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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-22/0060 of 2023/09/27

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 FC2

Product family to which the
above construction product
belongs:

Pipe Penetration seal

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:

41 pages including 3 annex(es) 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 340454-00-1104 for Fire
Stopping and Fire Sealing Products, Penetration Seals

This version replaces:

The ETA with the same number issued on 2022-04-19

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 and intended use

Technical description of the product

The ArmaProtect FC2 consists of a solid metal sleeve which is equipped with layers of intumescent material. In the event of a fire, the intumescent material expands. Detailed specification and data for identification and performance criteria relevant for fire safety with regard to the construction products are given in Annex 1-3:

- 1) The ArmaProtect FC2 consists of a solid metal sleeve. The housing shall consist of steel sheet and shall be sufficiently protected against corrosion.
- 2) The housing is equipped with layers of the high performance intumescent material ArmaProtect IWFC2 inlay.
- 3) For closing joints: Ablative or intumescent filler or non-combustible material (class A1 or A2-sl, d0 according to EN 13501-1) as e.g. concrete, cementitious or gypsum mortar, loose stone wool, mineral fibre slabs.

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

The definition of the intended use of the construction product, pipe penetration seal ArmaProtect FC2 is to seal of openings and reinstate the fire resistance performance of a fire rated wall constructions or rigid floor constructions where they are penetrated by various services.

The specific elements of construction in which the ArmaProtect FC2 can be used to provide as a fire sealing and fire stopping purpose in, are described in annex 2.

The supporting construction must be classified in accordance with EN 13501-2 for required fire resistance period.

The verification and assessment methods on which this European Technical Assessment is based, lead to the assumption of a working life for ArmaProtect FC2 of 10 years.

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 (ER 2)	
Reaction to fire	The ArmaProtect IWFC2 inlay is classified as in accordance with EN 13501-1 as Euroclass E The metal casing of the ArmaProtect FC2 collar is classified according to Commission Decision 96/603/EC as Euroclass A1 .
Resistance to fire	ArmaProtect FC2 – are classified in accordance with EN 13501-2 with the used described in annexes 1-3
3.3 Hygiene, health and the environment (ER 3)	
Air permeability	No Performance Assessed
Water permeability	No Performance Assessed
Content, emission and/or release of dangerous substances	No Performance Assessed
3.4 Sustainable use of natural resources (ER 7)	No Performance Assessed

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.

3.5 General aspects relating to fitness for use

Durability and serviceability:

The verification of durability and serviceability is part of testing the essential characteristics. The construction product called ArmaProtect IWFC2 inlay fulfils the requirements according to EAD 340454-00-1104 for use Category: X without expecting significant changes of the characteristics relevant for fire sealing and fire stopping properties and the result performance.

No testing has been conducted on the metal casing of the ArmaProtect FC2 collar, and therefore the casing that consist of steel sheet shall always be sufficiently protected against corrosion.

4 Assessment and verification of constancy of performance (AVCP)

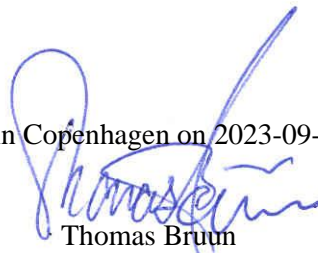
4.1 AVCP system

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

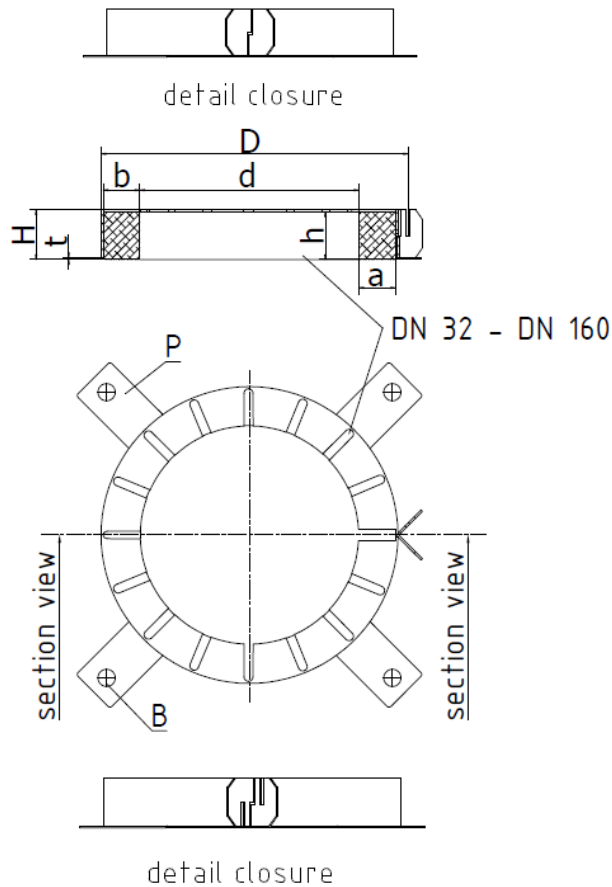
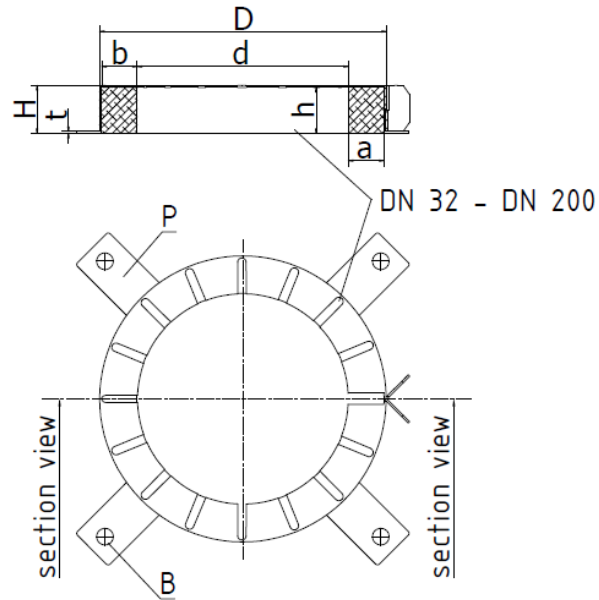
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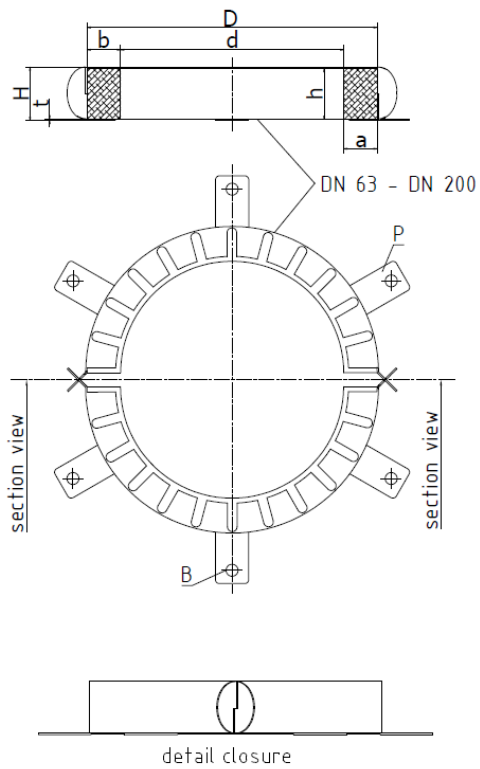
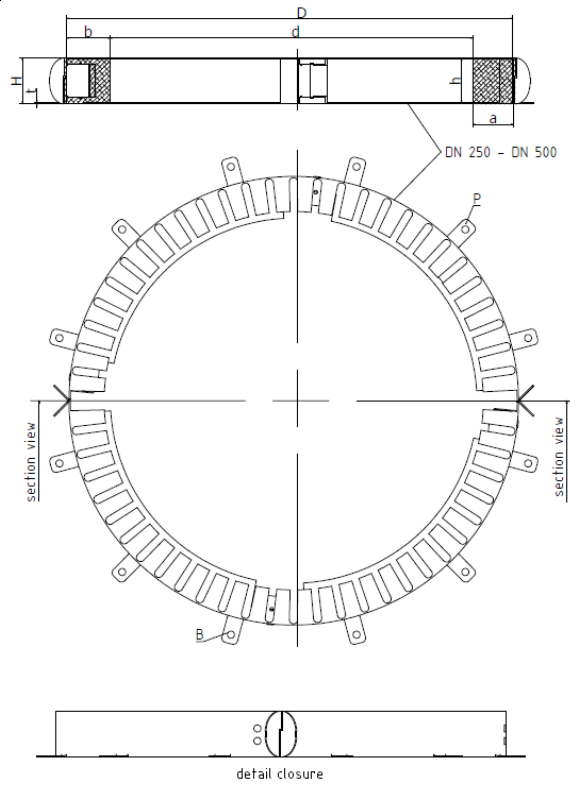


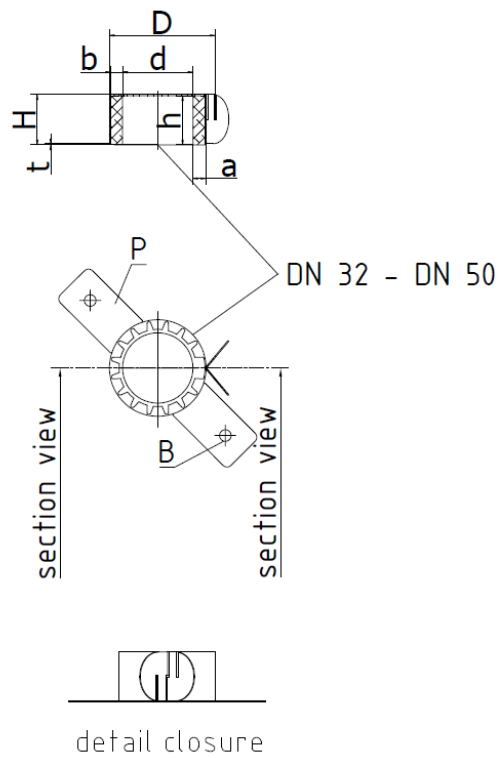
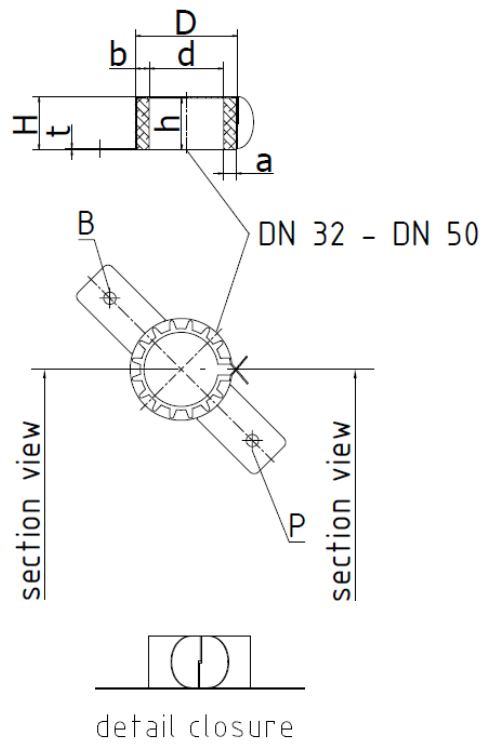
Thomas Bruun
Managing Director, ETA-Danmark

Annex 1
Product details, definitions and specification of intended use
 ArmaProtect FC2, Pipe Penetration seal

Manufacturer	Description
Armacell GmbH Robert-Bosch-Strasse 10 DE-48153 Münster	The metal casing of the ArmaProtect FC2 collar







dA [mm]	d [mm]	D [mm]	b [mm]	t [mm]	H [mm]	P [Stck]	h [mm]	a [mm]	B [mm]
32	36 - 40	50 - 54	7,0	0,6	26,0	2	25,4	6,4 +/- 0,5	6,0
40	44 - 48	58 - 62	7,0	0,6	26,0	2	25,4	6,4 +/- 0,5	6,0
50	54 - 57	68 - 71	7,0	0,6	26,0	2	25,4	6,4 +/- 0,5	6,0
63	67 - 70	94 - 97	13,5	0,6	26,0	4	25,4	12,8 +/- 1,0	6,0
75	79 - 83	106 - 110	13,5	0,6	26,0	4	25,4	12,8 +/- 1,0	6,0
90	94 - 100	132 - 138	18,3	1,1	26,6	4	25,4	17,1 +/- 1,0	9,0
110	114 - 120	155 - 161	20,5	1,1	26,6	4	25,4	19,2 +/- 1,5	9,0
125	129 - 135	172 - 178	20,5	1,1	40,0	4	38,1	19,2 -0/+2,0	9,0
140	144 - 152	200 - 206	28,0	1,1	40,0	6	38,1	25,6 -0/+2,0	9,0
160	164 - 169	220 - 225	28,0	1,1	40,0	6	38,1	25,6 -0/+2,0	9,0
180	184	264	40,0	1,5	40,0	8	38,1	38,4 +/- 3,0	9,0
200	204	284	40,0	1,5	40,0	8	38,1	38,4 +/- 3,0	9,0
225	239	328	44,5	1,5 / 1,0	51,5	10	50,0	42,0 +/- 3,0	8,0
250	264	353	44,5	1,5 / 1,0	51,5	10	50,0	42,0 +/- 3,0	8,0
280	289	378	44,5	1,5 / 1,0	51,5	12	50,0	42,0 +/- 3,0	8,0
300	314	403	44,5	1,5 / 1,0	51,5	12	50,0	42,0 +/- 3,0	8,0
315	328	417	44,5	1,5 / 1,0	51,5	12	50,0	42,0 +/- 3,0	8,0
355	370	459	44,5	1,5 / 1,0	51,5	12	50,0	42,0 +/- 3,0	8,0
400	415	504	44,5	1,5 / 1,0	51,5	12	50,0	42,0 +/- 3,0	8,0
450	465	554	44,5	1,5 / 1,0	51,5	14	50,0	42,0 +/- 3,0	8,0
500	515	604	44,5	1,5 / 1,0	51,5	14	50,0	42,0 +/- 3,0	8,0

Manufacturer	Description	
Armacell GmbH Robert-Bosch-Strasse 10 DE-48153 Münster	ArmaProtect IWFC2 inlay is a flexible intumescent strip with a nominal thickness between 1,0 mm to 8,0 mm.	
Property	Parameter	Method
Density	1200 kg/m ³ + - 10 %	
Weight loss due to heating	49,0 to 63 %	(tested at 550°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° C for 30 min with a top load

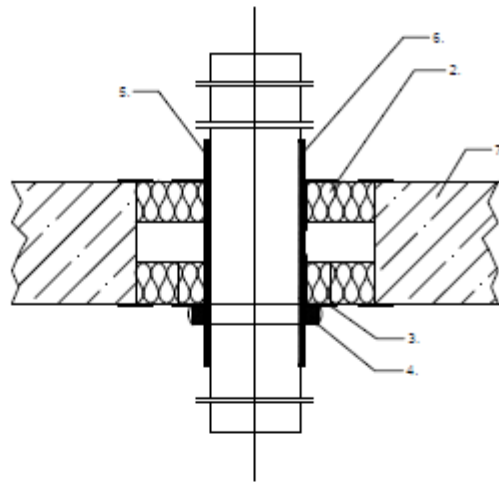
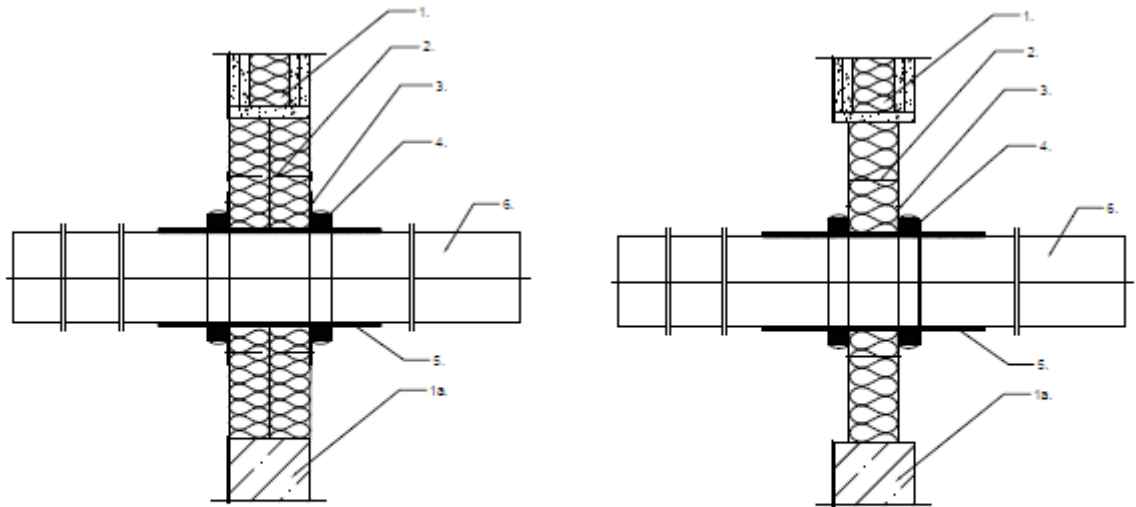
Annex 2

Description of the test conditions concerning the resistance to fire for the ArmaProtect FC2

ArmaProtect FC2 have been tested and classified of the resistance to fire performance in accordance with EN13501-2.

- Installation of the product has been carried out in flexible lightweight walls (drywalls). The wall shall have a minimum thickness of ≥ 100 mm and the structure shall be classified in accordance with EN 13501-2. Flexible lightweight walls with steel studs according to EN14195. The wall shall be lined on both faces with minimum 2 layer of gypsum boards total thickness 25 mm (minimum thickness 12,5 mm pr. board) according to EN 520. All individual compartments between the studs shall be filled with a minimum of 40 mm of stone wool insulation with minimum density of 85-115 kg/m³, class A1 according to EN13501-1. For the stud walls there must be a minimum distance of ≥ 100 mm of the penetration seal to any stud and the cavity between the penetration seal and the stud shall be closed with a minimum 100 mm of insulation with classification class A1 or A2 according to EN 13501 – 1 in the cavity between stud and seal.
- Rigid walls. The wall must have a minimum thickness as described in the following tables and comprise of masonry, aerated concrete, concrete, or reinforced concrete with a minimum density of 650 kg/m³. The rigid wall shall be classified in accordance with EN 13501 – 2 for the required fire resistance period
- Rigid floors. The floor must have a minimum thickness of ≥ 150 mm and comprise of aerated concrete, concrete, or reinforced concrete with a minimum density of 650 kg/m³. The rigid floor shall be classified in accordance with EN 13501 – 2 for the required fire resistance period.

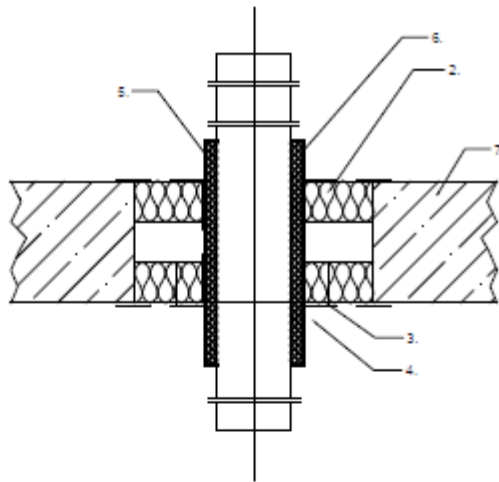
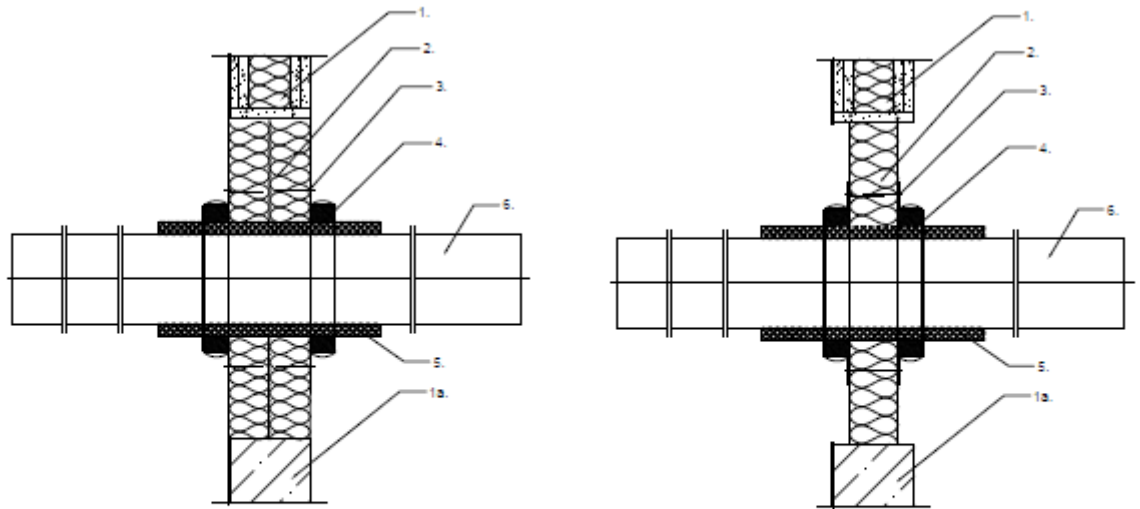
**ArmaProtect FC2, Installation of combustible pipes in mineral fibre penetration seal with pipe collar
in rigid or flexible walls or rigid floors**



- 1. flexible wall ≥ 100 mm
- 1a. rigid wall ≥ 100 mm
- 2. mineral fibre board
- 3. fastener
- 4. pipe collar
- 5. noise insulation made of PE
- 6. combustible pipe
- 7. rigid floor ≥ 150 mm

dimensions in mm

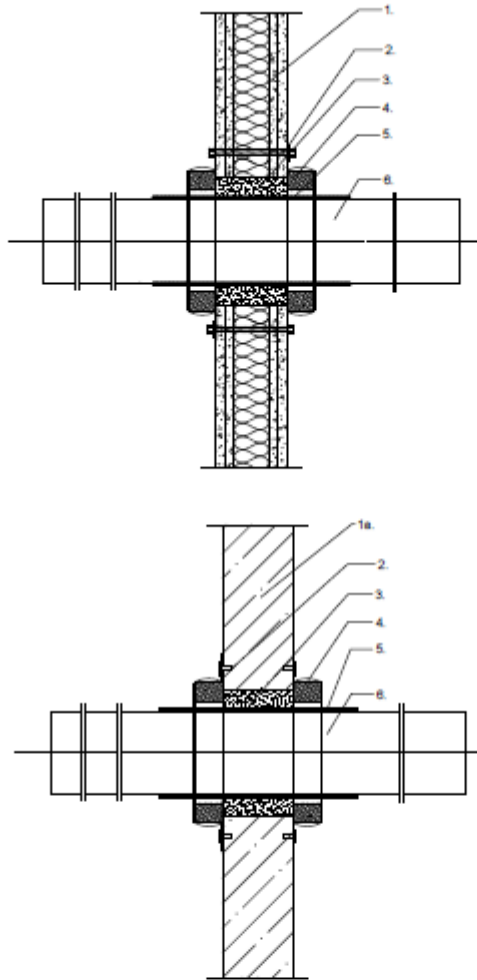
**ArmaProtect FC2, Installation of combustible pipes in mineral fibre penetration seal with pipe collar
in rigid or flexible walls or rigid floors**



1. flexible wall ≥ 100 mm
- 1a. rigid wall ≥ 100 mm
2. mineral fibre board
3. fastener
4. pipe collar
5. insulation made of FEF
6. combustible pipe
7. rigid floor ≥ 150 mm

dimensions in mm

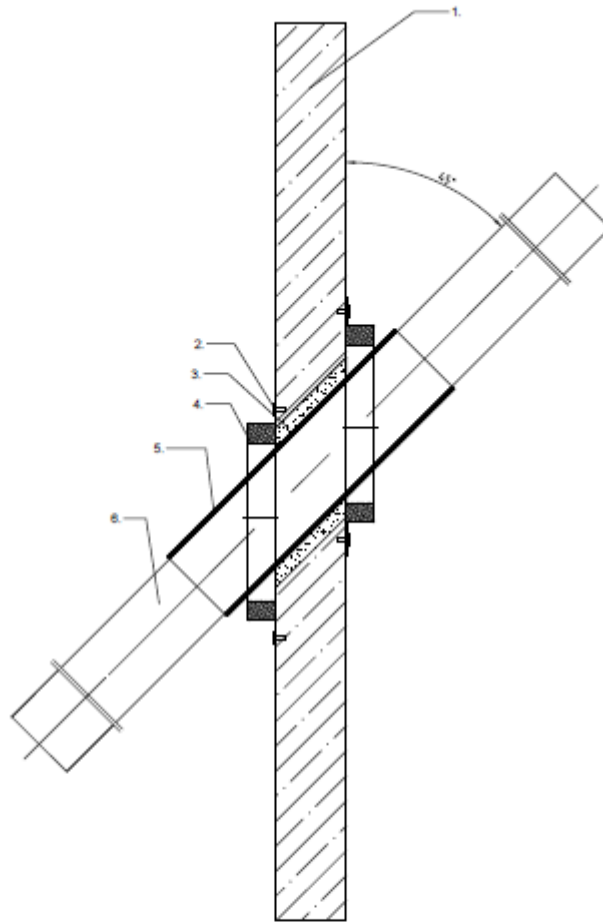
ArmaProtect FC2, Installation of combustible pipes in mineral fibre penetration seal with pipe collar in rigid or flexible walls or rigid floors



- 1. flexible wall ≥ 100 mm
- 1a. rigid wall ≥ 100 mm
- 2. fastening
- 3. annular gap
- 4. pipe collar
- 5. noise insulation made of PE
- 6. combustible pipe

dimensions in mm

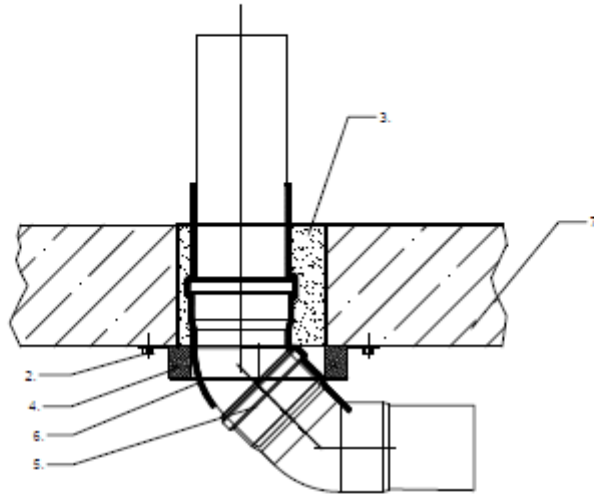
ArmaProtect FC2, Pipe Penetration seal of combustible pipes with pipe collar in rigid walls, diagonally, 45°



- 1a. rigid wall ≥ 100 mm
- 2. fastening
- 3. annular gap
- 4. pipe collar
- 5. noise insulation made of PE
- 6. combustible pipe

dimensions in mm

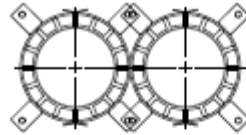
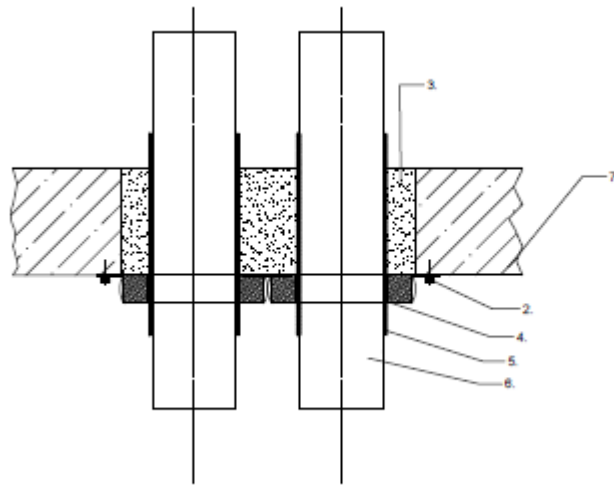
**ArmaProtect FC2, Pipe Penetration seal of combustible pipes with pipe collar in rigid floors, 2 x 45°
pipe bows**



- 2. fastening
- 3. annular gap
- 4. pipe collar
- 5. combustible pipe
- 6. noise insulation made of PE
- 7. floor ≥ 150 mm

dimensions in mm

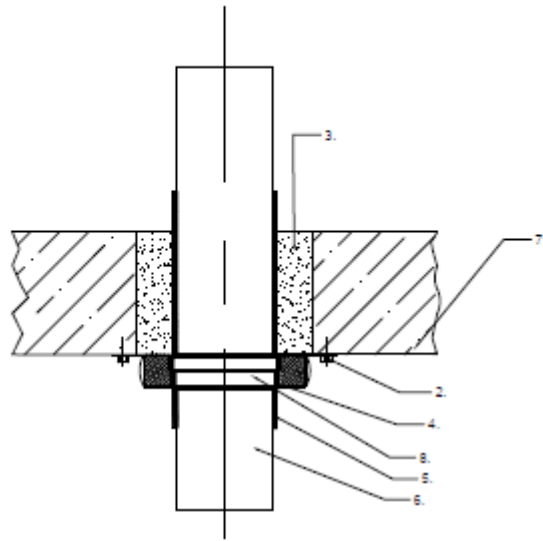
**ArmaProtect FC2, Pipe Penetration seal of combustible pipes with pipe collar in rigid floors,
pipe collar in zero distances**



- 2. fastening
- 3. annular gap
- 4. pipe collar
- 5. combustible pipe
- 6. noise insulation made of PE
- 7. floor \geq 150 mm

dimensions in mm

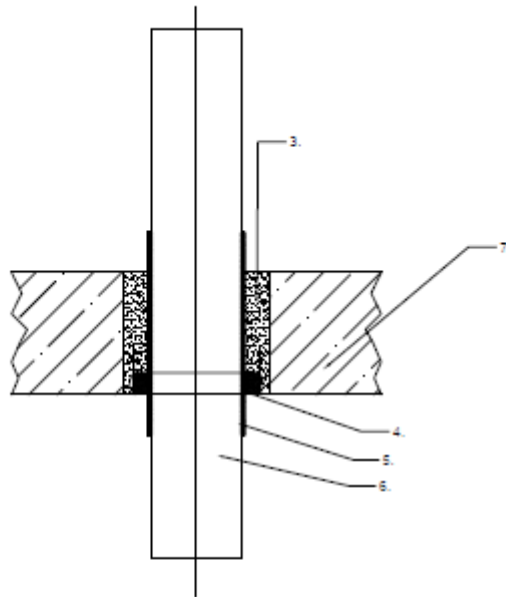
ArmaProtect FC2, Pipe Penetration seal of combustible pipes with sleeve with pipe collar in rigid floors



- 2. fastening
- 3. annular gap
- 4. pipe collar
- 5. combustible pipe
- 6. noise insulation made of PE
- 7. ≥ 150 mm
- 8. sleeve / connecting sleeve

dimensions in mm

**ArmaProtect FC2, Pipe Penetration seal of combustible pipes with pipe collar in rigid floors,
pipe collar mortared in rigid floor**



- 3. annular gap
- 4. pipe collar
- 5. combustible pipe
- 6. noise insulation made of PE
- 7. floor ≥ 150 mm

dimensions in mm

Annex 3
Resistance to Fire, classification of ArmaProtect FC2, Pipe Penetration – flexible walls

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
PVC-U	50 - 160	1,8 - 12,3	-	straight	flexible wall	100	EI 90-U/U
	32 - 50	1,8 - 5,6	-	straight	flexible wall	100	EI 120-U/U
	90 - 160	1,8 - 3,2	5,0 mm, PE	straight	flexible wall	100	EI 60-U/U
	32 - 160	2,7 - 4,6	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	110	10	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	110	1,8	-	diagonally, 45°	flexible wall	100	EI 120-U/C
PE-HD	32 - 110	1,8 - 10,0	-	straight	flexible wall	100	EI 120-U/C
	125 - 160	4,0 - 14,6	-	straight	flexible wall	100	EI 120-U/C
	50	4,6	-	diagonally, 45°	flexible wall	100	EI 120-U/C
	110	2,7	-	diagonally, 45°	flexible wall	100	EI 120-U/C
	50 - 160	1,9 - 14,6	-	straight	flexible wall	100	EI 90-U/U
	≤ 50	1,8 - 4,6	-	straight	flexible wall	100	EI 120-U/U
	110	2,7	-	straight	flexible wall	100	EI 120-U/U
PP-H	32 - 110	1,8 - 10,0	-	straight	flexible wall	100	EI 120-U/C
	125 - 160	4,0 - 14,6	-	straight	flexible wall	100	EI 120-U/C
	50 - 160	1,9 - 14,6	-	straight	flexible wall	100	EI 90-U/U
	110	2,7	-	straight	flexible wall	100	EI 120-U/U
	≤ 50	1,8 - 4,6	-	straight	flexible wall	100	EI 120-U/U
POLO-KAL 3S Z-42.1-341	75	3,8	-	straight	flexible wall	100	EI 60-U/C
	125	5,3	-	straight	flexible wall	100	EI 60-U/C
	110	4,8	4,0 mm, PE	straight	flexible wall	100	EI 60-U/C
	125	5,3	4,0 mm, PE	straight	flexible wall	100	EI 90-U/C
	160	7,5	4,0 mm, PE	straight	flexible wall	100	EI 60-U/C
	110	4,8	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 60-U/C
POLO-KAL NG Z-42.1-241	40 - 110	1,8 - 3,4	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	50 - 110	2,0 - 3,4	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 120-U/U
POLO-KAL XS Z-42.1-506	40 - 110	1,8 - 3,4	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	50 - 110	2,0 - 3,4	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 120-U/U
Geberit Silent PP Z-42.1-432	32 - 160	2,0 - 5,2	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	125 - 160	4,2 - 5,2	4,0 mm, PE	straight, zero distance	flexible wall	100	EI 90-U/C
	50 - 110	2,0 - 3,6	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 120-U/C
	50 - 90	2,0 - 3,1	4,0 mm, PE	diagonally, 45°	flexible wall	100	EI 90-U/C
	110	3,6	4,0 mm, PE	diagonally, 45°	flexible wall	100	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	50 - 110	2,0 - 3,6	4,0 mm, PE	2 x 45° pipe bends	flexible wall	100	EI 120-U/C
Geberit Silent Pro Z-42.1-542	50 - 160	3,0 - 6,0	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
		2,6 - 4,1	5,0 mm, PE	straight, sleeve	flexible wall	100	EI 120-U/U
Geberit Silent dB 20 Z-42.1-265	56 - 110	3,2 - 6,0	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	56 - 160	3,2 - 7,0	5,0 mm, PE	straight	flexible wall	100	EI 90-U/U
GF Silenta Premium Z-42.1-537	58 - 160	4,0 - 5,3	4,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	110 - 135	5,3	4,0 mm, PE	straight, zero distance	flexible wall	100	EI 120-U/U
	58 - 110	4,0 - 5,3	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 120-U/U
	58	4	4,0 mm, PE	diagonally, 45°	flexible wall	100	EI 120-U/U
	78 - 110	4,6 - 5,3	4,0 mm, PE	diagonally, 45°	flexible wall	100	EI 90-U/U
coes Blue Power Z-42.1-411	50	1,8	4,0 mm, PE	straight	flexible wall	100	EI 120-U/C
	50 - 90	1,8 - 3,4	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 120-U/C
	110	3,4	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 90-U/C
Wavin SiTECH+ Z-42.1-539	32 - 160	1,8 - 5,0	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
	32 - 75	1,8 - 2,6	4,0 mm, PE	straight, sleeve	flexible wall	100	EI 120-U/C
	32 - 125	1,8 - 3,9	9,0 - 40,0 FEF	straight	flexible wall	100	EI 120-U/C
REHAU Raupiano light Z-42.1-508	40 - 160	1,8 - 3,9	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
Conel Drain Z-42.1-510	40 - 160	1,8 - 3,9	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
REHAU Raupiano Plus Z-42.1-223	50 - 160	1,8 - 3,9	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
Pipelife Master 3 Plus Z-42.1-481	40 - 160	1,8 - 4,4	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
KeKelit Phonex AS	58 - 160	4,0 - 5,3	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
Wavin AS Z-42.1-228	58 - 160	4,0 - 5,3	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
Valsir TriPLUS Z-42.1-426	32 - 160	1,8 - 4,9	5,0 mm, PE	straight	flexible wall	100	EI 120-U/U
GF Cool-Fit 2.0 / 2.0F	32/75 - 140/200	-	-	straight	flexible wall	100	EI 120-U/C
GF Cool-Fit 4.0	110/180	-	-	straight	flexible wall	100	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
GF Cool-Fit 4.0F	63/110	-	-	straight	flexible wall	100	EI 120-U/C
Pelletschlauch PVC-Cu	60	-	-	straight	flexible wall	100	EI 120-U/C
Pelletschlauch PUR-Cu	60	-	-	straight	flexible wall	100	EI 120-U/C
aquatherm blue pipe SDR 9 MF RP	32	3,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	40	3,7	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	50	4,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	63	5,8	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	75	6,8	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	90	8,2	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	110	10	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	125	11,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	160	14,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 17,6 MF RP	125	7,1	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	160	9,1	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	200	11,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 9 MF RP	32	3,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	40	3,7	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	50	4,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	63	5,8	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	75	6,8	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	90	8,2	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	110	10	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	125	11,4	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	160	14,6	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 17,6 MF RP	125	7,1	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	160	9,1	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 9 MF RP OT	32	3,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP OT	40	3,7	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	50	4,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	125	11,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm blue pipe SDR 9 MF RP OT	32	3,6	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm green pipe SDR 9 MF RP	32	3,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	40	4,5	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	50	5,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	63	7,1	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	75	8,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	90	10	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	110	12,3	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	125	14	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	160	17,9	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	200	22,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	32	3,6	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	40	4,5	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	50	5,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	63	7,1	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
75	8,4	22 - 50, FEF	straight	flexible wall	≥ 100	EI 120-U/C	

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
			(LS, ≥ 800 mm)				
	90	10	22,5 - 50, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	110	12,3	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	125	14	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	160	17,9	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm green pipe SDR 6 S	32	5,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	40	6,7	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	50	8,3	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	63	10,5	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	75	12,5	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	90	15	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	110	18,3	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm green pipe SDR 7,4 S	32	4,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	40	5,5	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	50	6,9	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	63	8,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm green pipe SDR 11 S	32	2,9	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	40	3,7	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	50	4,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	63	5,8	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	75	6,8	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	90	8,2	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	110	10	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	125	11,4	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	160	14,6	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
	200	18,2	5,0 mm, PE	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm green pipe SDR 6 S	32	5,4	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	40	6,7	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	50	8,3	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	63	10,5	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	75	12,5	22 - 50, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	90	15	22,5 - 50, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	110	18,3	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm green pipe SDR 7,4 S	32	4,4	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	40	5,5	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	50	6,9	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	63	8,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
aquatherm green pipe SDR 11 S	32	2,9	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	40	3,7	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	50	4,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	63	5,8	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	75	6,8	22 - 50, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	90	8,2	22,5 - 50, FEF	straight	flexible wall	≥ 100	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
			(LS, ≥ 800 mm)				
	110	10	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	125	11,4	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C
	160	14,6	19, FEF (LS, ≥ 800 mm)	straight	flexible wall	≥ 100	EI 120-U/C

Resistance to Fire, classification of ArmaProtect FC2, Pipe Penetration – rigid walls

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
PVC-U	180 - 200	4,0 - 9,6	-	straight	rigid wall	100	EI 120-U/C
	225 - 400	5,0 - 11,7	-	straight	rigid wall	300	EI 120-U/C
PE-HD	180 - 200	4,9 - 11,4	-	straight	rigid wall	100	EI 120-U/C
	225 - 400	9,8 - 22,7	-	straight	rigid wall	300	EI 120-U/C
PP-H	180 - 200	4,9 - 18,2	-	straight	rigid wall	100	EI 120-U/C
POLO-KAL 3S Z-42.1-341	125	5,3	-	diagonally, 45°	rigid wall	100	EI 120-U/C
	75	3,8	4,0 mm, PE	diagonally, 45°	rigid wall	100	EI 120-U/C
	125	5,3	4,0 mm, PE	diagonally, 45°	rigid wall	100	EI 120-U/C
GF Cool-Fit 4.0	160/250	-	-	straight	rigid wall	240	EI 120-U/C
	225/315 - 355/500	-	-	straight	rigid wall	300	EI 90-U/C
GF Cool-Fit 4.0 F	160/250 - 225/315	-	-	straight	rigid wall	240	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	250	22,7	5,0 mm, PE	straight	rigid wall	≥ 240	EI 120-U/C
	315	28,6	5,0 mm, PE	straight	rigid wall	≥ 240	EI 90-U/C
	355	32,2	5,0 mm, PE	straight	rigid wall	≥ 240	EI 90-U/C
aquatherm blue pipe SDR 17,6 MF RP	250	14,2	5,0 mm, PE	straight	rigid wall	≥ 240	EI 120-U/C
	315	17,9	5,0 mm, PE	straight	rigid wall	≥ 240	EI 45-U/C
	355	20,1	5,0 mm, PE	straight	rigid wall	≥ 240	EI 45-U/C
aquatherm blue pipe SDR 9 MF RP	32	3,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	40	3,7	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	50	4,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	63	5,8	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	75	6,8	22 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	90	8,2	22 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	110	10	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	125	11,4	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C
	160	14,6	19, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
aquatherm blue pipe SDR 17,6 MF RP	125	7,1	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C
	160	9,1	19, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	200	11,4	19, FEF (LS, ≥ 940 mm)	straight	rigid wall	≥ 240	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	160	14,6	19, FEF (LS, ≥ 800) 38, FEF (LS, ≥ 940)	straight	rigid wall	≥ 300	EI 120-U/C
	200	18,2	19 - 38, FEF (LS, ≥ 940 mm)	straight	rigid wall	≥ 300	EI 120-U/C
	250	22,7	19 - 38, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 90-U/C
	315	28,6	19 - 38, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 90-U/C
	355	32,2	19, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 90-U/C
aquatherm blue pipe SDR 17,6 MF RP	160	9,1	19, FEF (LS, ≥ 800) 38, FEF (LS, ≥ 940)	straight	rigid wall	≥ 300	EI 120-U/C
	200	11,4	19 - 38, FEF (LS, ≥ 940 mm)	straight	rigid wall	≥ 300	EI 120-U/C
	250	14,2	19 - 38, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 90-U/C
	315	17,9	19 - 50, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	355	20,1	19, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 90-U/C
aquatherm blue pipe SDR 11 MF RP OT	250	22,7	5,0 mm, PE	straight	rigid wall	≥ 240	EI 120-U/C
aquatherm green pipe SDR 9 MF RP	250	27,9	5,0 mm, PE	straight	rigid wall	≥ 240	EI 120-U/C
	315	35,2	5,0 mm, PE	straight	rigid wall	≥ 240	EI 120-U/C
	355	39,7	5,0 mm, PE	straight	rigid wall	≥ 240	EI 120-U/C
	32	3,6	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	40	4,5	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	50	5,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	63	7,1	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	75	8,4	22 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	90	10	22,5 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	110	12,3	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C
	125	14	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C
	160	17,9	19, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	200	22,4	19, FEF (LS, ≥ 940 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	aquatherm green pipe SDR 9 MF RP	160	17,9	19, FEF (LS, ≥ 800) 38, FEF (LS, ≥ 940)	straight	rigid wall	≥ 300
200		22,4	19 - 38, FEF	straight	rigid wall	≥ 300	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
			(LS, ≥ 940 mm)				
	250	27,9	19 - 50, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 120-U/C
	315	35,2	19 - 50, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 120-U/C
	355	39,7	19, FEF (LS, ≥ 1000 mm)	straight	rigid wall	≥ 300	EI 120-U/C
aquatherm green pipe SDR 11 S	250	22,7	5,0 mm, PE	straight	rigid wall	≥ 240	EI 90-U/C
	315	28,6	5,0 mm, PE	straight	rigid wall	≥ 240	EI 90-U/C
aquatherm green pipe SDR 6 S	32	5,4	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	40	6,7	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	50	8,3	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	63	10,5	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	75	12,5	22 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	90	15	22,5 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	110	18,3	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C
aquatherm green pipe SDR 7,4 S	32	4,4	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	40	5,5	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	50	6,9	22 - 39,5, FEF	straight	rigid wall	≥ 240	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
			(LS, ≥ 800 mm)				
	63	8,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
aquatherm green pipe SDR 11 S	32	2,9	18 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	40	3,7	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	50	4,6	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	63	5,8	22 - 39,5, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	75	6,8	22 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	90	8,2	22,5 - 50, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	110	10	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C
	125	11,4	19, FEF (LS, ≥ 800) 50, FEF (LS, ≥ 940)	straight	rigid wall	≥ 240	EI 120-U/C
	160	14,6	19, FEF (LS, ≥ 800 mm)	straight	rigid wall	≥ 240	EI 120-U/C
	200	18,2	19, FEF (LS, ≥ 940 mm)	straight	rigid wall	≥ 240	EI 120-U/C

Resistance to Fire, classification of ArmaProtect FC2, Pipe Penetration – rigid floors

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
PVC-U	32 - 50	1,8 - 5,6	-	straight	floor	150	EI 120-U/U
	≤ 75	1,8	-	straight	floor	150	EI 120-U/U
	> 50 - ≤ 160	1,8 - 12,3	-	straight	floor	150	EI 90-U/U
	63 - 75	2,2 - 8,4	-	straight	floor	150	EI 120-U/C
	90 - 110	2,2 - 12,3	-	straight	floor	150	EI 120-U/C
	110	8,2	4,0 mm, PE	diagonally, 45°	floor	150	EI 120-U/C
	125 - 160	3,2 - 11,8	-	straight	floor	150	EI 120-U/C
	180 - 200	4 - 9,6	-	straight	floor	150	EI 120-U/C
	225 - 400	5,0 - 11,7	-	straight	floor	300	EI 120-U/C
PE-HD	32 - 50	1,8 - 4,6	-	straight	floor	150	EI 120-U/U
	50 - 125	1,8 - 14,6	-	straight	floor	150	EI 120-U/U
	> 125 - ≤ 160	4,0 - 14,6	-	straight	floor	150	EI 60-U/U
	160	4	5,0 mm, PE	straight	floor	150	EI 90-U/U
	63 - 75	2,7 - 6,9	-	straight	floor	150	EI 120-U/C
	90 - 110	2,7 - 10	-	straight	floor	150	EI 120-U/C
	50 - 110	4,6 - 10,0	4,0 mm, PE	diagonally, 45°	floor	150	EI 120-U/C
	125 - 160	4 - 14,6	-	straight	floor	150	EI 120-U/C
	180 - 200	4,9 - 18,2	-	straight	floor	150	EI 120-U/C
	225 - 400	9,8 - 22,7	-	straight	floor	300	EI 120-U/C
PP-H	≤ 50	1,8 - 4,6	-	straight	floor	150	EI 120-U/U
	≤ 75	1,9 - < 10,0	-	straight	floor	150	EI 90-U/U
	≤ 75	10	-	straight	floor	150	EI 120-U/U
	≤ 110	2,7 - < 10,0	-	straight	floor	150	EI 90-U/U
	110	2,7	-	straight	floor	150	EI 120-U/U
	110	10	-	straight	floor	150	EI 120-U/U
	≤ 125	3,1 - < 11,4	-	straight	floor	150	EI 90-U/U
	≤ 125	11,4	-	straight	floor	150	EI 120-U/U
	≤ 160	4,0 - 14,6	-	straight	floor	150	EI 120-U/U
	63 - 75	2,7 - 6,9	-	straight	floor	150	EI 120-U/C
	90 - 110	2,7 - 10	-	straight	floor	150	EI 120-U/C
	125 - 160	4 - 14,6	-	straight	floor	150	EI 120-U/C
	180 - 200	4,9 - 11,4	-	straight	floor	150	EI 120-U/C
	225 - 315	> 7,7 - 19,6	-	straight	floor	300	EI 90-U/C
	315	7,7	-	straight	floor	300	EI 120-U/C
POLO-KAL 3S Z-42.1-341	75 - 110	3,8 - 4,8	-	straight	floor	150	EI 90-U/C
	75 - 110	3,8 - 4,8	4,0 mm, PE	straight, sleeve	floor	150	EI 90-U/C
	75 - 110	3,8 - 4,8	4,0 mm, PE	diagonally, 45°	floor	150	EI 90-U/C
	125	5,3	-	diagonally, 45°	floor	150	EI 90-U/C
	125	5,3	4,0 mm, PE	diagonally, 35°	floor	150	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	125	5,3	4,0 mm, PE	2x45° bends	floor	150	EI 120-U/C
POLO-KALING Z-42.1-241	90 - 160	3,0 - 4,9	5,0 mm, PE	straight	floor	150	EI 90-U/U
	40 - 160	1,8 - 4,9	5,0 mm, PE	straight	floor	150	EI 60-U/U
POLO-KALXS Z-42.1-506	50 - 110	1,8 - 3,4	4,0 mm, PE	straight, sleeve	floor	150	EI 120-U/U
	50 - 110	1,8 - 3,4	4,0 mm, PE	2x45° bends	floor	150	EI 120-U/U
	90 - 160	3,0 - 4,9	5,0 mm, PE	straight	floor	150	EI 90-U/U
	40 - 160	1,8 - 4,9	5,0 mm, PE	straight	floor	150	EI 60-U/U
Geberit Silent PP Z-42.1-432	50 - 160	1,8 - 4,9	4,0 mm, PE	straight	floor	150	EI 120-U/C
	125 - 160	3,9 - 4,9	4,0 mm, PE	straight, zero distances	floor	150	EI 120-U/C
	50 - 110	1,8 - 3,4	4,0 mm, PE	straight, sleeve	floor	150	EI 120-U/C
	50 - 110	1,8 - 3,4	4,0 mm, PE	diagonally, 45°	floor	150	EI 120-U/C
	50 - 110	1,8 - 3,4	4,0 mm, PE	2x45° bends	floor	150	EI 120-U/C
	40 - 110	2,0 - 3,6	5,0 mm, PE	straight	floor	150	EI 90-U/U
	40 - 160	2,0 - 5,2	5,0 mm, PE	straight	floor	150	EI 60-U/U
Geberit Silent Pro Z-42.1-542	50 - 160	2,6 - 5,6	5,0 mm, PE	straight	floor	150	EI 120-U/U
	50 - 160	2,6 - 5,6	9,0 - 25,0 mm, FEF	straight	floor	150	EI 120-U/U
	50 - 90	2,6 - 3,9	5,0 mm, PE	straight, sleeve	floor	150	EI 120-U/U
	50 - 110	2,6 - 4,1	5,0 mm, PE	2x45° bends	floor	150	EI 120-U/U
	125	4,6	5,0 mm, PE	2x45° bends	floor	150	EI 90-U/U
	50 - 110	2,6 - 4,1	5,0 mm, PE	straight, collar installed in floor	floor	150	EI 120-U/U
GF Silenta Premium Z-42.1-537	58 - 160	4,0 - 5,3	4,0 mm, PE	straight	floor	150	EI 120-U/U
	110 - 135	5,3	4,0 mm, PE	straight, zero distances	floor	150	EI 120-U/U
	58 - 110	4,0 - 5,3	4,0 mm, PE	straight, sleeve	floor	150	EI 120-U/U
	58 - 110	4,0 - 5,3	4,0 mm, PE	2x45° bends	floor	150	EI 120-U/U
Wavin SITECH Z-42.1-403	110	3,4	4,0 mm, PE	straight	floor	150	EI 120-U/C
Rehau Raupiano plus Z-42.1-223	110	2,7	4,0 mm, PE	straight	floor	150	EI 120-U/C
Ostendorf Skolan dB Z-42.1-217	110	5,3	4,0 mm, PE	straight	floor	150	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
Conel Drain Z-42.1-510	50 - 110	1,8 - 2,7	4,0 mm, PE	straight	floor	150	EI 120-U/C
	50 - 110	1,8 - 2,7	4,0 mm, PE	straight, sleeve	floor	150	EI 120-U/C
	50 - 110	1,8 - 2,7	4,0 mm, PE	2x45° bends	floor	150	EI 120-U/C
	75 - 110	1,9 - 2,7	5,0 mm, PE	straight	floor	150	EI 90-U/U
	40 - 110	1,8 - 2,7	5,0 mm, PE	straight	floor	150	EI 60-U/U
REHAU Raupiano light Z-42.1-508	75 - 110	1,9 - 2,7	5,0 mm, PE	straight	floor	150	EI 90-U/U
	40 - 110	1,8 - 2,7	5,0 mm, PE	straight	floor	150	EI 60-U/U
Wavin SiTECH+ Z-42.1-539	32 - 160	1,8 - 4,9	4,0 mm, PE	straight	floor	150	EI 120-U/C
	50 - 160	1,8 - 4,9	9,0 - 34,0 mm, FEF	straight	floor	150	EI 120-U/C
	50 + 125	1,8 + 3,9	4,0 mm, PE	2x45° bends	floor	150	EI 120-U/C
	32, 75 - 160	1,8, 2,6 - 5,0	5,0 mm, PE	straight	floor	150	EI 90-U/U
	58 - 110	4,1 - 5,3	5,0 mm, PE	straight	floor	150	EI 60-U/U
Valsir TriPLUS	32 - 50	1,8	5,0 mm, PE	straight	floor	150	EI 90-U/U
GF Cool-Fit 2.0 / 2.0F	32/75 - 110/160	-	-	straight	floor	150	EI 120-U/C
	140/200	-	-	straight	floor	150	EI 90-U/C
GF Cool-Fit 4.0	110/180 - 160/250	-	-	straight	floor	150	EI 90-U/C
	280/400 - 355/500	-	-	straight	floor	150	EI 120-U/C
GF Cool-Fit 4.0F	63/125	-	-	straight	floor	150	EI 120-U/C
	75/140 - 160/500	-	-	straight	floor	150	EI 90-U/C
	225/315	-	-	straight	floor	150	EI 120-U/C
Pelletschlauch PVC-Cu	60	-	-	straight	floor	150	EI 120-U/C
Pelletschlauch PUR-Cu	60	-	-	straight	floor	150	EI 120-U/C
aquatherm blue pipe SDR 9 MF RP	32	3,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	40	3,7	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	50	4,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	63	5,8	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	75	6,8	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	90	8,2	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	110	10	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	125	11,4	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	160	14,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
200	18,2	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C	

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	250	22,7	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
	315	28,6	5,0 mm, PE	straight	floor	≥ 200	EI 90-U/C
aquatherm blue pipe SDR 17,6 MF RP	125	7,1	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	160	9,1	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	200	11,4	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	250	14,2	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
	315	17,9	5,0 mm, PE	straight	floor	≥ 200	EI 45-U/C
aquatherm blue pipe SDR 9 MF RP	32	3,6	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	40	3,7	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	50	4,6	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	63	5,8	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	75	6,8	22 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	90	8,2	22,5 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	110	10	22,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	125	11,4	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	160	14,6	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
aquatherm blue pipe SDR 17,6 MF RP	125	7,1	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	160	9,1	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	110	10	19 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	125	11,4	19 - 50, FEF	straight	floor	≥ 200	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
			(LS, ≥ 850 mm)				
	160	14,6	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	200	18,2	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
aquatherm blue pipe SDR 17,6 MF RP	125	7,1	19 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	200	11,4	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
aquatherm blue pipe SDR 11 MF RP	160	14,6	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	200	18,2	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	250	22,7	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	315	28,6	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	355	32,2	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
aquatherm blue pipe SDR 17,6 MF RP	160	9,1	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	200	11,4	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	250	14,2	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	315	17,9	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	355	20,1	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	32	3,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
aquatherm blue pipe SDR 9 MF RP OT	40	3,7	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	50	4,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	63	5,8	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	75	6,8	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	90	8,2	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	110	10	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
	125	11,4	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
	160	14,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	200	18,2	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
aquatherm green pipe SDR 9 MF RP	32	3,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	40	4,5	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	50	5,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	63	7,1	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	75	8,4	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	90	10	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	110	12,3	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	125	14	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	160	17,9	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	200	22,4	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	250	27,9	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
	315	35,2	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
	355	39,7	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
	32	3,6	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	40	4,5	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	50	5,6	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	63	7,1	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	75	8,4	22 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	90	10	22,5 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	110	12,3	22,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	125	14	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	160	17,9	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	110	12,3	19 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	125	14	19 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	160	17,9	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	200	22,4	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	160	17,9	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	200	22,4	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	250	27,9	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	315	35,2	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	355	39,7	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
aquatherm green pipe SDR 6 S	32	5,4	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	40	6,7	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	50	8,3	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	63	10,5	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	75	12,5	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	90	15	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	110	18,3	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
aquatherm green pipe SDR 7,4 S	32	4,4	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	40	5,5	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	50	6,9	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	63	8,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
aquatherm green pipe SDR 11 S	32	2,9	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	40	3,7	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	50	4,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	63	5,8	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	75	6,8	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	90	8,2	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	110	10	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	125	11,4	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	160	14,6	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	200	18,2	5,0 mm, PE	straight	floor	≥ 150	EI 120-U/C
	250	22,7	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C
315	28,6	5,0 mm, PE	straight	floor	≥ 200	EI 120-U/C	
aquatherm green pipe SDR 6 S	32	5,4	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	40	6,7	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	50	8,3	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	63	10,5	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	75	12,5	22 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	90	15	22,5 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	110	18,3	22,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
aquatherm green pipe SDR 7,4 S	32	4,4	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	40	5,5	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	50	6,9	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	63	8,6	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
aquatherm green pipe SDR 11 S	32	2,9	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	40	3,7	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	50	4,6	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	63	5,8	22 - 39,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	75	6,8	22 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	90	8,2	22,5 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	110	10	22,5, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	125	11,4	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
	160	14,6	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 150	EI 120-U/C
aquatherm green pipe SDR 6 S	110	18,3	19 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
aquatherm green pipe SDR 11 S	110	10	19 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	125	11,4	19 - 50, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
	160	14,6	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C

Pipe	Pipe-Ø	pipewall thickness	Insulation	assembly situation	component	component thickness	classification
	200	18,2	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 200	EI 120-U/C
aquatherm green pipe SDR 11 S	160	14,6	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	200	18,2	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	250	22,7	19 - 38, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C
	315	28,6	19, FEF (LS, ≥ 850 mm)	straight	floor	≥ 300	EI 120-U/C

The direct field of application for ArmaProtect FC2 is derived from the classification declared according to EN 13501-2 under the following conditions:

<p>Field of application (Chapter 4.3 of the classification report)</p>	<p>Test results and classifications are applicable only for the orientation in which the penetration was tested, therefore in floors (horizontal) and walls (vertical).</p> <p>The distance between the surface of the wall or the top side and underside of the ceiling and the nearest support or suspension point for the pipes must be smaller than the distance tested, i.e. it must measure no more than $a = 470$ mm.</p> <p>The test results only apply to seals for a single pipe penetration (pls. also refer to EN 1366-3:2009-07, Section 8.2.7.7 in conjunction with Fig. 8.2, Option 1 and Option 2, respectively), where the spacing of the seals - measured between the pipe collars has to be $a > 100$ mm and the inner diameter of the pipe collar may be maximally 4 mm higher than the outer diameter of the related pipe.</p> <p>The annular gap with a maximum width of 20 mm between wall reveal and pipe insulation is to be tightly filled with gap-sealing gypsum or an adhesive binder. The annular gap can be filled either with gap-sealing gypsum or adhesive binder on both sides of the lightweight partition wall to the respective panel thickness, however at least with a depth of 25 mm, and the remaining cavity has to be tightly and completely filled with mineral wool (Euroclass A1 according to EN 13501-1, packing density > 100 kg/m³).</p> <p>The annular gap with a maximum width of 20 mm between pipe insulation and component reveal has to be completely and tightly filled along the entire component thickness with a dimensionally stable and non-combustible mortar, concrete or gypsum.</p> <p>The fire resistance times achieved apply - depending on the fire resistance class of the related pipe type.</p> <p>The fire resistance times achieved exclusively apply to ArmaProtect FC2 pipe collars that are arranged and fixed on the component surface.</p> <p>When installed in a lightweight wall structure, ArmaProtect FC2 pipe collars have to be fixed using continuous M8 threaded steel rods in conjunction with M8 hexagon nuts ("push-through" installation).</p> <p>When installed in solid components (solid walls or solid ceiling structures), ArmaProtect FC2 pipe collars have to be fixed using 2-14 x 38 mm metal multi-purpose anchors in conjunction with MMS-P 7.5 x 45 mm steel bolts and corresponding washers and nuts.</p> <p>The test results only apply, if the remaining annular gap with a maximum width of 20 mm between wall reveal of the lightweight wall structure and the bare pipe is tightly and completely filled with a dimensionally stable gypsum filling compound (Euroclass A1 according to 13501-1).</p> <p>For installation in solid components, the test results only apply, if the remaining annular gap with a maximum width of 20 mm between the bare pipe and the component completely and tightly filled along the entire component thickness with a dimensionally stable mortar or concrete.</p>
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