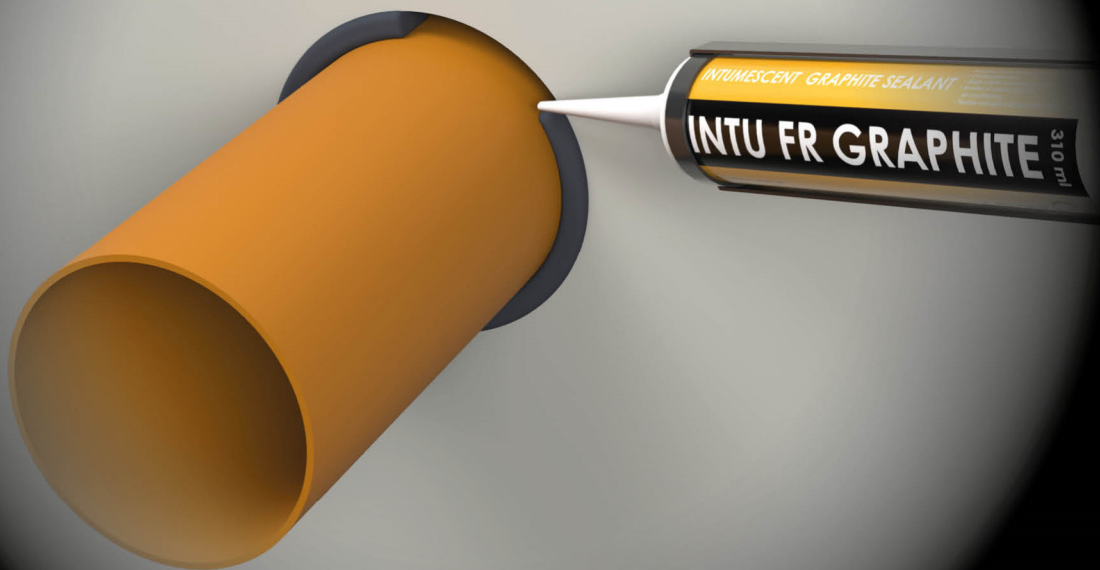


INTU FR GRAPHITE

Intumescent graphite sealant

TDS Technical Data Sheet



.INTUSEAL®
passive fire protection manufacturer



www.intuseal.com

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→ PRODUCT DESCRIPTION

The **INTU FR GRAPHITE** is graphite fire-retardant mass swells under the influence of fire, closing the opening around the installation and any gaps, creating a barrier that ensures the partition remains tight and insulating up to EI 120.

→ APPLICATION

The intumescent graphite sealant **INTU FR GRAPHITE** is intended for fire protection of penetration seals, especially:

- combustible pipes diameter of $\varnothing \leq 110\text{mm}$
- bundles of copper pipes for air conditioning
- single cables and cable bundles
- cables in casting pipes and AROT type pipes

Flexible walls:	The wall must be minimum 100 mm thickness with a frame structure of steel or wooden sections covered on both sides with a minimum of 2 layers of panels with a thickness of min 12,5 mm.
Rigid walls:	The wall must be minimum 100 mm thickness, made of concrete, reinforced concrete, concrete blocks, cellular concrete, ceramic brick (solid, hollow or lattice) or silicate brick (solid or hollow) with a density of min. 450 kg/m ³ .
Rigid floors:	The floor must be at least 150 mm thick made of concrete, reinforced concrete or cellular concrete with a minimum density of 550 kg/m ³ .

→ AVAILABILITY

Contents	Mass colour	Box	Pallet	Article number
310 ml	Black	15	1260	INFRG310

→ INSTALLATION METHOD

- Clean the opening and installations from grease and other contaminants.
- Place the mineral wool base material in the hole. Fill the gap with **INTU FR GRAPHITE** mass.
- At the end line up the surface of the mass (e.g. using a spatula)
Curing time: $\approx 1\text{mm} / 24\text{h}$



→ COMPLIANCE

- Test standard:
EN 1366-3 / EAD 350454-00-1104
- European Technical Assessment:
ETA 24/0152 of 28/03/2024
- Declaration of Performance:
DoP 3/2024
- Certificate of Constancy of Performance
1488-CPR-1109/W

→ TRANSPORT AND STORAGE

Store in dry and cool conditions, at a temperature between $+5^{\circ}\text{C}$ to $+35^{\circ}\text{C}$.

Usefulness 12 months from the date of production placed on the package.

➔ TECHNICAL DATA

Colour	Black (Graphite)
Usage category	Type Z ₂ : intended for use in internal conditions with humidity lower than 85% RH, excluding temperatures below 0°C, without exposure to rain or UV.
Reaction to fire	E
Methods used for the assessment	EAD 350454-00-1104 "Fire Stopping and Fire Sealing Products. Penetration Seals"
Approvals	ETA 24/0152 of 28/03/2024
Large gaps	System compatible with INTU FR UNIBOARD based on the ETA 24/1047 of 19/12/2024

Approximate consumption of INTU FR GRAPHITE for CABLE PENETRATIONS				
Hole diameter/ hole dimension W x H (mm)	Percentage part of hole area which cables inside			
	0%	20%	40%	60%
	Consumption of 310 ml INTU FR GRAPHITE cartridge			
80	0,80	0,64	0,48	0,32
100	1,30	1,04	0,78	0,52
120	1,80	1,44	1,08	0,72
140	2,50	2,00	1,50	1,00
160	3,20	2,56	1,92	1,28
150 x 150	3,60	2,88	2,16	1,44

Approximate consumption of INTU FR GRAPHITE for PIPE PENETRATIONS		
Pipe diameter Ø (mm)	Hole diameter Ø (mm)	Consumption of 310 ml INTU FR GRAPHITE cartridge
20	40	0,15
32	52	0,21
50	70	0,30
63	83	0,37
75	95	0,43
90	110	0,51
110	130	0,61

➔ FIRE RESISTANCE CLASSIFICATION

Pipe material	Pipe diameter Ø [mm]	INTU FR GRAPHITE depth x width range [mm]	FLEXIBLE / RIGID WALL		RIGID FLOOR	
			Pipe wall thickness [mm]	Configuration C/C and U/C	Pipe wall thickness [mm]	Configuration C/C and U/C
PP	Ø ≤ 50	25,0 x 10,0 – 20,0	1,8 – 18,3	EI 120	1,8 – 18,3	EI 120
	50 < Ø ≤ 75		1,9 – 18,3		1,9 – 18,3	
	75 < Ø ≤ 90		2,3 – 18,3		2,7 – 18,3	
	90 < Ø ≤ 110		2,7 – 18,3		2,7 – 18,3	
PE-X/AL/PE-X	Ø ≤ 20	25,0 x 10,0 – 20,0	2,0 – 6,0	EI 120	2,0 – 6,0	EI 120
	20 < Ø ≤ 32		3,1		3,1	
	32 < Ø ≤ 40		3,9		3,9	
	40 < Ø ≤ 50		4,8		4,8	
	50 < Ø ≤ 63		6,0		6,0	
PE-Xa	Ø ≤ 20	25,0 x 10,0 – 20,0	2,0 – 5,8	EI 120	2,0 – 5,8	EI 120
	20 < Ø ≤ 32		3,0		3,1	
	32 < Ø ≤ 40		3,8		3,9	
	40 < Ø ≤ 50		4,6		4,8	
	50 < Ø ≤ 63		5,8		5,8	
PP-R/PP-R-GF/ PP-R	Ø ≤ 20	25,0 x 10,0 – 20,0	2,8 – 10,0	EI 120	2,8 – 10,0	EI 120
	20 < Ø ≤ 32		4,4 – 16,0		4,4 – 16,0	
	32 < Ø ≤ 50		6,9 – 18,3		6,9 – 18,3	
	50 < Ø ≤ 63		8,6 – 18,3		8,6 – 18,3	
	63 < Ø ≤ 75		10,3 – 18,3		10,3 – 18,3	
	75 < Ø ≤ 90		12,3 – 18,3		12,3 – 18,3	
	90 < Ø ≤ 110		15,1 – 18,3		15,1 – 18,3	

Pipe material	Pipe diameter Ø [mm]	INTU FR GRAPHITE depth x width range [mm]	FLEXIBLE / RIGID WALL		RIGID FLOOR	
			Pipe wall thickness [mm]	Configuration C/C and U/C	Pipe wall thickness [mm]	Configuration C/C and U/C
PE-RT/AL/PE-RT	Ø ≤ 20	25,0 x 10,0 – 20.0	2,0 – 6,0	EI 120	2,0 – 7,5	EI 120
	20 < Ø ≤ 32		6,1 – 7,5	EI 60	3,1	
	32 < Ø ≤ 40		3,1	EI 120	3,9	
	40 < Ø ≤ 50		3,9		3,9	
	50 < Ø ≤ 63		4,8		4,8	
	63 < Ø ≤ 75		6,0		6,0	
	7,5		EI 60	7,5		
PP-R	Ø ≤ 20	25,0 x 10,0 – 20.0	2,3 – 10,0	EI 120	2,3 – 10,0	EI 120
	20 < Ø ≤ 32		3,3 – 12,5		EI 90	
	32 < Ø ≤ 50		12,6 – 16,0	EI 120		
	50 < Ø ≤ 63		4,8 – 12,5	EI 90	5,8 – 18,3	
			12,6 – 18,3	EI 120		
	63 < Ø ≤ 75		5,8 – 12,5	EI 90	6,8 – 18,3	
			12,6 – 18,3	EI 120		
	75 < Ø ≤ 90		6,8 – 12,5	EI 90	8,3 – 18,3	
			12,6 – 18,3	EI 120		
	90 < Ø ≤ 110		8,2 – 10,0	EI 90	10,0 – 18,3	
PP-R/AL/PP-R	Ø ≤ 20	25,0 x 10,0 – 20.0	2,8 – 10,0	EI 120	2,3 – 10,0	EI 120
	20 < Ø ≤ 32		4,4 – 16,0		4,0 – 16,0	
	32 < Ø ≤ 50		6,9 – 18,3		6,7 – 18,3	
	50 < Ø ≤ 63		8,6 – 18,3		8,6 – 18,3	
	63 < Ø ≤ 75		10,3 – 18,3		10,3 – 18,3	
	75 < Ø ≤ 90		12,3 – 14,9	EI 90	12,3 – 18,3	
			15,0 – 18,3	EI 120	15,1 – 18,3	
	90 < Ø ≤ 110		15,1 – 18,2	EI 90		
			18,3	EI 120		
	PVC		Ø ≤ 32	25,0 x 10,0 – 20.0	1,5 – 8,1	
32 < Ø ≤ 50		1,6 – 8,1	1,6 – 8,1			
50 < Ø ≤ 75		1,8 – 8,1	1,8 – 8,1			
75 < Ø ≤ 110		2,0 – 8,0	EI 90		2,0 – 8,1	
		8,1	EI 120			
PE-HD PE PE – X ABS SAN+PVC	Ø ≤ 32	25,0 x 10,0 – 20.0	1,8 – 6,8	EI 120	1,8 – 10,0	EI 120
	32 < Ø ≤ 50		6,9 – 10,0	EI 90	2,3 – 10,0	
			2,3 – 6,8	EI 120		
	50 < Ø ≤ 75		6,9 – 10,0	EI 90	3,0 – 10,0	
			3,0 – 6,8	EI 120		
	75 < Ø ≤ 90		6,9 – 10,0	EI 90	3,5 – 10,0	
			4,2 – 9,9	EI 60		
	90 < Ø ≤ 110		10,0	EI 90	4,2 – 10,0	
BlazeMaster CPVC	Ø ≤ 19,0	25,0 x 10,0 – 20.0	2,24 – 3,38	EI 120	-	
	19,0 < Ø ≤ 25,4		2,71 – 3,38			
	25,4 < Ø ≤ 31,8		3,38			
	Ø ≤ 31,8		3,39 – 3,84	EI 90		
	31,8 < Ø ≤ 38,1		3,84			

Cables

Installation penetration type	Diameter Ø [mm]	INTU FR GRAPHITE depth x width range [mm]	FLEXIBLE / RIGID WALLS
			Fire resistance class
Single cable	Ø ≤ 21	25,0 x 10,0 – 20,0	EI 120
Bundle of cables	Ø _{BUNDLE} ≤ 100, Ø _{CABLE} ≤ 21		
Single coaxial wireless cable type	Ø ≤ 22,23		
Steel pipes	Ø ≤ 16		

PVC (plastic) conduits with or without small cables

Conduit diameter [mm]	Service inside	2(on both sides) x depth of the graphite mass [mm]	Fire resistance class
Ø ≤ 16	Empty	2 x 25,0	EI 120-U/U
	Small cable: Ø _{CABLE} ≤ Ø _{CONDUIT}		
	Cable bundle: Ø _{BUNDLE} ≤ Ø _{CONDUIT}		
16 < Ø ≤ 25	Empty		
	Small cable: Ø _{CABLE} ≤ 21mm		
	Cable bundle: Ø _{BUNDLE} ≤ Ø _{CONDUIT} , Ø _{CABLE} ≤ 21mm		
25 < Ø ≤ 37	Empty		
	Small cable: Ø _{CABLE} ≤ 21mm		
	Cable bundle: Ø _{BUNDLE} ≤ Ø _{CONDUIT} , Ø _{CABLE} ≤ 21mm		

Plastic conduits (AROT DVK) with or without small cables

Conduit diameter [mm]	Services inside	1(one side) x depth of the graphite mass [mm]	Fire resistance class
Ø ≤ 100	Empty	1 x 25,0	EI 90 / E 120-U/C
	Ø _{CABLE} ≤ 21mm		
	Ø _{BUNDLE} ≤ Ø _{CONDUIT} Ø _{CABLE} ≤ 21mm		

Mixed bundles

Mixed bundle consisting of:	Pipe diameter [mm] / Cable size [mm²]	Pipe wall thickness [mm]	Insulation type / thickness [mm]	INTU FR GRAPHITE depth x width range [mm]	FLEXIBLE / RIGID WALLS
					Fire resistance class
max. 2 x Copper pipe	Ø ≤ 12,7	≥ 0,8	FEF / max. 13	25,0 x 10,0 – 20.0	EI 120
max. 1 x Copper pipe	Ø ≤ 28,6	≥ 1,0			
max. 1 x Plastic pipe	Ø ≤ 25,0	1,0	-		
max. 1 x Cable	4 x 1,5	-			
max. 4 x Copper pipe	Ø ≤ 12,7	≥ 0,8	PE / max. 9	25,0 x 10,0 – 20.0	EI 60
max. 2 x Copper pipe	Ø ≤ 22,3	≥ 1,0			
max. 2 x Copper pipe	Ø ≤ 28,6	≥ 1,0	PE / max. 13		
max. 2 x Plastic pipe	Ø ≤ 25,0	1,0	-		
max. 2 x Cable	4 x 1,5	-			

COMBUSTIBLE PIPES WITH INTU FR GRAPHITE

Pipe material	Filling the partition	Pipe Ø [mm]	FLEXIBLE / RIGID WALLS					
			Pipe wall thick [mm]	INTU FR GRAPHITE depth x width range [mm]		Fire resistance U/C and C/C		
PP	2 x INTU FR UNIBOARD 1S	Ø ≤ 75	1,9 – 12,4	2 x 25 x 10,0 – 20,0		EI 45		
			12,5 – 18,3			EI 90		
		75 < Ø ≤ 90	2,2 – 14,9			EI 45		
			15,0 – 18,3			EI 90		
		90 < Ø ≤ 110	2,7 – 18,2			EI 45		
			18,3			EI 90		
Pipe material	Filling the partition	Pipe diameter Ø [mm]	FLEXIBLE / RIGID WALLS			FLOORS		
			Pipe wall thickness [mm]	INTU FR GRAPHITE depth x width range [mm]	Fire resistance U/C and C/C	Pipe wall thickness [mm]	INTU FR GRAPHITE depth x width range [mm]	Fire resistance U/C and C/C
PP-R	2 x INTU FR UNIBOARD 1S	Ø ≤ 20	≥ 2,8	25,0 x 10,0 – 20,0	EI 45	≥ 2,3	50 x 10,0 – 20,0	EI 90
		20 < Ø ≤ 25	≥ 3,2			≥ 2,7		
		25 < Ø ≤ 32	≥ 3,8			3,3 – 12,5		
		32 < Ø ≤ 40	4,4 – 18,2			3,9 – 12,5		
			18,3		EI 90			
		40 < Ø ≤ 50	5,2 – 18,2		EI 45	4,8 – 12,5		
			18,3		EI 90			
		50 < Ø ≤ 63	6,2 – 18,2		EI 45	5,8 – 12,5		
			18,3		EI 90			
		63 < Ø ≤ 75	7,2 – 18,2		EI 45	6,8 – 12,5		
			18,3		EI 90			
		75 < Ø ≤ 90	8,4 – 18,2		EI 45	8,2 – 15,0		
			18,3		EI 90			
		90 < Ø ≤ 110	10,0 – 18,2		EI 45	10,0 – 18,3		
			18,3		EI 90			
PVC	2 x INTU FR UNIBOARD 1S		Ø ≤ 75	1,5 – 1,9	25,0 x 10,0 – 20,0	EI 45	1,5 – 8,1	50 x 10,0 – 20,0
		2,0		EI 60				
		2,1 – 8,1		EI 45				
		75 < Ø ≤ 90	1,7 – 1,9	EI 60		1,7 – 8,1		
			2,0	EI 45				
			2,1 – 8,1	EI 60				
		90 < Ø ≤ 110	2,0	EI 45		2,0 – 8,1		
			2,1 – 8,1	EI 60				
			2,0	EI 45				
			2,1 – 8,1	EI 60				

COMBUSTIBLE PIPES WITH INTU FR GRAPHITE

		Combustible pipe with INTU FR GRAPHITE penetration seal, double mineral wool board 1 – flexible / rigid wall $A \geq 100$ mm or floor $H \geq 150$ mm 2 – 2 x board INTU FR UNIBOARD 1S 3 – combustible pipe 4 – INTU FR GRAPHITE on minimum depth: $b \geq 25$ mm from both sides of the wall $b \geq 50$ mm from the bottom of the floor
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➔ SOLUTION DETAILS

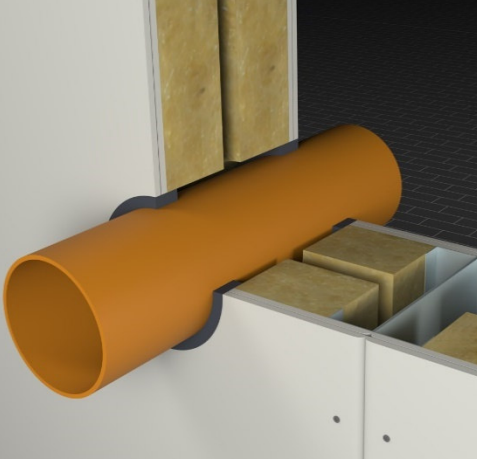
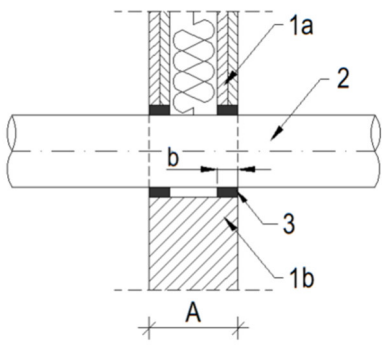
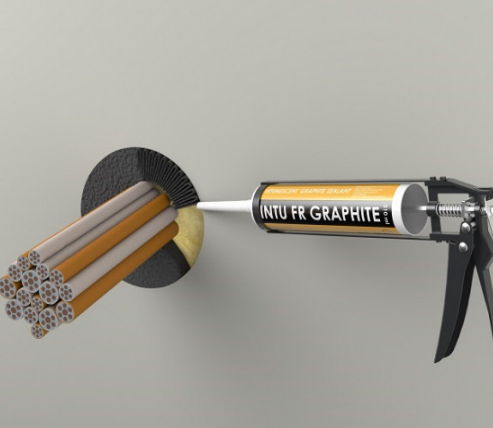
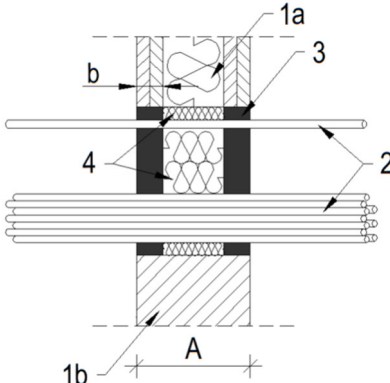
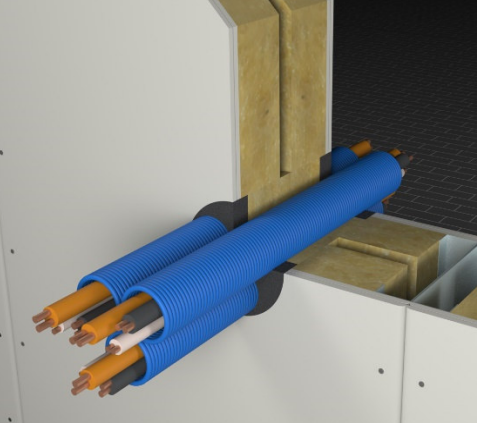
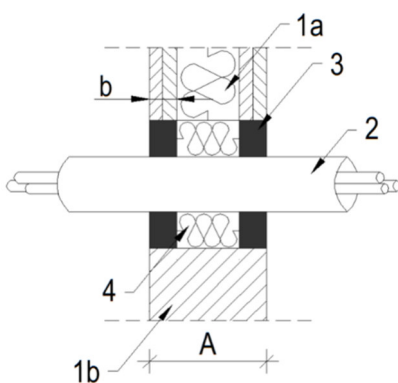
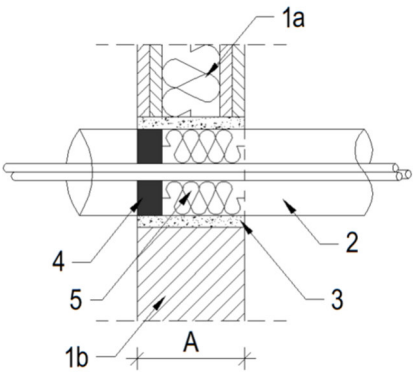
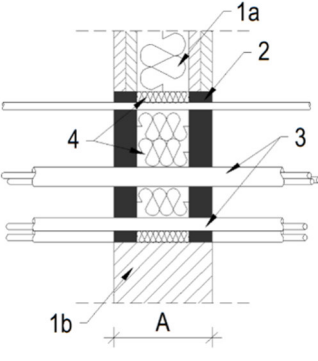
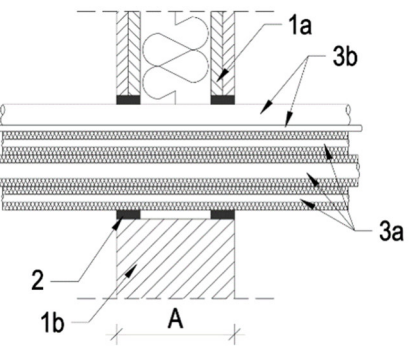
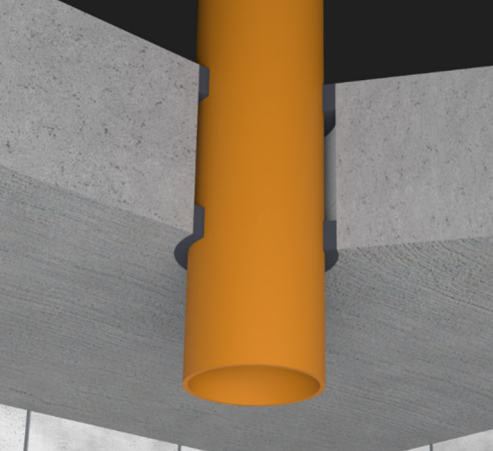
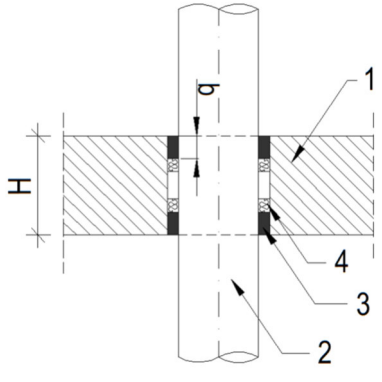
Fig.1	Combustible pipes penetration seals with single row of band in flexible or rigid wall with thickness $A \geq 100$ mm
	 1a - flexible wall, thickn. $A \geq 100$ mm 1b - rigid wall, thickness $A \geq 100$ mm 2 - INTU FR GRAPHITE sealant with minimum depth $b \geq 25$ mm 3 - combustible pipe $\varnothing \leq 110$ mm
Fig.2	Electrical and mixed penetration seals in flexible or rigid wall with thickness $A \geq 100$ mm
	 1a - flexible wall, thickn. $A \geq 100$ mm 1b - rigid wall, thickness $A \geq 100$ mm 2 - single cable $\varnothing_{\text{CABLE}} \leq 21$ mm or cables bundle $\varnothing_{\text{BUNDLE}} \leq 100$ mm, single type F cable, single coaxial wireless cable type $\varnothing \leq 22,23$ mm 3 - INTU FR GRAPHITE sealant with minimum depth $b \geq 25$ mm 4 - empty space filling with mineral wool with density ≥ 35 kg/m³
Fig.3	PVC (plastic) conduits with or without small cables in flexible or rigid wall with thickness $A \geq 100$ mm
	 1a - flexible wall, thickn. $A \geq 100$ mm 1b - rigid wall, thickness $A \geq 100$ mm 2 - plastic protective pipe PVC $\varnothing_{\text{CONDUIT}} \leq 37$ mm empty or with small cable $\varnothing_{\text{CABLE}} \leq 21$ mm / bundle of cables $\varnothing_{\text{BUNDLE}} \leq \varnothing_{\text{CONDUIT}}$ 3 - INTU FR GRAPHITE sealant with minimum depth $b \geq 25$ mm 4 - empty space filling with mineral wool with density ≥ 35 kg/m³

Fig.4	Plastic conduits (AROT DVK) with or without small cables in flexible or rigid wall with thickness $A \geq 100$ mm
	1a - rigid wall, thickness $A \geq 100$ mm 1b - flexible wall, thickness $A \geq 100$ mm 2 - single cable $\varnothing_{CABLE} \leq 21$ mm / bundle of cables in a protective pipe $\varnothing_{BUNDLE} \leq \varnothing_{CONDUIT}$ / empty plastic conduit $\varnothing_{CONDUIT} \leq 100$ mm 3 - cement mortar 4 - INTU FR GRAPHITE sealant minimum depth ≥ 25mm, applied on one any side 5 - mineral wool with density ≥ 35 kg/m³
Fig.5	PVC (plastic) conduits with or without small cables
	
1a - flexible wall, $A \geq 100$ mm 1b - rigid wall, $A \geq 100$ mm 2 - INTU FR GRAPHITE sealant min. depth ≥ 25mm, applied on both sides of the partition	3 - cable or bundle of cables in a protective pipe 4 - filling empty space with mineral wool with density ≥ 35 kg/m³
Fig.6	Mixed bundle penetration seals
	<u>Air conditioning installation bundle:</u> 3a - in FEF insulation: max. 3 x copper pipe, in PE insulation: max. 8 x copper pipe, 3b - with copper in FEF: 1 x PVC pipe and 1 x cable with copper in PE: 2 x PVC pipe and 2 x cable
Fig.7	Combustible pipes penetration seals in rigid floor with thickness $A \geq 150$ mm and density $\rho \geq 550$ kg/m³
	 1 - rigid floor $H \geq 150$ mm 2 - combustible pipe 3 - INTU FR GRAPHITE sealant with minimum depth $b \geq 25$ mm, applied on both sides of the floor 4 - mineral wool (density ≥ 35 kg/m³), material depth ≥ 15 mm.