



ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
Fax +45 72 24 59 04
Internet www.etadanmark.dk

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-21/1025 of 2024/03/06

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 66 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

ArmaProtect EXPS Firestop Sealant

Product family to which the above construction product belongs:

Fire stopping product – penetration seals.

Manufacturer:

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

Manufacturing plant:

Armacell GmbH
Manufacturing Plant 73

This European Technical Assessment contains:

16 pages including 2 annexes which form an integral part of the document

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

European Assessment Document (EAD) No. 350454-00-1104: Fire Stopping and fire sealing products – Penetration seals

This version replaces:

The ETA with the same number issued on 2021-09-12

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

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es) referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction must be identified as such.

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The intumescent fire protection filler on water-based dispersion product ArmaProtect EXPS Firestop Sealant is a viscos, intumescent putty, consisting of intumescent substances and a binder. It hardens when applied on a substrate and forms a flexible intumescent layer which reacts in case of fire by expanding and generating foam.

The construction product ArmaProtect EXPS Firestop Sealant is delivered in cartridges, pails and containers of different capacity.

Detailed specifications for identification and performance criteria for fire safety regarding the construction product are given in the annexes of this ETA.

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

The construction product ArmaProtect EXPS Firestop Sealant is intended for use as a component with a fire protection effect in building elements, assembled systems or constructions that are subject to requirements related to fire protection. Their reactive effect prevents heat transmission and fire spreading in the event of fire.

Within the scope of this ETA, the fire resistance was demonstrated for pipe or cable penetration seals. Pipe or cable penetrations seals are used to seal off openings in fire resistant walls or floors, which are penetrated by cables and/or pipes, and serves to preserve the walls or floors fire resistance in the area of the penetrations.

More information in table 3: "Performance of the product and references to the methods used for its assessment".

The intumescent fire sealing products are to be installed according to the manufacturer's installation manual.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the ArmaProtect EXPS Firestop Sealant of 10 years, provided the manufacturers conditions for the

packaging, transport, storage, installation, use, maintenance and repair are met.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body but are to be regarded only as a means for choosing the right products 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 product is classified as Class E in accordance with EN13501-1, and the EC Delegated regulation 2016/364/EU.
Resistance to fire	Classification according to EN 13501-2: See Annex A for further information of fire-resistant designs.
3.2 Hygiene, health and the environment (BWR3)	
Content, emission and/or release of dangerous substances	No dangerous substances
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 X.
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

*) See additional information in section 3.9 – 3.10.

3.6 Methods of verification

The characteristic values of the joint sealing system are based on the EAD 350454-00-1104.

3.7 General aspects related to the fitness for use of the product

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 EXPS Firestop Sealant 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 (hereinafter AVCP) system applied, with reference to its legal base

4.1 AVCP system

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

5 Technical details necessary for the implementation of the AVCP system, as provided for 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 2024-03-06 by



Thomas Bruun
Managing Director, ETA-Danmark

Annex A
Description of the construction products, properties and performances

Properties and Performance of components of the construction product "ArmaProtect EXPS Firestop Sealant"

Properties	Parameter
Density	1300 kg/m ³ ± 10%
Content of non-volatile components	65,0 % - 75,0 %
Weight loss on heating	54,0 % - 64,0 %
Expansion ratio	15 - 26,5
Expansion Pressure	1,00 - 1,90 N/mm ²

Description of possible additional components of the penetration seal

Description	Performance	Sample Product
Loose mineral wool in accordance with EN 14303	Reaction to fire class acc. to EN 13501-1: A1 Melting point: ≥ 1000 °C	Knauf Insulation LW; Rockwool "ProRox LF 970"
Mineral fibre lamella mat in accordance with EN 14303	Reaction to fire class acc. to EN 13501-1: A2-s1, d0 or A1 Bulk density: ≥ 35 kg/m ³ Melting point: ≥ 1000 °C	Rockwool lamella mat "KLIMAROCK"
pipe shell of concentrically wrapped rockwool in accordance with EN 14303	Reaction to fire class acc. to EN 13501-1: A2-s1, d0 or A1 Bulk density: ≥ 80 kg/m ³ Melting point: ≥ 1000 °C	Isover U Protect Pipe Section Alu 2 ; Rockwool ProRox PS 960
Insulation made of flexible elastomeric foam (FEF) in accordance with EN 14304	Reaction to fire class acc. to EN 13501-1: B-s3, d0	ArmaFlex AF; ArmaFlex XG

Annex B

Resistance to fire classification of intumescent fire protection filler ArmaProtect EXPS Firestop Sealant mounted as single penetration seals

B.1 General information:

B. 1.1. Wall/floor constructions

a. Flexible wall

The wall must have a minimum thickness of 100 mm and a metal profile frame lined on both faces with minimum 2 layers of 12,5 mm thick gypsum boards according to EN 520 type F.

In case that wooden stand walls are applied, a minimum distance of 100 mm must be kept from each of the wooden stands to the seal, and the cavity between the stands and the seal must be filled with at least 100 mm insulation material compliant to class A1 or A2 (in acc. with EN 13501-1).

b. Solid wall

Made of concrete or masonry with a thickness of ≥ 100 mm. (density 650 ± 200 kg/m³)

c. Rigid floor

Made of concrete or aerated concrete with a thickness of ≥ 150 mm (density 650 ± 200 kg/m³).

d. Shaft wall

In stud design with metal substructure and one-sided cladding of at least 2 layers made of building slabs with a thickness of 20 mm.

B.2.1 Flexible Walls

Intumescent fire protection filler	
Each side	depth: ≥ 25 mm
without backfilling	width: ≥ 10 mm - ≤ 25 mm
with backfilling	width: ≥ 10 mm - ≤ 50 mm
Total Thickness of penetration seal	≥ 100 mm
Working space between services	≥ 100 mm

B.2.2 Solid wall

Penetration seal:

Intumescent fire protection filler	
Each side	depth: ≥ 25 mm
without backfilling	width: ≥ 10 mm - ≤ 25 mm
with backfilling	width: ≥ 10 mm - ≤ 50 mm
Total Thickness of penetration seal	≥ 100 mm
Working space between services	≥ 100 mm

B.3 Rigid Floor

Penetration seal:

Intumescent fire protection filler	
Each side	depth: ≥ 25 mm
without backfilling	width: ≥ 10 mm - ≤ 25 mm
with backfilling	width: ≥ 10 mm - ≤ 50 mm
Total Thickness of penetration seal	≥ 150 mm
Working space between non insulated steel pipes $\leq 48,3$ mm	≥ 0 mm
Working space between other services	≥ 100 mm

B.4 Shaft wall

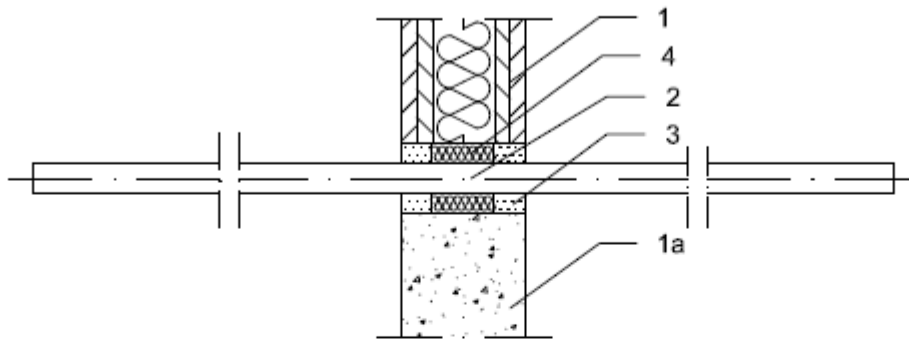
Penetration seal:

Intumescent fire protection filler	
Each side	depth: ≥ 20 mm
No backfilling	width: ≥ 10 mm - ≤ 25 mm
Total Thickness of penetration seal	≥ 40 mm
Horizontal working space between multilayer pipes KeKelit KELOX KM 110 (max. pipe $\varnothing 32$ mm)	≥ 0 mm
Working space between other services	≥ 100 mm

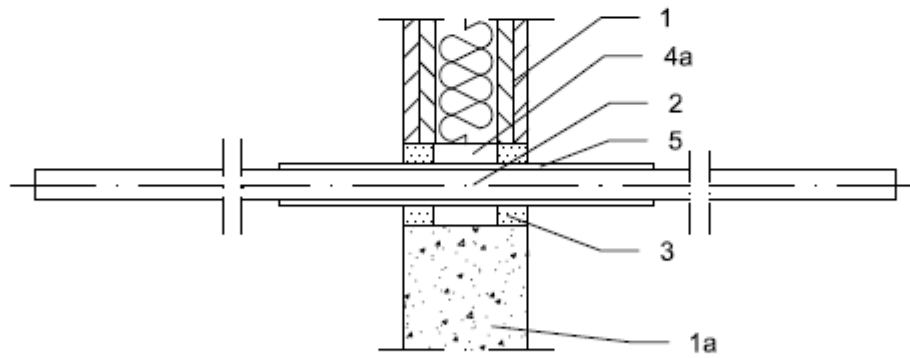
B.2.1 Flexible wall

B.2.2 Rigid wall

with backfilling



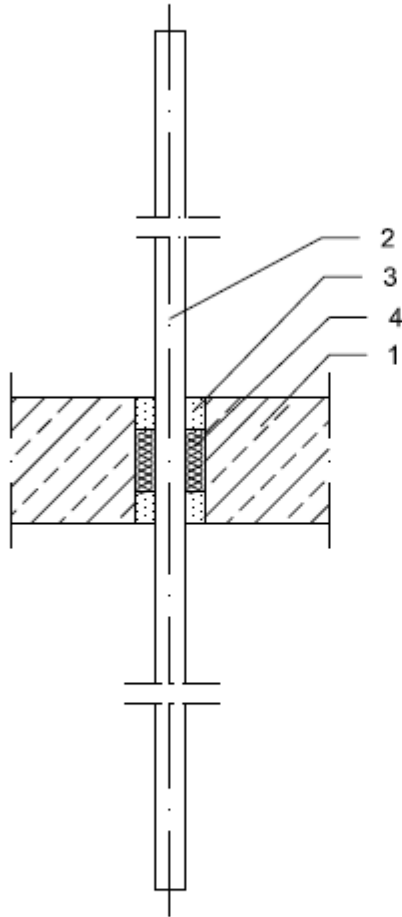
without backfilling



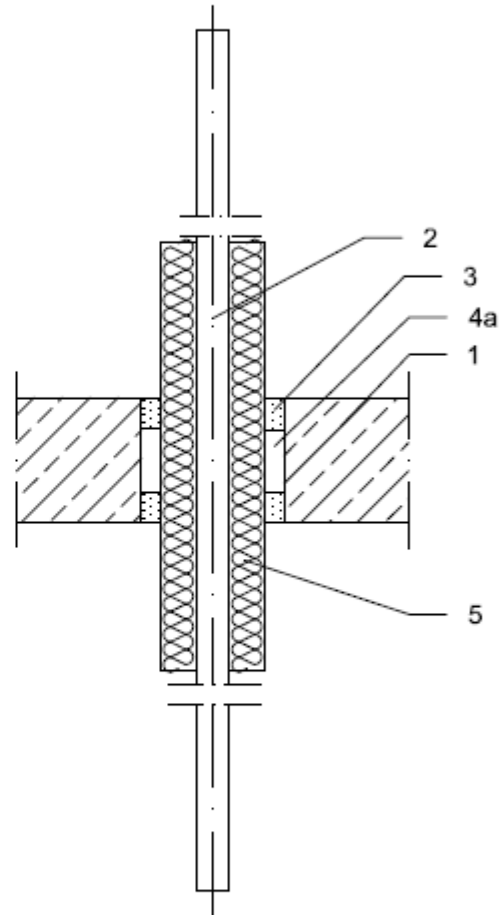
- 1. flexible wall
- 1a. rigid wall
- 2. installation
- 3. Intumescent fire protection filler
- 4. backfilling mineral wool
- 4a. without backfilling
- 5. PE-Insulation

B.3 Rigid floor

with backfilling

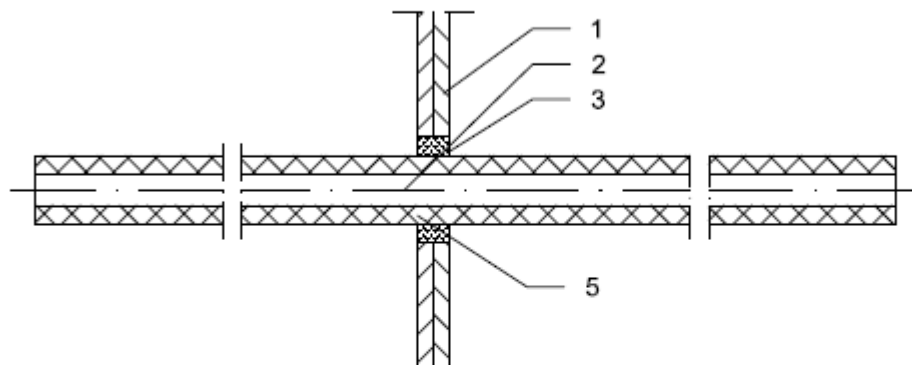


without backfilling



1. rigid floor
2. Installation
3. Intumescent fire protection filler
4. backfilling mineral wool
- 4a. without backfilling
5. mineral wool insulation

B.4 Shaft wall



1. shaft wall
2. Installation
3. Intumescent fire protection filler
5. FEF insulation

Combustible pipes					
Type	Pipe-Ø [mm]	Pipe wall thickness [mm]	Back-filling	Classification	
				Wall	Floor
Regulated pipes with/without backfilling and with/without 5 mm PE acoustic insulation					
PVC-U according to EN 1329-1, EN 1453-1, EN ISO 1542-2, EN ISO 15493, EN ISO 15877-2, EN 1566-1	≤ 50	1,8	N	EI 120-U/U	EI 120-U/U
	≤ 75	1,8	N	EI 90-U/U	EI 120-U/U
	≤ 110	1,8 - 8,1	N/Y	EI 120-U/C	EI 120-U/C
PE acc. to EN 1519-1, EN 12201-1, EN ISO 15494, EN 12666-1, PE-X acc. to EN ISO 15875-2 ABS acc. to EN 1455-1, EN ISO 15493 SAN+PVC acc. to ISO 19220	≤ 50	1,8	N	EI 120-U/U	EI 120-U/U
	≤ 75	1,8 - 1,9	N	EI 90-U/U	-
	≤ 110	1,8 - 10	N/Y	EI 120-U/C	EI 120-U/C
PP-H according to EN ISO 15874, EN 1451-1, EN ISO 15494	≤ 50	1,8	N	EI 120-U/U	EI 120-U/U
	≤ 75	1,8 - 1,9	N	EI 90-U/U	-
	≤ 110	1,8 - 10	N/Y	EI 120-U/C	EI 120-U/C
Non-regulated pipes with/without backfilling and with/without 5 mm PE acoustic insulation					
Friatec Friaphone	52 - 110	2,8 - 5,3	N/Y	EI 120-U/C	EI 120-U/C
Pipelife Master 3	50	2,0	N	EI 120-U/U	-
	50 - 110	1,8 - 3,0	N/Y	EI 120-U/C	EI 120-U/C
Poloplast POLO-KAL 3S	75	3,8	N	EI 60-U/U	-
	75 - 110	3,8 - 4,8	N/Y	EI 120-U/C	EI 120-U/C
Poloplast POLO-KAL NG	50	2,0	N	EI 120-U/U	-
	50 - 110	2,0 - 3,4	N/Y	-	EI 120-U/C
Poloplast POLO-KAL XS	50	2,0	N	EI 120-U/U	-
	50 - 110	2,0 - 3,4	N/Y	-	EI 120-U/C
Geberit Silent Pro	50	3,2	N	EI 120-U/U	-
	50 - 110	3,0 - 4,5	N/Y	EI 90-U/C	EI 120-U/C
Geberit Silent PP	50	2,0	N	EI 120-U/U	-
	50 - 110	2,0 - 3,6	N/Y	-	EI 120-U/C
Geberit Silent db20	56	3,2	N	EI 120-U/U	-
	56 - 110	2,0 - 3,6	N/Y	-	EI 120-U/C
Rehau Raupiano Plus	50	1,8	N	EI 120-U/U	-
	50 - 110	1,8 - 2,7	N/Y	-	EI 120-U/C
Conel Drain	50	1,8	N	EI 120-U/U	-
Ostendorf Skolan Safe	58	4,0	N	EI 120-U/U	-
	58 - 110	4,0 - 5,3	N/Y	-	EI 120-U/C
Silenta Premium	58	5,3	N	EI 120-U/U	-
Valsir TriPlus	50	1,9	N	EI 120-U/U	-
	50 - 110	1,8 - 3,4	N/Y	-	EI 120-U/C
Wavin AS+	50	3,0	N	EI 90-U/U	-
Wavin Sitech+	50	2,1	N	EI 90-U/U	-
	32 - 110	1,8 - 3,4	N/Y	-	EI 120-U/C

Combustible pipes					
Type	Pipe-Ø [mm]	Pipe wall thickness [mm]	Back-filling	Classification	
				Wall	Floor
Multilayer pipes with/without backfilling and with/without 5 mm PE acoustic insulation					
Geberit Mepla	16	2,25	Y	EI 120-U/C	EI 120-U/C
	16	2,25	N	EI 90-U/C	EI 120-U/C
	≤ 50	2,25 – 4,0	Y	EI 90-U/C	EI 120-U/C
	≤ 50	2,25 – 4,7	N	-	EI 120-U/C
	≤ 75	2,25 – 4,7	Y	EI 30-U/C	EI 120-U/C
KeKelit KELOX KM 110	16	2,0	Y	EI 120-U/C	EI 120-U/C
	16	2,0	N	EI 90-U/C	
	≤ 75	2,0 – 7,5	Y	EI 90-U/C	EI 120-U/C
UPONOR Uni Pipe Plus	≤ 32	2,0 – 3,0	Y	EI 120-U/C	EI 120-U/C
	≤ 32	2,0 – 3,0	N	EI 90-U/C	-
	32	3,0	N	EI 120-U/C	-
REHAU Rautitan stabil	≤ 40	2,0 – 6,0	Y	EI 120-U/C	EI 120-U/C
	≤ 40	2,0 – 6,0	N	EI 90-U/C	-
Fränkische Alpex F50	≤ 32	2,0 – 3,0	Y	EI 120-U/C	EI 120-U/C
Fränkische Alpex L	40	3,5	N/Y	EI 120-U/C	EI 120-U/C
	≤ 40	2,6 – 3,5	N	EI 90-U/C	-
	≤ 75	3,5 – 5,0	Y	EI 30-U/C	EI 120-U/C
	≤ 75	3,5 – 5,0	N	-	EI 120-U/C

Non-combustible pipes						
Type	Pipe-Ø [mm]	Pipe wall thickness [mm]	Insulation Length x width [mm]	Back-filling	Classification	
					Wall	Floor
Non-combustible pipes with/without backfilling and without insulation						
Copper	≤ 15,0	1,0	-	Y	-	EI 120-C/U*
	≤ 18,0					EI 90-C/U*
	≤ 22,0					EI 60-C/U*
Steel, stainless steel, cast iron	26,9	2,0	-	Y	EI 90-C/U	-
	≤ 42,4	2,3 – 14,2		Y/N	-	EI 120-C/U
	≤ 48,3	2,1 – 14,2		Y/N		EI 120-C/U*
	≤ 48,3	2,1 – 14,2		Y		EI 90-C/U**
Non-combustible pipes with/without backfilling and with lamella mat insulation (LS/CS)						
Copper	≤ 54	1,0 – 14,2	≥ 1000 mm x 30 - 60 mm	Y/N	EI 120-C/U	EI 120-C/U
	≤ 76	1,0 – 14,2	≥ 1500 mm x 30 - 60 mm	N	-	EI 120-C/U
	≤ 88,9	1,5 – 14,2	≥ 1500 mm x 30 - 60 mm	Y	EI 90-C/U	EI 90-C/U
	≤ 88,9	1,0 – 14,2	≥ 1500 mm x 60 mm	N	-	EI 120-C/U
Steel, stainless steel, cast iron	≤ 54	1,0 – 14,2	≥ 1000 mm x 30 - 60 mm	Y/N	EI 120-C/U	EI 120-C/U
	≤ 114	1,0 – 14,2	≥ 1500 mm x 30 - 60 mm	Y/N	EI 120-C/U	EI 120-C/U
Non-combustible pipes with/without backfilling and with lamella mat insulation (LI/CI)						
Copper	≤ 54	1,5 – 14,2	2 x ≥ 500 mm x 30 mm	N	EI 120-C/U	EI 120-C/U
Steel, stainless steel, cast iron	≤ 88,9	1,5 – 14,2	2 x ≥ 500 mm x 30 - 60 mm	N	EI 120-C/U	EI 120-C/U
	≤ 114	1,5 – 14,2	2 x ≥ 500 mm x 60 mm	N	EI 120-C/U	EI 120-C/U
	≤ 114	1,5 – 14,2	2 x ≥ 500 mm x 30 - 60 mm	N	-	EI 120-C/U
Non-combustible pipes with/without backfilling and with pipe shell insulation (CS)						
Copper	≤ 54	1,0 – 14,2	20 - 30 mm	Y/N	-	EI 120-C/U
	≤ 88,9	1,0 – 14,2	30 mm	Y	EI 120-C/U	EI 120-C/U
	≤ 88,9	1,0 – 14,2	30 mm	N	EI 90-C/U	EI 120-C/U
Steel, stainless steel, cast iron	≤ 54	1,0 – 14,2	20 - 30 mm	Y	EI 120-C/U	EI 120-C/U
	≤ 54	1,0 – 14,2	20 - 30 mm	N	EI 90-C/U	EI 120-C/U
	≤ 88,9	1,0 – 14,2	30 - 40 mm	Y	EI 120-C/U	EI 120-C/U
	≤ 88,9	1,0 – 14,2	30 - 40 mm	N	EI 90-C/U	EI 120-C/U
	≤ 114	1,0 – 14,2	40 mm	Y	EI 120-C/U	EI 120-C/U
	≤ 114	1,0 – 14,2	40 mm	N	EI 90-C/U	EI 120-C/U
Non-combustible pipes with/without backfilling and with FEF insulation (LS/CS)						
Copper, steel, stainless steel, cast iron	≤ 28	1,0 – 14,2	≥ 1250 mm x 19 - 25 mm	Y/N	EI 120-C/U	EI 120-C/U
	≤ 42	1,0 – 14,2	≥ 1250 mm x 25 mm	Y/N	EI 120-C/U	EI 120-C/U
	≤ 42	1,0 – 14,2	≥ 1250 mm x 19 - 38 mm	Y	EI 120-C/U	EI 120-C/U
	≤ 54	1,0 – 14,2	≥ 1250 mm x 38 mm	N	EI 60-C/U	EI 120-C/U
	≤ 54	1,0 – 14,2	≥ 1250 mm x 38 mm	Y	EI 120-C/U	EI 120-C/U
	≤ 54	1,0 – 14,2	≥ 1250 mm x 19 - 38 mm	Y/N	-	EI 120-C/U

* Floor ≥ 200 mm, ** Zero distance between pipes

Electrical Installations			
Type	Back-filling	Classification	
		Wall	Floor
Cable, cable bundle with stone wool backfilling			
Cable group 1 - $\varnothing \leq 21$ mm	Y	EI 120	EI 120
Cable group 2 - $\varnothing \leq 50$ mm	Y	-	EI 60
Cable E-YCWY 4x95RM $\varnothing \leq 47$ mm	Y	EI 90	-
Cable H07RN-F 4G95 $\varnothing \leq 61$ mm	Y	EI 90	-
Cable group 4 - bundle $\varnothing \leq 100$ mm, cable $\varnothing \leq 21$ mm	Y	EI 120	
Cable group 4 - bundle $\varnothing \leq 150$ mm, cable $\varnothing \leq 21$ mm	Y	-	EI 120
Cable group 4 - bundle $\varnothing \leq 180$ mm, cable $\varnothing \leq 21$ mm	Y	EI 90 EI 120*	-
Electric installation conduits			
EIC single $\varnothing \leq 32$ mm, with/without cables $\varnothing \leq 21$ mm	Y	EI 120-U/U	EI 120-U/U
EIC-bundle $\varnothing \leq 90$ mm, EIC $\varnothing \leq 32$ mm, with/without cables $\varnothing \leq 21$ mm	Y	-	EI 120-U/U
EIC-bundle $\varnothing \leq 100$ mm, EIC $\varnothing \leq 32$ mm, with/without cables $\varnothing \leq 21$ mm	Y	EI 60-U/U	-
Wave guides			
RFS CELLFLEX – LCF - $\varnothing \leq 50,3$ mm	Y	EI 120-U/C	EI 120-U/C
RFS RADIAFLEX - RLK - $\varnothing \leq 48,2$ mm	Y	EI 120-U/C	EI 120-U/C
CommScope HELIAX - AVA - $\varnothing \leq 51,1$ mm	Y	EI 120-U/C	EI 120-U/C

* Solid wall

HVAC split line combinations					
Type	\varnothing [mm]	Pipe wall thickness [mm]	Back-filling	Classification	
				Wall	Floor
Copper pipes with 9 mm PEF insulation	$\leq 2 \times \leq 22$	1,0 – 14,2	Y	EI 90	EI 120
PVC-U, PVC-C pipe	$\leq 1 \times \leq 25$	1,5			
Cable	$\leq 2 \times \leq 14$				
Copper pipes with 9 mm PEF insulation	$\leq 2 \times \leq 18$	1,0 – 14,2	Y	EI 120*	-
PVC-U, PVC-C pipe	$\leq 1 \times \leq 25$	1,5			
Cable	$\leq 2 \times \leq 14$				
Copper pipes with 14 mm PEF insulation	$\leq 2 \times \leq 22$	1,0 – 14,2	Y	EI 120-C/U	EI 120-C/U

* Insulation : 2 x 250 mm x 30 mm "Klimarock" (LI/CI)

Combustible pipes				
Type	Pipe-Ø [mm]	Pipe wall thickness [mm]	Back-filling	Classification
				Shaft wall
Non-regulated pipes without backfilling and without acoustic insulation				
Poloplast POLO-KAL NG	50	2,0	N	EI 90-U/U
Poloplast POLO-KAL XS	50	2,0	N	EI 90-U/U
Geberit Silent PP	50	2,0	N	EI 90-U/U
Non-regulated pipes without backfilling and with 19 mm FEF insulation				
Poloplast POLO-KAL NG	50	2,0	N	EI 90-U/U
Poloplast POLO-KAL XS	50	2,0	N	EI 90-U/U
Geberit Silent PP	50	2,0	N	EI 90-U/U
Multilayer pipes without backfilling and with/without 9 mm PE acoustic insulation				
Geberit Mepla	25	3,0	N	EI 90-U/C
	32	3,0	N	EI 90-U/C
REHAU Rautitan stabil	25	3,7	N	EI 90-U/C
	32	4,7	N	EI 90-U/C
KeKelit KELOX KM 110	20	2,5	N	EI 90-U/C*
	25	2,5	N	EI 90-U/C*
	32	3,0	N	EI 90-U/C*
Multilayer pipes without backfilling and with 19 mm FEF insulation				
Geberit Mepla	25	3,0	N	EI 90-U/C
	32	3,0	N	EI 90-U/C
REHAU Rautitan stabil	25	3,7	N	EI 90-U/C
	32	4,7	N	EI 90-U/C
KeKelit KELOX KM 110	25	2,5	N	EI 90-U/C
	32	3,0	N	EI 90-U/C

* Zero distance between pipes

Blank Seal				
Type	Ø [mm]	Back-filling	Classification	
			Wall	Floor
Blank seal	150	Y	-	EI 120