



Serie **INTU-FR L** **SLIM**



MULTI-DIAMETER FIRE-
RESISTANT COLLAR



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MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM



INSTALLATION

The intumescent collar **INTU FR L SLIM** is a universal, fire-resistant collar 30 mm high. It consists of two or more layers of a 2-mm-thick, 30-mm-wide graphite **BYA** material placed inside a metal sleeve. The sleeve is made up of several segments that can be easily separated to create a collar that fits the conduit's outer diameter.

- Fire resistance up to EI120.
- Protection for combustible ducts up to Ø EI15 mm.
- Protection for non-combustible ducts with FEF insulation up to Ø168.3 mm.
- Protection for SPLIT air conditioning units.
- Bundles of corrugated conduits with or without cables.

APPLICATION

The **INTU FR L SLIM** collar is used to seal penetrations of metal conduits with FEF synthetic rubber insulation, uninsulated combustible conduits, and bundles of copper air conditioning conduits with PE or FEF insulation passing through compartmentation walls. The conduits may penetrate the wall perpendicularly or at an angle.

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Flexible Walls:

Minimum wall thickness: 100 mm. The walls must have a steel Ω -frame or wooden joist structure supporting two layers of at least two 12.5-mm-thick drywall-type insulation panels on each side (minimum thickness per side: 25 mm).

Rigid Walls:

Minimum wall thickness: 100 mm. Walls must be made of concrete, reinforced concrete, aerated concrete, concrete blocks, ceramic blocks (solid, hollow, or lattice), or silicate blocks (solid, hollow) with a minimum density of 450 kg/m³.

Floor slabs:

Minimum floor slab thickness: 100 mm. They must be made of concrete, reinforced concrete, or cellular concrete with a minimum density of 550 kg/m³.

PACKAGING AND REFERENCES

PRODUCT	CONTENT	PACKAGING	QUANTITY / PALLET	REFERENCE
INTU-FR SLIM	2.52 m metal sleeve 12 m Intumescent tape CLIP S Short Clamps – 20 pcs.	1 Box	375	INCOLS
CLIP S	Pack of 20.	1 BYA	N/A	INCOLSCS
CLIP L	Pack of 20.	1 BYA	N/A	INCOLSCL

TRANSPORTATION AND STORAGE:

Store in a cool, dry place at temperatures between +5°C and +25°C.

TESTS AND CERTIFICATES:

EN 1366-3 / EAD 350454-00-1104.

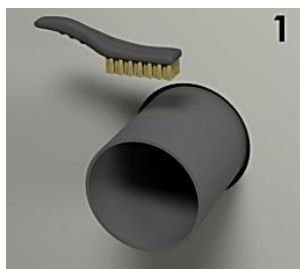
ETA 24/0497 of 26/08/2024.

DoP 2/2024.

Certificate of performance 1488-CPR-1130/W.

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

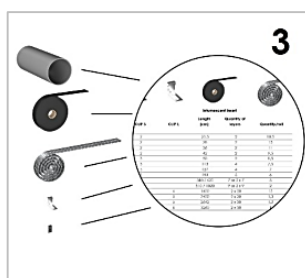
INSTALLATION



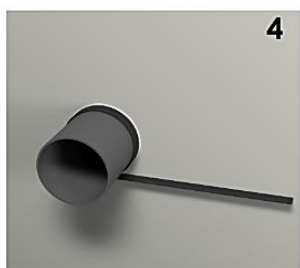
1 Remove dust and grease, and make the surface smooth.



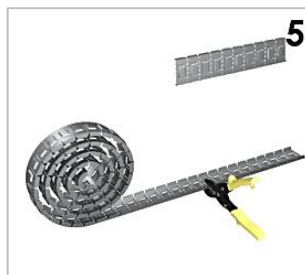
2 Seal the open spaces with intumescent sealant INTU FR MASTIC.



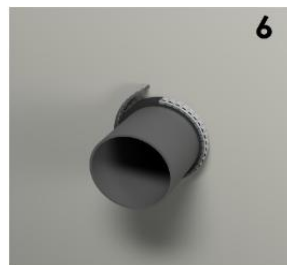
3 Refer to the table below. Select and cut the correct length of graphite tape.



4 Wrap the entire strip around the conduit.



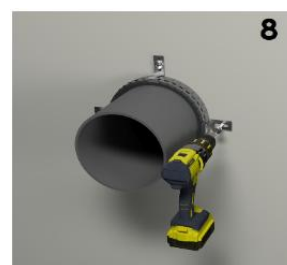
5 Select and cut the metal sleeve to the correct length.



6 Place the sleeve around the intumescent tape.



7 Choose the right CLIPs (S or L).



8 Screw the clips to the structure using the appropriate screws.



9 If applicable, fill out the installation label.

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APPROXIMATE CONSUMPTION



Ø Pipe (mm)	Graphite roll turns / coils	Grafite cm	Number of segments	Segments cm	CLIPS	CLIPS L	Collar height
32	2	23.5	9	13.5	2	-	30
40	2	28	11	16.5	2	-	30
50	2	36	15	22.5	2	-	30
63	2	42	17	25.5	3	-	30
75	2	50	19	28.5	3	-	30
82	4	113	22	33	3	-	30
90	4	127	23	34.5	3	-	30
110	5	193	28	42	3	-	30
125	1 x 7	310	1 x 33	49.5	4	-	30
	2 x 7	620	2 x 33	99	1	4	2 x 30
160	1 x 9	510	1 x 42	63	4	-	30
	2 x 9	1020	2 x 42	126	1	4	2 x 30
200	2 x 10	1400	2 x 52	159	1	4	2 x 30
225	2 x 15	2400	2 x 61	183	1	5	2 x 30
250	2 x 15	2642	2 x 66	198	1	5	2 x 30
315	2 x 15	3260	2 x 80	240	1	6	2 x 30

*Depending on the application, either a single collar (30 mm high) or two stacked collars (total height 60 mm) are installed. See the data in the tables below.

When installing a single collar, secure it to the structure using CLIPS S. When two collars are stacked on top of each other, use a CLIPS S to hold the first one in place and CLIPS L to permanently secure the assembly. See details on the following pages.

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

TECHNICAL INFORMATION

Example of an estimated energy consumption for the INTU-FR L SLIM

Ø50 conduit without insulation (single collar)					
Ø Duct (mm)	Intumescent tape		Metal sleeve		Clip type
	Graphite roll turns / Coils	Length (cm)	Segments	Length (cm)	CLIP S
50	2	36	15	22.5	2

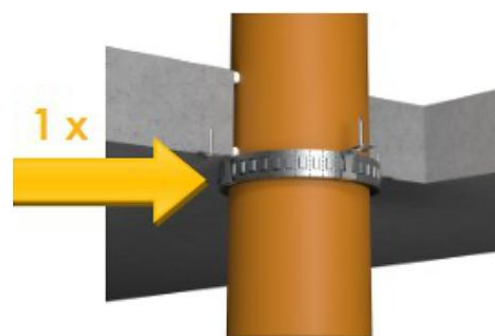
CALCULATION FORMULA: $L_{bya} = \pi \times \varnothing_{duct} \times (\text{coils}) \times (1.1-1.15)$
(for Ø 50: $L_{bya} = \pi \times 50 \times 2 \times 1.15 = \sim 36 \text{ cm}$)

Ø250 conduit without insulation (double collar)						
Ø Duct (mm)	Intumescent tape		Metal sleeve		Clip type	
	Graphite roll turns / Coils	Length (cm)	Segments	Length (cm)	CLIP S	CLIP L
250	2 x 15	2642	2 x 66	198	1	5

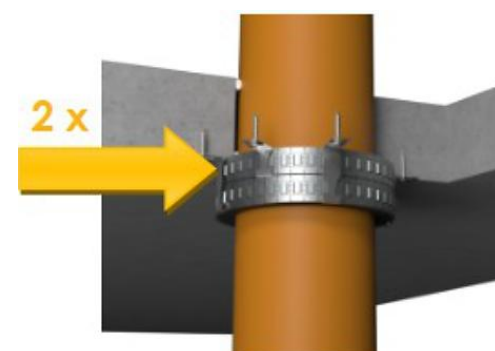
CALCULATION FORMULA: $L_{bya} = \pi \times \varnothing_{duct} \times (\text{coils}) \times (1.1-1.15)$
(for Ø 250: $L_{bya} = \pi \times 250 \times 2 \times 15 \times 1.15 = \sim 2642 \text{ cm}$)

Can be installed on the top surface of the floor slab

Ø50 conduit without insulation (single collar)



Ø250 conduit without insulation (double collar)



MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Color	Stainless steel sleeve + black graphite
Shelf life	Not applicable
Transport/Storage Temperature	-5 °C to +35 °C (in dry conditions, in original packaging)
Usage Category	Type Z2: For indoor use only, with ambient humidity below 85% RH; use at temperatures below 0°C is prohibited; do not expose to rain or UV rays.
Reaction class	Class E
Standard used for the report	EAD 350454-00-1104 "Fire Stopping y Fire Sealing Products. Penetration Seals"
Report	ETA-24 / 0497
Service life	25 years
Sealing gasket	INTU FR MASTIC Sealant
Wide opening	Combine with INTU FR UNIPANEL 1S or INTU FR UNIPANEL 2S
Can be installed on one side of the wall	ALLOWED (see ETA-24 / 0497)
Can be installed on the top surface of the floor slab	
Permitted Pipe Angles	Angle between 45° and 90°

FIRE RESISTANCE RATING: 1. FUEL DUCTS (uninsulated)

Duct type	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PP	Ø ≤ 32	1,8 – 12,5	2 x 2	EI 120	1,8 – 12,5	1 x 2	EI 120
	32 < Ø ≤ 50						
	50 < Ø ≤ 63	1,9 – 12,5					
	63 < Ø ≤ 75						
	75 < Ø ≤ 90	2,2 – 15,0	2 x 4		2,2 – 15,0	1 x 4	
	90 < Ø ≤ 110	2,7 – 18,3	2 x 5		2,7 – 18,3	1 x 5	
	110 < Ø ≤ 125	3,1 – 17,2	4 x 7		3,1 – 15,7	2 x 7	
	135 < Ø ≤ 160	4,0 – 14,6	4 x 9		3,9 – 9,5	2 x 9	
	160 < Ø ≤ 180	5,9 – 11,2	4 x 10	EI 60	5,8 – 8,6	2 x 10	EI 90
	160 < Ø ≤ 200	7,7			7,7		
PP-R	Ø ≤ 20	≥ 2,3	2 x 2	EI 120	≥ 2,3	1 x 2	EI 120
	20 < Ø ≤ 25	≥ 2,5			≥ 2,5		
	25 < Ø ≤ 32	3,3 – 12,5			3,3 – 12,5		
	32 < Ø ≤ 40	3,9 – 12,5			3,9 – 12,5		
	40 < Ø ≤ 50	4,8 – 12,5			4,8 – 12,5		
	50 < Ø ≤ 63	5,8 – 12,5			5,8 – 12,5		
	63 < Ø ≤ 75	6,8 – 12,5			6,8 – 12,5		
	75 < Ø ≤ 90	8,2 – 15,0			2 x 4	8,2 – 15,0	
	90 < Ø ≤ 110	10,0 – 18,3	2 x 5		10,0 – 18,3	1 x 5	
PE-Xa	Ø ≤ 20	2,0	2 x 2	EI 120	2,0	1 x 2	EI 120
	20 < Ø ≤ 25	2,3			2,3		
	25 < Ø ≤ 32	3,0			3,0		
	32 < Ø ≤ 40	3,7			3,7		
	40 < Ø ≤ 50	4,6			4,6		
	50 < Ø ≤ 63	5,8			5,8		
PP-R/AL/PP-R	Ø ≤ 20	≥ 2,8	2 x 2	EI 120	≥ 2,8	1 x 2	EI 120
	20 < Ø ≤ 25	≥ 3,3			≥ 3,3		
	25 < Ø ≤ 32	4,0 – 12,5			4,0 – 12,5		
	32 < Ø ≤ 40	4,8 – 12,5			4,8 – 12,5		
	40 < Ø ≤ 50	5,9 – 12,5			5,9 – 12,5		
	50 < Ø ≤ 63	7,2 – 12,5			7,2 – 12,5		
	63 < Ø ≤ 75	8,4 – 12,5			8,4 – 12,5		
	75 < Ø ≤ 90	10,1 – 15,0			2 x 4	10,1 – 15,0	
	90 < Ø ≤ 110	12,3 – 18,3	2 x 5		12,3 – 18,3	1 x 5	

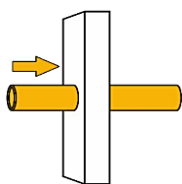
MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Duct type	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab					
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C			
PE-X/AL/ PE-X	Ø ≤ 20	2,0	2 x 2	EI 120	2,0	1 x 2	EI 120			
	20 < Ø ≤ 25	2,5		EI 45	2,5					
	25 < Ø ≤ 32	3,0			3,0					
	32 < Ø ≤ 40	4,0			4,0					
	40 < Ø ≤ 50	4,8			4,8					
	50 < Ø ≤ 63	6,0			6,0					
PE-RT/AL/ PE-RT	Ø ≤ 20	2,0	2 x 2	EI 120	2,0	1 x 2	EI 120			
	20 < Ø ≤ 25	2,5		EI 45	2,5					
	25 < Ø ≤ 32	3,0			3,0					
	32 < Ø ≤ 40	4,0			4,0					
	40 < Ø ≤ 50	4,8			4,8					
	50 < Ø ≤ 63	6,0			6,0					
	63 < Ø ≤ 75	7,5			7,5					
	PE-Xb/AL/ PE-Xb	Ø ≤ 20			2,0			2 x 2	EI 90	3,0
20 < Ø ≤ 26		3,0								
25 < Ø ≤ 32					3,5					
32 < Ø ≤ 40					4,5					
40 < Ø ≤ 50										
PE-HD PE PE-X ABS SAN + PVC	Ø ≤ 32	2,0 – 6,8	2 x 2	EI 120	1,9 – 6,8	1 x 2	EI 120			
	32 < Ø ≤ 50	2,4 – 6,8			2,4 – 6,8					
	50 < Ø ≤ 63	2,7 – 6,8			2,7 – 6,8					
	63 < Ø ≤ 75	3,0 – 6,8			3,0 – 6,8					
	75 < Ø ≤ 90	3,5 – 8,2	2 x 4		3,5 – 8,2	1 x 4				
	90 < Ø ≤ 110	4,2 – 10,0	2 x 5		4,2 – 10,0	1 x 5				
	110 < Ø ≤ 125	4,4 – 9,9	4 x 7		4,4 – 9,9	2 x 7				
	135 < Ø ≤ 160	4,9 – 9,5	4 x 9		4,9 – 9,5	2 x 9				
	160 < Ø ≤ 180	8,4 – 10,7	4 x 10	EI 90	8,1 – 10,4	2 x 10				
	160 < Ø ≤ 200	11,9			11,3					
PP-R/PP-R- GF/PP-R	Ø ≤ 20	≥ 2,8	2 x 2	EI 120	≥ 2,8	1 x 2	EI 120			
	20 < Ø ≤ 25	≥ 3,3			≥ 3,3					
	25 < Ø ≤ 32	4,4 – 12,5			4,4 – 12,5					
	32 < Ø ≤ 40	5,5 – 12,5			5,5 – 12,5					
	40 < Ø ≤ 50	6,9 – 12,5			6,9 – 12,5					
	50 < Ø ≤ 63	8,7 – 12,5			8,7 – 12,5					
	63 < Ø ≤ 75	10,3 – 12,5			10,3 – 12,5					
	75 < Ø ≤ 90	11,2 – 12,3			2 x 4			EI 90	12,4 – 15,0	1 x 4
		12,4 – 15,0	EI 120							
	90 < Ø ≤ 110	12,3 – 15,0	2 x 5	EI 90	15,1 – 18,3	1 x 5				
		15,1 – 18,3		EI 120						

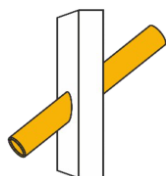
MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Duct type	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab			
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	
PVC	Ø ≤ 32	1,2 – 5,6	2 x 2	EI 120	1,2 – 5,6	1 x 2	EI 120	
	32 < Ø ≤ 50							
	50 < Ø ≤ 63				1,4 – 6,1			
	63 < Ø ≤ 75	1,5 – 6,6						
	75 < Ø ≤ 90	1,7 – 7,3	2 x 4		1,7 – 7,3	1 x 4		
	90 < Ø ≤ 110	2,0 – 8,1	2 x 5		2,0 – 8,1	1 x 5		
	110 < Ø ≤ 125	2,4 – 8,5	4 x 7		2,4 – 8,5	2 x 7		
	135 < Ø ≤ 160	3,2 – 9,5	4 x 9		3,2 – 9,5	2 x 9		
	160 < Ø ≤ 180	4,4 – 5,4	4 x 11	EI 60	3,6 – 6,7	2 x 10	EI 30	
		5,5 – 8,6	4 x 10	EI 120				
		8,7 – 9,3	4 x 11	EI 60	6,8 – 9,3			
	180 < Ø ≤ 200	5,6 – 7,6	4 x 12	EI 120	3,9			EI 120
		7,7	4 x 10					
		7,8 – 9,1	4 x 12	EI 60	4,0 – 9,0	2 x 11	EI 30	
	200 < Ø ≤ 250	8,6	4 x 15		5,8 – 8,5	2 x 13		
	250 < Ø ≤ 315				7,7	2 x 15	EI 60	
PE – RT Geberit Mepla	Ø ≤ 20	2,5	2 x 2	EI 120	2,5	1 x 2	EI 120	
	20 < Ø ≤ 25	3,0			3,0			
	25 < Ø ≤ 32	3,0			3,0			
	32 < Ø ≤ 40	3,5		EI 90	3,5		EI 90	
	40 < Ø ≤ 50	4,5		EI 45	4,5		EI 45	
	50 < Ø ≤ 63	4,5			4,5			
PP-HT	Ø ≤ 50	1,8	2 x 2	EI 120	1,8	1 x 2	EI 120	
	50 < Ø ≤ 75	1,9			1,9			
	75 < Ø ≤ 90	2,2	2 x 4		2,2	1 x 4		
	90 < Ø ≤ 110	2,7	2 x 5		2,7	1 x 5		
	110 < Ø ≤ 125	3,1	2 x 7	EI 60				
	125 < Ø ≤ 160	3,9	2 x 9					
PP-MF SILERE	Ø ≤ 58				4,0	1 x 2	EI 120	
	58 < Ø ≤ 78				4,5	1 x 4		
	78 < Ø ≤ 90				4,9			
	90 < Ø ≤ 110				5,4	1 x 5		
	110 < Ø ≤ 135				5,6	2 x 7		
PP-ML TRIPLUS	Ø ≤ 50				1,8	1 x 2	EI 120	
	50 < Ø ≤ 75				2,6			
	75 < Ø ≤ 90				3,1	1 x 4		
	90 < Ø ≤ 110				3,4	1 x 5		
	110 < Ø ≤ 125				3,9	2 x 7		
	125 < Ø ≤ 160				4,9	2 x 9		

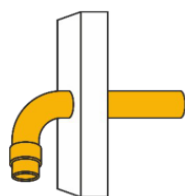
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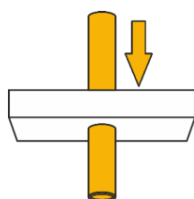
Duct type	Ø Duct (mm)	RIGID WALL A single-sided wall collar		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PP	Ø ≤ 50	1,8	1 x 2	EI 120
	50 < Ø ≤ 63	2	1 x 3	EI 60
	63 < Ø ≤ 75	2,2	1 x 4	
	75 < Ø ≤ 90	2,4		
	90 < Ø ≤ 110	2,7	1 x 5	



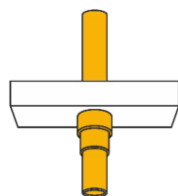
Duct type	Ø Duct (mm)	RIGID WALL 45° duct / flange on both sides of the wall		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PVC	$\varnothing \leq 110$	3,2	2 x 5	EI 120



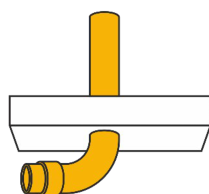
Duct type	Ø Duct (mm)	RIGID / FLEXIBLE WALL Duct with elbow / Collar on one side of the wall		
		Espesor pared conducto (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PVC	$\varnothing \leq 110$	3,2	2 x 5	EI 120
PP		2,7		EI 90



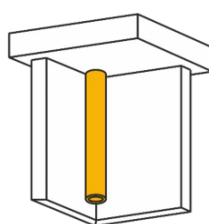
Duct type	Ø Duct (mm)	FLOOR SLAB Collar on the top surface of the floor slab		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PP	$\varnothing \leq 110$	8,1	1 x 5	EI 120



Duct type	Ø Duct (mm)	FLOOR SLAB Duct with a joint/collar on the underside of the floor slab		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PP	$\varnothing \leq 110$	3,9	1 x 5	EI 120



Duct type	Ø Duct (mm)	FLOOR SLAB Duct with elbow / collar on the underside of the floor slab		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PE-HD / PE / PE-X / ABS / SAN + PVC	$\varnothing \leq 110$	6,6	1 x 5	EI 120
PP		2,7		EI 90
PVC		3,2		EI 120



Duct type	Ø Duct (mm)	FLOOR SLAB Duct set back / collar on the top surface of the floor slab		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PE-HD / PE / PE-X / ABS / SAN + PVC	$\varnothing \leq 110$	4,2	1 x 5	EI 120
PP		3,9		
PVC		3,2		

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

2. ACOUSTIC DUCTS

Duct type	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
Magnaplast Ultra dB	Ø ≤ 50	2,0	2 x 2	EI 120	2,0	1 x 2	EI 120
	50 < Ø ≤ 75	2,3			2,3		
	75 < Ø ≤ 110	3,4	2 x 5	EI 90	3,4	1 x 5	EI 30 EI 120 EI 30 EI 120
	110 < Ø ≤ 125				3,9	1 x 9	
						2 x 9	
	125 < Ø ≤ 160				4,9	1 x 9	
2 x 9							
Geberit Silent dB20	Ø ≤ 56	3,2	2 x 2	EI 120	7,0	1 x 9	EI 60
	56 < Ø ≤ 63						
	63 < Ø ≤ 75	3,6	2 x 4				
	75 < Ø ≤ 90	4,6					
	90 < Ø ≤ 110	6,0	4 x 7				
	110 < Ø ≤ 135	6,5					
	135 < Ø ≤ 160	7,0					
Geberit Silent PP	Ø ≤ 50				1,8	1 x 2	EI 120
	50 < Ø ≤ 75				2,6		
	75 < Ø ≤ 90				3,1	1 x 4	
	90 < Ø ≤ 110				3,6	1 x 5	
	110 < Ø ≤ 125				4,2	2 x 7	
	125 < Ø ≤ 160				4,5	2 x 9	
Wavin SiTech+	Ø ≤ 50	1,8	2 x 2	EI 120			
	50 < Ø ≤ 75	2,6					
	75 < Ø ≤ 90	3,1	2 x 4				
	90 < Ø ≤ 110	3,4	2 x 5				
	110 < Ø ≤ 125	3,9	4 x 7				
	125 < Ø ≤ 160	4,9	4 x 9				
Raupiano Plus PP/PP-MF/PP	Ø ≤ 50				1,8	1 x 2	EI 120
	50 < Ø ≤ 75				1,9		
	75 < Ø ≤ 90				2,2	1 x 4	
	90 < Ø ≤ 110				2,7	1 x 5	
	110 < Ø ≤ 125				3,1	2 x 7	
	125 < Ø ≤ 160				4,0	2 x 9	

3. PRE-INSULATED DUCTS

Duct type	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
COOL-FIT	Ø = 75 / 125	6,8 / 3,8	4 x 7	EI 120			
	Ø = 90 / 140	8,2 / 4,0			8,2 / 4,0	2 x 7	EI 120

COOL-FIT – PE-100 DUCT, pre-insulated with GF-HE foam, PE outer surface

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

4. COMBUSTIBLE/FUEL DUCTS (insulated)

Duct type	Ø Duct (mm)	FEF insulation thickness (mm)	FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
Geberit Silent dB20	Ø ≤ 110	13	6,0	2 x 7	EI 90
PE - HD	Ø ≤ 110	13	4,2	2 x 7	EI 120

Duct type	Ø Duct (mm)	PE Insulation Thickness x Minimum Length (mm)	FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Duct wall thickness (mm)	Fire Resistance U/C & C/C
Geberit Silent dB20	Ø ≤ 110	9 x 100	2,7	1 x 6	EI 90

5. NON-COMBUSTIBLE/FUEL DUCT (insulated)

Duct type	Ø Duct (mm)	FEF insulation thickness (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
copper	Ø ≤ 12,7	9	≥ 0,8	2 x 2	EI 60			
	12,7 < Ø ≤ 22,23		≥ 0,9					
steel	Ø ≤ 18,0	9	≥ 1,2	2 x 2	EI 120	≥ 1,2	1 x 2	EI 120
		10 - 25		2 x 3			1 x 3	
	18,0 < Ø ≤ 28,0	9	1,2 - 1,4	2 x 2	EI 45	1,5 - 1,9	1 x 2	
		10 - 32					1 x 3	
		9	1,5 - 1,9	2 x 2	EI 120	2,0 - 3,9	1 x 2	
		10 - 32		2 x 3			1 x 3	
		33 - 50					1 x 4	EI 90
		9	≥ 2,0	2 x 2	EI 120	≥ 4,0	1 x 2	EI 120
		10 - 32		2 x 3			1 x 3	
		33 - 50		2 x 4			1 x 4	

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Duct type	Ø Duct (mm)	FEF insulation thickness (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab			
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	
steel	28,0 < Ø ≤ 42,4	9	1,2 – 1,4	2 x 2	EI 45	1,5 – 1,9	1 x 2		
		10 – 32					1 x 3		
		9	1,5 – 1,9	2 x 2	EI 90	2,0 – 3,9	1 x 2		
		10 – 31		2 x 3			EI 120		1 x 3
		32							1 x 4
		33 - 50				≥ 4,0	1 x 2	EI 120	
		9	≥ 2,0	2 x 2	EI 90		1 x 3		
		10 – 31		2 x 3			EI 120		1 x 4
		32		2 x 4	EI 90				
		33 - 50			EI 90				
		50							
	42,4 < Ø ≤ 66,7	9	1,2 – 1,4	2 x 2	EI 45	1,5 – 1,9	1 x 2		
		10 - 32					1 x 3		
		9	1,5 – 1,9	2 x 2	EI 90	2,0 – 3,9	1 x 2		
		10 – 31		2 x 3			EI 120		1 x 3
		32							1 x 4
		33 - 50				≥ 4,0	1 x 2	EI 120	
		9	≥ 2,0	2 x 2	EI 90		1 x 3		
		10 – 31		2 x 3			EI 120		1 x 4
		32		2 x 4	EI 90		1 x 3		
		33 - 50		2 x 4			1 x 4		
		66,7 < Ø ≤ 108,0		32	≥ 2,0	2 x 3	EI 90	2,0 – 3,9	1 x 3
	33 - 50		2 x 4	1 x 4					
	33 - 50					≥ 3,6		EI 120	
	108,0 < Ø ≤ 114,3		32	≥ 3,6	2 x 3	EI 90	≥ 3,6		1 x 3
		33 - 50	2 x 4		1 x 4				
	114,3 < Ø ≤ 168,3	32	≥ 4,0	2 x 3	EI 60	≥ 4,0	1 x 3		
		33 - 49		2 x 4			EI 90		
		50							

6. BUNCH OF DUCTS

Bunch of combustible/fuel ducts

Maximum per bunch	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall		
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PVC	Ø ≤ 110	1,5	2 x 5	EI 120
PP-R		8,3		
PP-R		6,9		

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Bunch of air conditioning ducts

Duct type	Duct Ø or Cable Ø (mm)	FEF insulation thickness (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance
Copper duct nº 1	Ø ≤ 12,7	9	≥ 0,8	2 x 2	EI 60	≥ 0,8	1 x 2	EI 120
Copper duct nº 2	Ø ≤ 22,23	9	≥ 1,0			≥ 1,0		
PVC	Ø ≤ 25	-	1,5			1,5		
Cable	4 x 1,5 mm ²	-	-			-		
Copper duct nº 1	Ø ≤ 12,7	9	≥ 0,8	2 x 2	EI 60	≥ 0,8	1 x 2	EI 120
Copper duct nº 2	Ø ≤ 22,23	9	≥ 1,0			≥ 1,0		
PVC	Ø ≤ 25	-	1,5			1,5		
Cable	4 x 1,5 mm ²	-	-			-		

7. SYSTEMS COMPATIBLE WITH INTU-FR UNIPANEL

Combustible/Fuel Ducts (Uninsulated)

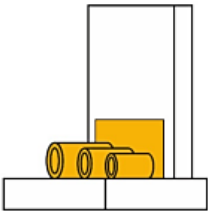
Duct type	Partition sealing	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PP	2 x INTU FR UNIPanel 1S	Ø ≤ 75	1,9 – 12,5	2 x 2	EI 120	1,9 – 12,5	1 x 2	EI 120
		75 < Ø ≤ 90	2,2 – 15,0	2 x 4		2,2 – 15,0	1 x 4	
		90 < Ø ≤ 110	2,7 – 18,3	2 x 5		2,7 – 18,3	1 x 5	
		110 < Ø ≤ 125				3,1 – 14,0	2 x 7	
		125 < Ø ≤ 160				3,9	2 x 9	

Duct type	Partition sealing	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PP-R	2 x INTU FR UNIPanel 1S	Ø ≤ 25	≥ 2,3	2 x 2	EI 120	≥ 2,3	1 x 2	EI 120
		20 < Ø ≤ 25	≥ 2,7			≥ 2,7		
		25 < Ø ≤ 32	3,3 – 12,5			3,3 – 12,5		
		32 < Ø ≤ 40	3,9 – 12,5			3,9 – 12,5		
		40 < Ø ≤ 50	4,8 – 12,5			4,8 – 12,5		
		50 < Ø ≤ 63	5,8 – 12,5			5,8 – 12,5		
		63 < Ø ≤ 75	6,8 – 12,5			6,8 – 12,5		
		75 < Ø ≤ 90	8,2 – 15,0	2 x 4		8,2 – 15,0	1 x 4	
		90 < Ø ≤ 110	10,0 – 18,3	2 x 5		10,0 – 18,3	1 x 5	

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Duct type	Partition sealing	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab			
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	
PVC-U / PVC-C	2 x INTU FR UNlpanel 1S	Ø ≤ 75	1,8 – 5,6	2 x 2	EI 120	1,8 – 5,6	1 x 2	EI 120	
		75 < Ø ≤ 90	1,9 – 6,7	2 x 4		1,9 – 6,7	1 x 4		
		90 < Ø ≤ 110	2,0 – 8,1	2 x 5		2,0 – 8,1	1 x 5		
PE-HD PE PE-X ABS SAN + PVC	2 x INTU FR UNlpanel 1S	63 < Ø ≤ 75	3,0 – 6,8	2 x 2	EI 120	3,0 – 6,8	1 x 2	EI 120	
		75 < Ø ≤ 90	3,5 – 8,2	2 x 4		3,5 – 8,2	1 x 4		
		90 < Ø ≤ 110	4,2 – 10,0	2 x 5		4,2 – 10,0	1 x 5		
		110 < Ø ≤ 125				5,8 – 9,9	1 x 7		
		125 < Ø ≤ 160				9,5	1 x 9		

Duct type	Partition sealing	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/C & C/C
PE-HD / PE / PE-X / ABS / SAN + PVC	1 x INTU FR UNlpanel 2S	Ø ≤ 75	3,0 – 6,8	2 x 2	EI 60	3,0 – 6,8	1 x 2	EI 90
		75 < Ø ≤ 90	3,5 – 8,2	2 x 4		3,5 – 8,2	1 x 4	
		90 < Ø ≤ 110	4,2 – 10,0	2 x 5		4,2 – 10,0	1 x 5	

	Duct type	Partition sealing	Ø Duct (mm)	PE Insulation Thickness (mm)	RIGID WALL Ducts attached to the floor / Insulated ducts		
					Duct wall thickness (mm)	Nº of Collars x Nº of Graphite Turns	Fire Resistance U/C & C/C
	PP - R	2 x INTU FR UNlpanel 1S	Ø ≤ 20	9	2,3	2 x 5	EI 120
				25	6,9		EI 90
				25	7,0 – 12,5		EI 120
			20 < Ø ≤ 50	25	6,9		EI 90
				25	7,0 – 12,5		EI 120
	Wiązka: 2 x PP-R	2 x INTU FR UNlpanel 1S	50 < Ø ≤ 75	25	12,5	2 x 5	EI 90
			1) Ø ≤ 20	9	2,3		EI 120
			2) Ø ≤ 50	9	6,9		

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Duct type	Ø Duct (mm)	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab				
		Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/U	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/U		
PE-HD PE PE-X ABS SAN + PVC	Ø ≤ 32	2,4 – 4,6	2 x 2	EI 120	2,0 – 4,6	1 x 2	EI 120		
	32 < Ø ≤ 50				2,4 – 4,6				
	50 < Ø ≤ 63	2,8 – 4,5	2 x 3	EI 60	2,8 – 3,9	1 x 3	EI 45 / E 120		
					4,0 – 4,5		EI 60		
					4,6 – 5,8				
	63 < Ø ≤ 75	3,2 – 4,4	2 x 4		3,2 – 4,4	1 x 4	EI 45 / E 120		
					5,6 – 6,8		EI 60		
					3,6 – 4,6		EI 45 / E 120		
	7,5 – 8,2	EI 60							
	75 < Ø ≤ 90	3,6 – 4,3			4,2 – 9,9	1 x 5	EI 45 / E 120		
					10,0		EI 60		
	90 < Ø ≤ 110	4,2	2 x 5						
PP	Ø ≤ 32	1,8 – 8,3	2 x 2	EI 120	1,8 – 8,3	1 x 2	EI 120		
	32 < Ø ≤ 50								
	50 < Ø ≤ 63	2,0 – 7,1	2 x 3	EI 60	2,2 – 7,3	1 x 3			
		7,2 – 7,3							
	63 < Ø ≤ 75	2,2 – 6,0	2 x 4	EI 120	2,6 – 6,4	1 x 4			
		6,1 – 6,4		EI 60					
		2,4 – 4,6		EI 120					
	75 < Ø ≤ 90	4,7 – 5,3		EI 60	3,1 – 5,3				
		90 < Ø ≤ 110		2,7	EI 120	3,8		1 x 5	
	2,8 – 3,8		EI 60						
	PVC	Ø ≤ 32	1,2 – 5,6	2 x 2	EI 120	1,2 – 5,6		1 x 2	EI 30 / E 45
		32 < Ø ≤ 50							
50 < Ø ≤ 63		1,4 – 2,6	2 x 3	EI 30	1,4 – 4,8	1 x 3			
		2,7 – 6,1		EI 60					
63 < Ø ≤ 75		1,5 – 4,0	2 x 4	EI 30	1,5 – 4,1	1 x 4			
		5,7 – 6,6		EI 60					
		1,7 – 5,7		EI 30					
75 < Ø ≤ 90		5,8 – 7,3		EI 60	1,7 – 3,2				
		90 < Ø ≤ 110		2,0 – 8,0	2 x 5	EI 30	2,0	1 x 5	
8,1			EI 60						

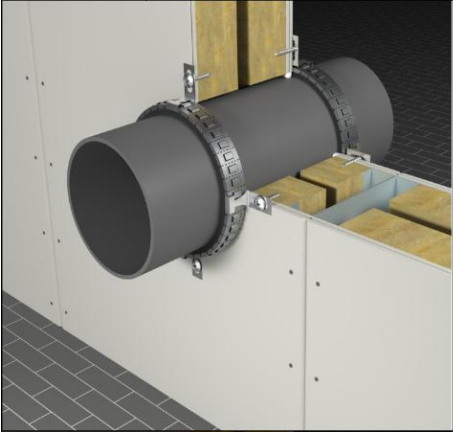
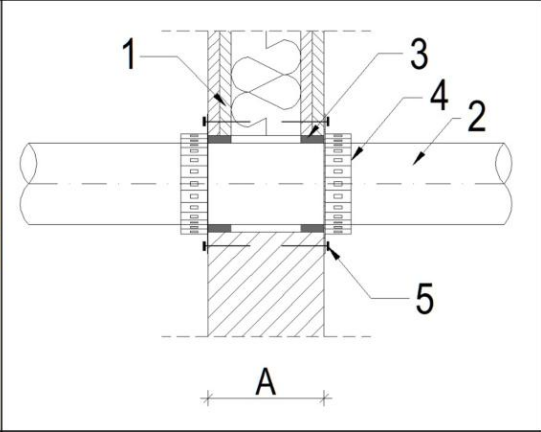
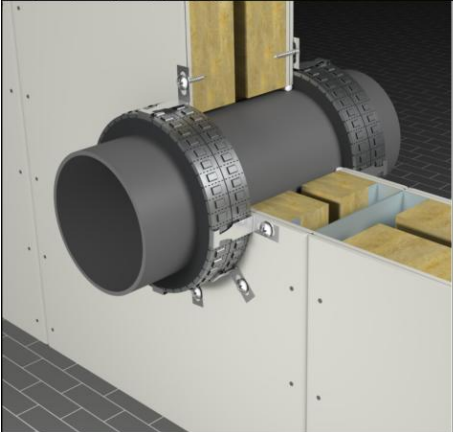
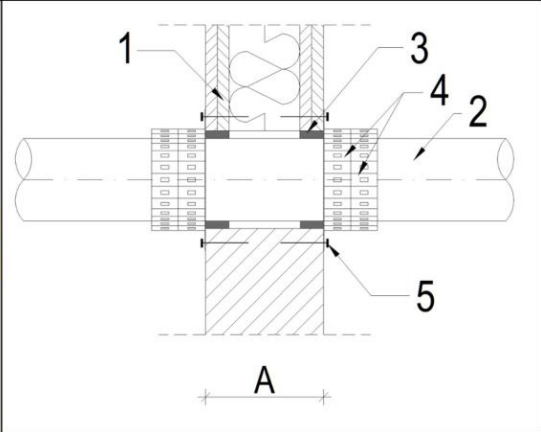
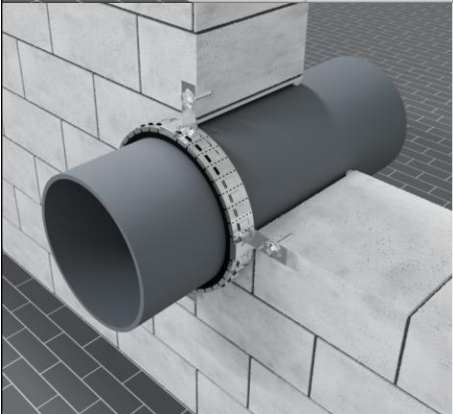
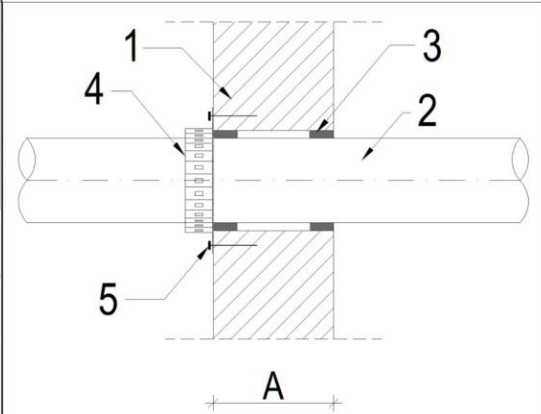
Bunch of corrugated ducts

Maximum in a bunch	Ø Duct (mm)	Penetrations in the corrugated material	RIGID / FLEXIBLE WALL A collar on both sides of the wall			FLOOR SLAB Collar on the underside of the floor slab		
			Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/U	Duct wall thickness (mm)	Number of Collars x Number of Graphite Turns	Fire Resistance U/U
1	Ø ≤ 50	Empty Ø Cable ≤ 21 mm Ø Bunch of cables < 50 mm	3,0	2 x 5	EI 120	3,0	1 x 5	EI 120
2								
3								
4								

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

TECHNICAL INFORMATION

Sealing the penetration of combustible ducts through a wall

		Fig. 1 Wall-mounted combustible duct, 1 collar on each side of the wall. 1 – Rigid/flexible wall $A \geq 100$ mm. 2 – Combustible duct $\varnothing \leq 110$ mm. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, single collar on each side of the opening. 5 – Steel screws, min. $\varnothing 6 \times 50$ mm
		Fig. 2 Combustible duct in the wall, with a double collar on each side of the wall 1 – Rigid/flexible wall $A \geq 100$ mm. 2 – Combustible duct $\varnothing > 110$ mm. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, double collar on each side of the wall. 5 – Steel screws, min. $\varnothing 6 \times 50$ mm.
		Fig. 3 Wall-mounted combustible duct, with one flange on one side of the wall. 1 – Rigid wall $A \geq 100$ mm. 2 – Combustible duct $\varnothing \leq 110$ mm. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, single collar on each side of the opening. 5 – Steel screws, min. $\varnothing 6 \times 50$ mm.

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Sealing of combustible duct penetrations / bunch in wall

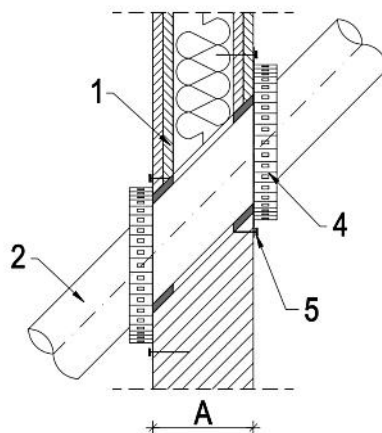
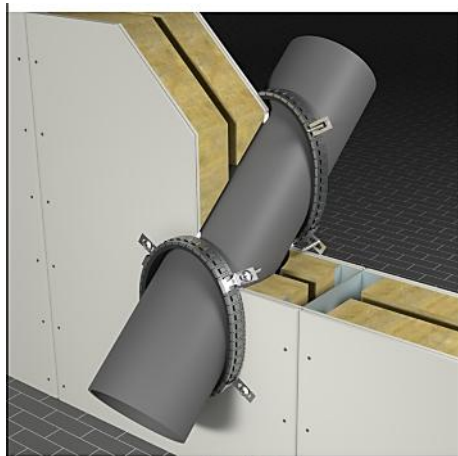


Fig. 4 Combustible duct, angled penetration.

- 1 – Rigid/flexible wall $A \geq 100$ mm.
 - 2 – Sloped combustible duct.
 - 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening.
 - 4 – INTU FR COLLAR L SLIM, single collar on each side of the wall.
 - 5 – Steel screws, min. $\varnothing 6 \times 50$ mm.
- Note: For a duct with a diameter of 110: 1 (number of collars) $\times$ 5 (number of graphite wraps). Length of the metal sleeve = 28 segments.

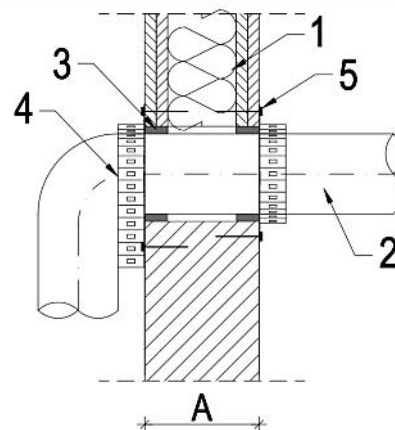
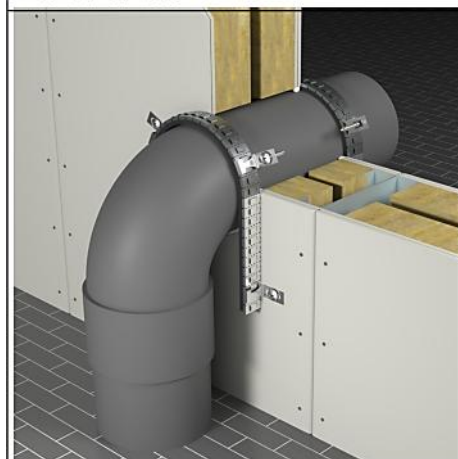


Fig. 5: Combustible duct penetration with an elbow in the wall.

- 1 – Rigid/flexible wall $A \geq 100$ mm
 - 2 – Combustible duct with elbow.
 - 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening.
 - 4 – INTU FR COLLAR L SLIM, single collar on each side of the wall.
 - 5 – Steel screws, min. $\varnothing 6 \times 50$ mm.
- Note: For a duct with a diameter of 110: 1 (number of collars) $\times$ 5 (number of graphite wraps). Length of the metal sleeve = 28 segments.

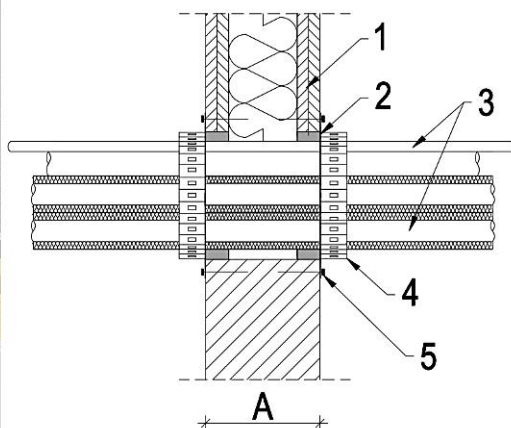
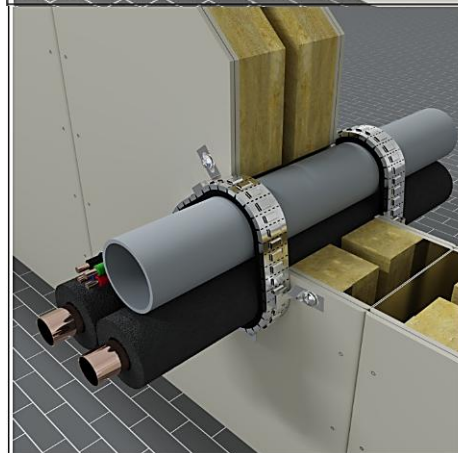


Fig. 6 Installation kit for a wall-mounted air conditioner.

- 1 – Rigid/flexible wall $A \geq 100$ mm.
- 2 – Bunch of cables and ducts.
- 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the structure.
- 4 – INTU FR COLLAR L SLIM, single collar on each side of the wall.
- 5 – Steel screws, min. $\varnothing 6 \times 50$ mm.

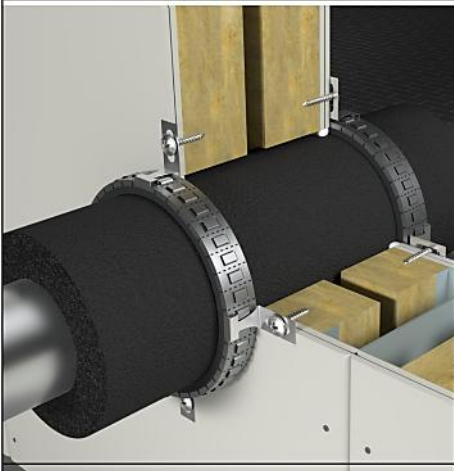
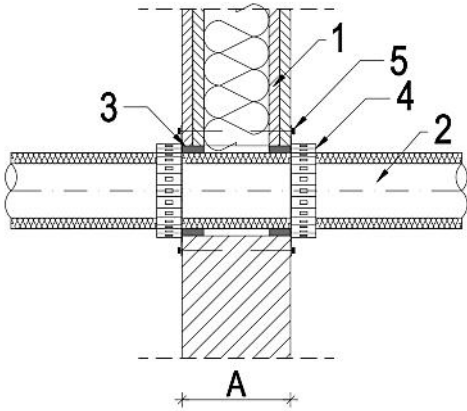
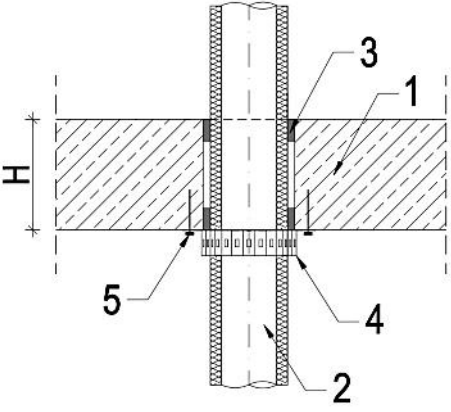
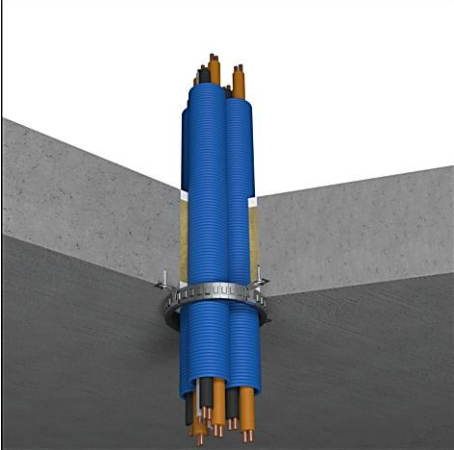
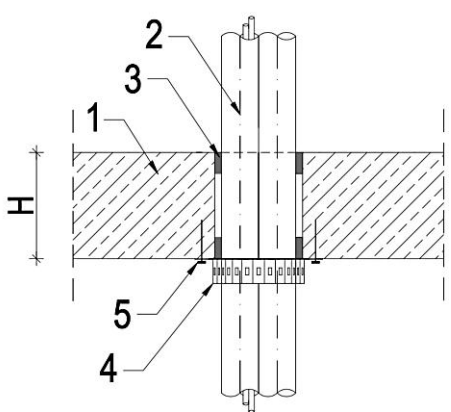
MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Sealing the penetration of combustible ducts through a floor slab

		Fig. 7: In-floor combustible duct, with a single collar on the underside of the floor slab. 1 – floor slab $H \geq 150$ mm. 2 – combustible duct $\varnothing \leq 110$ mm. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, single collar on the underside of the floor slab. 5 – steel screws, min. $\varnothing 6 \times 50$ mm.
		Fig. 8: Combustible duct in the floor slab, with a double collar on the underside of the slab. 1 – floor slab $H \geq 150$ mm. 2 – combustible duct $\varnothing > 110$ mm. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, double collar on the underside of the floor slab. 5 – steel screws, min. $\varnothing 6 \times 50$ mm.
		Fig. 9: Combustible duct with elbow, in a floor slab. 1 – floor slab $H \geq 150$ mm. 2 – combustible duct with elbow. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, single collar on the underside of the floor slab. 5 – steel screws, min. $\varnothing 6 \times 50$ mm. Note: For a duct with a diameter of 110: 1 (number of collars) x 5 (number of graphite wraps). Length of the metal sleeve = 28 segments.

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

Sealing Penetrations in Non-Combustible and Corrugated Ducts

		Fig. 10 Insulated metal duct, with a single collar on each side of the opening. 1 – Rigid/flexible wall $A \geq 100$ mm. 2 – Insulated metal duct or insulated combustible duct. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, single collar on each side of the opening. 5 – Steel screws, min. $\varnothing 6 \times 50$ mm.
		Fig. 11 Insulated metal duct, single collar on the underside of the floor slab. 1 – floor slab $H \geq 150$ mm. 2 – insulated metal duct or insulated combustible duct. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 4 – INTU FR COLLAR L SLIM, single collar on the underside of the floor slab. 5 – steel screws, min. $\varnothing 6 \times 50$ mm
		Fig. 12 Bunch of corrugated ducts, single collar on the underside of the floor slab. 1 – Slab $H \geq 150$ mm. 2 – Bunch of corrugated ducts with or without cables. 3 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the structure. 4 – INTU FR COLLAR L SLIM, single collar on the underside of the slab. 5 – Steel screws, min. $\varnothing 6 \times 50$ mm.

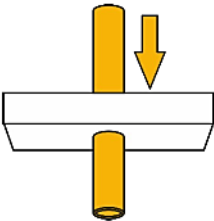
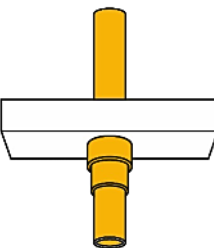
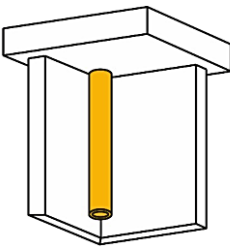
MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

SYSTEMS COMPATIBLE WITH INTU-FR UNIPANEL

		Fig. 13 Insulated combustible duct with a penetration through a double-layer mineral wool panel wall. 1 – Rigid/flexible wall $A \geq 100$ mm. 2 – 2 x INTU FR UNIPanel 1S. 3 – Insulated metal duct or insulated combustible duct. 4 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 5 – INTU FR COLLAR L SLIM, single collar on each side of the opening. 6 – Steel screws, min. $\varnothing 6 \times 50$ mm.
		Fig. 14 Fuel line with a penetration through a single-layer mineral wool panel. 1 – Rigid/flexible wall $A \geq 100$ mm. 2 – 1 x INTU FR UNIPanel 2S. 3 – Combustible duct. 4 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 5 – INTU FR COLLAR L SLIM, single collar on each side of the opening. 6 – Steel screws, min. $\varnothing 6 \times 50$ mm
		Fig. 15 Combustible duct penetrating a double-layer mineral wool panel floor slab. 1 – floor slab $H \geq 150$ mm. 2 – 2 x INTU FR UNIPanel 1S. 3 panels – combustible duct. 4 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the opening. 5 – INTU FR COLLAR L SLIM, single collar on the underside of the floor slab. 6 – steel screws, min. $\varnothing 6 \times 50$ mm.
		Fig. 16: Combustible duct, single mineral wool panel. 1 – floor slab $H \geq 150$ mm. 2 – 1 x INTU FR UNIPanel 2S. 3 – combustible duct. 4 – INTU FR MASTIC, min. depth ≥ 25 mm on each side of the partition. 5 – INTU FR COLLAR L SLIM single collar on the underside of the mineral wool panel. 6 – steel screws, min. $\varnothing 6 \times 50$ mm

MULTI-DIAMETER FIRE-RESISTANT COLLAR SERIES INTU-FR L SLIM

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Collar on the top surface of the floor slab 	FRONT VIEW S - short clips L - long clips $0 \leq a \leq 20 \text{ mm}$ $b = 25 \text{ mm}$	1 – floor slab $H \geq 150 \text{ mm}$. 2 – combustable duct. 3 – INTU FR COLLAR L SLIM single collar on the top surface of the floor slab. 4 – steel screws, min. $\varnothing 6 \times 50 \text{ mm}$.
Duct joint collar 	FRONT VIEW S - short clips L - long clips $0 \leq a \leq 30 \text{ mm}$ $b = 25 \text{ mm}$	1 – floor slab $H \geq 150 \text{ mm}$. 2 – combustable duct. 3 – INTU FR MASTIC, min. depth $\geq 25 \text{ mm}$ on each side of the opening. 4 – INTU FR COLLAR L SLIM, double collar on the underside of the floor slab (over the joint). 5 – steel screws, min. $\varnothing 6 \times 50 \text{ mm}$.
Collar in the corner between walls 	S - short clips L - long clips $0 \leq a \leq 20 \text{ mm}$ $b = 25 \text{ mm}$	1a – floor slab $H \geq 150 \text{ mm}$. 1b – rigid wall $A \geq 100 \text{ mm}$. 2 – combustable duct. 3 – INTU FR MASTIC, min. depth $\geq 25 \text{ mm}$ on each side of the structure. 4 – INTU FR COLLAR L SLIM, single collar on the underside of the floor slab. 5 – steel screws, min. $\varnothing 6 \times 50 \text{ mm}$



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