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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

European Technical Assessment ETA-22/0064 of 2022/03/27

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 CM
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 74
This European Technical Assessment contains:	23 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:	-

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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 construction product ArmaProtect CM is a mortar which is intended to be used in penetration seals. It is supplied in powder form in bags, in cement grey colour.

A detailed technical description and the fire-safety-related performance criteria of the construction products are given in Annex 1.

2 Specification of the intended use in accordance with the applicable EAD

The construction product ArmaProtect CM is intended to be used as a component with a fire protection effect in building elements or parts thereof or constructions that are subject to fire-protection requirements. Heat transmission and spread of fire are restricted in the event of fire.

The construction product ArmaProtect CM is intended for use in penetration seals. Construction products for penetration seals are used to seal openings in fire-resistant walls or floors, which are penetrated by services. Penetration seals are used to maintain the fire resistance of the wall or floor in the area of these penetrations.

Within the scope of this ETA, a set of test specimens were subjected to a fire test. A fire resistance of EI 240 was demonstrated for individual designs of cable penetration seals and a fire resistance of EI 120 was demonstrated for individual designs of pipe penetration seals - manufactured using the construction product ArmaProtect CM.

The construction product may be used for the installation of penetration seals in dry interior areas and temperatures above 0 °C (use category Type Z_1).

The provisions made in this European Technical Assessment are based on an assumed intended working life of the ArmaProtect CM 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	Classification in accordance with EN13501-1, and the EC Delegated regulation 2016/364/EU. See annex 1
Resistance to fire	Classification according to EN 13501-2: See Annex 1
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 and accessibility 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 350454-00-1104 for use condition Z_1.
3.4 Protection against noise (BWR5)	
Airborne sound insulation	No performance assessed
3.5 Energy Economy and heat retention (BWR6)	
Thermal properties	No performance assessed
Water vapour permeability	No performance assessed

3.9 Methods of verification

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

3.10 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 CM 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 Attestation and verification of constancy of performance (AVCP)

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 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 2022-03-27 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex 1
Properties of the construction product ArmaProtect CM and the performance of penetration seals, comprising ArmaProtect CM

Property	Performance criterion
Fire behavior	Classification of fire behavior according to EN 13501-1: A1
Compressive stregth	M 2,5
Density	$\rho \geq 900 kg/m^3$
initial shear strength	0,15 N/mm² (table value)
Contents of chlorides	≤ 0,10 M.-%
Water vapour permeability μ	5/20 (table value)
Thermal conductivity $\lambda_{10,dry,mat}$	≤ 0,25 W/(m*K) für P = 50% (table value) ≤ 0,27 W/(m*K) für P = 90%

The properties listed can be used both for the identification of the construction product and for the implementation of the factory production control of the manufacturer.

Implementation details for the factory production control are included in the inspection plan.

The use of the construction product ArmaProtect CM shall be in accordance with national requirements for planning, design and execution and in accordance with the installation instruction of the manufacturer.

The tested/ illustrated seals are only examples for the use.

Performances of penetration seals, comprising the construction product ArmaProtect CM

Structural element	Penetration seal	Maximum dimensions of the opening
Plasterboard wall and rigid walls ≥ 100 mm	≥ 100 mm	550 mm x 600 mm or equivalent area
Rigid walls and floors ≥ 150 mm	≥ 150 mm	1200 mm x 2000 mm or equivalent area
Rigid walls ≥ 240 mm and floors ≥ 200 mm	≥ 240 mm	600 mm x 600 mm or equivalent area

Fire resistance classes			
	Measures	Wall	Floor
		Fire resistance class	Fire resistance class
Cables, cable bundles and cable trays with fire protection wrap ArmaProtect FW2 – Wrap width = 500 mm			
Cables Ø ≤ 80 mm	2 x 2 layers	**EI 240**	**EI 240**
Cable bundles Ø ≤ 100 mm with cables ≤ 21 mm	2 x 2 layers	**EI 240**	**EI 240**

distances/ wall/ floor		cables	cable bundlers	cable trays	Seal edge		
					upper	under	side
	Cables	≥ 10 (next to each other) ≥ 40 (above each other)			≥ 30	≥ 20	≥ 20
Cable bundles		≥ 10 (next to each other) ≥ 40 (above each other)			≥ 30	≥ 20	≥ 20
	Cable trays	≥ 10 (next to each other) ≥ 40 (above each other)			≥ 30	≥ 20	≥ 20

Fire resistance classes			
	Measures	Flexible Plasterboard wall	
		Fire resistance class	
Cables, without protective measures			
Cables Ø ≤ 21 mm	-	**EI 90 / E 120**	
Cables, cable bundles and cable trays with fire protection wrap ArmaProtect FW2			
Cables Ø ≤ 50 mm	2x 2-layer, 125 mm outside seal	**EI 90 / E 120**	
Cables Ø ≤ 80 mm	2x 2-layer, 125 mm outside seal	**EI 90 / E 120**	
Cable bundles Ø ≤ 150 mm with cable Ø 21	2x 1-layer, 125 mm outside seal	**EI 120**	
Electrical installation conduit with fire protection wrap ArmaProtect FW2 – Wrap width 125 mm			
Conduits Ø ≤ 32 mm Conduit-bundles Ø ≤ 100 mm (single conduits Ø ≤ 32 mm)	2x 2-layer, 50 mm inside seal / 75 mm outside seal	**EI 120**	

Distances /wall					Seal edge		
	Cables	Cable bundles	Cable trays	Electrical installation conduits single or bundled	Upper	Under	Side
Cables	≥ 5 (side by side) ≥ 50 (above the other)				≥ 50	≥ 0	≥ 5
Cable bundles							
Cable trays							
Electrical installation conduits single or bundled							

Fire resistance classes for wall and floor partition

Fire resistance classes

	Measures	Wall	Floor
		Fire resistance class	Fire resistance class
Cables, cable bundles and cable trays without protective measures			
Cables Ø ≤ 32 mm	-	**EI 120**	**EI 120**
Single-core-non-sheathed cables (Wires, Ø ≤ 24 mm)	-	**EI 120**	**EI 120**
Cable bundles Ø ≤ 60 mm	-	**EI 120**	**EI 120**
Cable bundles Ø ≤ 100 mm	-	**EI 90 / E 120**	**EI 60 / E 120**
Cables, cable bundles and cable trays with 240 mm seal thickness			
Cables Ø ≤ 50 mm	240 mm seal thickness	**EI 120**	**EI 90 / E 120**
Cables Ø ≤ 80 mm	240 mm seal thickness	**EI 90 / E 120**	**EI 90 / E 120**
Cable bundles Ø ≤ 100 mm	240 mm seal thickness	**EI 120**	**EI 120**
Cables, cable bundles and cable trays with fire protection wrap ArmaProtect FW2			
Cables Ø ≤ 50 mm	2x 2-layer, 125 mm	**EI 120**	**EI 120**
Cables Ø ≤ 80 mm	2x 2-layer, 125 mm	**EI 90 / E 120**	**EI 120**
	2x 2-layer, 150 mm	**EI 120**	**EI 120**
Cable bundles Ø ≤ 100 mm	2x 1-layer, 125 mm	**EI 120**	**EI 120**
Electrical installation conduit with fire protection wrap ArmaProtect FW2 – Wrap width 125 mm			
Conduits Ø ≤ 32 mm	2x 1-layer	**EI 120 U/U**	**EI 120 U/U**
Conduits Ø ≤ 63 mm	2x 2-layer	**EI 120 U/U**	**EI 120 U/U**
Conduits Ø ≤ 100 mm	2x 3-layer + lamella mat ≥ 500 mm x ≥ 30 mm	**-**	**EI 120 U/U**
Conduit-bundles Ø ≤ 100 mm (single conduits Ø ≤ 32 mm)	2x 2-layer	**EI 120 U/U**	**EI 120 U/U**
Electrical installation conduit with non-combustible insulation made of mineral-fibre „lamella mat“			
Conduits Ø ≤ 63 mm	Lamella mat ≥ 500 mm x ≥ 30 mm	**EI 120 U/U**	**EI 120 U/U**
“speed pipe“ single or bundled, with or w/o glass fibre or micro cable; with fire protection wrap ArmaProtect FW2 – Wrap width 125 mm			
max. 24 pcs.; outside pipe-Ø ≤ 7 mm max. 7 pcs.; outside pipe-Ø ≤ 10 mm max. 5 pcs.; outside pipe-Ø ≤ 12 mm	Wall 2x, Floor 1x 1-layer	**EI 120 U/U**	**EI 120 U/U**
Non-combustible pipes made of copper with non-combustible insulation made of mineral-fibre „lamella mat”			
Outside pipe-Ø ≤ 15 mm	≥ 250 mm x ≥ 20 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 28 mm	≥ 500 mm x ≥ 20 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 42 mm	≥ 500 mm x ≥ 30 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 54 mm	≥ 500 mm x ≥ 40 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 88,9 mm	≥ 750 mm x ≥ 60 mm	**EI 120 C/U**	**EI 120 C/U**

	Measures	Wall	Floor
		Fire resistance class	Fire resistance class
Non-combustible pipes made of steel, stainless steel or cast iron with non-combustible insulation made of mineral-fibre „lamella mat"			
Outside pipe-Ø ≤ 15,0 mm	≥ 250 mm x ≥ 20 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 28,0 mm	≥ 500 mm x ≥ 20 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 42,0 mm	≥ 500 mm x ≥ 30 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 114,3 mm	≥ 500 mm x ≥ 40 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 168,3 mm	≥ 1000 mm x ≥ 40 mm	**EI 120 C/U**	**EI 120 C/U**
Outside pipe-Ø ≤ 323,9 mm	≥ 1000 mm x ≥ 40 mm + lamella mat ≥ 500 mm x ≥ 30 mm	**EI 120 C/U**	**EI 120 C/U**

Fire resistance classes			
	Measures	Wall	Floor
		Fire resistance class	Fire resistance class
Multilayer pipes „HENCO pipes“ with non-combustible insulation made of mineral-fibre „lamella mat”			
Outside pipe-Ø ≤ 12,0 mm, wall thickness 1,6 mm	Lamella mat ≥ 250 mm x ≥ 20 mm	**EI 120 U/C**	**EI 120 U/C**
Outside pipe-Ø ≤ 32,0 mm, wall thickness 3,0 mm		**EI 120 U/C**	**EI 120 U/C**
Outside pipe-Ø ≤ 63,0 mm, wall thickness 4,5 mm	Lamella mat ≥ 250 mm x ≥ 30 mm	**EI 120 U/C**	**EI 120 U/C**
Multilayer pipes „HENCO pipes“ with PE-foam (PEF) insulation and intumescent wrap ArmaProtect FW2 – Wrap width 100 mm			
Outside pipe-Ø ≤ 14,0 mm, wall thickn. 2,0 mm, PEF 6 mm	2x 1-layer + lamella mat ≥ 250 mm x ≥ 20 mm	**EI 120 U/C**	**EI 120 U/C**
Outside pipe-Ø ≤ 26,0 mm, wall thickn. 3,0 mm, PEF 6 - 13 mm		**EI 120 U/C**	**EI 120 U/C**
Outside pipe-Ø ≤ 32,0 mm, wall thickn. 2,0 mm, PEF 6 - 10 mm		**EI 120 U/C**	**EI 120 U/C**
Combustible pipes with/without 5 mm PE-foam acoustic insulation made of PVC-U, PVC-C , PP-H or PE-100 with intumescent wrap ArmaProtect FW2 – Wrap width 100 mm			
Outside pipe-Ø ≤ 50,0 mm	Wall 2x, Floor 1x 1-layer	**EI 120 U/U**	**EI 120 U/U**
Outside pipe-Ø ≤ 80,0 mm	Wall 2x, Floor 1x 2-layer	**EI 120 U/U**	**EI 120 U/U**
Outside pipe-Ø ≤ 110,0 mm	Wall 2x, Floor 1x 3-layer	**EI 120 U/U**	**EI 120 U/U**
Outside pipe-Ø ≤ 135,0 mm	Wall 2x, Floor 1x 4-layer	**EI 120 U/C**	**EI 120 U/C**
Outside pipe-Ø ≤ 160,0 mm	Wall 2x, Floor 1x 5-layer	**EI 120 U/C**	**EI 120 U/C**
HVAC split line combinations with fire protection wrap ArmaProtect FW2 – Wrap width 125 mm**			
Pipe 1/Pipe 2 outside-Ø 6 mm - 10 mm/ 10 mm - 18 mm + PE-100 outside-Ø ≤ 25 mm, t 1.9 - 3.5 mm	2x 2-layer	**EI 120**	**EI 120**
Double solar pipes „NanoSUN²“ with fire protection wrap ArmaProtect FW2 – Wrap width 125 mm			
DN16 and DN 25	Wall 2x, Floor 1x 1-layer	**EI 120 C/U**	**EI 120 C/U**
Hydraulic hoses „HANSA FLEX“ (also with wire braid reinforcement) with fire protection wrap ArmaProtect FW2 – Wrap width 125 mm			
up to Ø 55.9 mm (Hansa-Flex HD 200 (2SN)) (e.g. hydraulic hoses for elevators) with additional cables	2x 1-layer + lamella mat ≥ 250 mm x ≥ 20 mm	**EI 120**	**EI 120**

**combined lines for split HVAC-units with twin or single copper pipe and pipe insulation 9 mm thick, made from PE foam, in accordance with EN 14313; optionally with additional cable/pipe without spacing.

Fire resistance classes				
ArmaProtect CT Cable Tube – Retrofitting possibilities in walls				
Length CT [mm]		**150**	**200**	**300**
Services	**Measures**			
Cable up to Ø 21 mm	-	**EI 90 / E 120**	**EI 120**	**EI 120**
Cable > Ø 21 mm to Ø 50 mm	-	**EI 45 / E 90**	**EI 45 / E 90**	**EI 90 / E 120**
Cable > Ø 50 mm to Ø 80 mm	-	-	-	**EI 90 / E 120**
Cable bundles up to Ø 107 mm with cable up to Ø 21 mm	-	**EI 90 / E 120**	**EI 120**	**EI 120**
Conduits up to 3 pcs. made of plastic, flexible Ø 32 mm with or w/o cable up to Ø 14 mm	-	**EI 90 / E 90**	**EI 120**	**EI 120**
Conduits made of plastic, flexible Ø 16 mm - 32 mm single or bundled up to Ø 107 mm, with w/o cable up to Ø ≤ 21 mm	-	-	**EI 120**	**EI 120**
max. 2 plastic pipes, outside pipe-Ø 20 mm x s 1.5 mm to Ø 32 mm x s 2.4 mm and max. 2 plastic pipes with outside pipe-Ø 20 mm x s 1.5 mm and up to 3 additional cables up to Ø ≤ 14 mm (sheathed cable with max. 5 wires ≤ 1.5 mm²)	-	-	-	**EI 120**
Combined lines for split HVAC-units Pipe 1/pipe 2 outside-Ø 6 mm - 10 mm/ 10 mm - 18 mm + 9 mm insulation made of PE-foam; Plastic pipe PVC-U, outside-Ø up to 25 mm, s 1.5 mm + max. 3 additional cable up to Ø 14 mm without spacing	-	**EI 90 / E 90**	**EI 90 / E 90**	**EI 90 / E 90**

Fire resistance classes				
ArmaProtect CT Cable Tube – Retrofitting possibilities in walls				
Length CT [mm]		**150**	**200**	**300**
Services	**Measures**			
Cable up to Ø 21 mm	-	**EI 90 / E 120**	**EI 120**	**EI 120**
Cable > Ø 21 mm to Ø 50 mm	-	**EI 45 / E 90**	**EI 45 / E 90**	**EI 90 / E 120**
Cable > Ø 50 mm to Ø 80 mm	-	-	-	**EI 90 / E 120**
Cable bundles up to Ø 107 mm with cable up to Ø 21 mm	-	**EI 90 / E 120**	**EI 120**	**EI 120**
Conduits up to 3 pcs. made of plastic, flexible Ø 32 mm with or w/o cable up to Ø 14 mm	-	**EI 90 / E 90**	**EI 120**	**EI 120**
Conduits made of plastic, flexible Ø 16 mm - 32 mm single or bundled up to Ø 107 mm, with w/o cable up to Ø ≤ 21 mm	-	-	**EI 120**	**EI 120**
max. 2 plastic pipes, outside pipe-Ø 20 mm x s 1.5 mm to Ø 32 mm x s 2.4 mm and max. 2 plastic pipes with outside pipe-Ø 20 mm x s 1.5 mm and up to 3 additional cable up to Ø ≤ 14 mm (sheathed cable with max. 5 wires ≤ 1.5 mm²)	-	-	-	**EI 120**
Combined lines for split HVAC-units Pipe 1/pipe 2 outside-Ø 6 mm - 10 mm/ 10 mm - 18 mm + 9 mm insulation made of PE-foam; Plastic pipe PVC-U, outside-Ø up to 25 mm, s 1.5 mm + max. 3 additional cables up to Ø 14 mm without spacing	-	**EI 90 / E 90**	**EI 90 / E 90**	**EI 90 / E 90**

Spacing requirements – walls

															Seal edge		
		Cables	Cable bundles	Cable trays	Electrical installation conduits single or bundled	Combustible pipes	Multilayer pipes	Non-combustible pipes; Insulation made of mineral-fibre mats	Non-combustible pipes; Insulation made of FEF	HVAC split line combinations	Double solar pipes „NanoSUN[b]	PE lines „speed pipes[c]	Hydraulic hoses „HANSA FLEX[c]	ArmaProtect CT Cable Tube	front	back	side
	Cables	(≥ 50 one ≥ 10 above the other)			Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 50	Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 35	≥ 35	≥ 40	≥ 100	≥ 25	≥ 45	≥ 65	≥ 30	≥ 0	≥ 0
	Cable bundles	(≥ 50 one ≥ 10 above the other)			≥ 100	≥ 50	≥ 100	≥ 35	≥ 35	≥ 40	≥ 100	≥ 25	≥ 45	≥ 65	≥ 30	≥ 0	≥ 0
	Cable trays	(≥ 50 one ≥ 10 above the other)			≥ 100	≥ 50	≥ 100	≥ 35	≥ 35	≥ 40	≥ 100	≥ 25	≥ 45	≥ 65	≥ 30	≥ 0	≥ 0
	Electrical installation conduits single or bundled	Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 100		≥ 0	≥ 100	≥ 100	≥ 80	≥ 80	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Combustible pipes	≥ 50			≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Multilayer pipes	Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 100		≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Non-combustible pipes; Insulation made of mineral-fibre mats	≥ 50			≥ 80	≥ 0	≥ 100	≥ 0	≥ 0	≥ 50	≥ 100	≥ 20	≥ 100	≥ 100	≥ 0		
	Non-combustible pipes; Insulation made of FEF	≥ 50			≥ 80	≥ 0	≥ 100	≥ 0	≥ 0	≥ 50	≥ 100	≥ 20	≥ 100	≥ 100	≥ 0		
	HVAC split line combinations	≥ 40			≥ 100	≥ 50	≥ 100	≥ 50	≥ 50	≥ 25	≥ 85	≥ 100	≥ 100	≥ 100	≥ 0		
	Double solar pipes „NanoSUN[b]	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 85	≥ 100	≥ 100	≥ 85	≥ 100	≥ 0		
	PE lines „speed pipes[c]	≥ 25			≥ 100	≥ 100	≥ 100	≥ 20	≥ 20	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100	≥ 0		
	Hydraulic hoses „HANSA FLEX[c]	≥ 45			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 85	≥ 100	≥ 100	≥ 100	≥ 80		
	ArmaProtect CT Cable Tube	≥ 65			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 3	≥ 15		

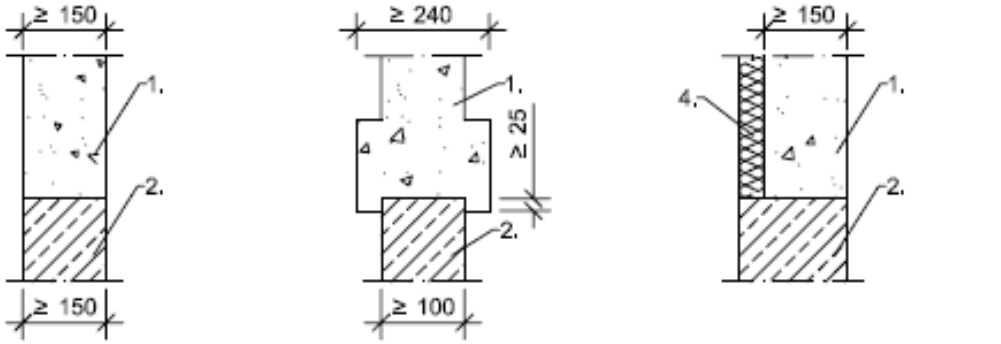
Spacing requirements – floors

														Seal edge		
		Cables	Cable bundles	Cable trays	Electrical installation conduits single or bundled	Combustible pipes	Multilayer pipes	Non-combustible pipes; Insulation made of mineral-fibre mats	Non-combustible pipes; Insulation made of FEF	HVAC split line combinations	Double solar pipes „NanoSUN“	PE lines „speed pipes“	Hydraulic hoses „HANSA FLEX“	ArmaProtect CT Cable Tube	front	back	side
	Cables	Seal thickness ≥ 150: ≥ 10, (≥ 50 one above the other) Seal thickness ≥ 240: ≥ 0, (≥ 45 one above the other)			Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 50	Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 25	≥ 25	≥ 100	≥ 100	≥ 40	≥ 85	≥ 65	≥ 30	≥ 0	Seal thickness ≥ 150: ≥ 10 Seal thickness ≥ 240: ≥ 25
	Cable bundles	Seal thickness ≥ 150: ≥ 10, (≥ 50 one above the other) Seal thickness ≥ 240: ≥ 0, (≥ 45 one above the other)			≥ 100	≥ 50	≥ 100	≥ 25	≥ 25	≥ 100	≥ 100	≥ 40	≥ 85	≥ 65	≥ 30	≥ 0	Seal thickness ≥ 150: ≥ 10 Seal thickness ≥ 240: ≥ 25
	Cable trays	Seal thickness ≥ 150: ≥ 10, (≥ 50 one above the other) Seal thickness ≥ 240: ≥ 0, (≥ 45 one above the other)			≥ 100	≥ 50	≥ 100	≥ 25	≥ 25	≥ 100	≥ 100	≥ 40	≥ 85	≥ 65	≥ 30	≥ 0	Seal thickness ≥ 150: ≥ 10 Seal thickness ≥ 240: ≥ 25
	Electrical installation conduits single or bundled	Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 100		≥ 0	≥ 100	≥ 100	≥ 60	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Combustible pipes	≥ 50			≥ 100	≥ 25	≥ 100	≥ 0	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Multilayer pipes	Cable ≤ 21: ≥ 0 Cable > 21: ≥ 100	≥ 100		≥ 100	≥ 100	≥ 0	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Non-combustible pipes; Insulation made of mineral-fibre mats	≥ 25			≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	Non-combustible pipes; Insulation made of FEF	≥ 25			≥ 100	≥ 0	≥ 100	≥ 0	≥ 0	≥ 60	≥ 100	≥ 100	≥ 100	≥ 100	≥ 0		
	HVAC split line combinations	≥ 100			≥ 100	≥ 100	≥ 100	≥ 60	≥ 60	≥ 50	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100		
	Double solar pipes „NanoSUN“	≥ 100			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 80	≥ 100	≥ 30		
	PE lines „speed pipes“	≥ 40			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 25	≥ 100	≥ 100	≥ 30		
	Hydraulic hoses „HANSA FLEX“	≥ 85			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 80	≥ 100	≥ 100	≥ 100	≥ 35		
	ArmaProtect CT Cable Tube	≥ 65			≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 100	≥ 10	≥ 15		

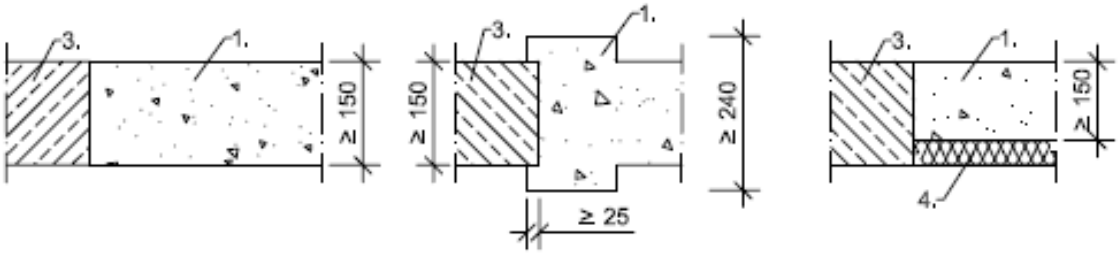
Annex 2
Examples of classifications

Mixed penetration sealing system made of mortar

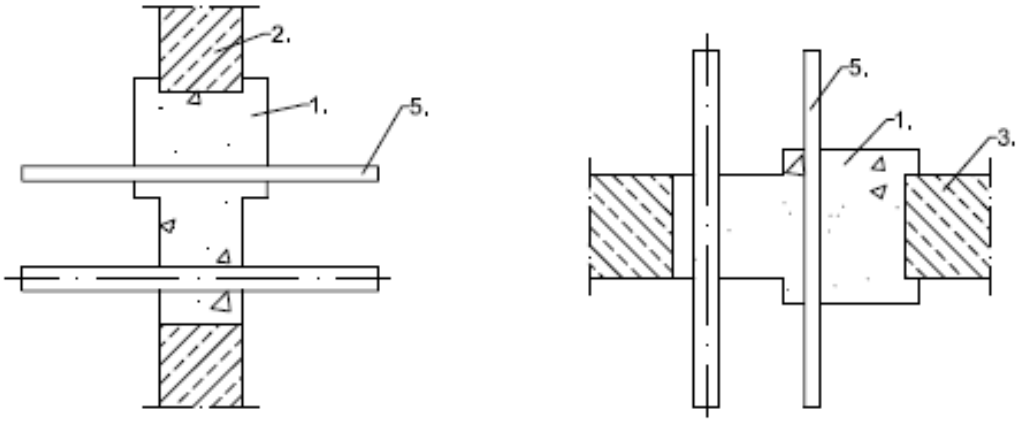
Variants in solid walls



Variants in floors



Cables, cable bundles with cables and cable trays

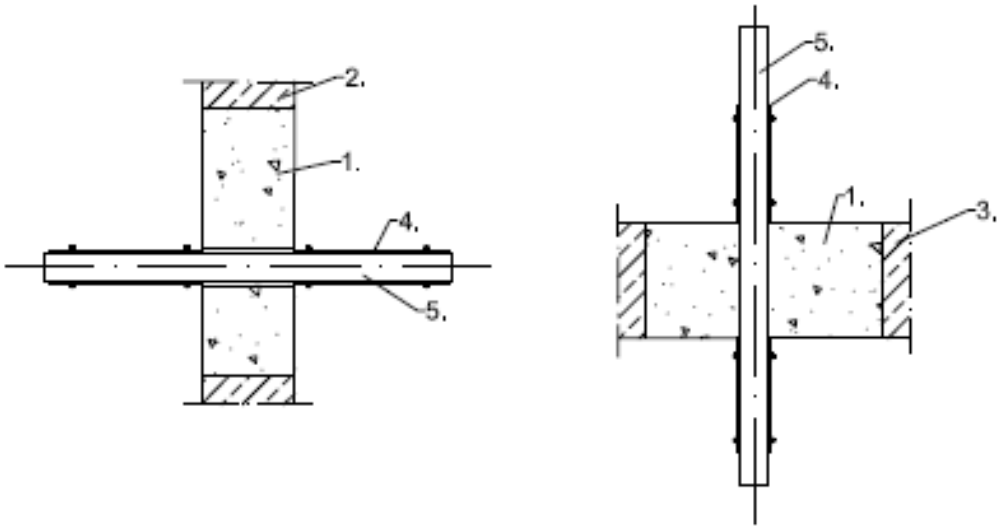


	Dimensions [mm]	Seal thickness [mm]	Fire resistance class	
			Wall	Floor
Cables	ø ≤ 32	150	EI 120	EI 120
	ø ≤ 50	240	EI 120	EI 90 / E 120
	ø ≤ 80		EI 90 / E 120	EI 90
Single-core-non-sheathed cables	ø wires ≤ 24	150	EI 120	EI 120
Cable bundles	ø ≤ 60		EI 120	EI 120
	ø ≤ 100		EI 90 / E 120	EI 60 / E 120
	ø ≤ 100	240	EI 120	EI 120

dimensions in mm

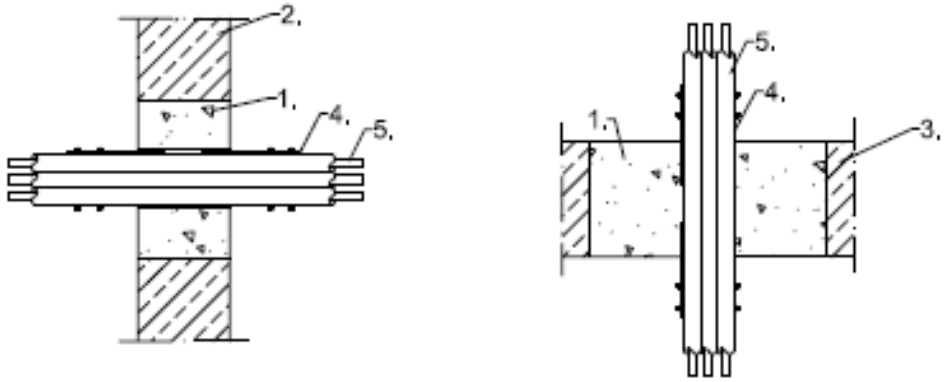
1. ArmaProtect CM ≥ 150 mm thickness
2. rigid wall ≥ 150 mm thickness
3. rigid floor ≥ 150 mm thickness
4. lost formwork e. g. made of mineral fibre mat (non-flammable, melting point > 1000°C)
5. cables / cable bundles / cable trays

Cables Ø ≤ 80 mm, cable bundles Ø ≤ 100 mm with cables and cable trays
- with intumescent wrap



	Intumescent wrap							Fire resistance class	
	Dimensions [mm]	Wrap width L [mm]	Qty. Wraps [n]	Qty. Layers [n]	Overlapping [mm]	Inside seal [mm]	[Outside seal [mm]	Wall	Floor
Cables	ø ≤ 32	-	-	-	-	-	-	EI 120	EI 120
	ø ≤ 50	125	2	2	45-60	0	125	EI 120	EI 120
	ø ≤ 80							EI 90 / E 120	EI 120
		150					150	EI 120	EI 120
Cable bundles	ø ≤ 100	125		1			125	EI 120	EI 120

Electrical installation conduit Ø ≤ 100 mm single or bundled
- with intumescent wrap



	Intumescent wrap							Fire resistance class	
	Dimensions [mm]	Wrap width L [mm]	Qty. Wraps [n]	Qty. Layers [n]	Overlapping [mm]	Inside seal [mm]	[Outside seal [mm]	Wall	Floor
EIC made of plastic, single	EIC-ø ≤ 32 cable-ø ≤ 21	-	-	1	-	-	-	EI 120 U/U	EI 120 U/U
	EIC-ø ≤ 63 cable-ø ≤ 21	-	-	2	-	-	-	EI 120 U/U	
EIC made of plastic, single*	EIC-ø ≤ 100 cable-ø ≤ 50	125	2	3	0	50	75	-	
EIC made of plastic, bundled	bundle-ø ≤ 100 EIC-ø ≤ 32 cable-ø ≤ 21	-	-	2	-	-	-	EI 120 U/U	

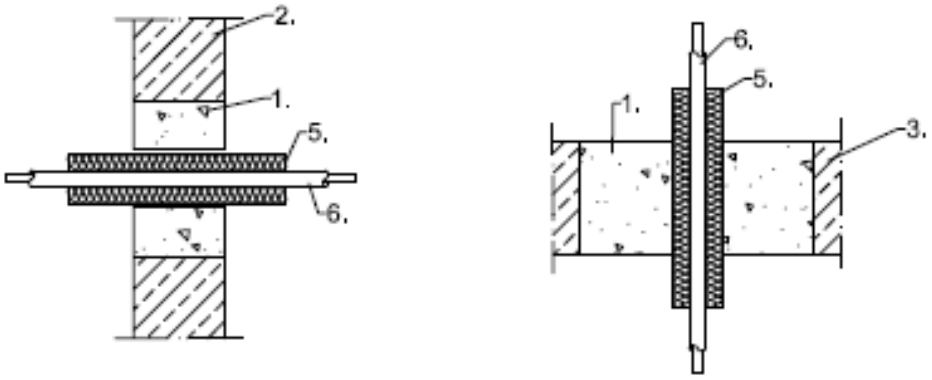
*With additional protective insulation made of mineral-fibre mats (L1 ≥ 500 mm x D1 ≥ 30 mm)

dimensions in mm

1. ArmaProtect CM ≥ 150 mm thickness
2. rigid wall ≥ 150 mm thickness
3. rigid floor ≥ 150 mm thickness
4. intumescent wrap
5. Electrical installation conduits (EIC) made of plastic, single or bundled

Electrical installation condult Ø ≤ 63 mm (single)

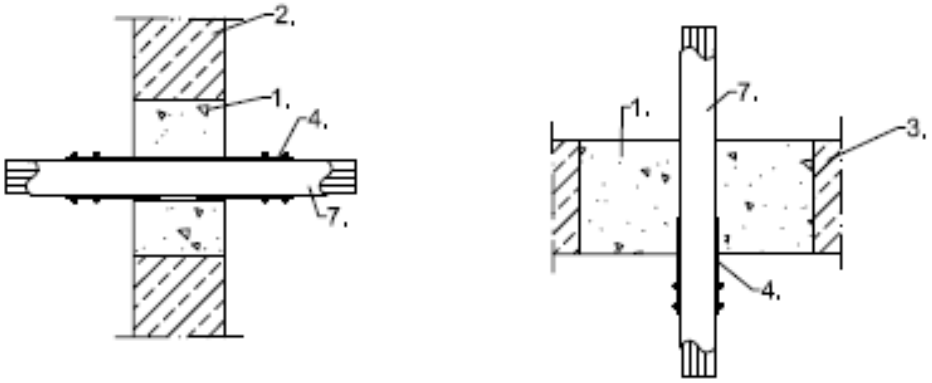
- with non-combustible insulation made of mineral-fibre "lamella mat"



EIC-material	EIC outside-ø [mm]	Section insulation		Fire resistance class	
		Thickness [mm]	Length L 1/2 [mm]	Wall	Floor
PE-HD	≤ 63	≥ 30	≥ 500	EI 120 U/C	EI 120 U/C

PE lines "speed pipes"

- with intumescent wrap



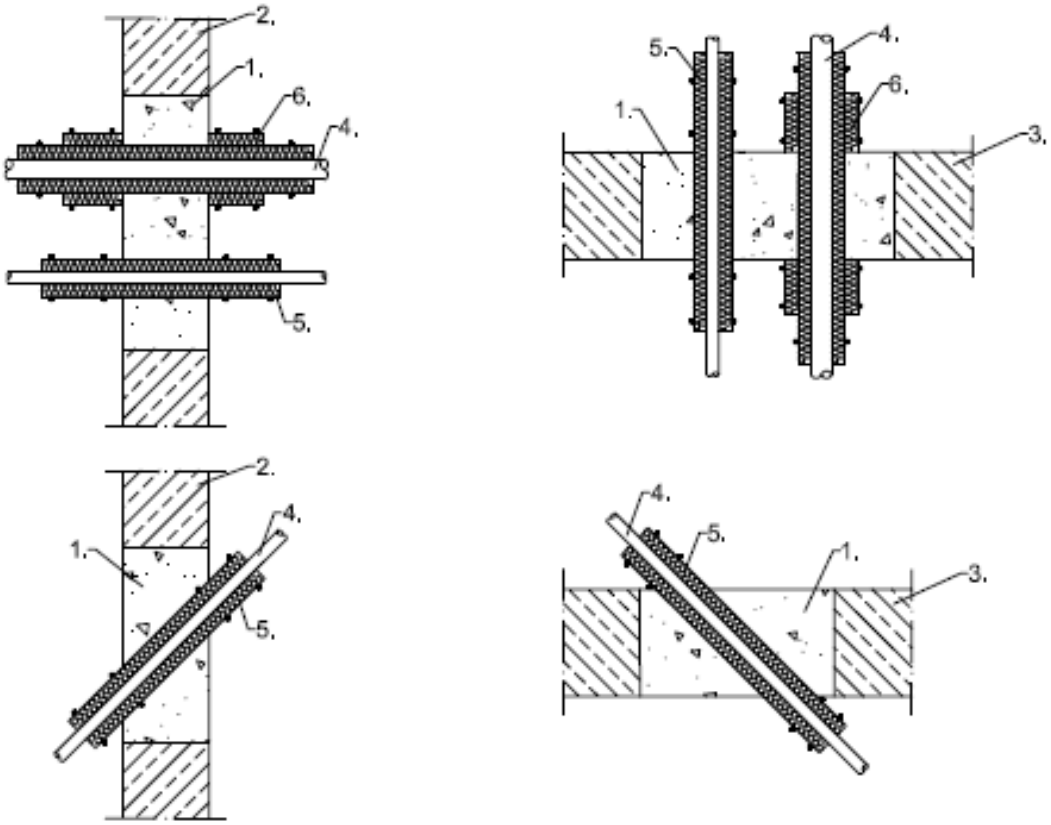
Set-up Speed pipes	Wall thickness [mm]	Intumescent wrap						Fire resistance class	
		Wrap width [mm]	Qty. Wraps [n]	Qty. Layers [n]	Overlapping [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
ø 7,0 mm x 24 Pcs	≥ 1,5	125	2	1	0	50	75	EI 120 U/U	-
ø 10,0 mm x 7 Pcs	≥ 2,0								
ø 12,0 mm x 5 Pcs	≥ 2,0								
ø 7,0 mm x 24 Pcs	≥ 1,5		1	2				-	EI 120 U/U
ø 10,0 mm x 7 Pcs	≥ 2,0								
ø 12,0 mm x 5 Pcs	≥ 2,0								

dimensions in mm

1. ArmaProtect CM ≥ 150 mm thickness
2. rigid wall ≥ 150 mm thickness
3. rigid floor ≥ 150 mm thickness
4. intumescent wrap
5. mineral fibre mats or -shells
6. single Electrical installation condults (EIC), PE-HD
7. PE lines "speed pipes" (for glass fibre cables and micro cables)

Non-combustible pipes with non-combustible insulation

- Installed in an angle of 45° - 90°



Pipe material	Outside pipe-ø [mm]	Length L [mm]	Thickness D [mm]	Fire resistance class	
				Wall	Floor
Copper	≤ 15,0	≥ 250	≥ 20	EI 120 C/U	EI 120 C/U
	> 15,0 - ≤ 28,0	≥ 500	≥ 20		EI 120 C/U
	> 28,0 - ≤ 42,0		≥ 30		
	> 42,0 - ≤ 54,0		≥ 40		
	> 54,0 - ≤ 88,9	≥ 750	≥ 60		
	> 88,9 - ≤ 108,0*	≥ 1000	≥ 30		
Steel, stainless steel, cast iron	≤ 15,0	≥ 250	≥ 20		
	> 15,0 - ≤ 28,0	≥ 500			
	> 28,0 - ≤ 42,0		≥ 30		
	> 42,0 - ≤ 114,3		≥ 40		
	> 114,3 - ≤ 168,3	≥ 1000			
	> 168,3 - ≤ 323,9*				

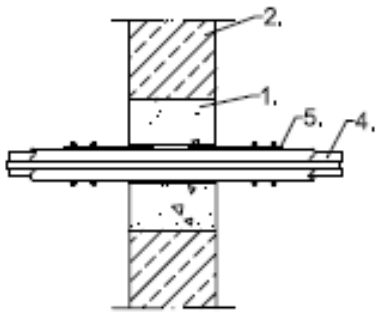
*Additional protectiv insulation made of mineral fibre mat (L1 ≥ 500 mm x D1 ≥ 30 mm)

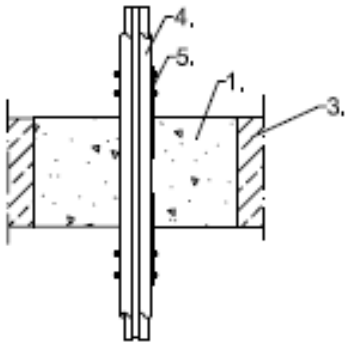
Pipe material	Outside pipe-ø [mm]	Length L [mm]	Thickness D [mm]	Fire resistance class	
				Wall	Floor
Copper	≤ 15,0	≥ 250	≥ 22,5	EI 120 C/U	EI 120 C/U
	> 15,0 - ≤ 28,0	≥ 500	≥ 26		EI 120 C/U
	> 15,0 - ≤ 42,0		≥ 19		
	> 28,0 - ≤ 54,0		≥ 38		
	> 54,0 - ≤ 108,0	≥ 1000	≥ 38		
Steel, stainless steel, cast iron	≤ 15,0	≥ 250	≥ 22,5		
	> 15,0 - ≤ 28,0	≥ 500	≥ 26		
	> 15,0 - ≤ 42,0		≥ 19		
	> 28,0 - ≤ 54,0		≥ 38		
	> 54,0 - ≤ 114,3	≥ 750	≥ 33		
	> 114,3 - ≤ 168,3	≥ 1000	≥ 40		
	> 168,3 - ≤ 323,9*				

dimensions in mm

1. ArmaProtect CM ≥ 150 mm thickness
2. rigid wall ≥ 150 mm thickness
3. rigid floor ≥ 150 mm thickness
4. non-combustible pipes
5. insulation made of mineral fibre mats / -shells
6. protective insulation made of mineral fibre mats / -shells

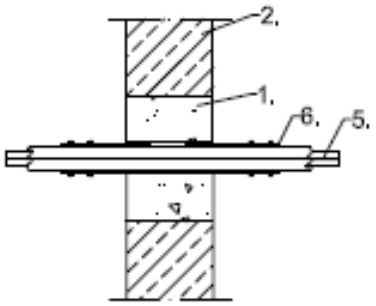
HVAC split line combinations "Tubolit Duo Split"
- with intumescent wrap

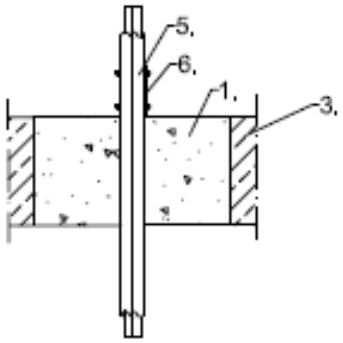




Pipe-material	Pipe-outside-ø [mm]	Qty. Add. Cables ø ≤ 14 [mm] [n]	Pipe-insulation [Type, mm]	PE-pipe ø [mm]	Intumescent wrap						Fire resistance class	
					Wrap width [mm]	Qty. wraps [n]	Qty. layers [n]	Overlapping [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
Copper	2 x 5 10/18	2	PEF s 9.0	s 25	125	2	2	0	50	75	EI 120	EI 120

Double solar pipes "NanoSUN²"
- with intumescent wrap





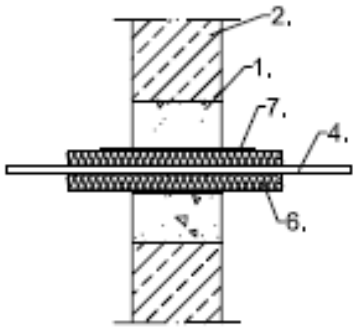
Pipe-material	Intumescent wrap						Fire resistance class	
	Wrap width [mm]	Qty. wraps [n]	Qty. layers [n]	Overlapping [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
DIN 16 - DN 25	125	2	1	≥ 40	0	125	EI 120 C/U	EI 120 C/U
		1 (above)					EI 120 C/U	EI 120 C/U

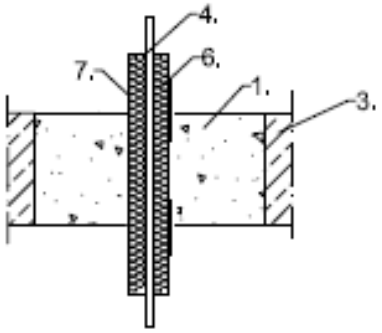
dimensions in mm

1. ArmaProtect CM ≥ 150 mm thickness
2. rigid wall ≥ 150 mm thickness
3. rigid floor ≥ 150 mm thickness
4. HVAC split line combinations
5. double solar pipes "NanoSUN²"
6. intumescent wrap

"HANSA FLEX" hydraulic hoses with lamella mat

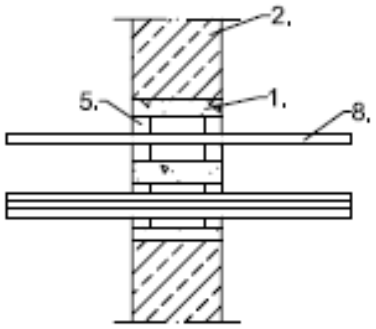
- with intumescent wrap

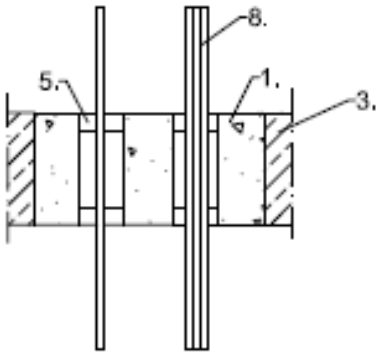




Outside pipe-ø [mm]	Intumescent wrap	Protectiv insulation made of lamella mat "Klimarock"		Intumescent wrap						Fire resistance clas	
	Wrap width [mm]	Length L 1/2 [mm]	Thickness D [mm]	Wrap width [mm]	Qty. wraps [n]	Qty. layers [n]	Overlapping [mm]	Inside seal [mm]	Outside seal [mm]	Wall	Floor
≤ 88,9	≥ 250	≥ 30	≥ 20	125	2	1	0	50	75	EI 120	EI 120

Cable Tube with cables or cable bundles



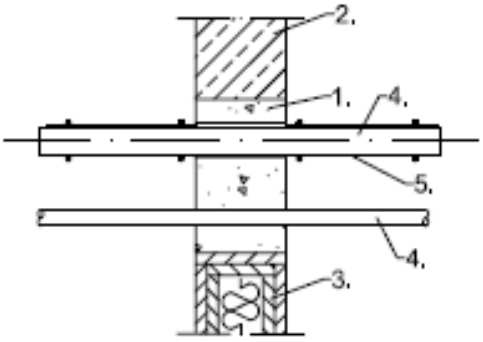


dimensions in mm

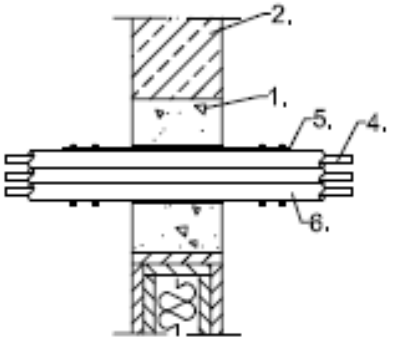
1. ArmaProtect CM ≥ 150 mm thickness
2. rigid wall ≥ 150 mm thickness
3. rigid floor ≥ 150 mm thickness
4. "HANSA FLEX" hydraulic hoses with wire mesh insert
5. Cable Tube
6. lamella mat
7. Intumescent wrap
8. cables

Mixed penetration sealing system made of mortar

Cables Ø ≤ 80 mm, cable bundles Ø ≤ 150 mm with cables Ø ≤ 21 mm and cable trays
- with intumescent wrap (wrap width = 125 mm)



Electrical installation conduit Ø ≤ 32 mm, Conduit-bundles Ø ≤ 100 mm
- with intumescent wrap (wrap width = 125 mm)

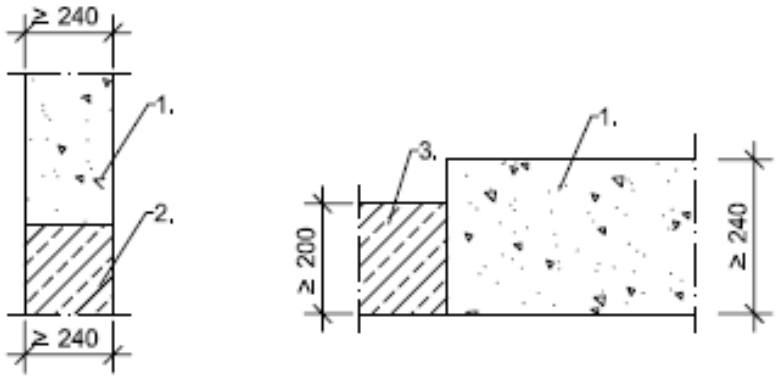


			Fire resistance class
	Dimensions [mm]	**Measures**	**Wall**
Cables	ø ≤ 21	-	EI 90 / E 120
	ø ≤ 50	intumescent wrap	
	ø ≤ 80		
Cable bundles	ø ≤ 150		EI 120
EIC made of plastic, single	EIC-ø ≤ 32 Cable-ø ≤ 21		EI 120 U/U
EIC made of plastic, bundled	Bundle-ø ≤ 100 EIC-ø ≤ 32 Cable-ø ≤ 21		

dimensions in mm

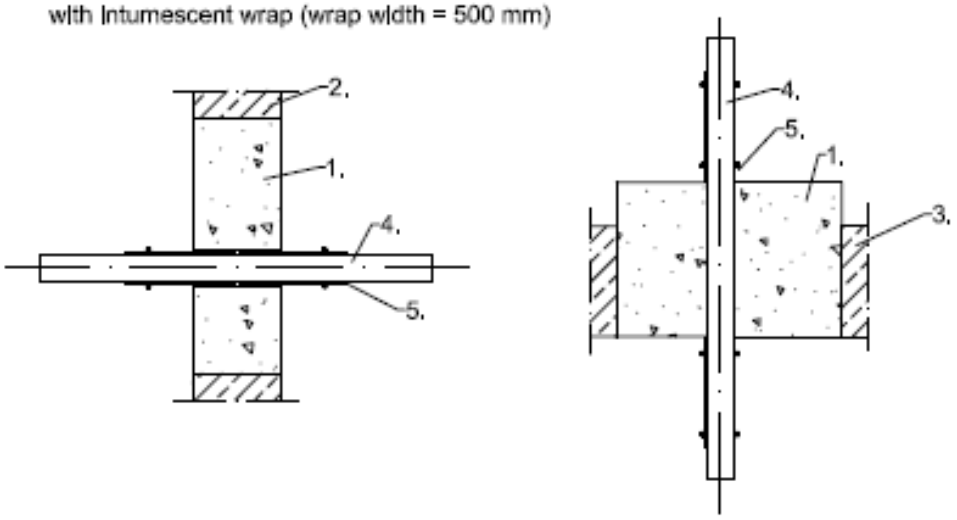
1. ArmaProtect CM ≥ 240 mm thickness
2. rigid walls ≥ 100 mm thickness
3. plasterboard walls ≥ 100 mm thickness
4. cable
5. intumescent wrap
6. Electric installation pipes (conduits), made of plastic

Mixed penetration sealing system made of mortar



Cables Ø ≤ 80 mm, cable bundles Ø ≤ 100 mm with cables Ø ≤ 21 mm and cable trays

- with intumescent wrap (wrap width = 500 mm)



		Fire resistance class	
	Measures	**Wall**	**Floor**
Cables ø ≤ 80	intumescent wrap	EI240	EI240
Cable bundles ø ≤ 100 mm with cables ø ≤ 21 mm	intumescent wrap	EI240	EI240

dimensions in mm

1. ArmaProtect CM ≥ 240 mm thickness
2. rigid wall ≥ 240 mm thickness
3. rigid floor ≥ 240 mm thickness
4. cable, cable bundle, cable trays
5. intumescent wrap