8 - 4,6	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
$> 50 - \leq 75$	1,8 - 8,4	2x3	EI 120 - U/C	E 120 - U/C	X	X			x
$> 75 - \leq 110$	2,7-10,0	2x4	EI 120 - U/C	E 120 - U/C	X	X			x

Wall penetrations for pipe material PP . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	1,8 - 4,6	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
$> 50 - \leq 75$	1,8 - 8,4	2x3	EI 120 - U/C	E 120 - U/C	X	X			x
$> 75 - \leq 110$	2,7-10,0	2x4	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 125	3,9-12,2	2x5	EI 90 - U/C	E 90 - U/C	X	X			x
≤ 160	$> 4,0-14,6$	2x6	EI 90 - U/C	E 90 - U/C	X	X			x

Wall penetrations for pipe material Blue Power . Insulation without.									
Pipe ϕ (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	ArmaProtect IWFC1
≤ 50	1,8	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	2,5	2x3	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 110	3,4	2x4	EI 120 - U/C	E 120 - U/C	X	X			x

Wall penetrations for pipe material Wavin SITECH . Insulation without.									
Pipe ϕ (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	ArmaProtect IWFC1
≤ 50	2,0	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	2,6	2x3	EI 90 - U/C	E 120 - U/C	X	X			x
≤ 110	3,6	2x4	EI 90 - U/C	E 120 - U/C	X	X			x

Wall penetrations for pipe material aquatherm green pipe MS . Insulation without.									
Pipe ϕ (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	ArmaProtect IWFC1
≤ 16	2,2	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 50	6,9	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	10,4	2x3	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 110	15,2	2x4	EI 120 - U/C	E 120 - U/C	X	X			x

Also covered pipe diameter (mm) / wall thickness (mm)

20-2,8 / 25-3,5 / 32-4,5 / 40-5,6 / 63-8,7 / 90-12,5/

Wall penetrations for pipe material Geberit Silent PP . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	2,0	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	2,6	2x3	EI 90 - U/C	E 120 - U/C	X	X			x
≤ 110	3,6	2x4	EI 90 - U/C	E 120 - U/C	X	X			x

Wall penetrations for pipe material POLO-KAL NG . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	2,0	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	2,6	2x3	EI 90 - U/C	E 120 - U/C	X	X			x
≤ 110	3,4	2x4	EI 90 - U/C	E 120 - U/C	X	X			x
≤ 125	3,9	2x5	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 160	4,9	2x6	EI 120 - U/C	E 120 - U/C	X	X			x

Wall penetrations for pipe material Rehau Raupiano Plus . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	1,8	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	1,9	2x3	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 110	2,7	2x4	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 125	3,1	2x5	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 160	3,6	2x6	EI 120 - U/C	E 120 - U/C	X	X			x

Wall penetrations for pipe material Triplus 3 Schicht-Schallschutzrohr . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 40	1,8	2x2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	2,5	2x3	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 90	3,1	2x4	EI 120 - U/C	E 120 - U/C	X	X			x

The classification for the wall penetrations are declared under the following conditions:

<p>Field of application (Chapter 5.1 classification report)</p>	<p>Installation in walls: At least 100 mm thick standard lightweight wall construction with a standard value for fire resistance of 90 minutes according to EN1366-3. The above mentioned pipe penetration seals may be mounted into all lightweight wall constructions of same fire resistance classification provided that:</p> <ul style="list-style-type: none"> • The construction is classified according to EN 13501-2 • The construction has a total thickness which is not less than the minimum thickness of the standard lightweight wall of 94-100 mm, that has been used in the test. • This regulation is not valid for pipe closure systems which are arranged within the supporting construction. In case of higher thickness of the supporting construction the length of the penetration seal has to be increased by the same amount as the increased amount of wall. The distance to the surface of the supporting construction remain the same on both sides. • The number of panel layers is ≥ 2 and the total thickness of the panel layer is ≥ 25 when no soffit covering is used. • Lightweight construction walls with timber stud frame when the number of panel layers is ≥ 2 and the total thickness of the panel layer is ≥ 25. No part of the penetration seal is allowed to be closer than 100 mm to a timber stud. The cavity between penetration seal and timber stud is closed by using 100 mm insulation classified as A1 or A2 according to EN 13501-1 which is put into the gap between seal and stud.
	<p>The inside surface of the opening has to be equipped with a lining.</p> <p>Walls made of concrete, aerated concrete or masonry with a wall thickness of ≥ 100</p> <p>The pipe penetration seals are only allowed to be designed as single penetration seals.</p> <p>The pipes are only allowed to be put through the penetration seal in a right angle.</p> <p>The first support (service support constructions) of the pipes both-sided of the separating element have to be arranged in a distance of ≤ 650 mm. The support must be non-combustible, according to EN 13501-1 Euro class A.</p> <p>The filling of the remaining gap (1-3 cm gap width) has to be made in the thickness of the building element with gypsum/gypsum filling compound.</p>
<p>Distances</p>	<p>The minimum distance which have to be kept are:</p> <p>Distance between two single penetration seals of non-insulated pipes (distance from the pipe wall) ≥ 100 mm.</p> <p>Distance between two single penetration seals of insulated pipes (distance from the insulation) ≥ 100 mm</p>

The below applies to the tested seals as indicated in Annex 1 and/or Annex 2 for **floors made of concrete or aerated concrete with floor thickness of ≥ 150 mm and a density of ≥ 550 kg/m³** according to EN1366-3, clause 13.2.1

Floor penetrations for pipe material PVC-U . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	1,8 - 5,6	2	EI 240 - U/C	E 240 - U/C	X	X			x
$> 50 - \leq 75$	1,8 - 8,4	3	EI 240 - U/C	E 240 - U/C	X	X			x
$> 75 - \leq 110$	1,8-12,3	4	EI 240 - U/C	E 240 - U/C	X	X			x
$> 110 - \leq 125$	2,2 - 12,1	5	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 125	12,1	5	EI 240 - U/C	E 240 - U/C	X	X			x
≤ 160	3,2-11,9	6	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 160	11,9	6	EI 240 - U/C	E 240 - U/C	X	X			x

Floor penetrations for pipe material PE . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	1,8 - 4,6	2	EI 240 - U/C	E 240 - U/C	X	X			x
$> 50 - \leq 75$	1,8 - 8,4	3	EI 240 - U/C	E 240 - U/C	X	X			x
$> 75 - \leq 110$	2,7	4	EI 240 - U/C	E 240 - U/C	X	X			x
$> 75 - \leq 110$	$> 2,7-10,0$	4	EI 180 - U/C	E 240 - U/C	X	X			x
≤ 125	3,1	5	EI 240 - U/C	E 240 - U/C	X	X			x
≤ 125	$> 3,1-11,4$	5	EI 120 - U/C	E 240 - U/C	X	X			x
≤ 160	4	6	EI 240 - U/C	E 240 - U/C	X	X			x
≤ 160	$> 4,0-14,6$	6	EI 120 - U/C	E 240 - U/C	X	X			x

Floor penetrations for pipe material PP . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	1,8 - 4,6	2	EI 240 - U/C	E 240 - U/C	X	X			x
$> 50 - \leq 75$	1,8 - 8,4	3	EI 240 - U/C	E 240 - U/C	X	X			x
$> 75 - \leq 110$	2,7	4	EI 240 - U/C	E 240 - U/C	X	X			x
$> 75 - \leq 110$	$> 2,7-10$	4	EI 180 - U/C	E 180 - U/C	X	X			x

Floor penetrations for pipe material Uponor MLC Rohr "weiß" . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	4,5	2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	7,5	3	EI 90 - U/C	E 90 - U/C	X	X			x
≤ 110	10	4	EI 90 - U/C	E 90 - U/C	X	X			x
Also covered pipe diameter (mm) / wall thicknesses (mm)									
(14-18)x2,0 / 20x2,25 / 25x2,5 / 32x3,0 / 40 x 4,0 / 63x6,0 / 90x8,5									

Floor penetrations for pipe material aquatherm green pipe MS . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 16	2,2	2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 50	6,9	2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	10,4	3	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 110	15,2	4	EI 120 - U/C	E 120 - U/C	X	X			x
Also covered pipe diameter (mm) / wall thicknesses (mm)									
20-2,8 / 25-3,5 / 32-4,5 / 40-5,6 / 63-8,7 / 90-12,5									

Floor penetrations for pipe material Wavin SITECH . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	2	2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	2,6	3	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 110	3,6	4	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 125	4,2	5	EI 60 - U/C	E 60 - U/C	X	X			x
≤ 160	5,3	6	EI 60 - U/C	E 60 - U/C	X	X			x

Floor penetrations for pipe material Geberit Silent PP . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	2	2	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 75	2,6	3	EI 120 - U/C	E 120 - U/C	X	X			x
≤ 110	3,6	4	EI 120 - U/C	E 120 - U/C	X	X			x

Floor penetrations for pipe material POLO-KAL NG . Insulation without.									
Pipe \varnothing (mm)	Wall thickness (mm)	Numbers of layers "ArmaProtect IWFC1"	Maximum achieved classification		Admissible pipe end configuration				Admissible collar lining
			E = Integrity and I = Insulation	E = Integrity	C/C	U/C	C/U	U/U	
≤ 50	2	2	EI 90 - U/C	E 120 - U/C	X	X			x
≤ 75	2,6	3	EI 90 - U/C	E 120 - U/C	X	X			x
≤ 110	3,6	4	EI 120 - U/C	E 120 - U/C	X	X			x

The classification is declared under the following conditions:

<p>Field of application (Chapter 5.2 classification report)</p>	<p>Floors made of concrete or aerated concrete with floor thickness of ≥ 150 mm and a density of ≥ 550 kg/m³ according to EN1366-3, clause 13.2.1</p> <p>The filling of the remaining gap (1-5 cm gap width) has to be carried out by using a casting compound with mineral construction material (class A1 or A2) such as cement mortar, gypsum etc.</p>
<p>Distances</p>	<p>The minimum distance which have to be kept are:</p> <p>Distance between two single penetration seals of non-insulated pipes (distance from the pipe wall) ≥ 100 mm.</p> <p>Distance between two single penetration seals of insulated pipes (distance from the insulation) ≥ 100 mm</p>