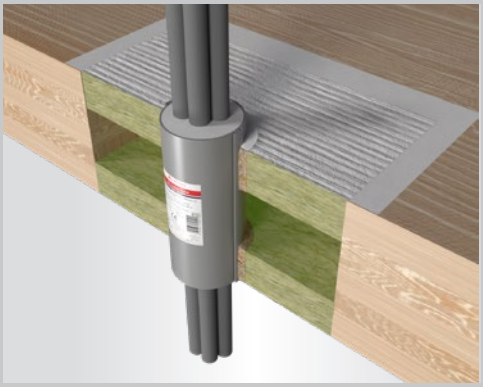
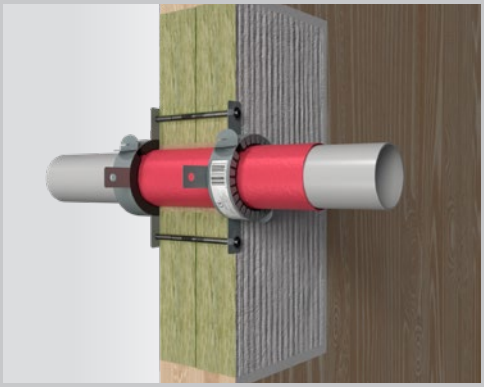
EU

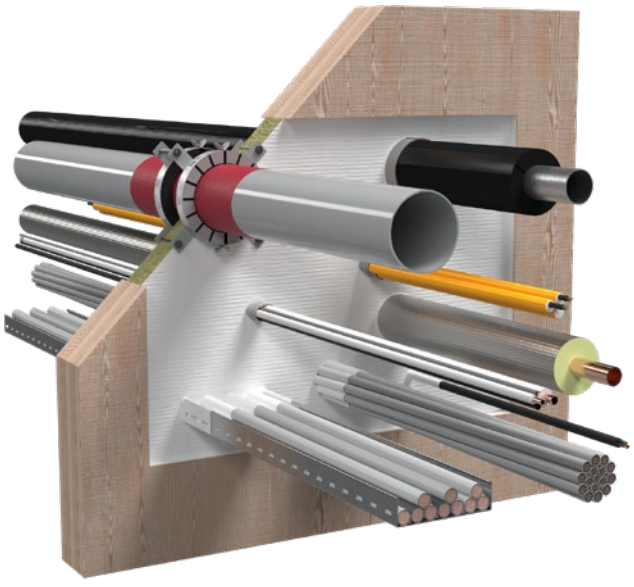
Fire protection solutions for timber construction

06/2024 (EN approvals)

Modern fire sealing solutions for CLT walls and floors







CLT walls			CLT floors		
Fire resistance class	**Minimum thickness**	**Thickness of first layer**	**Fire resistance class**	**Minimum thickness**	**Thickness of first layer**
EI 30	80 mm	≥ 20 mm			
EI 60	100 mm	≥ 20 mm	EI 60	100 mm	≥ 20 mm
EI 90	100 mm	≥ 30 mm	EI 90	140 mm	≥ 40 mm
EI 120	160 mm	≥ 40 mm	EI 120	160 mm	≥ 40 mm

Fire protection in timber construction

Sustainable timber construction is on the rise worldwide. Timber is structurally strong, can be utilised in many ways and also offers a high quality of living. As a raw material timber stores CO_2 for the life of a building. In multi-storey buildings, solid construction with cross-laminated timber (CLT) is generally put to use. CLT is made of several board layers which are glued together crosswise, thus providing a high load-bearing capacity.

Due to the growing popularity of timber construction there is an ever higher demand for modern fire protection solutions. Despite a classification of “normal flammability” as per European standard 13501-1, building elements made of timber are as fire-resistant as standard walls and floors made of concrete or masonry. Timber elements must meet legal requirements for fire resistance, which also includes fire protection systems for sealing apertures. As in any building, integral timber elements are penetrated by pipes and electrical installations for supply purposes. Any openings in fire-resistant building elements must be sealed with protection systems of the same fire resistance class.

Approved penetration sealing systems are subjected to extensive testing, which however mostly applies to installation in plasterboard walls, solid walls or solid floors. As timber has a different reaction to fire, the systems’ functions may be impaired. For this reason, installation is not possible without further certificates.

For this reason, Flamro has had its well-proven sealing systems now also tested in timber walls and floors.

Your specialist for structural fire protection

Fire protection systems made by Flamro

Flamro offers a comprehensive portfolio of products and systems for passive structural fire protection with general certificates of usability. Our products protect lives, keep damage to property to a minimum, prevent interruption to business and avert enviromental damage.

Flamro's fire protection systems were tested for application in cross-laminated timber in accordance with EN 1366-3. Our well-proven products were installed under the same conditions and with the same scope of services. This means our penetrations sealing systems provide the same performance in timber elements as in plasterboard walls, solid walls and solid floors.

Highlights

A wide range of applications

- Approved fire protection sealing with the mixed penetration systems KSL single and double layer – with a fire resistance duration of max. 120 minutes for all standard services.
- A scope of application comprising a great number of services with a wide range of diameters and types of insulation.
- Sealing systems for non-combustible pipes made of steel, stainless steel or cast iron up to an outer diameter of 219.1 mm with FEF or mineral wool insulation.
- Sealing systems for non-combustible pipes with PIR insulation (single layer system).
- Many options to combine products from Flamro's fire protection folio (wraps, pipe collars, cable tubes).
- Seals for single penetrations.

Easy installation

- No need for plasterboard cladding.
- Suitable for pre-manufactured modules.
- Seals for single penetrations can be directly installed into the timber element.
- Minimal dry film thickness both on seal surface and on penetrating cables, cable bundles and cable trays, which only require coating at minimal length as well.
- Subsequent installation made easy: single cables up to an outer diameter of 21 mm do not require coating at all, and no special tools are needed to cut and modify the mineral fibre boards.

High-quality material

- FLAMMOTECT-A's consistency allows a particularly clean coating of cables and seal surfaces, which remains flexible even when it is dry.
- The necessary dry film thickness can be applied in one step.
- FLAMMOTECT-A can be coated over with other materials.
- All materials included are highly resistant to moisture.

Zero clearance options

- Approved zero clearance options between copper and steel pipes.
- Approved zero clearance options between various types of combustible pipes.

Application

Minimum requirements:

Wall

- Manufacturer: Stora Enso
- Thickness
  EI 30 ≥ 80 mm (first layer: ≥ 20 mm)
  EI 60 ≥ 100 mm (first layer: ≥ 20 mm)
  EI 90 ≥ 100 mm (first layer: ≥ 30 mm)
  EI 120 ≥ 160 mm (first layer: ≥ 40 mm)

Floor

- Manufacturer: Stora Enso
- Thickness

  EI 60 ≥ 100 mm (first layer: ≥ 20 mm)
  EI 90 ≥ 140 mm (first layer: ≥ 40 mm)
  EI 120 ≥ 160 mm (first layer: ≥ 40 mm)

The results also apply to identically constructed CLT walls and floors or equal or greater thickness.

A wall or floor of cross laminated timber can be regarded as equivalent to the tested wall and floor if the following requirements are met.

- The construction of the wall/floor is identical.
- The fire resistance class of the wall/floor is identical or higher.
- The construction is certified as per EN 13501-2.
- The construction is based on the same solid wood panels as tested.
- The solid wood panels are of the same building material category as tested or of a better category.
- The strength class of the solid wood panels as per EN 338 ist equivalent to the class of the tested panels or a higher class.
- The mass burning rate of the solid wood panels as per EN 1995-1-2 is equivalent to the class of the tested panels or a higher class.
- The thickness of the solid wood panel is at least equivalent to that of the tested panel.

Since particularly critical walls and floors were tested with this construction, we are also able to offer our sealing systems for timber components by other manufacturers, such as:

- KLH
- Mayr-Melnhof
- Binderholz
- best wood SCHNEIDER
- DERIX
- Eugen Decker
- HASSLACHER
- Pfeifer Timber GmbH
- Schilliger Holz
- ZÜBLIN Timber GmbH

Our technical service will be glad to assist you with any enquiry.

Our applications and products are subject to continuous improvement and testing. Contact our support service to enquire about the current state of approval.

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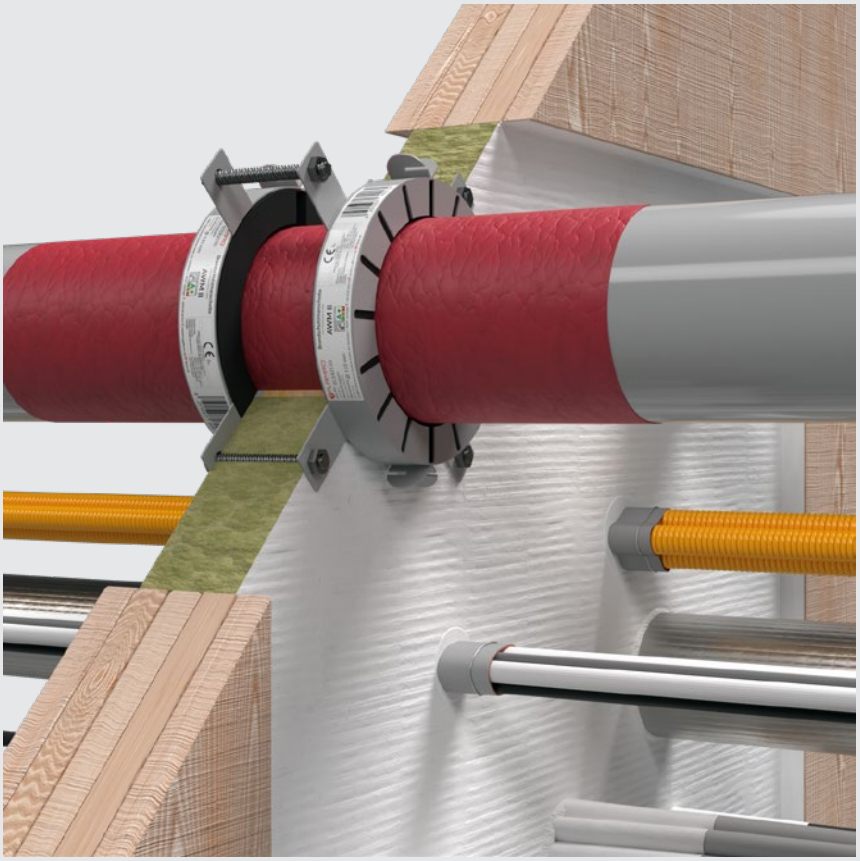
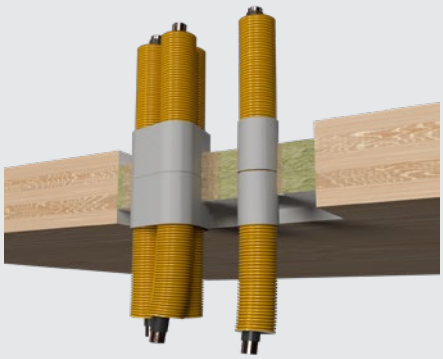
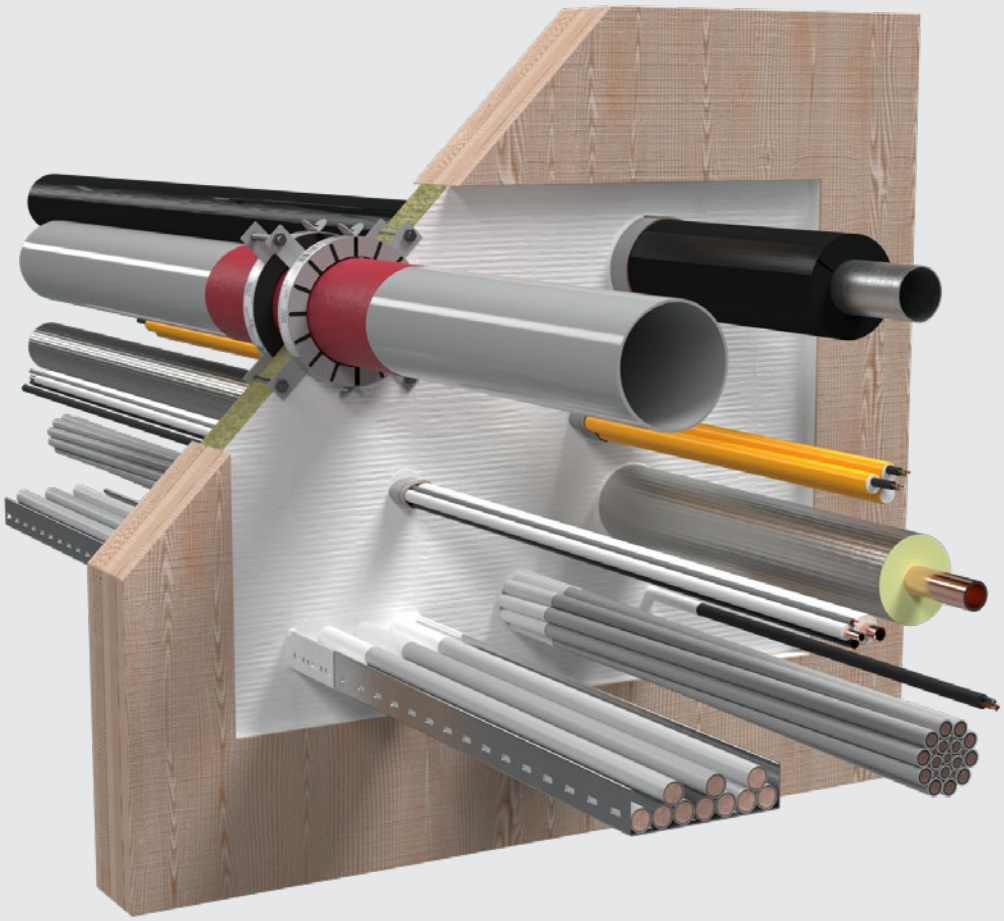




Mixed penetration sealing systems – single layer



System Flammotect 1 × 60 mm

Our well-proven mixed penetration sealing system made of a 60 mm mineral fibre board and an ablative fire protection coating was tested as a blank seal in CLT walls and floors by Stora Enso. This makes it possible to apply its entire large scope of services also in timber construction with a 100 mm clearance to the aperture edge. There is no need for additional plasterboard cladding.

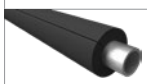
Further highlights

- Large and varied scope of applicable services with a wide range of diameters and types of insulation
- Minimal requirements for dry film thickness on seal surface as well as on penetrating cables, cable bundles and cable trays
- Necessary dry film thickness applicable in one step
- A great number of possible combinations
- Easy to install (also in case of subsequent installations)
- High resistance to humidity

Services

			max. diameter*
	Cables		≤ 80
	Cable bundles		≤ 100 / ≤ 21
	Cable trays		✓
	Wave guides / coaxial cables		≤ 51.1
	Electrical installation conduits made of plastic	single	≤ 32
		bundled	≤ 100
	speedpipes		bundled ≤ 40; single ≤ 14

*All specifications in mm

		max. diameter*
	Non-combustible pipes with mineral fibre insulation	≤ 219.1 (steel) ≤ 88.9 (copper)
	Non-combustible pipes with FEF insulation	≤ 219.1 (steel) ≤ 88.9 (copper)
	Non-combustible pipes with PIR insulation	≤ 219.1 (steel) ≤ 108.0 (copper)
	Combustible pipes	≤ 160
	Multilayer pipes	≤ 75
	HVAC split line combinations	✓

*All specifications in mm

System data

EI 60

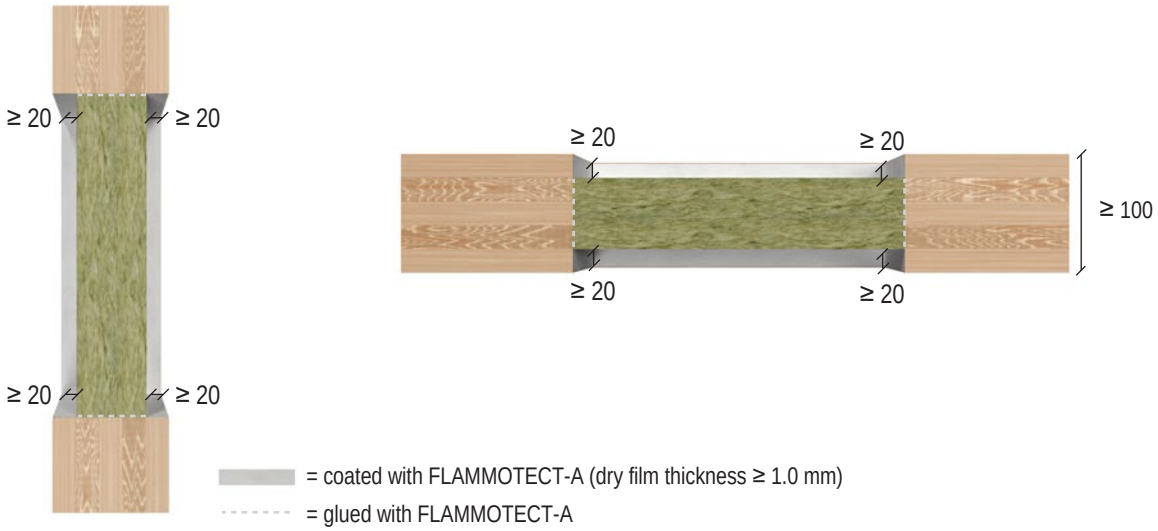
Certificates		ETA-22/0052 KB 323032803-A
Thickness of building element	Wall	≥ 100
	Floor	≥ 100
Thickness of seal	Wall	≥ 60
	Floor	≥ 60
Seal size	Wall	800 × 600
	Floor	800 × 600

EI 30 in CLT walls

Certificate		in preparation
Thickness of building element	Wall	≥ 80
Thickness of seal	Wall	≥ 60
Seal size	Wall	800 × 600

All specifications in mm

Design variants

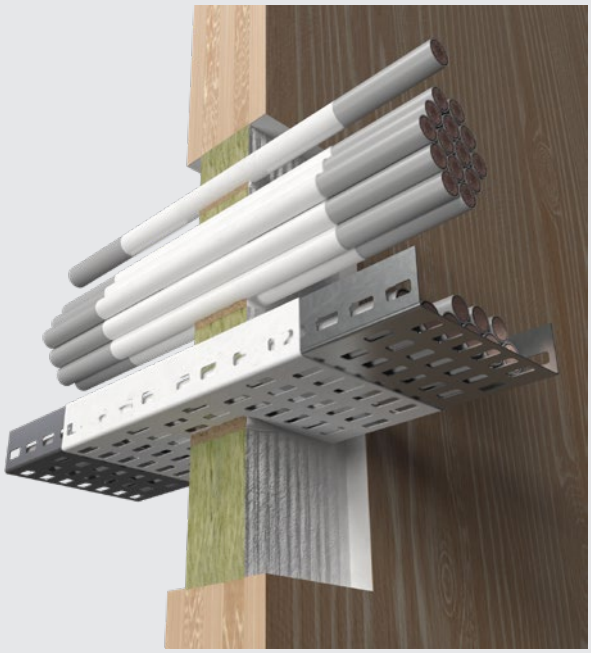


All specifications in mm

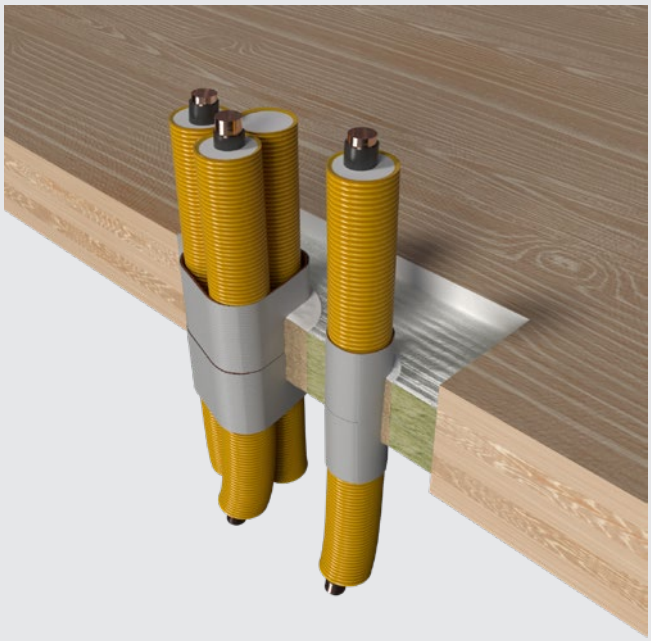
Consult the installation manual for more specific information.

Cables and further services

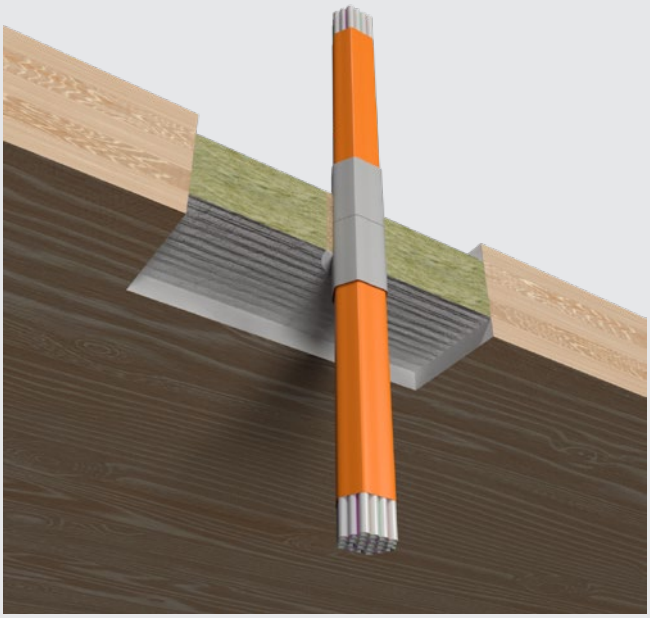
- Cables, cable bundles and cable trays



- Electrical installation conduits

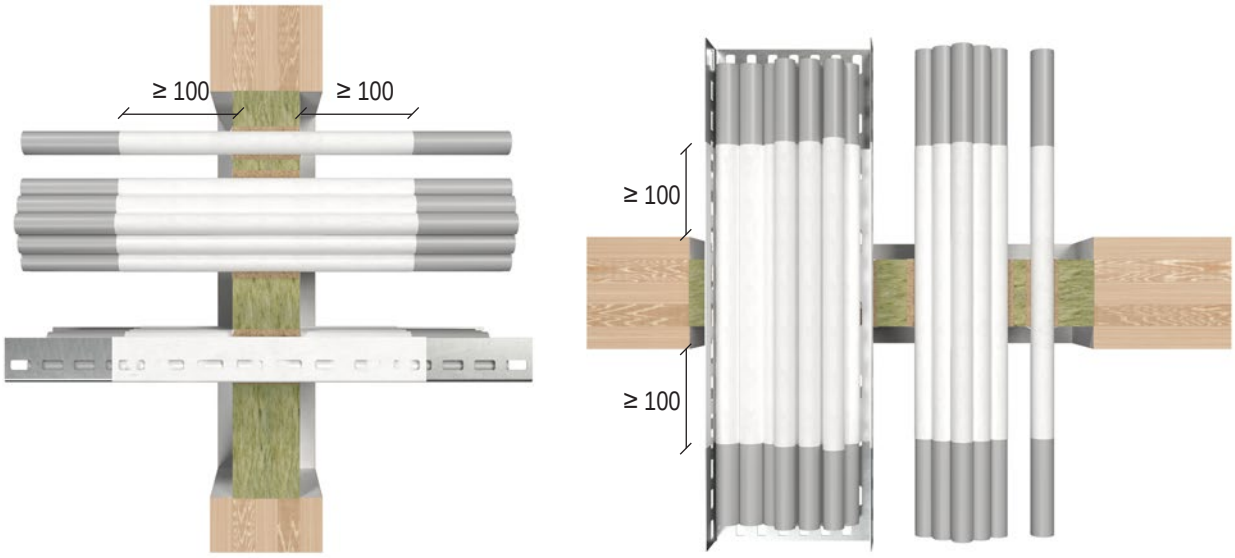


- speedpipes



- Wave guides and coaxial cables

Cables in wall and floor seals

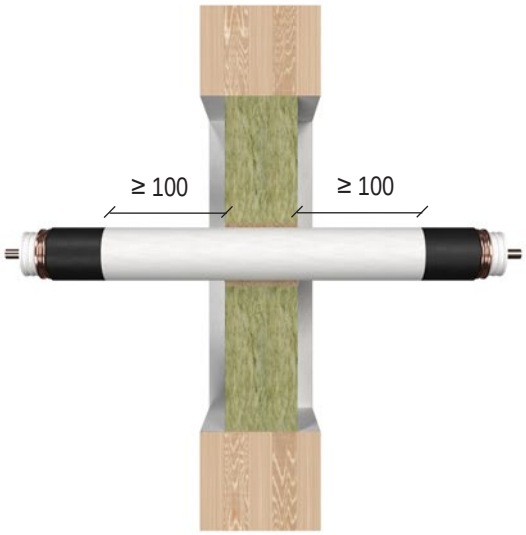


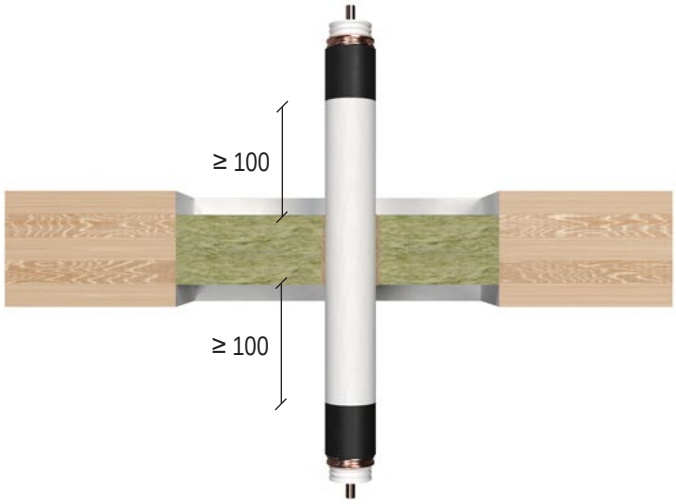
All specifications in mm

Wall		
Services	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class**
Cables Ø ≤ 21 mm	≥ 100 mm × ≥ 0.75 mm dry film thickness	EI 60
Cables Ø ≤ 50 mm		EI 60
Cables Ø ≤ 80 mm		EI 60
Cable bundles Ø ≤ 100 mm		EI 60
Conduits made of steel Ø ≤ 16 mm		EI 60 U/C
Conduits made of plastic Ø ≤ 16 mm		EI 60 U/U

Floor		
Services	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class**
Cables Ø ≤ 21 mm	≥ 100 mm × ≥ 0.75 mm dry film thickness	EI 60
Cables Ø ≤ 50 mm		EI 60
Cables Ø ≤ 80 mm		EI 60
Cable bundles Ø ≤ 100 mm		EI 60
Conduits made of steel Ø ≤ 16 mm		EI 60 U/C
Conduits made of plastic Ø ≤ 16 mm		EI 60 U/U

Wave guides and coaxial cables in wall and floor seals



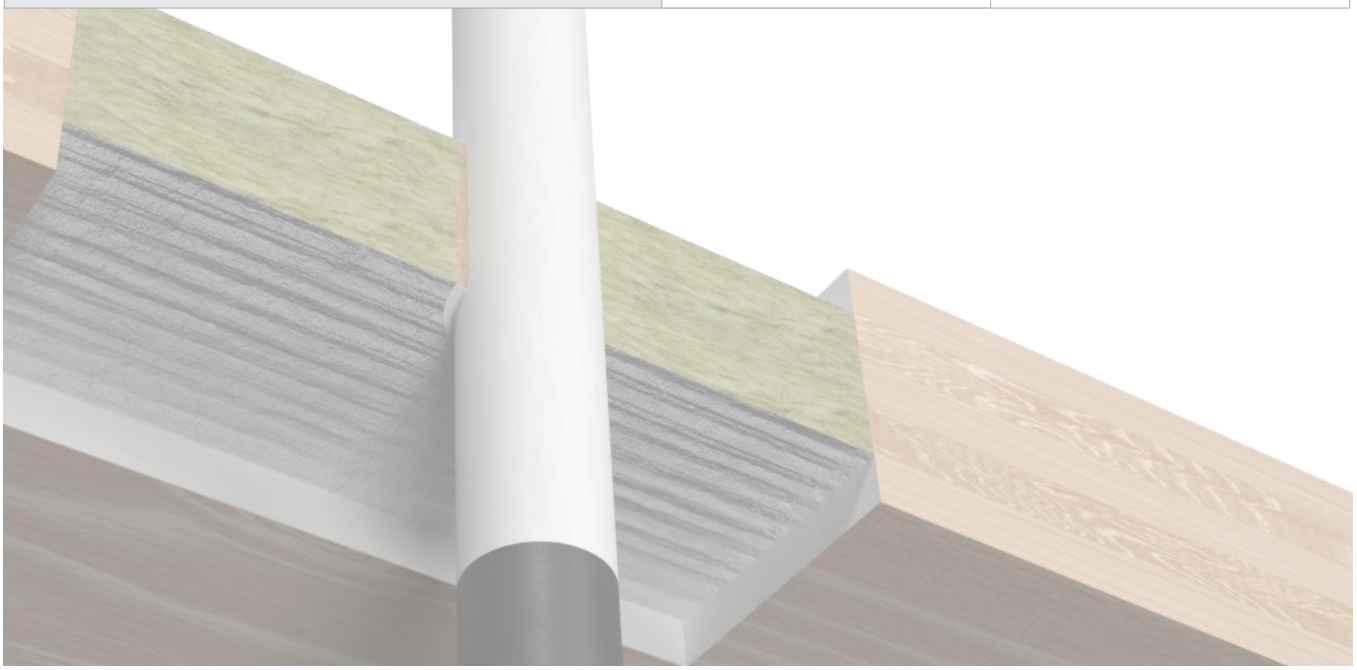


coating with FLAMMOTECT-A (dry film thickness ≥ 1.0 mm)

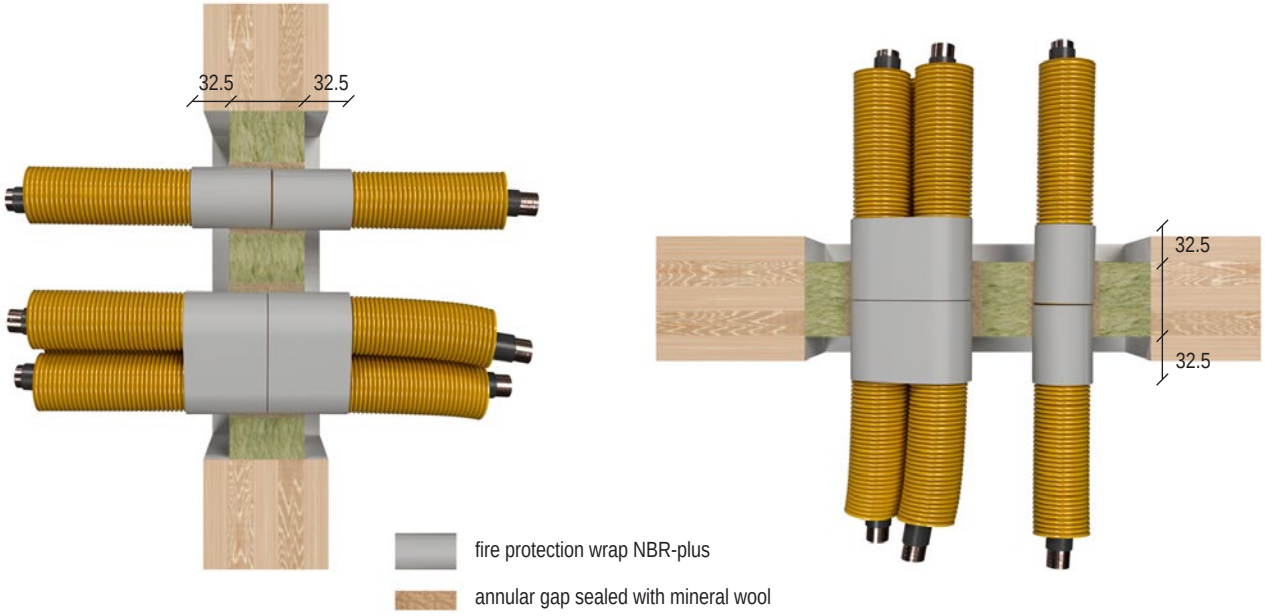
annular gap sealed with mineral wool

All specifications in mm

Wall		
Services	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class**
CommScope HELIAX®, Ø ≤ 51.1	≥ 100 mm × ≥ 1.0 mm dry film thickness	**EI 45 U/C / E 60 U/C**
RFS CELLFLEX®, Ø ≤ 50.3		EI 60 U/C
RFS RADIAFLEX®, Ø ≤ 48.2		EI 60 U/C
Floor		
Services	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class**
CommScope HELIAX®, Ø ≤ 51.1	≥ 100 mm × ≥ 1.0 mm dry film thickness	**EI 45 U/C / E 60 U/C**
RFS CELLFLEX®, Ø ≤ 50.3		**EI 45 U/C / E 60 U/C**
RFS RADIAFLEX®, Ø ≤ 48.2		EI 60 U/C



Electrical installation conduits in wall and floor seals



All specifications in mm

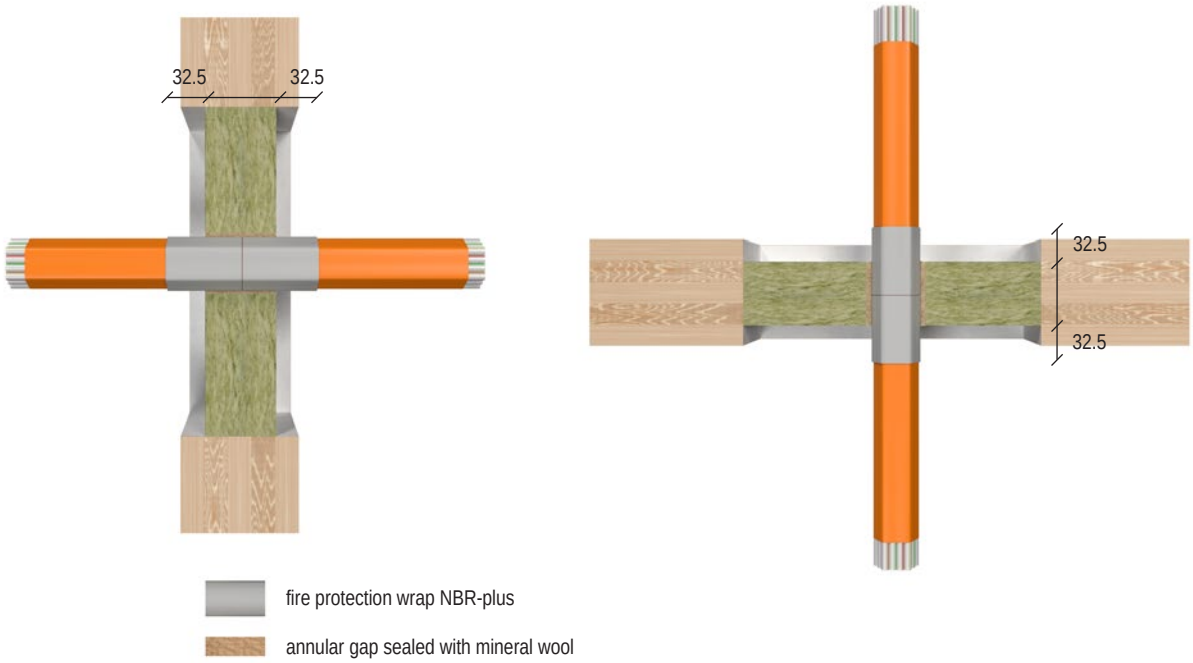
Wall

Services	Outer diameter [mm]	NBR-plus					Fire resistance class
		Wrap width [mm]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Electrical installation conduits made of plastic, single, with/without cables ≤ 21 mm	≤ 32.0	2 × 62.5 or 1 × 125.0	0	2 × 30.0 or 1 × 60.0	2 × 32.5	2	EI 60 U/U
Electrical installation conduits made of plastic, bundled, with/without cables ≤ 21 mm	≤ 100.0						

Floor

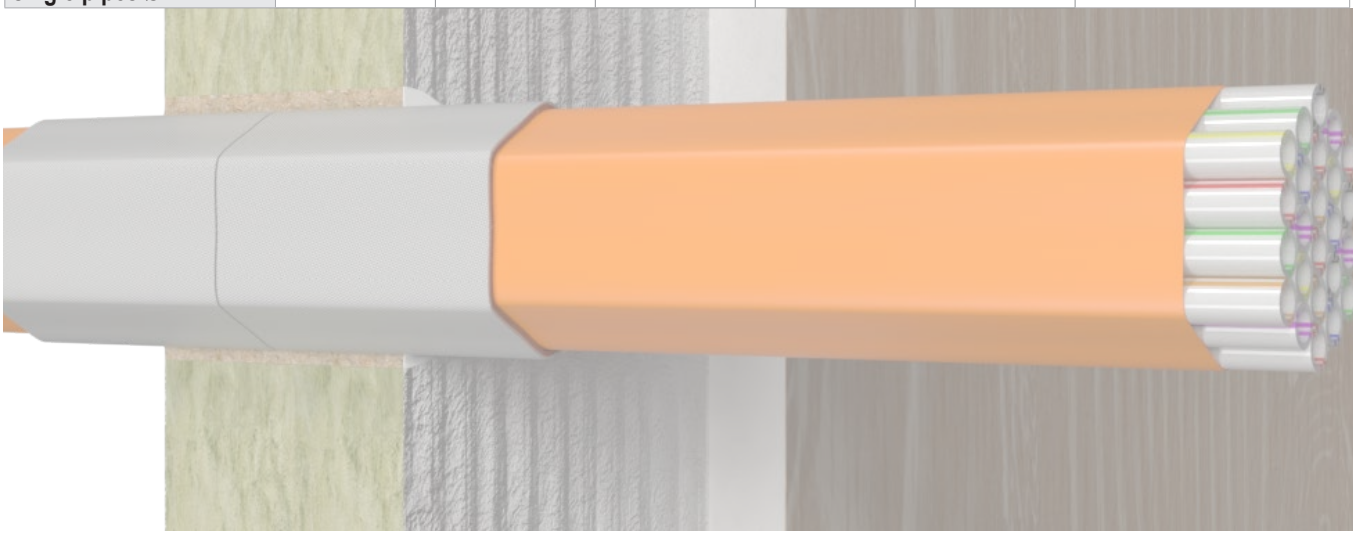
Services	Outer diameter [mm]	NBR-plus					Fire resistance class
		Wrap width [mm]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Electrical installation conduits made of plastic, single, with/without cables ≤ 21 mm	≤ 32.0	2 × 62.5 oder 1 × 125.0	0	2 × 30.0 oder 1 × 60.0	2 × 32.5	2	**EI 45 U/U /** E 60 U/U
Electrical installation conduits made of plastic, bundled, with/without cables ≤ 21 mm	≤ 100.0						

speedpipes in wall and floor seals



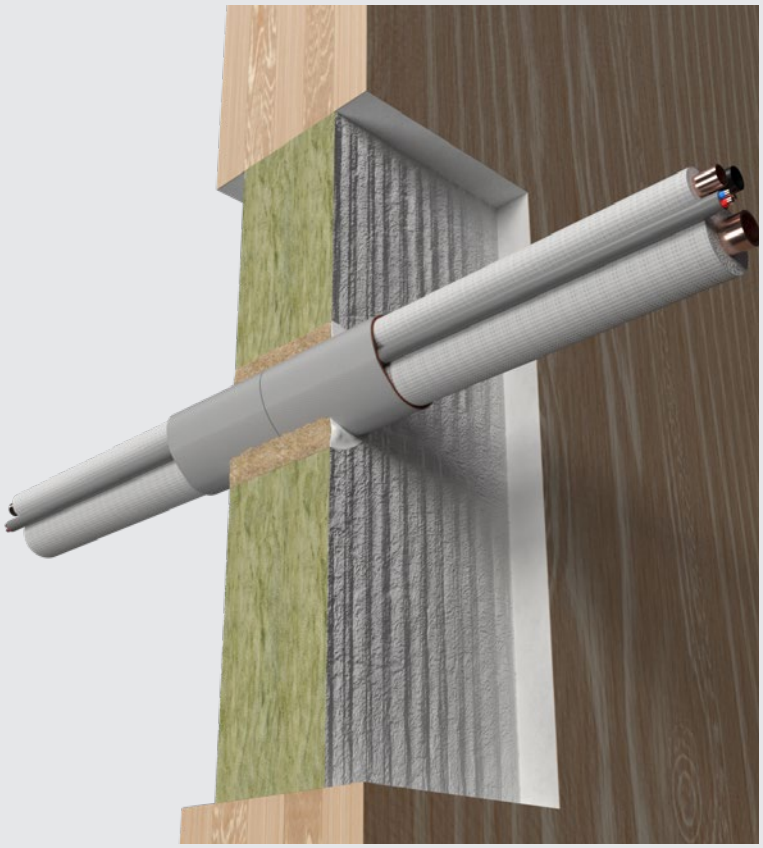
All specifications in mm

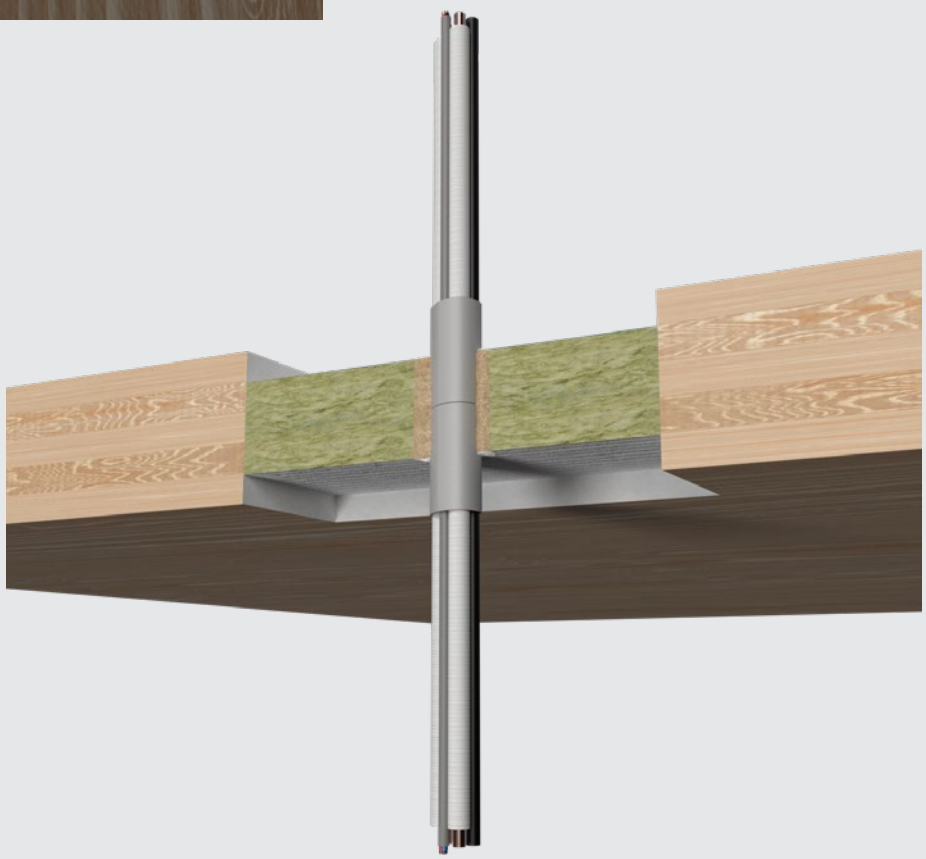
Wall						
Services	**NBR-plus**					**Fire resistance class**
	Wrap width [mm]	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal [mm]**	**Number of layers [n]**	
Bundles Ø ≤ 40 mm with single pipes Ø ≤ 7 mm	2 × 62.5 or 1 × 125.0	0	2 × 30.0 oder 1 × 60.0	2 × 32.5	1	EI 60 U/U
Bundles Ø ≤ 40 mm with single pipes Ø ≤ 14 mm						
Floor						
Services	**NBR-plus**					**Fire resistance class**
	Wrap width [mm]	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal [mm]**	**Number of layers [n]**	
Bundles Ø ≤ 40 mm with single pipes Ø ≤ 7 mm	2 × 62.5 or 1 × 125.0	0	2 × 30.0 or 1 × 60.0	2 × 32.5	1	EI 60 U/U
Bundles Ø ≤ 40 mm with single pipes Ø ≤ 14 mm						



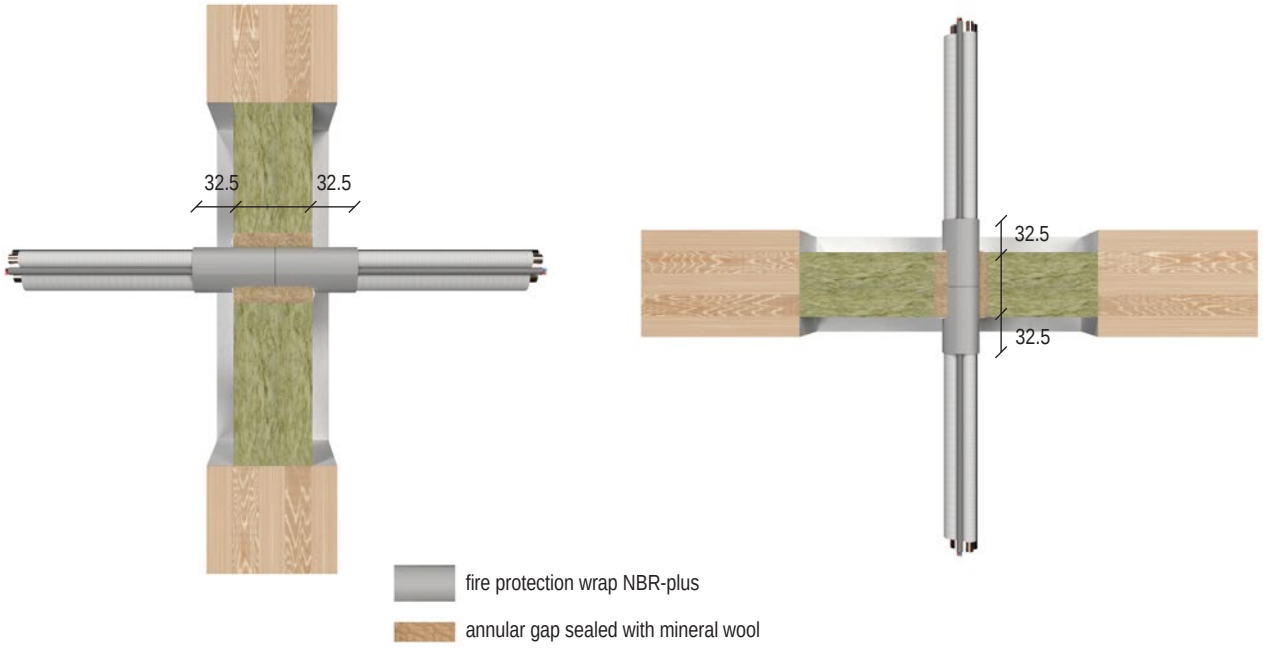
HVAC split line combinations

- **Seals with fire protection wrap NBR-plus**





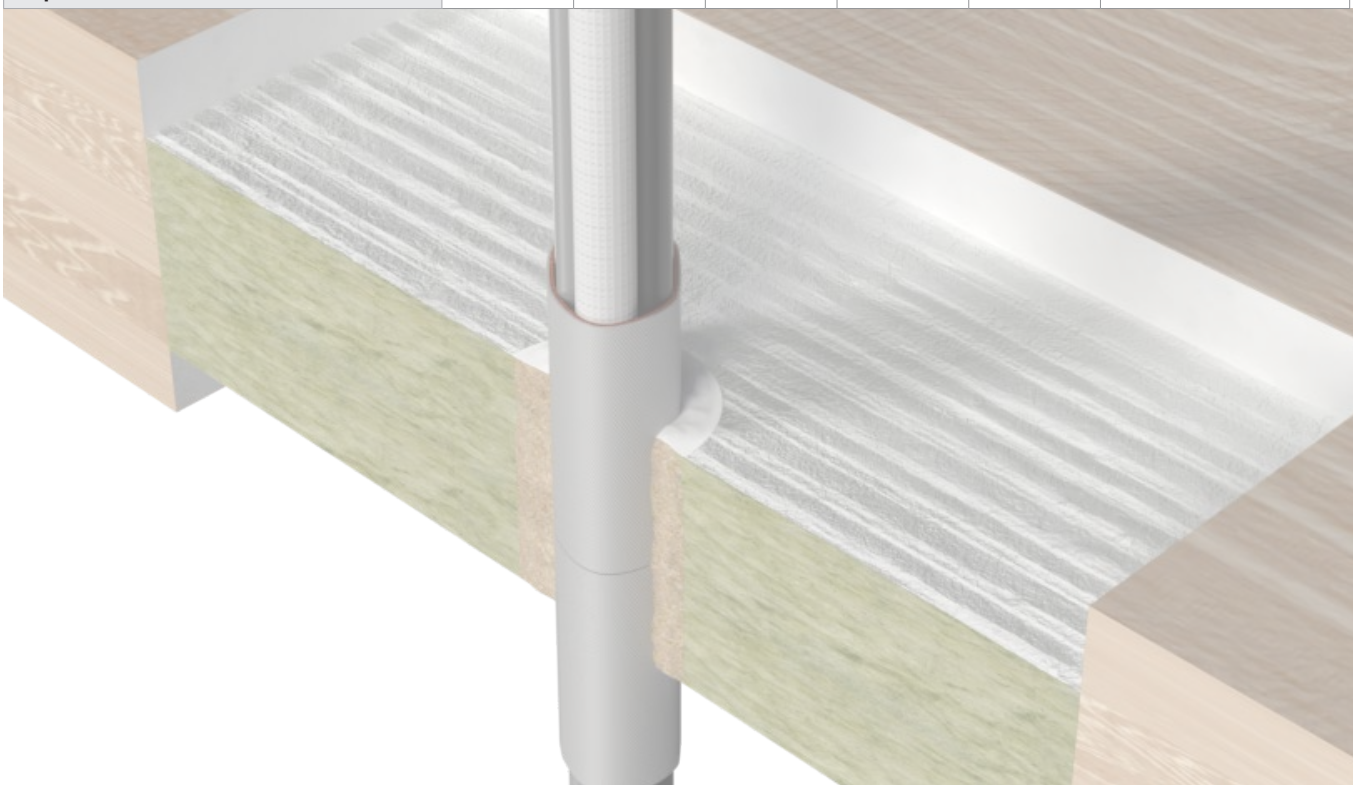
HVAC split line combinations in wall and floor seals



All specifications in mm

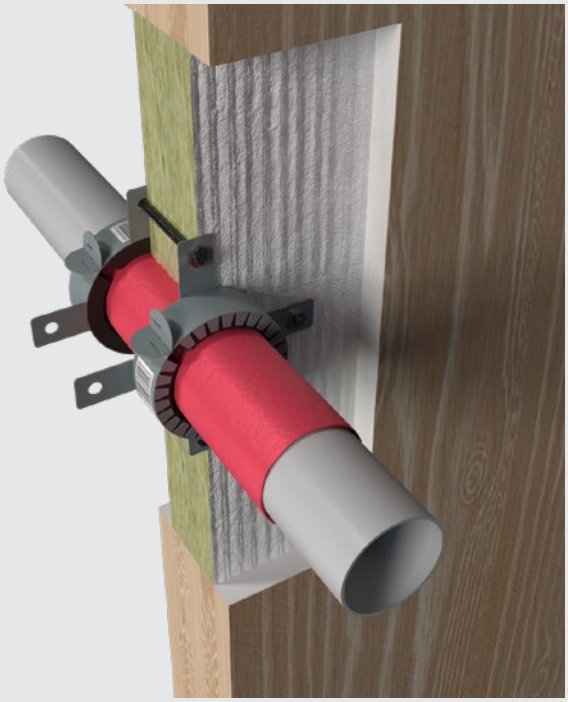
Wall/floor

Services	NBR-plus					Fire resistance class
	Wrap width [mm]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
up to 2 copper pipes Ø ≤ 18.0 mm, pipe wall thickness 1.0–14.2 mm, 9 mm PE foam, + 1 pipe PVC-U/PVC-C Ø ≤ 25.0 mm, pipe wall thickness 1.5 mm, + up to 3 cables Ø ≤ 14.0 mm	2 × 62.5 or 1 × 125	0	2 × 30 or 1 × 60	2 × 32.5	2	EI 60

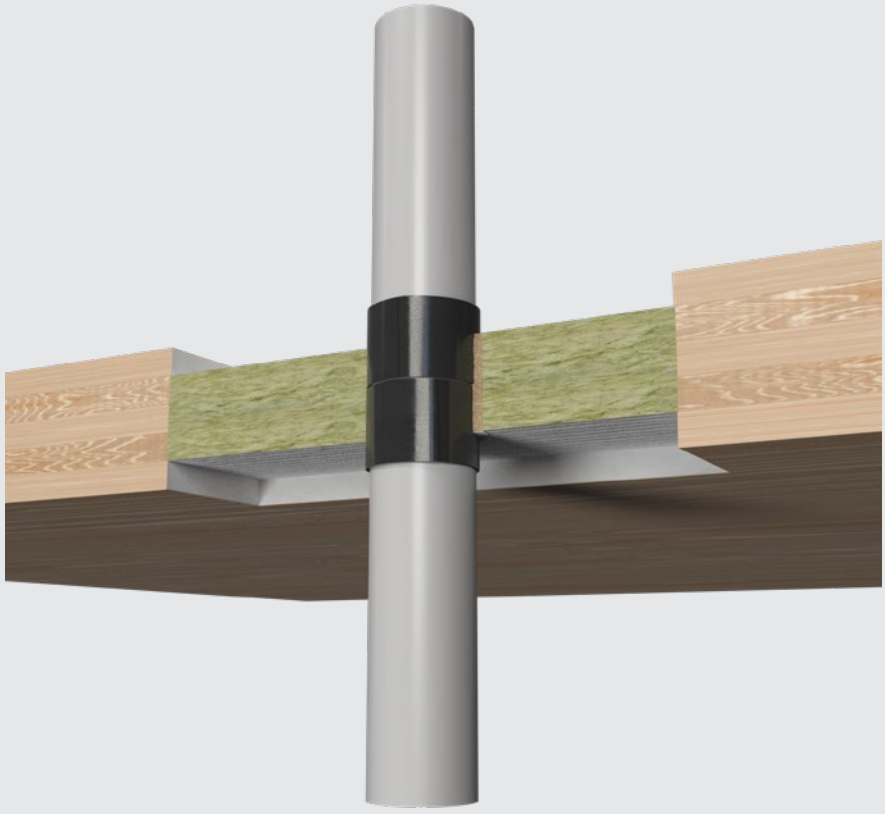


Combustible pipes

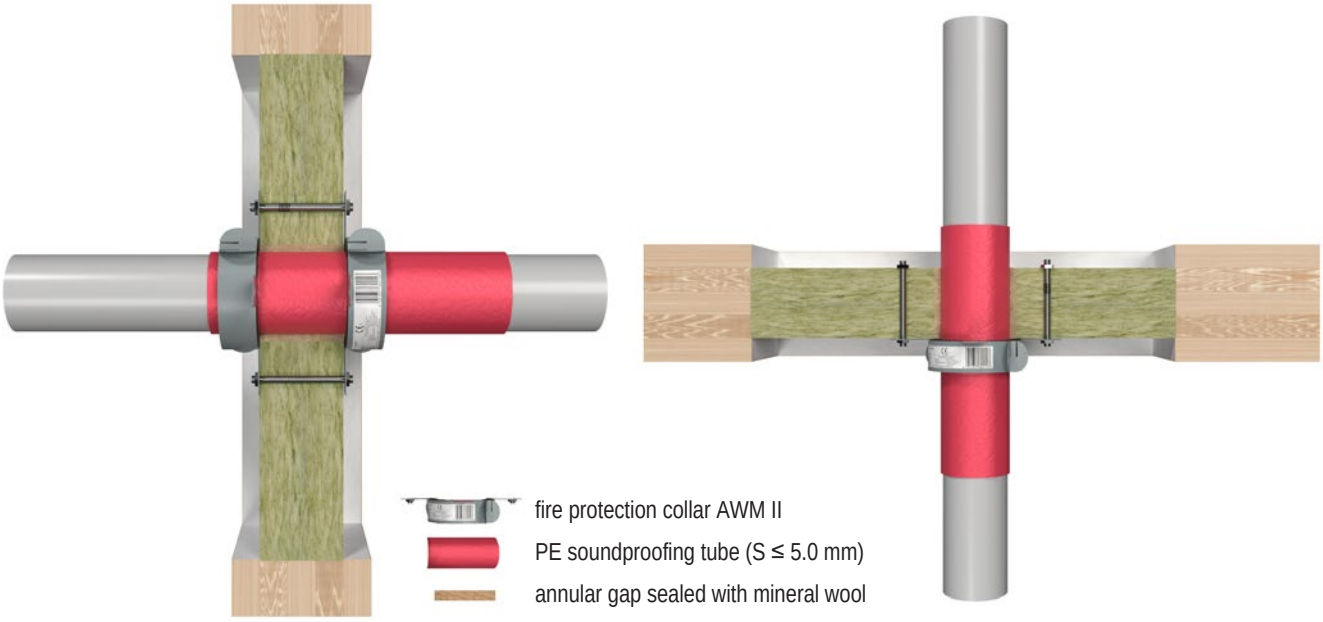
- **Seals with fire protection collar AWM II**



- **Seals with fire protection wrap KSL-W**



Combustible pipes with pipe collar in wall and floor seals



All specifications in mm

Wall – standard pipes

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Pipe collar	Fire resistance class
PVC-U, PVC-C	32.0–50.0	1.5–5.6	AWM II on both sides	EI 90 U/U
	63.0–75.0	1.6–6.6		
	90.0–110.0	1.8–8.1		
	125.0–160.0	3.2–11.8		
PE-HD, ABS, SAN + PVC	32.0–50.0	1.8–4.6		EI 90 U/U
	63.0–75.0	2.2–6.6		EI 60 U/U / E 90 U/U
		5.1–6.6		EI 90 U/U
	90.0–110.0	2.7–10.0		EI 60 U/U / E 90 U/U
		10.0		EI 90 U/U
	125.0–160.0	4.0–14.6		EI 90 U/U
PP-H	32.0–50.0	1.8–4.6		EI 90 U/U
	63.0–75.0	2.2–6.6		
	90.0–110.0	2.7–10.0		
	125.0–160.0	4.0–14.6		

Wall – non-standard pipes

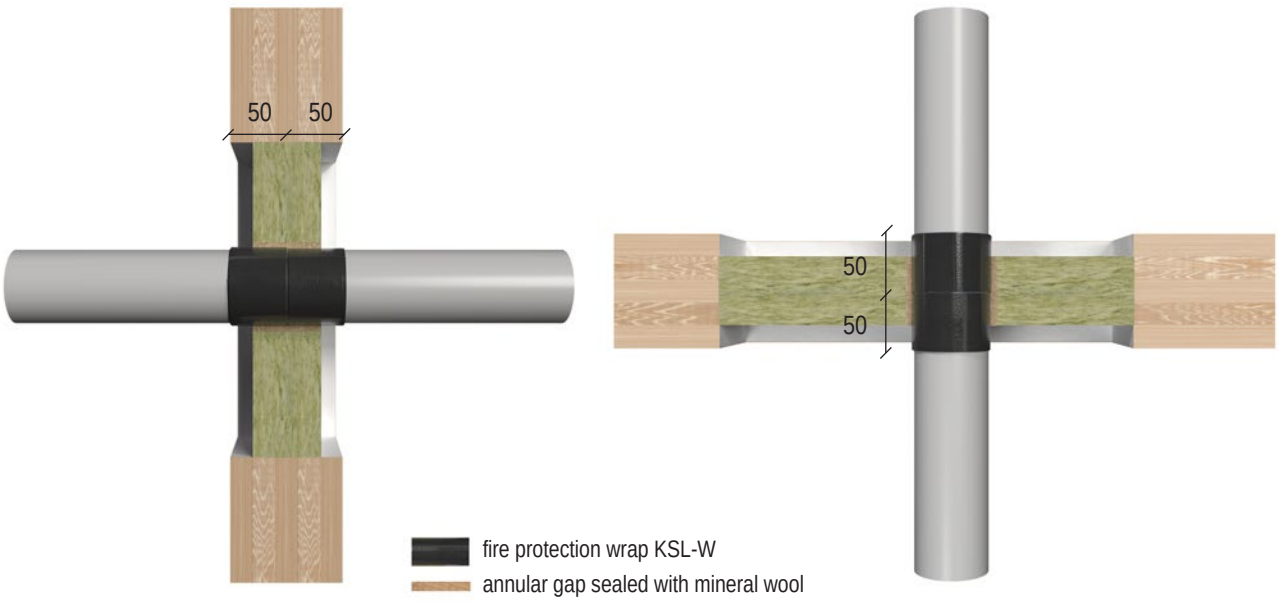
Type of pipe	Outer diameter [mm]	Pipe collar	Fire resistance class
REHAU RAUPIANO LIGHT, CONEL DRAIN	≤ 75.0	AWM II on both sides	EI 90 U/U
	90.0		EI 60 U/U / E 90 U/U
	110.0		EI 90 U/U
Geberit Silent-db20	≤ 160.0		EI 90 U/U
Geberit Silent-PP	≤ 160.0		EI 90 U/U
Geberit Silent-Pro	≤ 160.0		EI 90 U/U
POLOPLAST POLO-KAL 3S POLOPLAST POLO-KAL NG POLOPLAST POLO-KAL XS	≤ 160.0		EI 90 U/U

Wall – non-standard pipes			
Type of pipe	**Outer diameter [mm]**	**Pipe collar**	**Fire resistance class**
REHAU RAUPIANO PLUS	50.0	AWM II on both sides	EI 90 U/U
	75.0		EI 60 U/U / E 90 U/U
	≤ 110.0		EI 90 U/U
Wavin AS+	≤ 160.0		EI 90 U/U

Floor – standard pipes				
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Pipe collar**	**Fire resistance class**
PVC-U, PVC-C	32.0–50.0	1.5–5.6	AWM II on underside	EI 60 U/U / E 90 U/U
	63.0–75.0	1.6–6.6		EI 60 U/U / E 90 U/U
	90.0–110.0	1.8–7.0/8.1		EI 60 U/U / E 90 U/U
	125	2.5–9.2		EI 60 U/U / E 90 U/U
	140.0–160.0	3.2–11.8		EI 60 U/U / E 90 U/U
PE-HD, ABS, SAN + PVC	32.0–50.0	1.8–4.6		EI 60 U/U
	63.0–75.0	2.3–6.6		EI 90 U/U
	90.0	2.8–8.2		EI 90 U/U
	110.0	3.4–10.0		EI 90 U/U
	125.0– ≤ 160.0	4.0–14.6		EI 60 U/U
PP-H	32.0–50.0	1.8–4.6		EI 60 U/U
	63.0–75.0	1.9–8.6		EI 90 U/U
	90.0	2.2–8.2		EI 90 U/U
	110.0	2.7–10.0		EI 90 U/U
	125.0	3.1–3.9		EI 90 U/U
	125.0–160.0	4.0–14.6		EI 60 U/U

Floor – non-standard pipes			
Type of pipe	**Outer diameter [mm]**	**Pipe collar**	**Fire resistance class**
Geberit Silent-db20	≤ 160	AWM II on underside	EI 90 U/U
Geberit Silent-PP	≤ 160		EI 90 U/U
Geberit Silent-Pro	≤ 110		EI 90 U/U
	≤ 160		EI 60 U/U / E 90 U/U

Combustible pipes with fire protection wrap in wall and floor seals



All specifications in mm

Wall – standard pipes

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	KSL-W						Fire resistance class
			Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
PVC-U, PVC-C	32.0–50.0	2.4–5.6	50	2	0	2 × 30	2 × 20	2	EI 60 U/U
	63.0–75.0	2.8–4.6						3	EI 60 U/U
	90.0–110.0	3.2						4	EI 60 U/U
PE-HD, ABS, SAN + PVC	32.0–50.0	1.8–4.6						2	EI 60 U/U
	63.0–75.0	2.2–5.4						3	EI 60 U/U
		> 5.4–6.9						4	EI 30 U/U
	90.0–110.0	2.7–6.6						4	EI 60 U/U
		> 6.6–10.0						4	EI 30 U/U
PP-H	32.0–50.0	2.0–6.9						2	EI 90 U/U
	63.0–75.0	2.2–8.1						3	EI 60 U/U
		2.6–5.5						3	EI 90 U/U
	90.0	2.9–4.5						4	EI 90 U/U
	90.0–110.0	2.7–10.0						4	EI 60 U/U
	110.0	3.4						4	EI 90 U/U

Wall – non-standard pipes

Type of pipe	Outer diameter [mm]	KSL-W						Fire resistance class
		Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
REHAU RAUPIANO LIGHT, CONEL DRAIN	50	50	2	0	2 × 30	2 × 20	2	EI 90 U/U
	≤ 110.0						4	EI 90 U/U
Geberit Silent-db20	56						2	EI 90 U/U
	≤ 110.0						4	
Geberit Silent-PP	50						2	EI 60 U/U / E 90 U/U
	≤ 110.0						4	
Geberit Silent-Pro	50						2	EI 60 U/U / E 90 U/U
	≤ 110.0						4	

Wall – non-standard pipes

Type of pipe	Outer diameter [mm]	KSL-W						Fire resistance class
		Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
POLOPLAST POLO-KAL 3S	75.0	50	2	0	2 × 30	2 × 20	3	EI 60 U/U / E 90 U/U
	≤ 110.0						4	
POLOPLAST POLO-KAL NG POLOPLAST POLO-KAL XS	50						2	EI 90 U/U
	≤ 110.0						4	
REHAU RAUPIANO PLUS	50.0						2	EI 90 U/U
	≤ 110.0						4	EI 90 U/U
Wavin AS+	50						2	EI 90 U/U
	≤ 110.0						4	

Floor – standard pipes

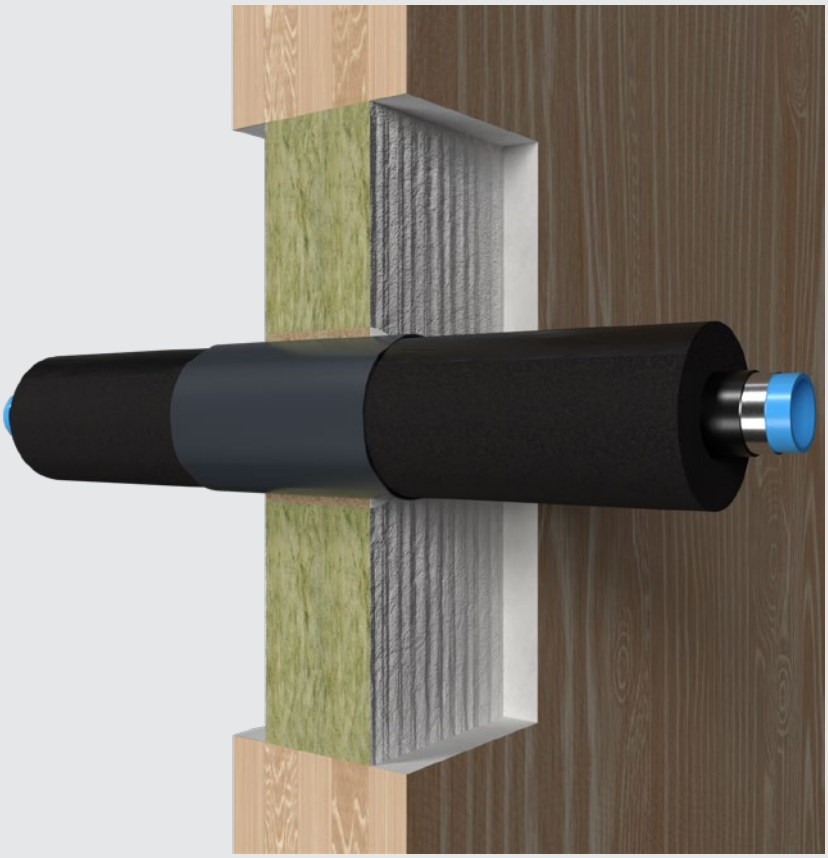
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	KSL-W						Fire resistance class
			Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
PVC-U, PVC-C	32.0–50.0	2.4	50	2	0	2 × 30	2 × 20	2	EI 60 U/U
		2.4–3.7							EI 30 U/U
	63.0	3.7–5.5						3	EI 30 U/U
	75.0	4.8–5.5						3	EI 30 U/U
	90.0	6.0–6.5						4	EI 30 U/U
	110.0	8.1						4	EI 30 U/U
PE-HD, ABS, SAN + PVC	32.0–50.0	1.8–4.6						2	EI 90 U/U
	63.0–75.0	2.2–6.9						3	EI 90 U/U
	90.0–110.0	2.7–10.0						4	EI 90 U/U
PP-H	32.0	6.9						2	EI 90 U/U
	32.0–50.0	2.0–6.9						2	EI 60 U/U / E 90 U/U
	63.0–75.0	2.3–8.1						3	EI 60 U/U / E 90 U/U
		5.1–6.7						3	EI 90 U/U
	90.0–110.0	2.7–6.3						4	EI 90 U/U
		2.7–10.0						4	EI 60 U/U / E 90 U/U

Floor – non-standard pipes

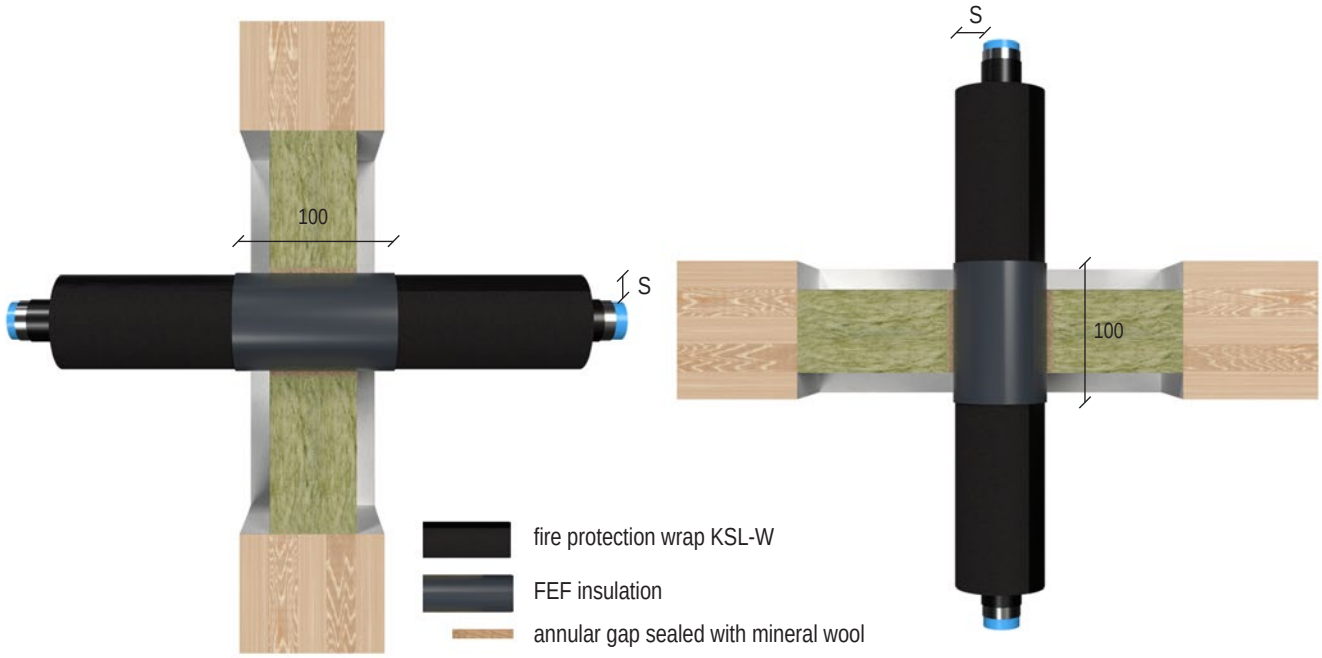
Type of pipe	Outer diameter [mm]	KSL-W						Fire resistance class
		Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
REHAU RAUPIANO LIGHT, CONEL DRAIN	50	50	2	0	2 × 30	2 × 20	2	EI 60 U/U / E 90 U/U
Geberit Silent-db20	56						2	EI 90 U/U
	≤ 110						4	EI 90 U/U
Geberit Silent-PP	50						2	EI 60 U/U / E 90 U/U
	≤ 110						4	EI 60 U/U / E 90 U/U
Geberit Silent-Pro	50						2	EI 90 U/U
	≤ 110						4	EI 90 U/U
POLOPLAST POLO-KAL 3S	75						3	EI 60 U/U / E 90 U/U
	≤ 110						4	EI 60 U/U / E 90 U/U
POLOPLAST POLO-KAL NG POLOPLAST POLO-KAL XS	50						2	EI 60 U/U
	≤ 110						4	EI 60 U/U
REHAU RAUPIANO PLUS	50						2	EI 60 U/U / E 90 U/U
Wavin AS+	50						2	EI 90 U/U
	≤ 110						4	EI 90 U/U

Multilayer pipes

- **Seals with fire protection wrap KSL-W**



Multilayer pipes with fire protection wrap in wall and floor seals



All specifications in mm

Wall

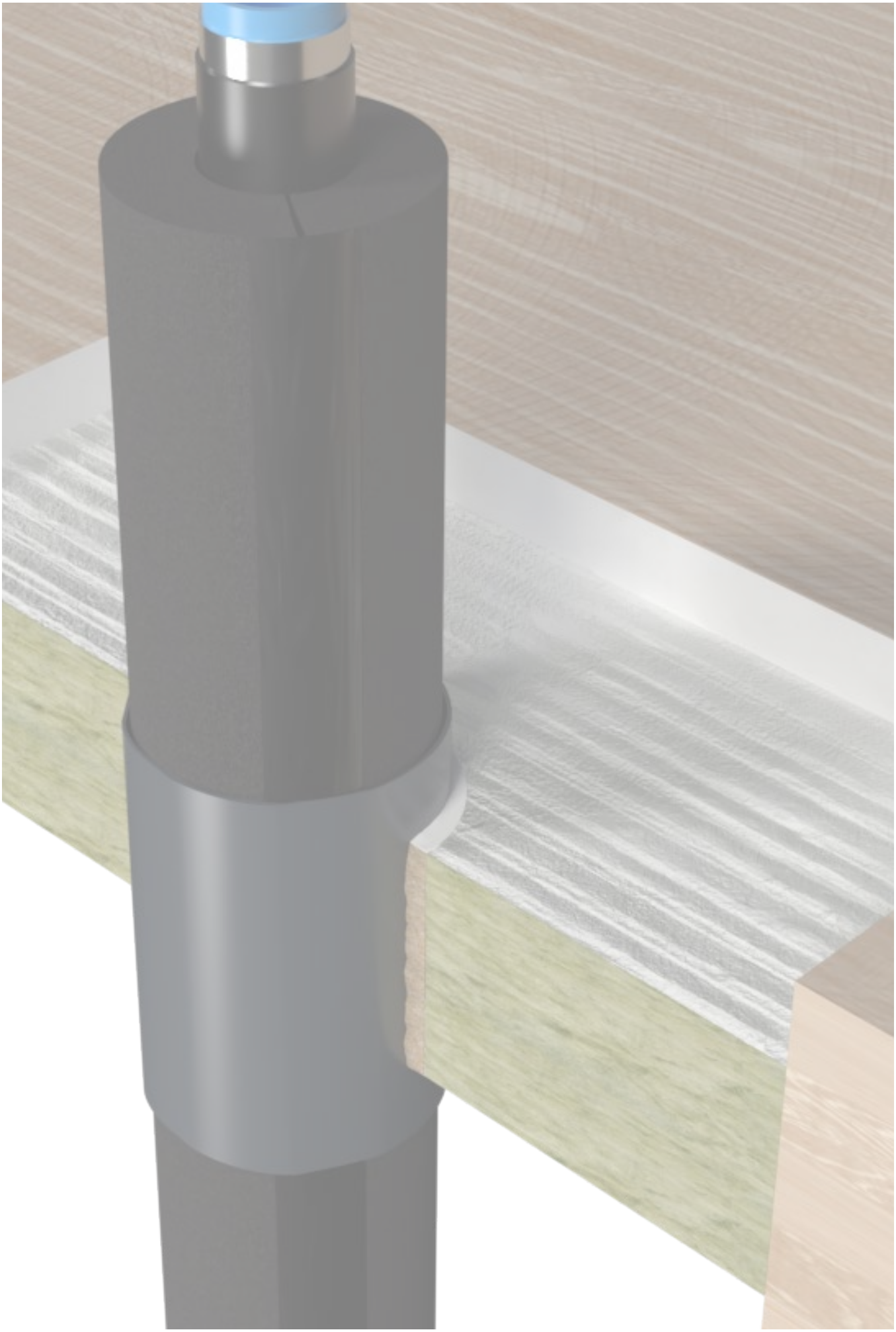
Type of pipe	Outer diameter [mm]	Pipe wall thick-ness [mm]	Type of insula-tion	Insu-lation length [mm]	Insulation thickness S [mm]	KSL-W						Fire resistance class
						Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Geberit Mepla	16.0	2.25	FEF	CS	8.0–35.0	50	2	0	2 × 30	2 × 20	1	EI 60 U/C / E 90 U/C
	20.0	2.5			16.0–35.0						1	EI 60 U/C / E 90 U/C
	26.0	3.0			16.0–35.0						1	EI 60 U/C / E 90 U/C
	32.0	3.0			16.0–35.0						1	EI 60 U/C / E 90 U/C
	40.0	3.5			13.5–39.0						2	EI 60 U/C / E 90 U/C
	50.0	4.5			14.0–39.0						2	EI 60 U/C / E 90 U/C
	63.0	4.5			14.0–40.5						2	EI 60 U/C / E 90 U/C
	75.0	4.7			14.0–40.5						2	EI 60 U/C / E 90 U/C
Geberit FlowFit	16.0	2.0	FEF	CS	8.5–33.5	50	2	0	2 × 30	2 × 20	1	EI 60 U/C / E 90 U/C
	20.0	2.0			13.0–33.5						1	EI 60 U/C / E 90 U/C
	26.0	2.5			13.0–33.5						1	EI 60 U/C / E 90 U/C
	32.0	2.8			13.0–33.5						1	EI 60 U/C / E 90 U/C
	40.0	3.0			16.5–40.5						2	EI 60 U/C / E 90 U/C
	50.0	3.8			17.0–40.5						2	EI 60 U/C / E 90 U/C
	63.0	4.0			17.0–40.5						2	EI 60 U/C / E 90 U/C
	75.0	4.6			17.0–40.5						2	EI 60 U/C / E 90 U/C

Wall

Type of pipe	Outer diameter [mm]	Pipe wall thickness [mm]	Type of insulation	Insulation length [mm]	Insulation thickness S [mm]	KSL-W						Fire resistance class
						Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
KE KELIT KELOX KM 100, KE KELIT KELOX KM 110	16.0	2.0	FEF	≥ 250 on each side	8.0–35.0	50	2	0	2 × 30	2 × 20	1	EI 60 U/C / E 90 U/C
	18.0	2.0			8.0–35.0						1	EI 60 U/C / E 90 U/C
	20.0	2.25			8.5–35.0						1	EI 60 U/C / E 90 U/C
	25.0	2.5			8.5–35.0						1	EI 60 U/C / E 90 U/C
	32.0	3.0			9.0–35.0						1	EI 60 U/C / E 90 U/C
	40.0	4.0			13.0–40.5						2	EI 60 U/C / E 90 U/C
	50.0	4.5		≥ 500 on each side	13.0–40.5						2	EI 60 U/C / E 90 U/C
	63.0	6.0			13.0–40.5						2	EI 60 U/C / E 90 U/C
	75.0	7.5			13.0–40.5						2	EI 60 U/C / E 90 U/C

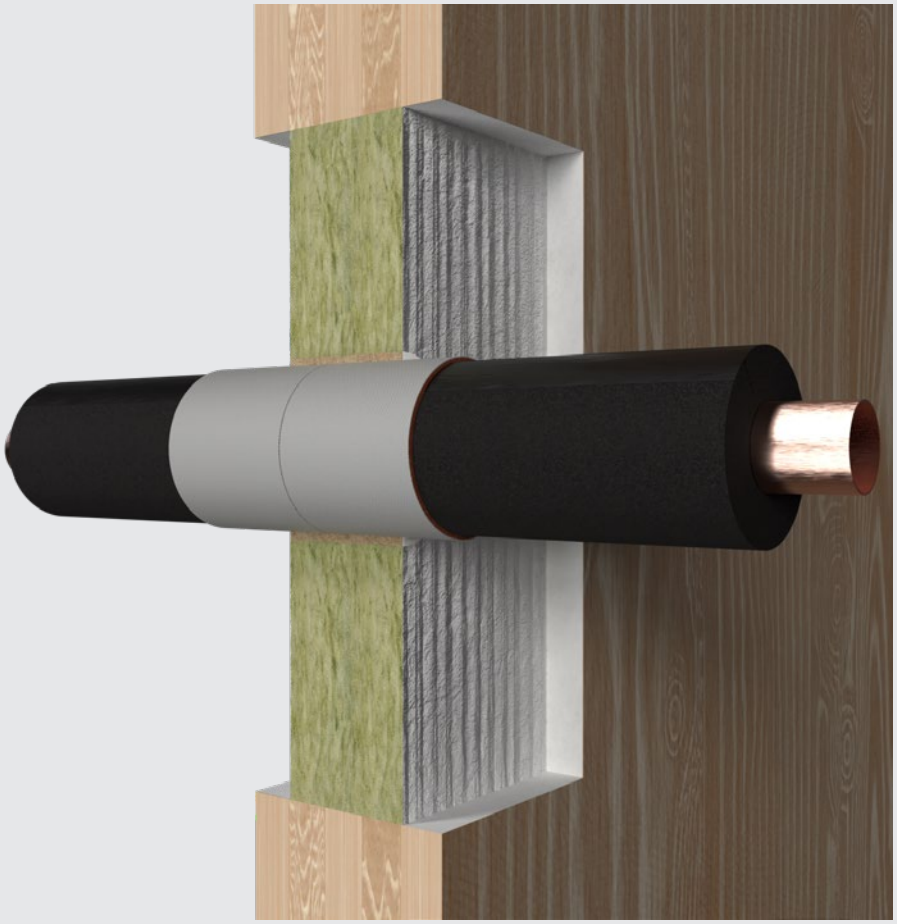
Floor

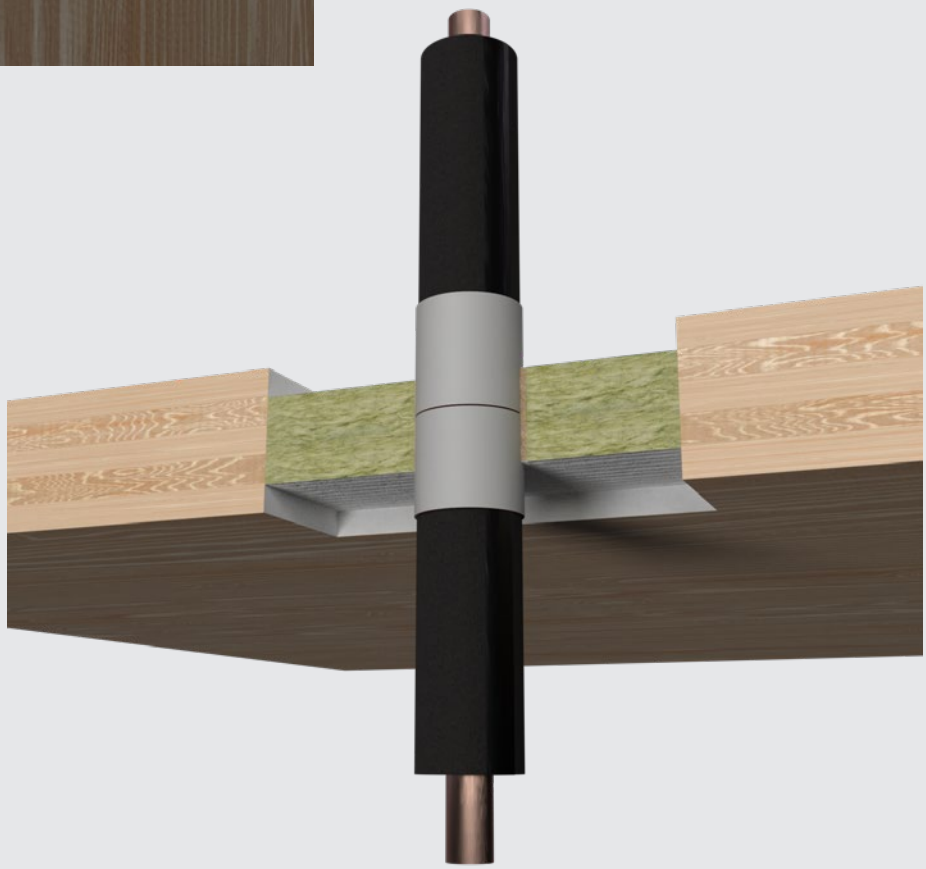
Type of pipe	Outer diameter [mm]	Pipe wall thickness [mm]	Type of insulation	Insulation length [mm]	Insulation thickness S [mm]	KSL-W						Fire resistance class
						Wrap width [mm]	Number of wraps [n]	Overlap	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
90 minutes												
Geberit Mepla	≥ 40.0 – ≤ 63.0	3.5–4.5	FEF	CS	35.0–39.0	50	2	0	2 × 30	2 × 20	2	EI 90 U/C
	63.0	4.5										
Geberit FlowFit	16.0	2.0		≥ 250 on each side	8.5–35.0						1	
	20.0	2.0			8.5–35.0						1	
	26.0	2.5			13.0–35.0						1	
	32.0	2.8			13.0–35.0						1	
	40.0	3.0			20.5–40.5						2	
	50.0	3.8		≥ 500 on each side	40.5						2	
	63.0	4.0			40.5						2	
	75.0	4.6			40.5						2	
60 minutes												
Geberit Mepla	16.0	2.25	FEF	CS	8.0–35.0	50	2	0	2 × 30	2 × 20	1	EI 60 U/C / E 90 U/C
	20.0	2.5			8.0–35.0						1	
	26.0	3.0			8.0–35.0						1	
	32.0				8.0–35.0						1	
	40.0	3.5			9.0–40.5						2	
	50.0	4.5			14.0–40.5						2	
	63.0	4.5			14.0–40.5						2	
	75.0	4.7			17.0–40.5						2	



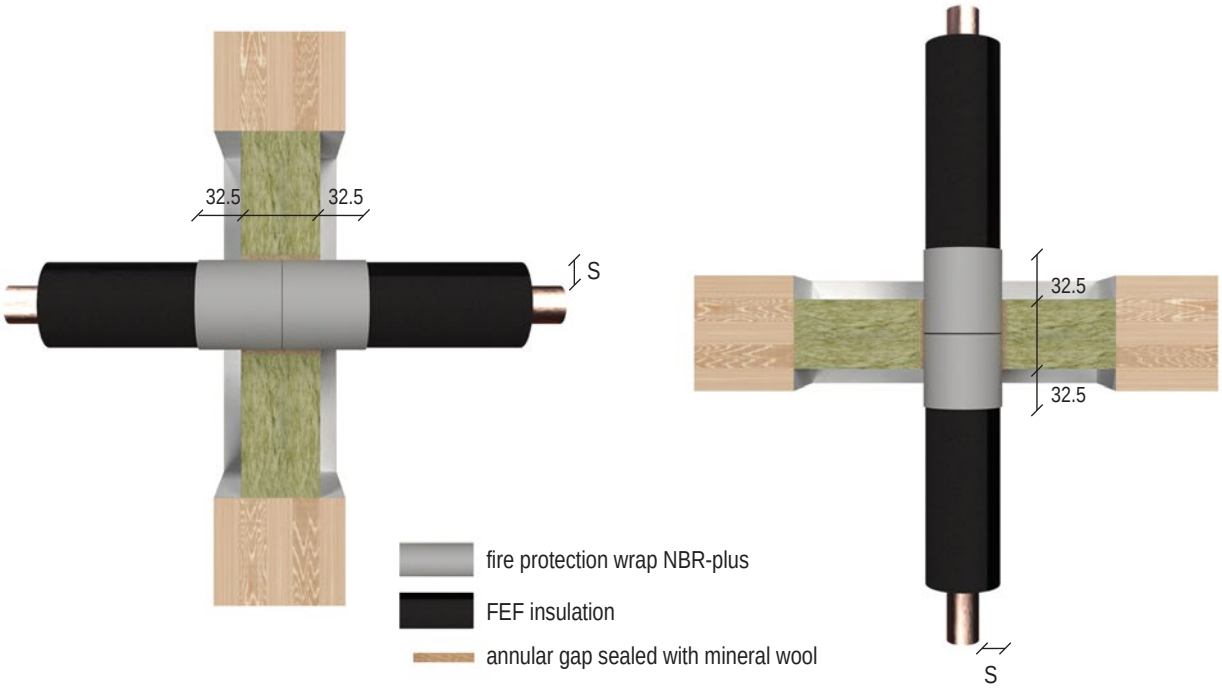
Non-combustible pipes

- **Seals with fire protection wrap NBR-plus**





Non-combustible pipes with fire protection wrap in wall and floor seals



All specifications in mm

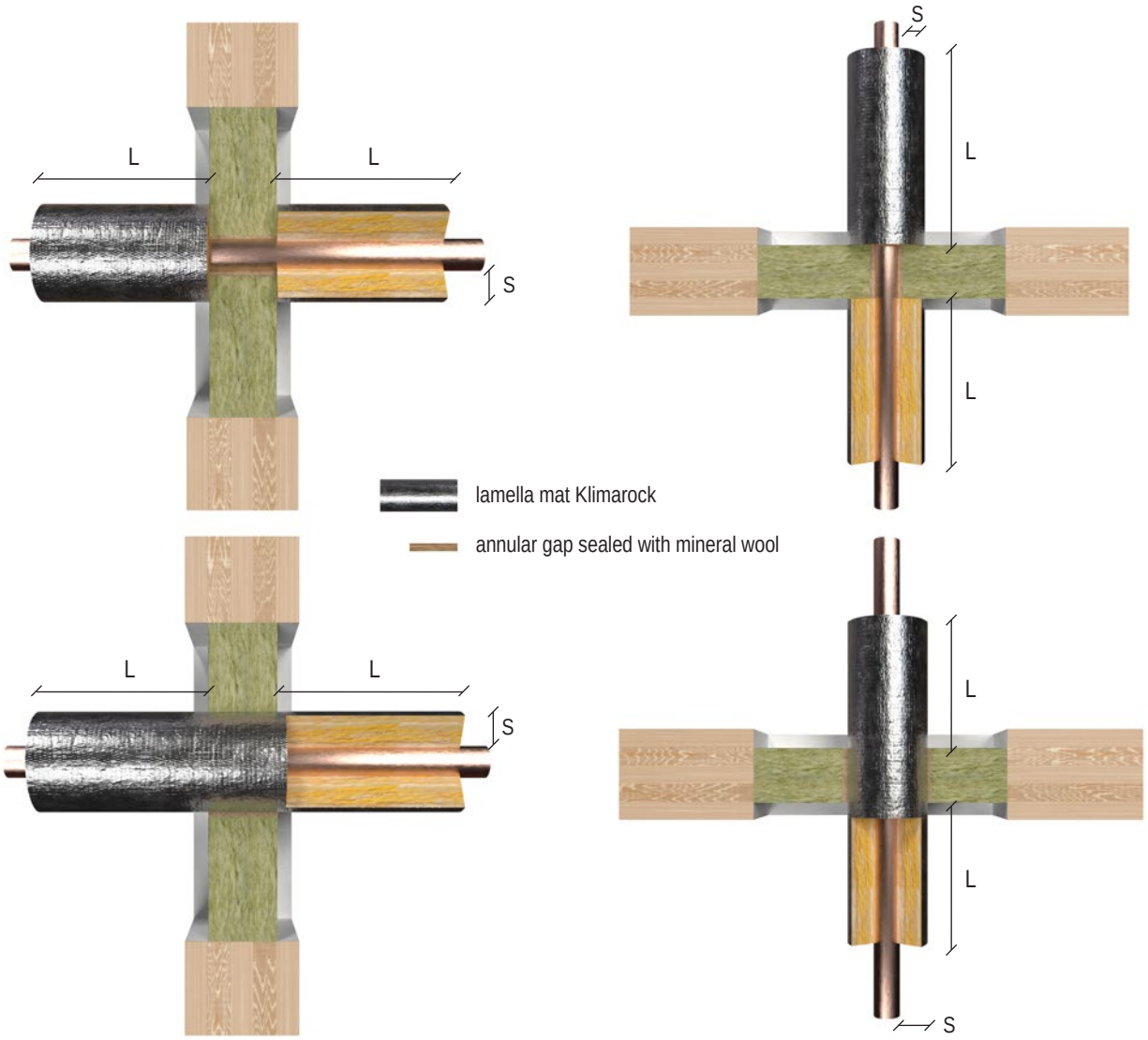
Wall

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		NBR-plus					Fire resistance class
			Insulation length	Insulation thickness [mm]	Insulation length [mm]	Insulation thickness [mm]	Wrap width [mm]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
60 minutes												
Copper, steel, stainless steel, cast iron	≤ 15.0	0.6–14.2	CS	10.0–38.0	–	–	2 × 62.5 or 1 × 125	0	2 × 30 or 1 × 60	2 × 32.5	2	EI 60 U/C
	≤ 42.0			12.0–38.0	–	–					2	
	≤ 60.0			19.0–38.0	–	–					2	
	≤ 88.9			22.5–38.0	–	–					2	
Steel, stainless steel, cast iron	≤ 88.9			15.5–38.0	–	–					2	
	≤ 114.3			15.0–38.0	–	–					2	
	≤ 159.0			25.0–38.0	250.0	19.0					2	
	≤ 219.1			25.0–38.0	250.0	38.0					2	

Wall												
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		NBR-plus					Fire resistance class
			Insulation length	Insulation thickness [mm]	Insulation length [mm]	Insulation thickness [mm]	Wrap width [mm]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
30 minutes												
Copper, steel, stainless steel, cast iron	≤ 42.0	0.6–14.2	CS	10.0–38.0	–	–	2 × 62.5 or 1 × 125	0	2 × 30 or 1 × 60	2 × 32.5	2	EI 30 U/C
	≤ 88.9			18.0–38.0	–	–					2	

Floor												
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		NBR-plus					Fire resistance class
			Insulation length	Insulation thickness [mm]	Insulation length [mm]	Insulation thickness [mm]	Wrap width [mm]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
60 minutes												
Copper, steel, stainless steel, cast iron	≤ 15.0	0.6–14.2	CS	10.0–38.0	–	–	2 × 62.5 or 1 × 125	0	2 × 30 or 1 × 60	2 × 32.5	2	EI 60 U/C
	≤ 42.0			12.0–38.0	–	–					2	
	> 42.0 – ≤ 88.9			19.0	–	–					2	
	≤ 88.9			22.5–38.0	–	–					2	
Steel, stainless steel, cast iron	≤ 15.0			10.0–38.0	–	–					2	
	≤ 42.0			15.0–38.0	–	–					2	
	≤ 88.9			18.5–38.0	–	–					2	
	≤ 114.3	3.2–14.2		18.5–38.0	–	–					2	
	≤ 159.0	4.0–14.2		25.0–38.0	250	19					2	
	≤ 219.1	4.5–14.2		25.0–38.0	250	38					2	
30 minutes												
Copper, steel, stainless steel, cast iron	≤ 42.0	0.6–14.2	CS	10.0–38.0	–	–	2 × 62.5 oder 1 × 125	0	2 × 30 or 1 × 60	2 × 32.5	2	EI 30 U/C
	≤ 88.9			19.0–38.0	–	–					2	

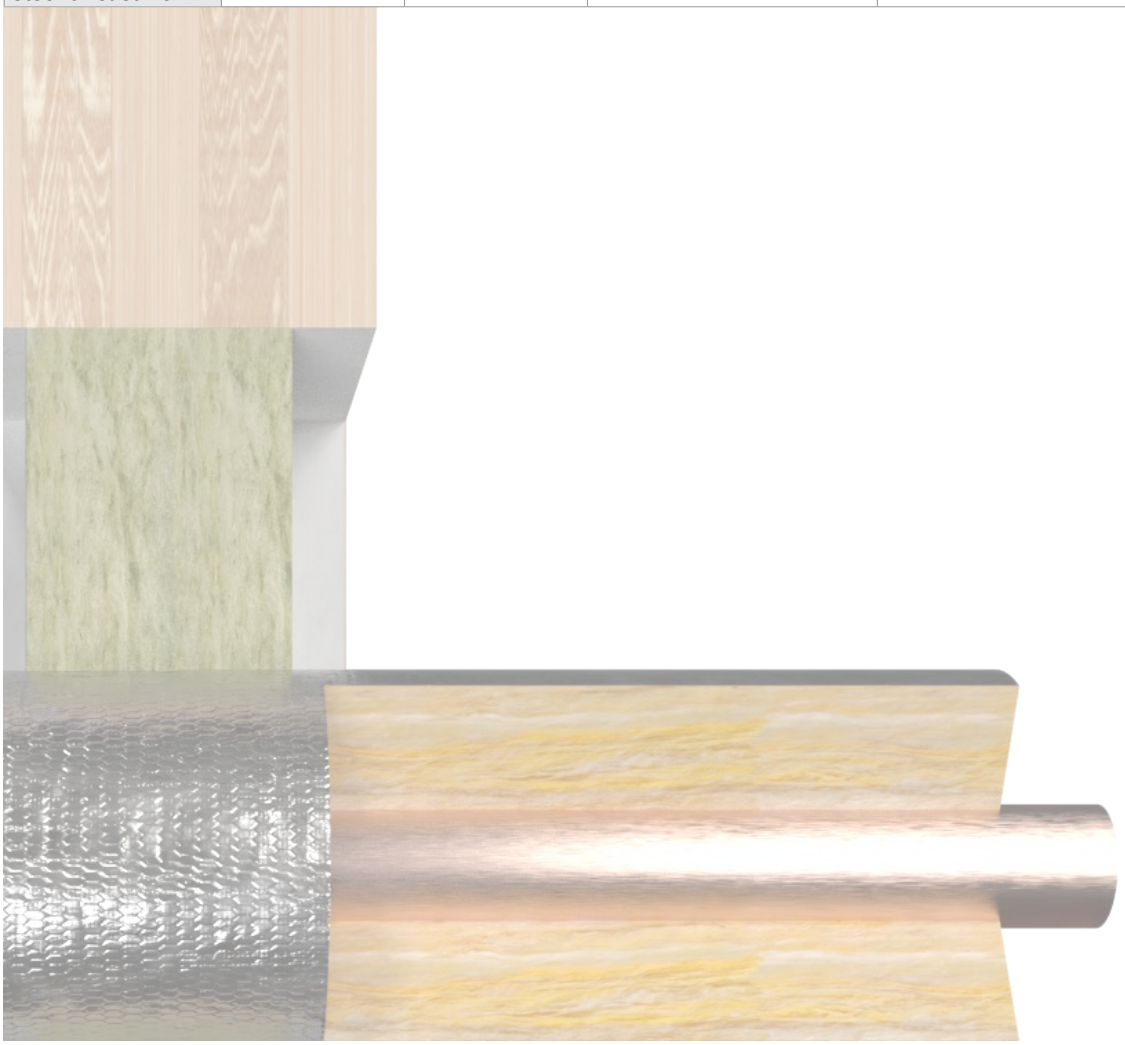
Non-combustible pipes with lamella mat in wall and floor seals



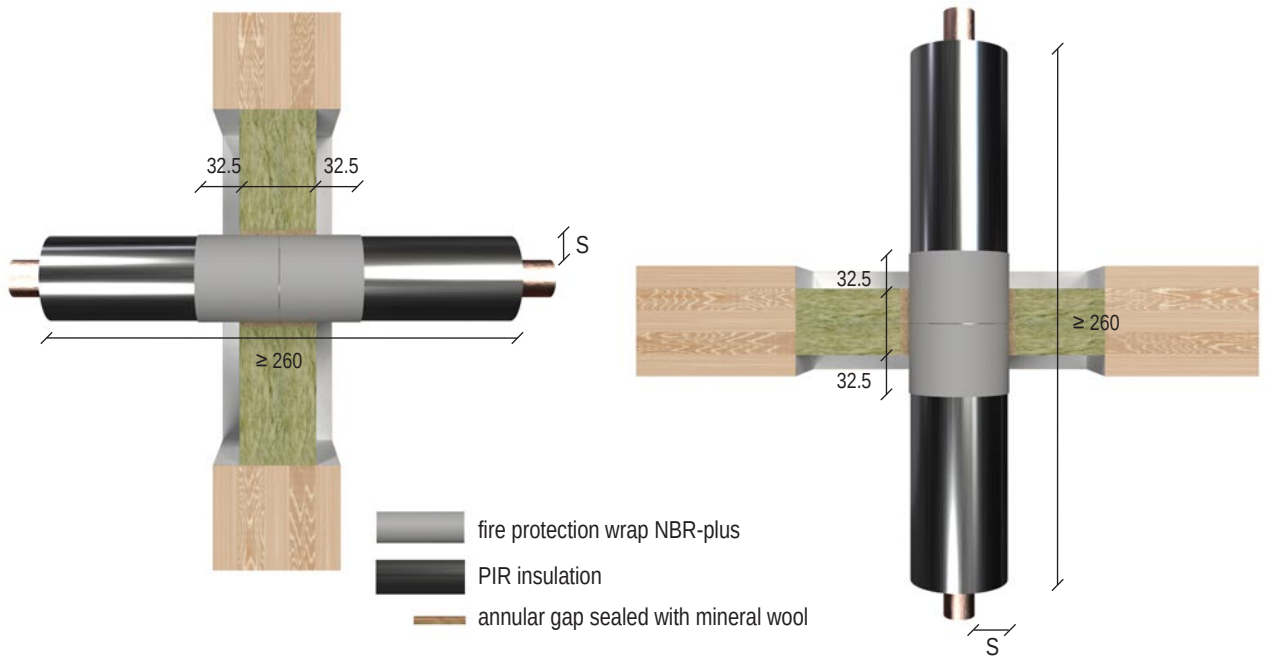
All specifications in mm

Wall					
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Lamella mat**		**Fire resistance class**
			Insulation length L (LS/LI) [mm]	**Insulation thickness S [mm]**	
60 minutes					
Copper, steel, stainless steel, cast iron	≤ 60.0	0.6–14.2	≥ 470 on both sides	30–100	EI 60 U/C
	≥ 60.0 – 88.9	0.6 / 2.0–14.2	≥ 720 on both sides		
Steel, stainless steel, cast iron	≥ 60.0 – < 114.3	0.6 / 2.8–14.2	≥ 470 on both sides		
	≥ 114.3 – < 219.1	2.8–14.2	≥ 470 on both sides		
		2.8 / 4.5–14.2	≥ 970 on both sides		
	219.1	4.5–14.2	≥ 970 on both sides		
Multiple penetration					
Up to three pipes made of copper, steel. stainless steel or cast iron	≤ 22.0	1.0–14.2	≥ 470 on both sides	30	EI 60 U/C

Floor					
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Lamella mat		Fire resistance class
			Insulation length L (LS/LI) [mm]	Insulation thickness S [mm]	
60 minutes					
Copper, steel, stainless steel, cast iron	≤ 15.0	0.8–14.2	≥ 220 on both sides	30–100	EI 60 U/C
	≥ 15.0 – ≤ 42.0	1.0–14.2	≥ 470 on both sides		
	≥ 42.0 – ≤ 88.9	1.0 / 2.0–14.2	≥ 970 on both sides		
Steel, stainless steel, cast iron	≥ 159.0 – ≤ 219.1	3.6 / 4.0–14.2	≥ 970 on both sides		
45 minutes					
Copper, steel, stainless steel, cast iron	≤ 15.0	0.6–14.2	≥ 220 on both sides	30–100	**EI 45 U/C**
	≥ 15.0 – ≤ 60.0	0.6–14.2	≥ 470 on both sides		
	≥ 60.0 – ≤ 88.9	0.6 / 2.0–14.2	≥ 720 on both sides		
Multiple penetration					
Up to three pipes made of copper, steel. stainless steel or cast iron	≤ 22.0	1.0–14.2	≥ 425 on both sides	30	**EI 45 U/C** / E 60 U/C



Non-combustible pipes with PIR insulation and fire protection wrap in wall and floor seals



All specifications in mm

Wall									
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**PIR insulation**	**NBR-plus**					**Fire resistance class**
			Thickness S [mm]	**Wrap width [mm]**	**Number of layers [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal [mm]**	
60 minutes									
Copper, steel, stainless steel, cast iron	≤ 15.0	0.6–14.2	20–80	2 × 62.5 or 1 × 125	2	0	2 × 30 or 1 × 60	2 × 32.5	EI 60 U/C
	> 15 – ≤ 88.9		30–80						
	108.0	2.5–14.2	40–80						
Steel, stainless steel, cast iron	≤ 15.0	0.6–14.2	20–80						
	> 15.0 – ≤ 88.9		30–80						
	> 88.9 – ≤ 108.0	2.5–14.2	40–80						
	> 108.0 – ≤ 168.3	4.0–14.2							
	> 168.3 – ≤ 219.1	4.5–14.2	50						
45 minutes									
Copper, steel, stainless steel, cast iron	≤ 42.0	0.6–14.2	20–80	2 × 62.5 or 1 × 125	2	0	2 × 30 or 1 × 60	2 × 32.5	**EI 45 U/C**
	> 42 – ≤ 88.9		30–80						
	108.0	2.5–14.2	50						
Steel, stainless steel, cast iron	≤ 42.0	0.6–14.2	20–80						
	> 42.0 – ≤ 88.9		30–80						
	> 88.9 – ≤ 108.0	2.5–14.2							
	> 108.0 – ≤ 168.3	4.0–14.2							
	> 168.3 – ≤ 219.1	4.5–14.2	50						

Wall									
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**PIR insulation**	**NBR-plus**					**Fire resistance class**
			Thickness S [mm]	**Wrap width [mm]**	**Number of layers [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal [mm]**	
30 minutes									
Copper, steel, stainless steel, cast iron	≤ 88.9	0.6–14.2	20–80	2 × 62.5 or 1 × 125	2	0	2 × 30 or 1 × 60	2 × 32.5	EI 30 U/C
	108.0	2.5–14.2	30–80						
Steel, stainless steel, cast iron	≤ 88.9	0.6–14.2	20–80						
	> 88.9 – ≤ 108.0	2.5–14.2	30						
	> 108.0 – ≤ 168.3	4.0–14.2							
	> 168.3 – ≤ 219.1	4.5–14.2	50						

Floor									
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**PIR insulation**	**NBR-plus**					**Fire resistance class**
			Thickness S [mm]	**Wrap width [mm]**	**Number of layers [n]**	**Overlap [mm]**	**Inside seal [mm]**	**Outside seal [mm]**	
60 minutes									
Copper, steel, stainless steel, cast iron	≤ 15.0	0.6–14.2	20–80	2 × 62.5 or 1 × 125	2	0	2 × 30 or 1 × 60	2 × 32.5	EI 60 U/C
	> 15 – < 88.9		30–80						
	> 88.9 – ≤ 108.0	2.5–14.2							
Steel, stainless steel, cast iron	≤ 15.0	0.6–14.2	20–80						
	> 15.0 – ≤ 88.9		30–80						
	> 88.9 – ≤ 108.0	2.5–14.2							
	> 108.0 – ≤ 168.3	4.0–14.2							
	> 168.3 – ≤ 219.1	4.5–14.2	100						
45 minutes									
Copper, steel, stainless steel, cast iron	≤ 42.0	0.6–14.2	20–80	2 × 62.5 or 1 × 125	2	0	2 × 30 or 1 × 60	2 × 32.5	**EI 45 U/C**
	> 42 – ≤ 88.9		30–80						
	> 88.9 – ≤ 108.0	2.5–14.2							
30 minutes									
Copper, steel, stainless steel, cast iron	≤ 88.9	0.6	20–80	2 × 62.5 or 1 × 125	2	0	2 × 30 or 1 × 60	2 × 32.5	EI 30 U/C
	> 88.9 – ≤ 108.0	2.5–14.2	30–80						

Mixed penetration sealing systems – double layer

System Flammotect 2 × 50 mm

Our well-proven mixed penetration sealing system made of two 50 mm mineral fibre boards and an ablative fire protection coating was tested as a blank seal in CLT walls and floors by Stora Enso. This makes it possible to apply its entire large scope of services also in timber construction with a 100 mm clearance to the aperture edge. There is no need for additional plasterboard cladding.

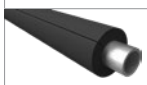
Further highlights

- Easy to install (also in case of subsequent installations)
- High flexibility

Services

			Maximum diameter*
	Cables		≤ 80
	Cable bundles		≤ 100 / ≤ 21
	Cable trays		✓
	Wave guides / coaxial cables		≤ 51.1
	Electrical installation conduits	single	≤ 63 / ≤ 21
		bundled	≤ 100 / ≤ 63 / ≤ 21

*All specifications in mm

		Maximum diameter*
	Non-combustible pipes with mineral fibre insulation	≤ 219.1 (steel) ≤ 88.9 (copper)
	Non-combustible pipes with FEF insulation	≤ 219.1 (steel) ≤ 88.9 (copper)
	Combustible pipes	≤ 160
	Multilayer pipes	≤ 75
	HVAC split line combinations	✓

*All specifications in mm

System data

EI 90 applications with two 50 mm mineral fibre boards

Certificates		ETA-22/0052 KB 321100703-A KB 322042005-A
Thickness of building element	Wall	≥ 100
	Floor	≥ 140
Thickness of seal	Wall	≥ 100
	Floor	≥ 140
Seal size	Wall	600 × 1000
	Floor	600 × 1000

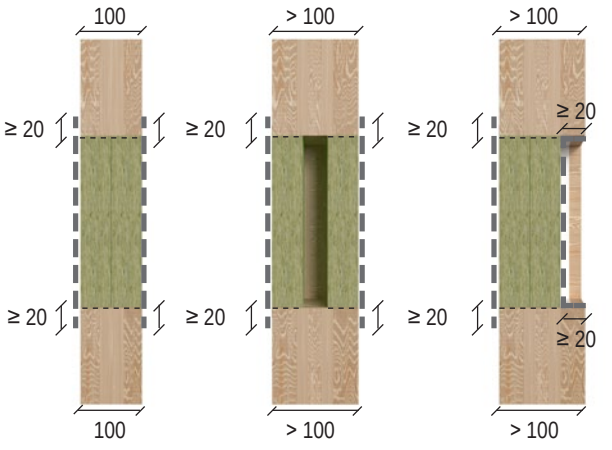
All specifications in mm

EI 120 applications with two 60 mm mineral fibre boards

Certificate		ETA in preparation
Thickness of building element	Wall	≥ 160
	Floor	≥ 160
Thickness of seal	Wall	≥ 120
	Floor	≥ 160
Seal size	Wall	600 × 1000
	Floor	600 × 1000

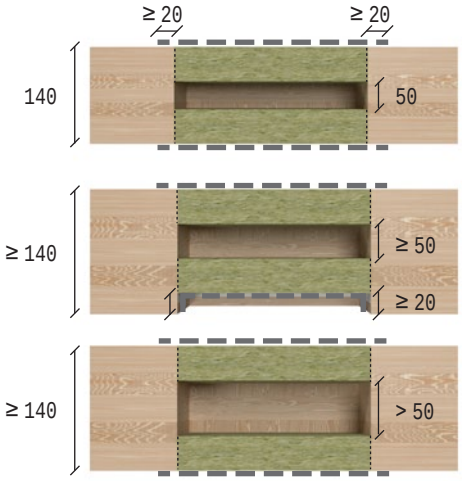
All specifications in mm

Design variants



= coated with FLAMMOTECT-A (dry film thickness ≥ 1.0 mm)

= glued with FLAMMOTECT-A



= coated with FLAMMOTECT-A (dry film thickness ≥ 1.0 mm)

= glued with FLAMMOTECT-A

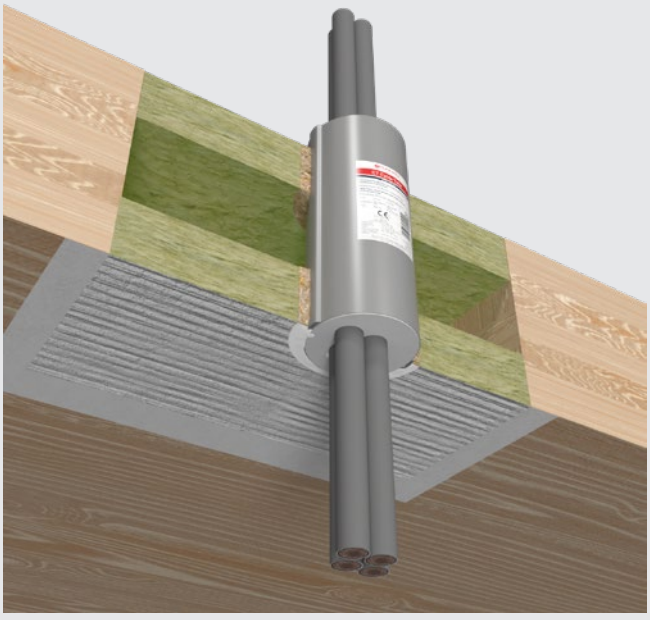
Consult the installation manual for more specific information.

Cables and further services

- Cables, cable bundles and cable trays

- Electrical installation conduits

- Cable Tube CT



- Wave guides and coaxial cables

Cables in wall and floor seals

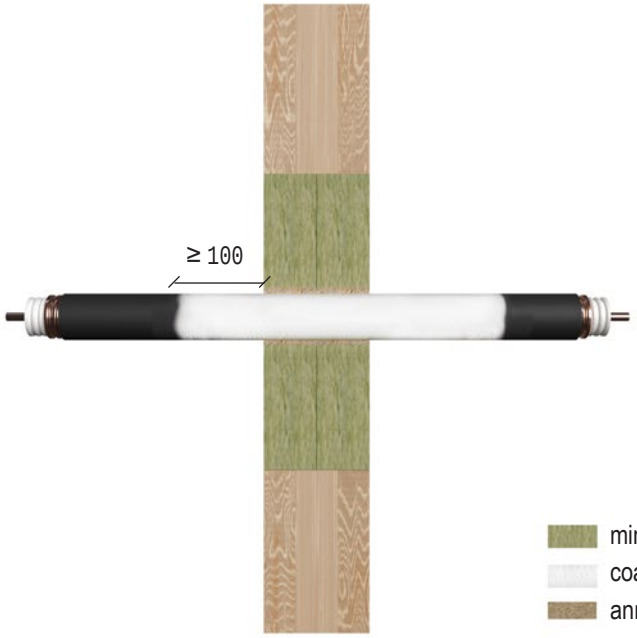
All specifications in mm

Wall		
Services	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class***
Cables Ø ≤ 21 mm	100 × 1.0 mm (length × dry film thickness)	EI 90
Cables Ø ≤ 50 mm		EI 90
Cables Ø ≤ 80 mm		EI 90
Cable bundles Ø ≤ 100 mm with single cables Ø ≤ 21 mm		EI 90

Floor		
Services	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class***
Cables Ø ≤ 21 mm	100 × 1.0 mm (length × dry film thickness)	EI 90
Cables Ø ≤ 50 mm		EI 90
	150 × 1.0 mm (length × dry film thickness)	EI 90
Cables Ø ≤ 80 mm	100 × 1.0 mm (length × dry film thickness)	EI 90
	150 × 1.0 mm (length × dry film thickness)	EI 90
Cable bundles Ø ≤ 100 mm with single cables Ø ≤ 21 mm	100 × 1.0 mm (length × dry film thickness)	EI 90

* Installing two mineral fibre boards with a thickness of 60 mm or three mineral fibre boards with a thickness of 50 mm raises the fire resistance class to EI 120.

Wave guides and coaxial cables in wall seals

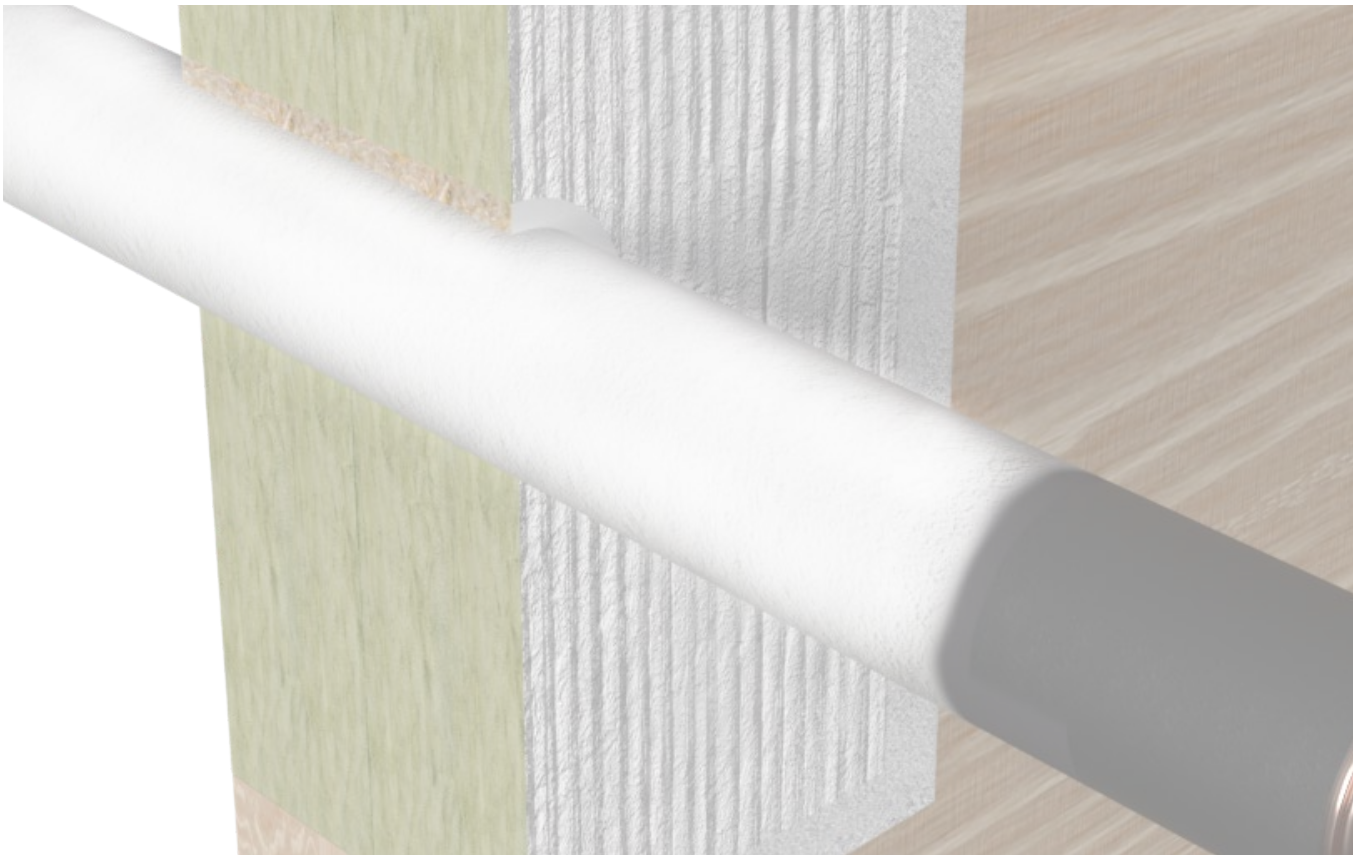


mineral fibre board
coating with FLAMMOTECT-A (dry film thickness ≥ 1.0 mm)
annular gap sealed with mineral wool

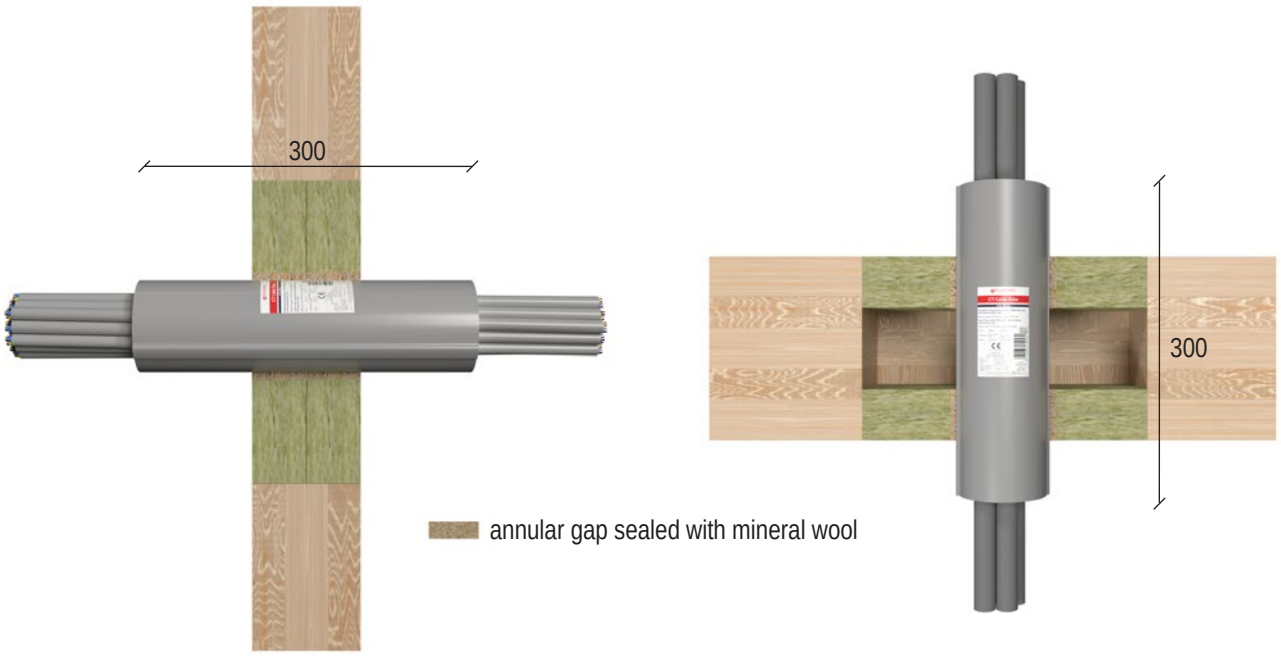
All specifications in mm

Wall		
Service	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class****
CommScope HELIAX®, Ø ≤ 51.1	100 × 1.0 mm (length × dry film thickness)	EI 90 U/C
RFS CELLFLEX®, Ø ≤ 50.3		
RFS RADIAFLEX®, Ø ≤ 48.2		

* Installing two mineral fibre boards with a thickness of 60 mm or three mineral fibre boards with a thickness of 50 mm raises the fire resistance class to EI 120.

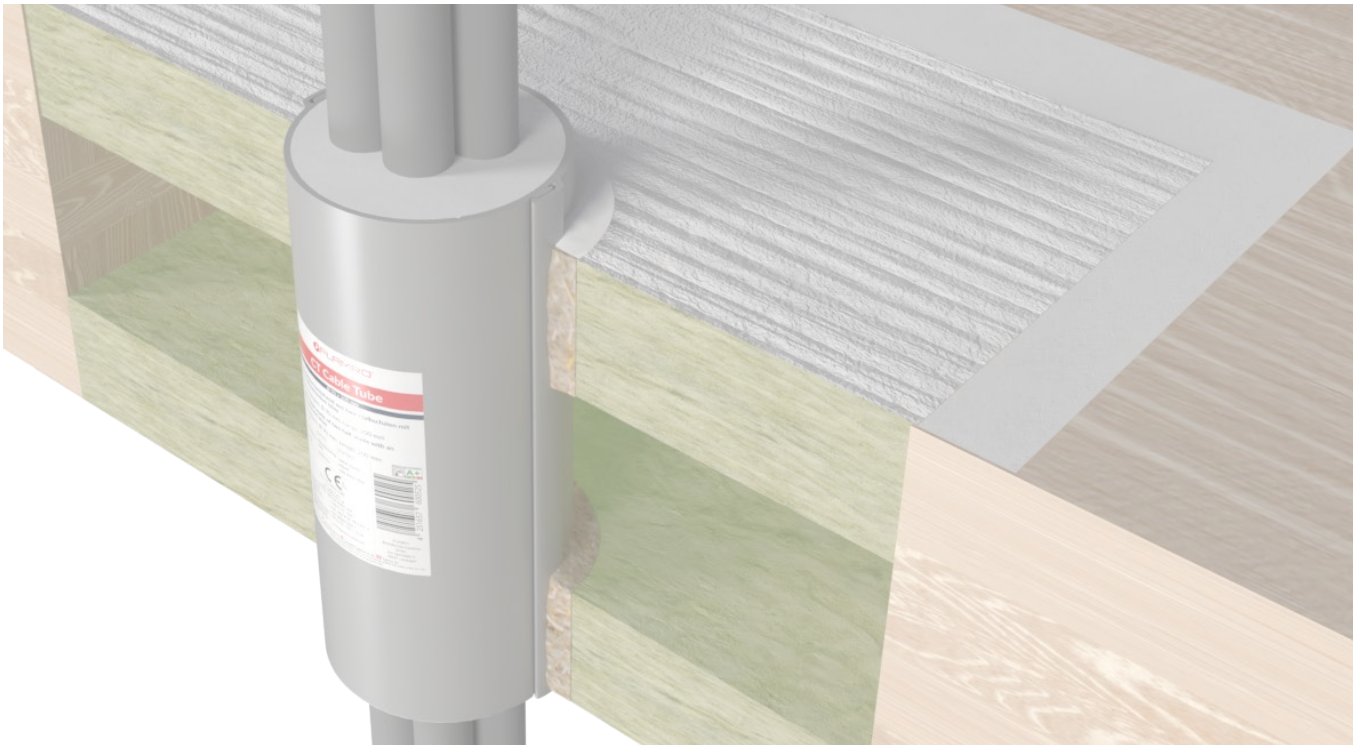


Cable Tubes in wall and floor seals

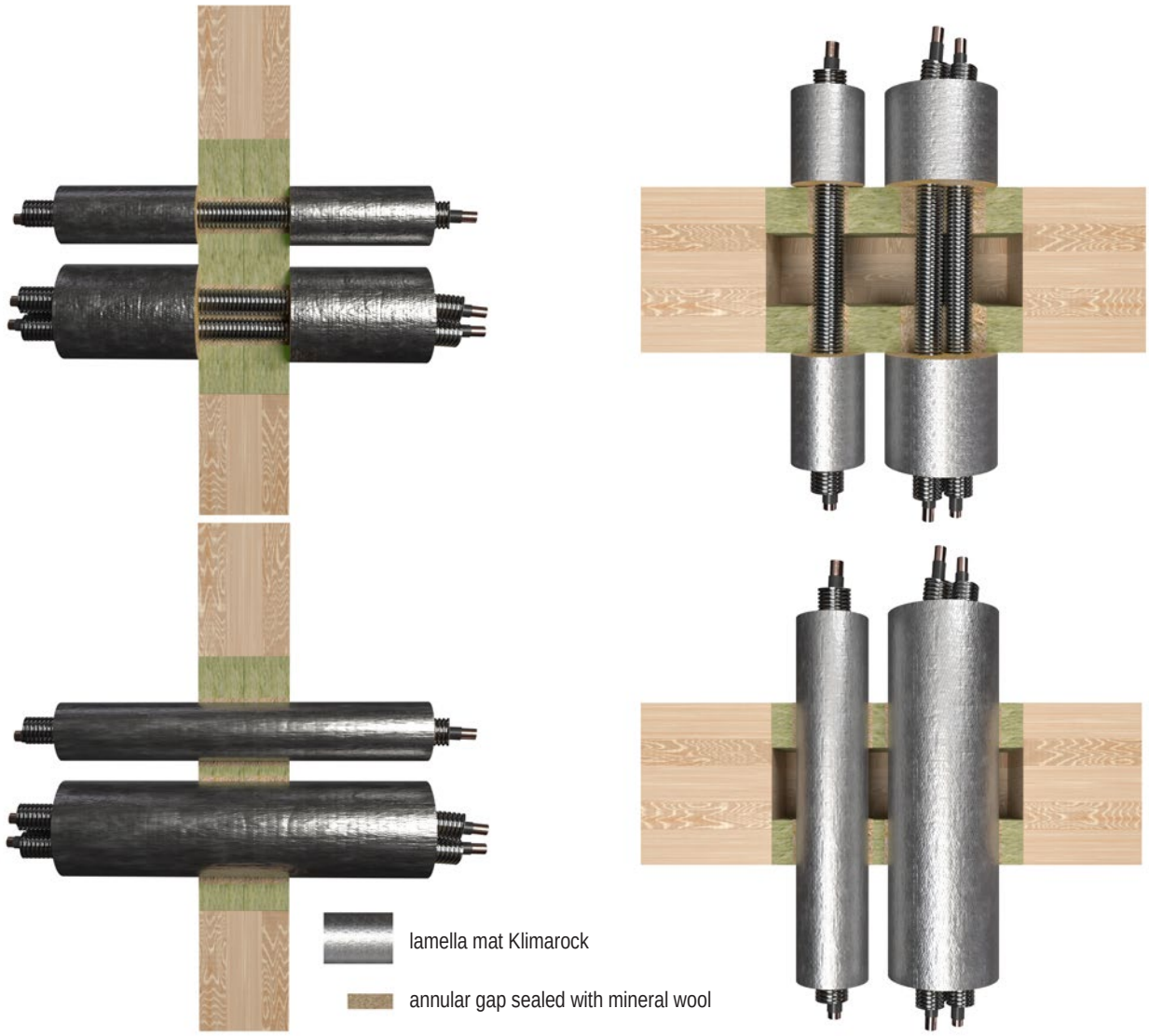


All specifications in mm

Wall		
Services	**Outer diameter [mm]**	**Fire resistance class**
Cables	≤ 21	EI 90
Cable bundles	≤ 100	
Floor		
Services	**Outer diameter [mm]**	**Fire resistance class**
Cables	≤ 21	EI 90
Cable bundles	≤ 100	



Electrical installation conduits made of steel in wall and floor seals

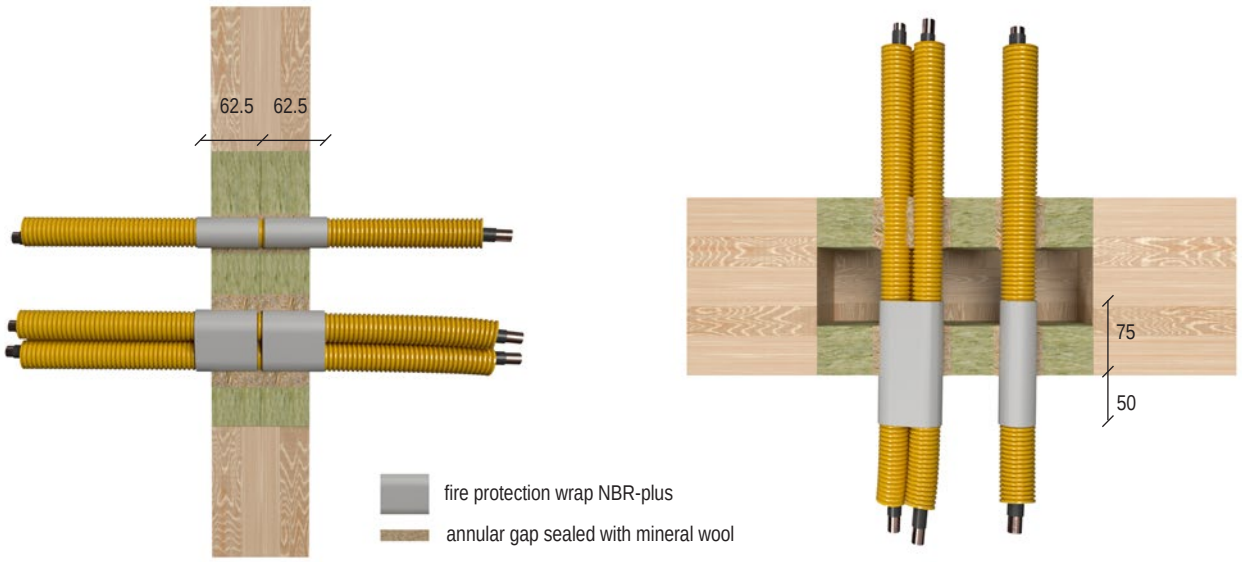


All specifications in mm

Wall and floor

Services	Outer diameter [mm]	Lamella mat		Fire resistance class
		Insulation thickness [mm]	Insulation length [mm]	
Electrical installation conduits made of steel, single, with/without cables ≤ 21 mm	≤ 32	30	500	EI 90 U/C
Electrical installation conduits made of steel, bundled, with/without cables ≤ 21 mm	3 × ≤ 32	30	500	EI 90 U/C

Electrical installation conduits made of plastic in wall and floor seals



All specifications in mm

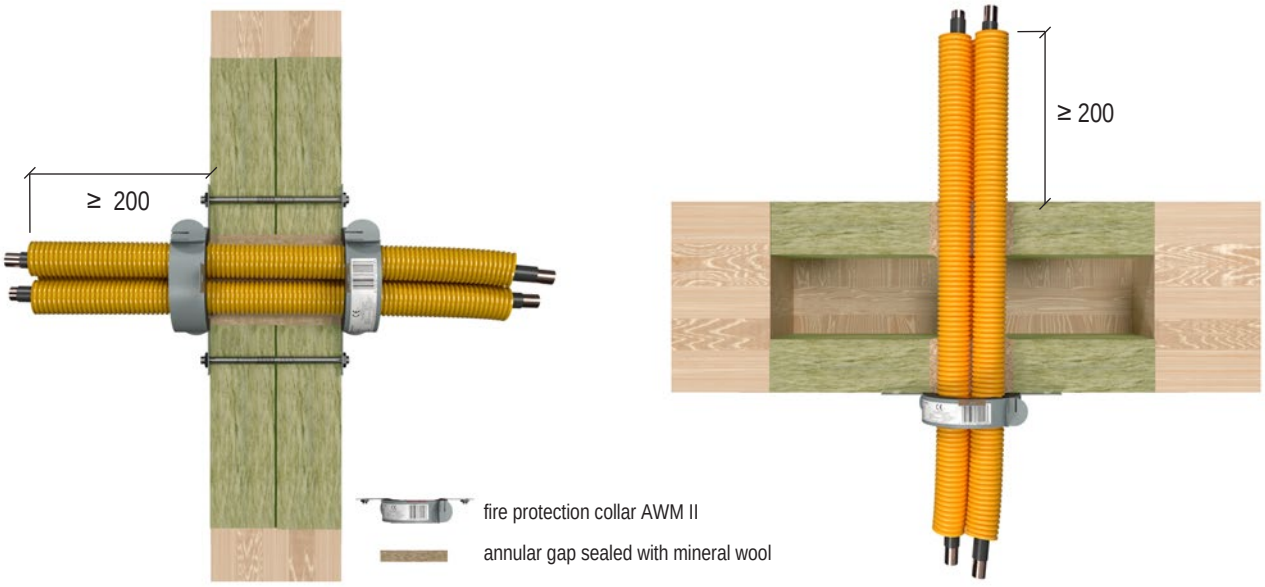
Wall

Service	Outer diameter [mm]	NBR-plus						Fire resistance class
		Wrap width [mm]	Number of wraps [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Electrical installation conduits made of plastic, single, with/without cables ≤ 21 mm	≤ 32	62.5	2	–	47.5–50.0	12.5–15.0	1	EI 90 U/U
Electrical installation conduits made of plastic, bundled, with/without cables ≤ 21 mm	≤ 32, bundled to ≤ 100						2	

Floor

Service	Outer diameter [mm]	NBR-plus						Fire resistance class
		Wrap width [mm]	Number of wraps [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Electrical installation conduits made of plastic, single, with/without cables ≤ 21 mm	≤ 32	125	1	–	75	50	1	EI 90 U/U
Electrical installation conduits made of plastic, bundled, with/without cables ≤ 21 mm	≤ 32, bundled to ≤ 100						2	

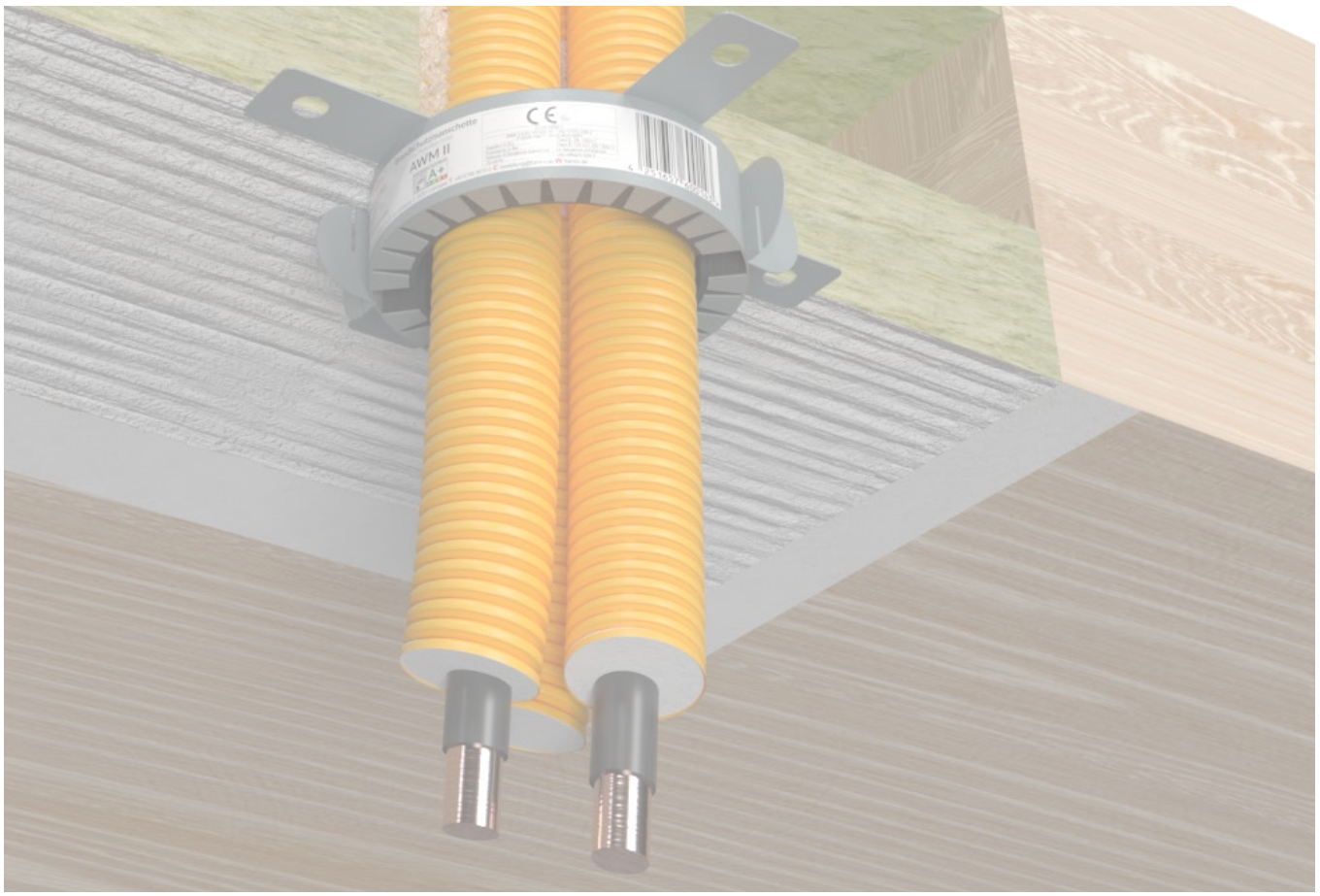
Electrical installation conduits made of plastic with pipe collar in wall and floor seals



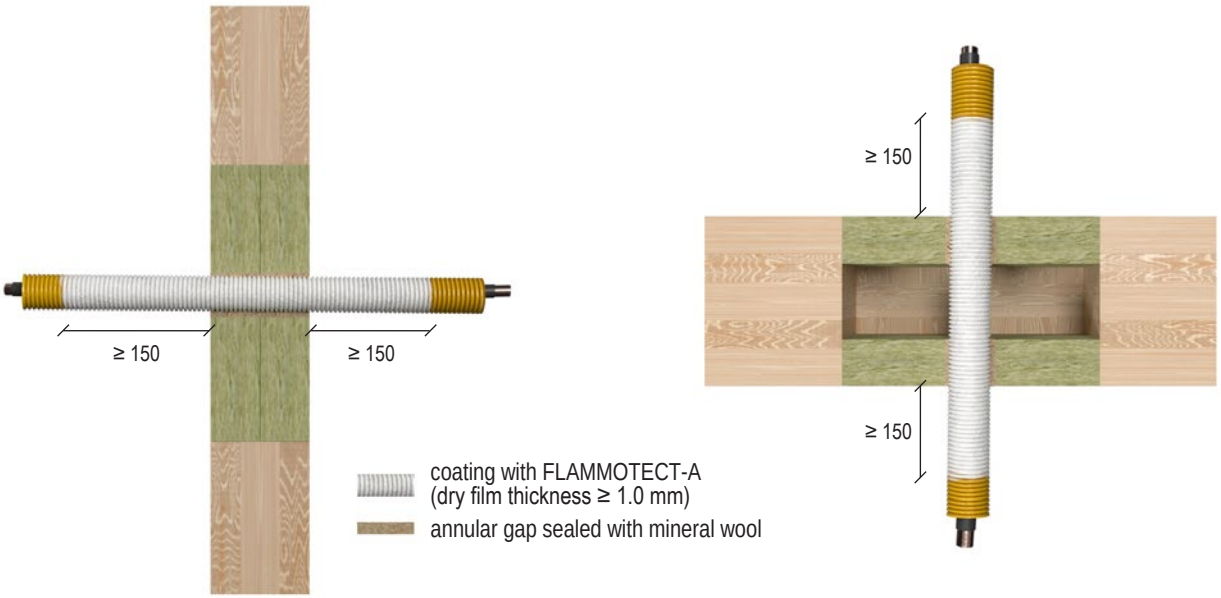
All specifications in mm

Wall and floor			
Service	**Outer diameter [mm]**	**Fire protection collars**	**Fire resistance class***
Electrical installation conduits made of plastic, single, with/without cables ≤ 21 mm	≤ 63	Wall: AWM II on both sides Decke: AWM II on underside	EI 90 U/C
Electrical installation conduits made of plastic, bundled, with/without cables ≤ 21 mm	≤ 32, bundled to ≤ 125		

* Installing two mineral fibre boards with a thickness of 60 mm or three mineral fibre boards with a thickness of 50 mm raises the fire resistance class to EI 120.



Electrical installation conduits made of plastic with fire protection coating in wall and floor seals

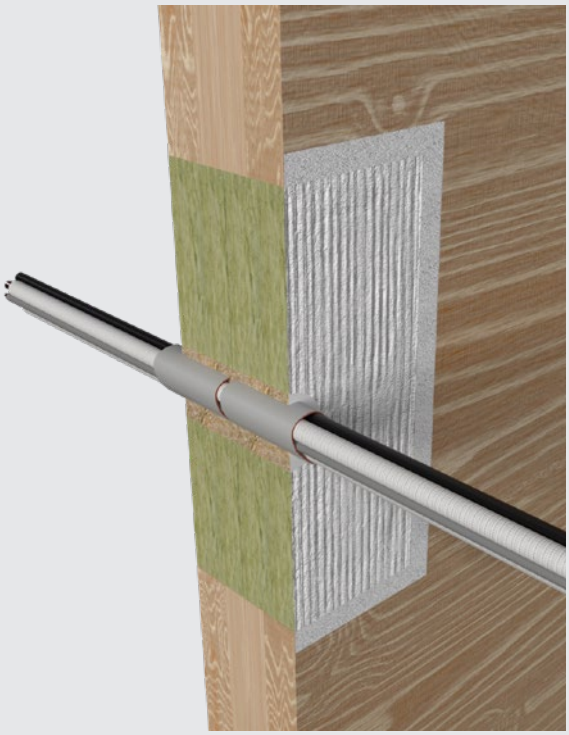


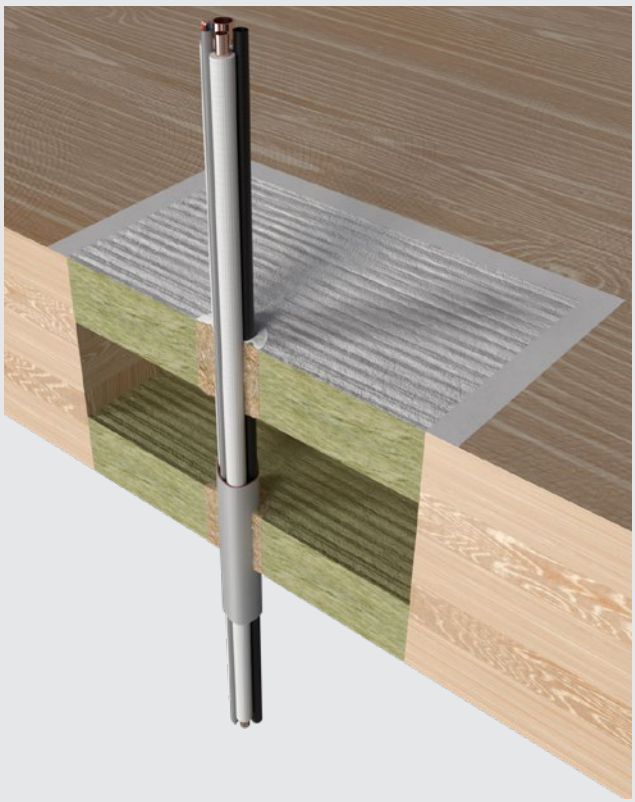
All specifications in mm

Wall and floor			
Services	**Outer diameter [mm]**	**Coating on both sides with FLAMMOTECT-A**	**Fire resistance class**
Electrical installation conduits made of plastic, single, with/without cables ≤ 21 mm	≤ 32	10 × 1.0 mm5 (length × dry film thickness)	EI 90 U/C

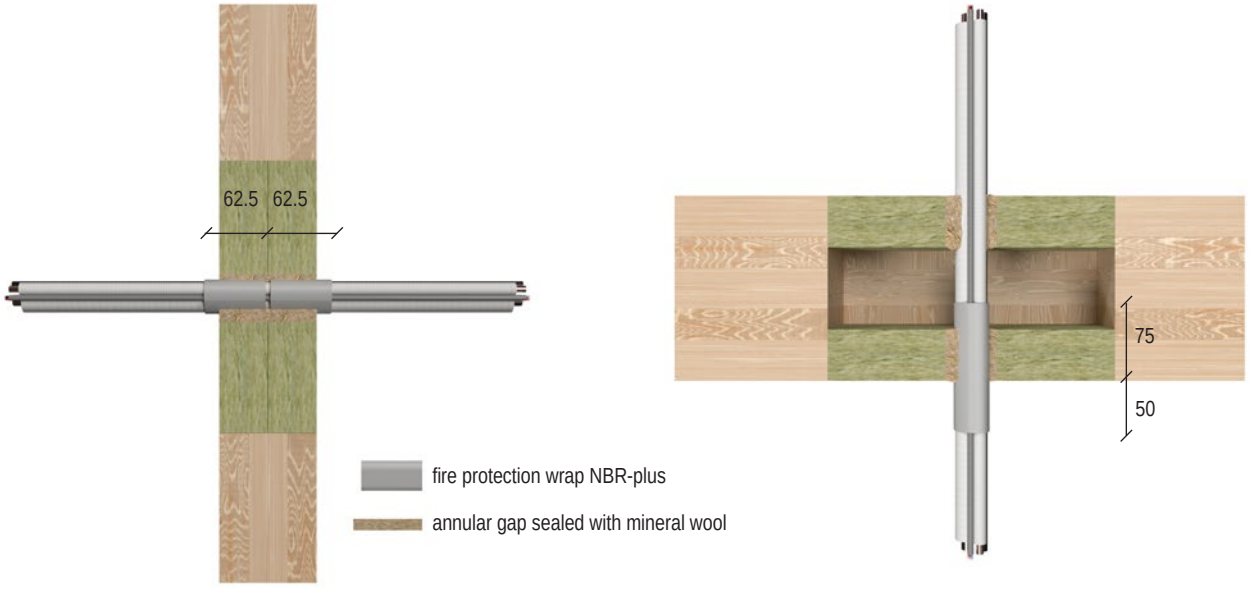
HVAC split line combinations

- **Seals with fire protection wrap NBR-plus**





HVAC split line combinations in wall and floor seals



All specifications in mm

Wall

Service	NBR-plus						Fire resistance class*
	Wrap width [mm]	Number of wraps [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
up to 2 copper pipes Ø ≤ 18.0 mm, pipe wall thickness 1.0–14.2 mm, 9 mm PE foam, 1 pipe PVC-U/PVC-C Ø ≤ 25.0 mm, pipe wall thickness 1.5 mm, up to 3 cables Ø ≤ 14.0 mm	62.5	2	0	47.5–50.0	12.5–15.0	2	EI 90

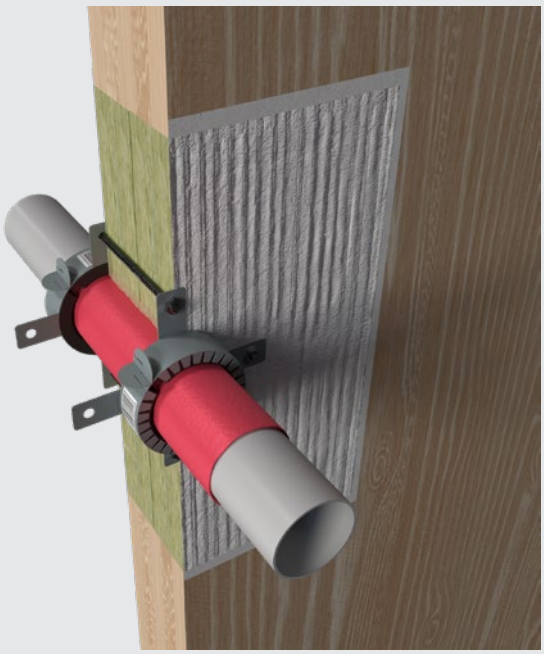
Floor

Service	NBR-plus						Fire resistance class*
	Wrap width [mm]	Number of wraps [n]	Overlap [mm]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
up to 2 copper pipes Ø ≤ 18.0 mm, pipe wall thickness 1.0–14.2 mm, 9 mm PE foam, 1 pipe PVC-U/PVC-C Ø ≤ 25.0 mm, pipe wall thickness 1.5 mm, up to 3 cables Ø ≤ 14.0 mm	125	1	0	75	50	2	EI 90

* Installing two mineral fibre boards with a thickness of 60 mm or three mineral fibre boards with a thickness of 50 mm raises the fire resistance class to EI 120.

Combustible pipes

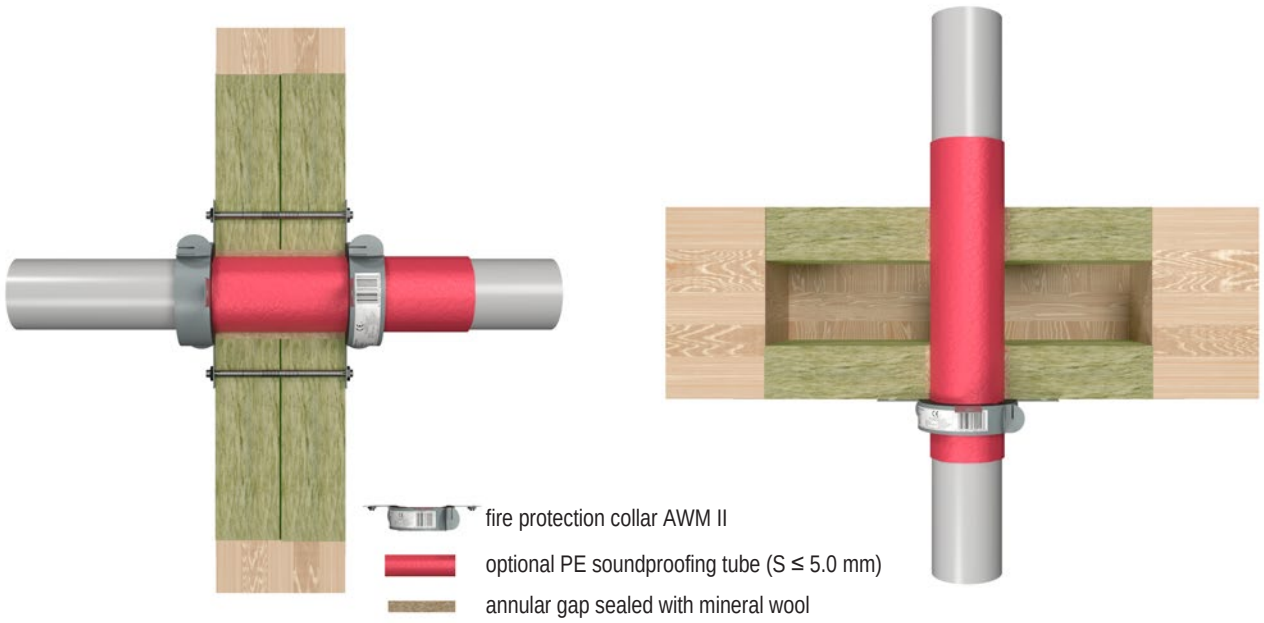
- Seals with fire protection collar AWM II



- Seals with EC Endless Collar

- Seals with fire protection wrap KSL-W

Combustible pipes with pipe collar in wall and floor seals



All specifications in mm

Consult the installation manual for specific information on how to fasten the pipe collar.

Wall – standard pipes (fastened with coarse thread screws)				
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Pipe collar**	**Fire resistance class***
PVC-U, PVC-C	32.0–160.0	1.8–11.9	AWM II on both sides	EI 90 U/U
PE-HD, ABS, SAN + PVC	32.0–50.0	1.8–4.6		EI 90 U/U
	> 50.0 – 160.0	1.9–14.6		EI 90 U/U
PP	32.0–50.0	1.8–4.6		EI 90 U/U
	> 50.0 – 160.0	1.9–14.6		EI 90 U/U
PE-HD, ABS, SAN + PVC	32.0–160.0	2.7–4.6		EI 90 U/U
PP	110.0	10.0		EI 90 U/U

Wall – non-standard pipes (fastened with coarse thread screws)			
Type of pipe	**Outer diameter [mm]**	**Pipe collar**	**Fire resistance class***
CONEL DRAIN	40.0–160.0	AWM II on both sides	EI 90 U/U
Pipelife Master 3	40.0–160.0		EI 90 U/U
KE KELIT PHON EX AS	58.0–160.0		EI 90 U/U
Wavin AS	58.0–160.0		EI 90 U/U
POLO-KAL 3S	90.0–110.0		EI 90 U/U
POLO-KAL NG, POLO-KAL XS	40.0–110.0		EI 90 U/U
REHAU RAUPIANO PLUS	50.0–160.0		EI 90 U/U
REHAU RAUPIANO LIGHT	40.0–160.0		EI 90 U/U
Geberit Silent-dB20	56.0–110.0		EI 90 U/U
	56.0–160.0		EI 90 U/U
Geberit Silent-PP	32.0–160.0		EI 90 U/U
Geberit Silent-Pro	50.0–160.0		EI 90 U/U
GF Silenta Premium	58.0–160.0		EI 90 U/U
Hakan Silenta Premium	58.0–160.0		EI 90 U/U
Wavin SiTech+	32.0–160.0		EI 90 U/U
Valsir Triplus	32.0–160.0		EI 90 U/U

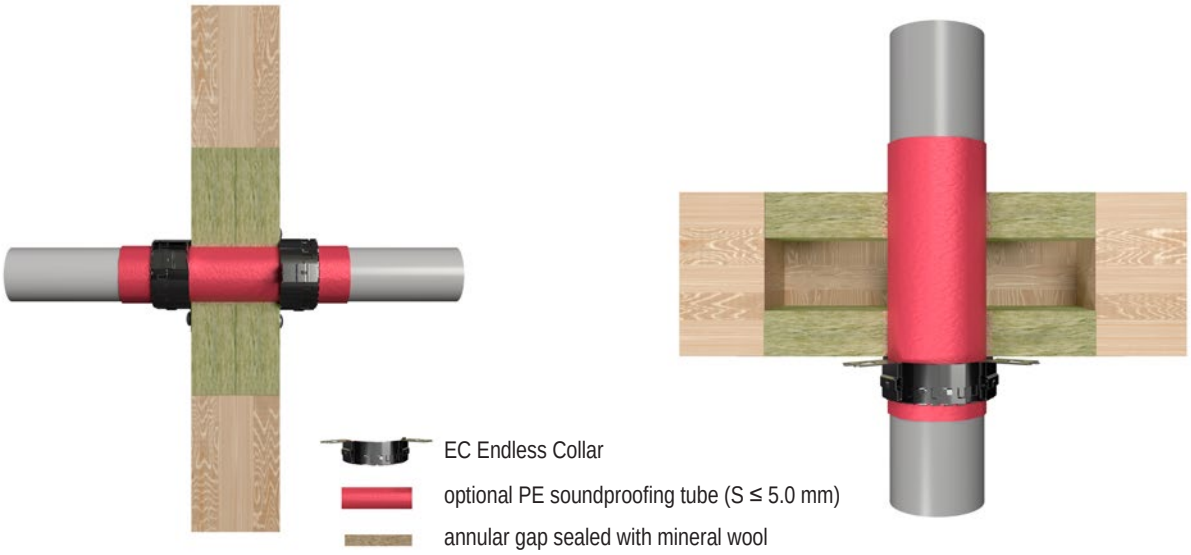
* Installing two mineral fibre boards with a thickness of 60 mm or three mineral fibre boards with a thickness of 50 mm raises the fire resistance class to EI 120 (exception: Wavin SiTech+).

Floor – standard pipes (fastened with coarse thread screws)				
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Pipe collar**	**Fire resistance class***
PVC-U, PVC-C	32.0–50.0	1.8–5.6	AWM II on underside	EI 90 U/U
	> 50.0 – 160.0	1.8–12.3		EI 90 U/U
PE-HD, ABS, SAN + PVC	32.0–125.0	1.8–14.6		EI 90 U/U
PP	32.0–50.0	1.8–4.6		EI 90 U/U
	> 50.0 – 160.0	1.9–14.6		EI 90 U/U
PE-HD, ABS, SAN + PVC	160.0	4.0		EI 90 U/U

Floor – non-standard pipes (fastened with coarse thread screws)			
Type of pipe	**Outer diameter [mm]**	**Pipe collar**	**Fire resistance class***
REHAU RAUPIANO LIGHT	75.0–110.0	AWM II on underside	EI 90 U/U
CONEL DRAIN	75.0–110.0		EI 90 U/U
POLO-KAL NG, POLO-KAL XS	90.0–160.0		EI 90 U/U
Geberit Silent-PP	40.0–110.0		EI 90 U/U
Geberit Silent-Pro	50.0–110.0		EI 90 U/U
GF Silenta Premium	58.0–110.0		EI 90 U/U
Hakan Silenta Premium	58.0–110.0		EI 90 U/U
Wavin SiTech+	32.0		EI 90 U/U
	75.0–160.0		EI 90 U/U
Valsir Triplus	32.0–50.0		EI 90 U/U

* Installing two mineral fibre boards with a thickness of 60 mm or three mineral fibre boards with a thickness of 50 mm raises the fire resistance class to EI 120 (exception: Wavin SiTech+).

Combustible pipes with endless collar in wall and floor seals



All specifications in mm

Consult the installation manual for specific information on how to fasten the pipe collar.

Wall – standard pipes (fastened with coarse thread screws)

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	EC Endless Collar	Fire resistance class
			Number of layers [n]	
PVC-U, PVC-C	90.0–110.0	1.8	4	EI 90 U/U
	40.0–50.0	2.0–5.6	2	EI 90 U/U
	50.0 – < 75.0	1.9–7.0	3	
	75.0–110.0	1.8–9.0	4	
	110.0–125.0	1.8–9.8	5	
	125.0–160.0	2.3–11.9	6	
PE-HD, ABS, SAN+PVC	40.0–50.0	1.8–4.6	2	EI 90 U/U
	50.0–75.0	1.8–3.8	3	EI 90 U/U
	63.0–75.0	2.2–3.8		
	90.0	2.7	4	
	110.0	2.7		
PP	90.0–110.0	2.7	4	EI 90 U/U

Wall – non-standard pipes (fastened with coarse thread screws)			
Type of pipe	Outer diameter [mm]	EC Endless Collar	Fire resistance class
		Number of layers [n]	
POLO-KAL NG, POLO-KAL XS	90.0–110.0	4	EI 90 U/U
	110.0–125.0	5	
	125.0–160.0	6	
REHAU RAUPIANO PLUS	75.0–90.0	4	EI 90 U/U
	90.0–110.0	4	EI 90 U/U
	110.0–125.0	5	
	125.0–160.0	6	
Geberit Silent-PP	32.0–50.0	2	EI 90 U/U
	50.0–75.0	3	EI 90 U/U
	75.0–90.0	4	
	90.0–110.0	4	
		4	EI 90 U/U
Wavin SiTech+	32.0–50.0	2	EI 90 U/U
		2	EI 90 U/U
	50.0–75.0	3	
	75.0–90.0	4	
	90.0–110.0	4	

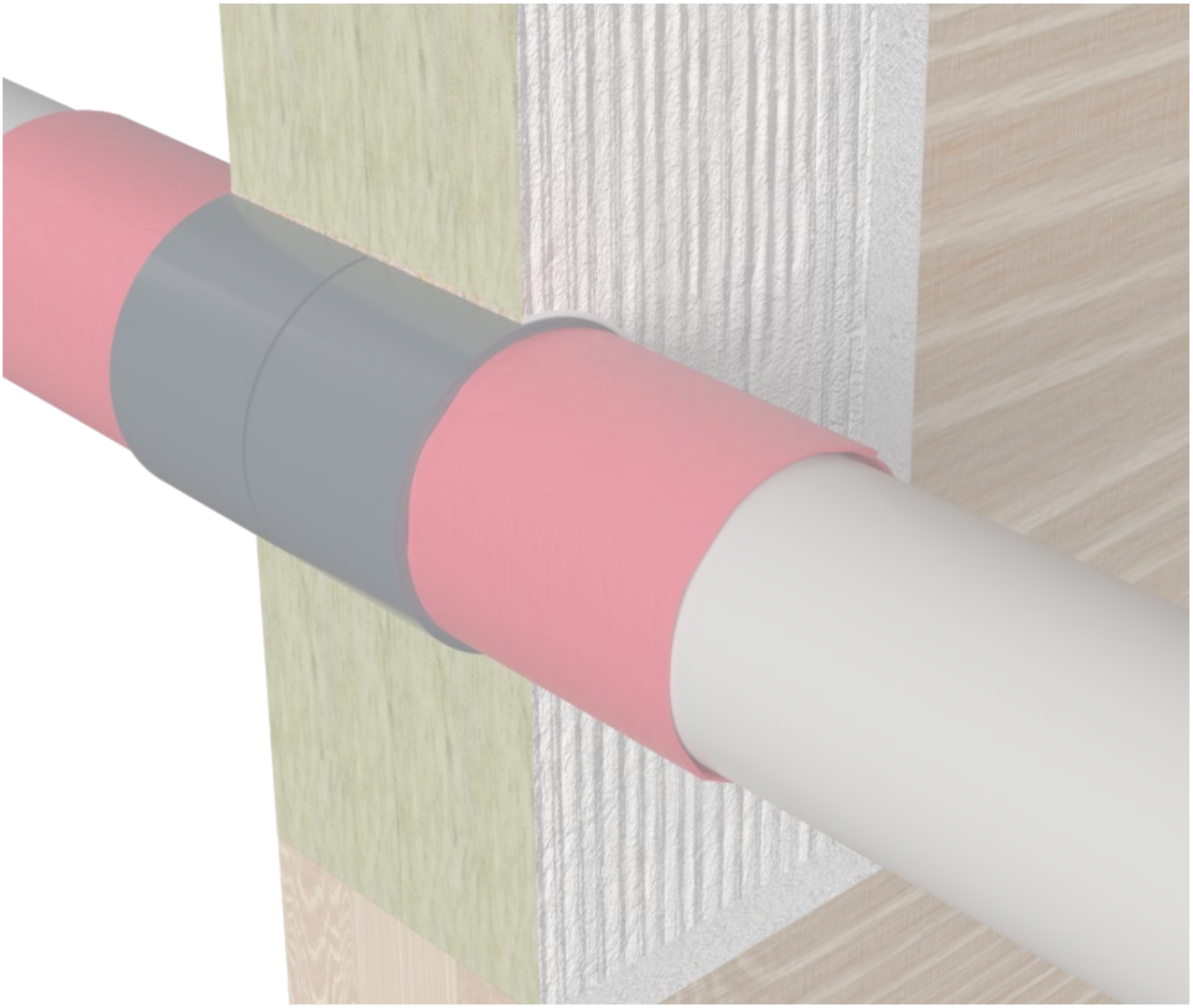
Floor – standard pipes (fastened with coarse thread screws)				
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	EC Endless Collar	Fire resistance class
			Number of layers [n]	
PVC-U, PVC-C	40.0–50.0	1.8–5.6	2	EI 90 U/U
	50.0–75.0	2.1–5.1	3	
	75.0–110.0	2.1–4.3	4	
	110.0–125.0	2.6–4.0	5	
	125.0	2.8–4.0	5	
	140.0–160.0	3.2	6	
PE-HD, ABS, SAN+PVC	40.0–50.0	4.6	2	EI 90 U/U
	50.0–63.0	3.8–4.6	3	
	63.0–75.0	3.8	4	
	75.0–90.0	2.7–3.8	4	
	90.0–110.0	2.7–4.6	4	
		2.7–4.6	4	EI 90 U/U
PP	40.0–50.0	1.8–4.6	2	EI 90 U/U
	50.0–63.0	4.6–5.2	3	
	63.0–75.0	5.2–6.8	3	
	75.0–90.0	5.2–10.0	4	
	90.0–110.0	10.0	4	

Floor – non-standard pipes (fastened with coarse thread screws)			
Type of pipe	Outer diameter [mm]	EC Endless Collar	Fire resistance class
		Number of layers [n]	
REHAU RAUPIANO PLUS	75.0–90.0	4	EI 90 U/U
Geberit Silent-PP	32.0–50.0	2	EI 90 U/U
Wavin SiTech+	32.0–50.0	3	EI 90 U/U

Combustible pipes with fire protection wrap in wall and floor seals

All specifications in mm

The fire protection wrap KSL-W can either be installed flush with the seal surface or protrude up to 5 mm from the seal.



Wall – standard pipes								
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	KSL-W					Fire resistance class
			Wrap width [mm]	Number of wraps [n]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
PVC-U	≤ 50.0	1.8–5.6	50	2	45–50	0–5	2	EI 90 U/U
	> 50.0 – ≤ 110.0	1.8–12.3					4	
PE-HD	≤ 50.0	1.8–4.6					2	
	> 50.0 – ≤ 110.0	1.8–10.0					4	
PP	≤ 50.0	1.8–4.6					2	
	> 50.0 – ≤ 110.0	1.8–10.0					4	

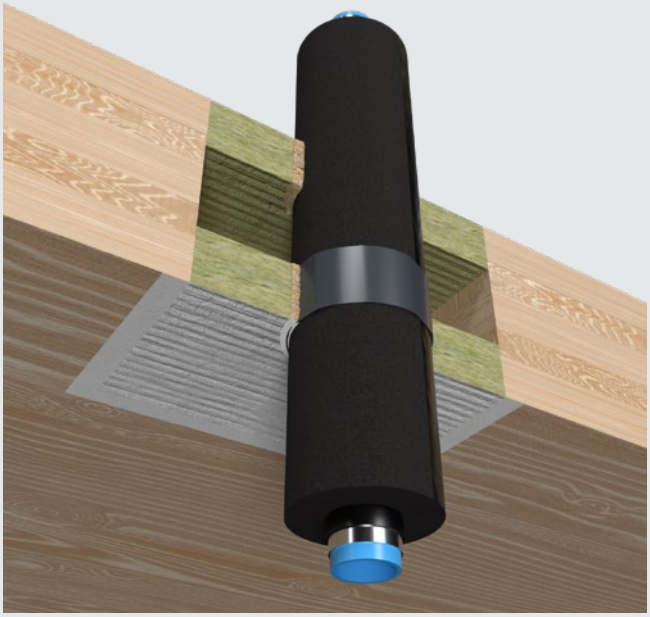
Wall – non-standard pipes							
Type of pipe	Outer diameter [mm]	KSL-W					Fire resistance class
		Wrap width [mm]	Number of wraps [n]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Geberit Silent-PP	≤ 50.0	50	2	45–50	0–5	2	EI 90 U/U
	≤ 110.0					4	
Geberit Silent-Pro	≤ 75.0					2	
	≤ 110.0					4	
KE KELIT PHON EX AS	≤ 56.0					2	
	≤ 110.0					4	
Pipelife Master 3	≤ 50.0					2	
	≤ 110.0					4	
POLO-KAL NG	≤ 50.0					2	
	≤ 110.0					4	
CONEL DRAIN	≤ 50.0					2	
	≤ 110.0					4	
Geberit Silent-dB 20	≤ 56.0					2	
	≤ 110.0					4	
Wavin SiTech+	≤ 50.0					2	
	≤ 110.0					4	
POLO-KAL XS	≤ 50.0					2	
	≤ 110.0					4	
REHAU RAUPIANO PLUS	≤ 50.0					2	
	≤ 110.0					4	
REHAU RAUPIANO LIGHT	≤ 50.0					2	
	≤ 110.0					4	
Silenta Premium	≤ 58.0					2	
	≤ 110.0					4	

Floor – standard pipes								
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	KSL-W					Fire resistance class
			Wrap width [mm]	Number of wraps [n]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
PVC-U, PVC-C	≤ 50.0	1.8–5.6	50	1	45–50	0–5	2	EI 90 U/U
	≤ 110.0	1.8–12.3					4	EI 90 U/U
PE-HD, ABS, SAN + PVC	≤ 50.0	1.8–4.6					2	EI 90 U/U
	≤ 110.0	1.8–10.0					4	
PP	≤ 50.0	1.8–4.6					2	EI 90 U/U
	≤ 110.0	1.8–10.0					4	

Floor – non-standard pipes							
Type of pipe	Outer diameter [mm]	KSL-W					Fire resistance class
		Wrap width [mm]	Number of wraps [n]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Geberit Silent-PP	≤ 50.0	50	1	45–50	0–5	2	EI 90 U/U
	≤ 110.0					4	
Geberit Silent-Pro	≤ 75.0					2	
	≤ 110.0					4	
KE KELIT PHON EX AS	≤ 56.0					2	
	≤ 110.0					4	
Pipelife Master 3	≤ 50.0					2	
	≤ 110.0					4	
POLO-KAL NG	≤ 50.0					2	
	≤ 110.0					4	
CONEL DRAIN	≤ 50.0					2	
	≤ 110.0					4	
Geberit Silent-dB 20	≤ 56.0					2	
	≤ 110.0					4	
Wavin SiTech+	≤ 50.0					2	
	≤ 110.0					4	
POLO-KAL XS	≤ 110.0					4	
REHAU RAUPIANO PLUS	≤ 110.0					4	
REHAU RAUPIANO LIGHT	≤ 110.0					4	
Silenta Premium	≤ 58.0					2	
	≤ 110.0					4	

Multilayer pipes

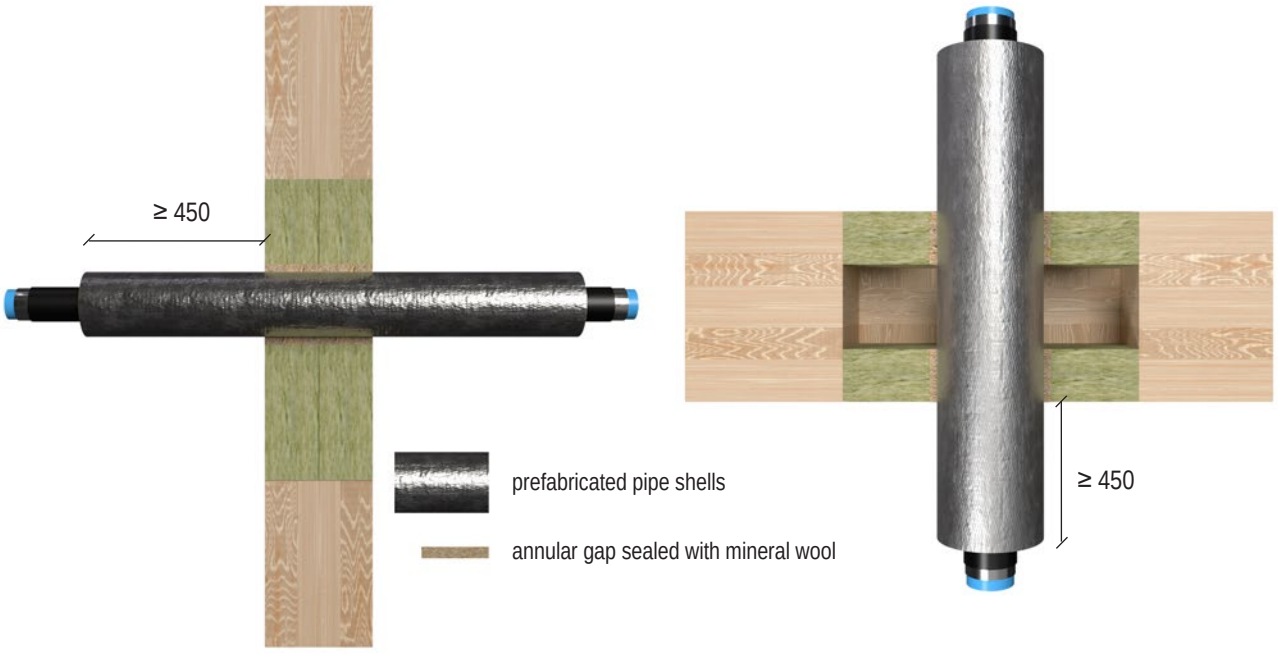
- Seals with fire protection wrap KSL-W



- Seals with EC Endless Collar

- Seals with pipe shells

Multilayer pipes with pipe shells in wall and floor seals

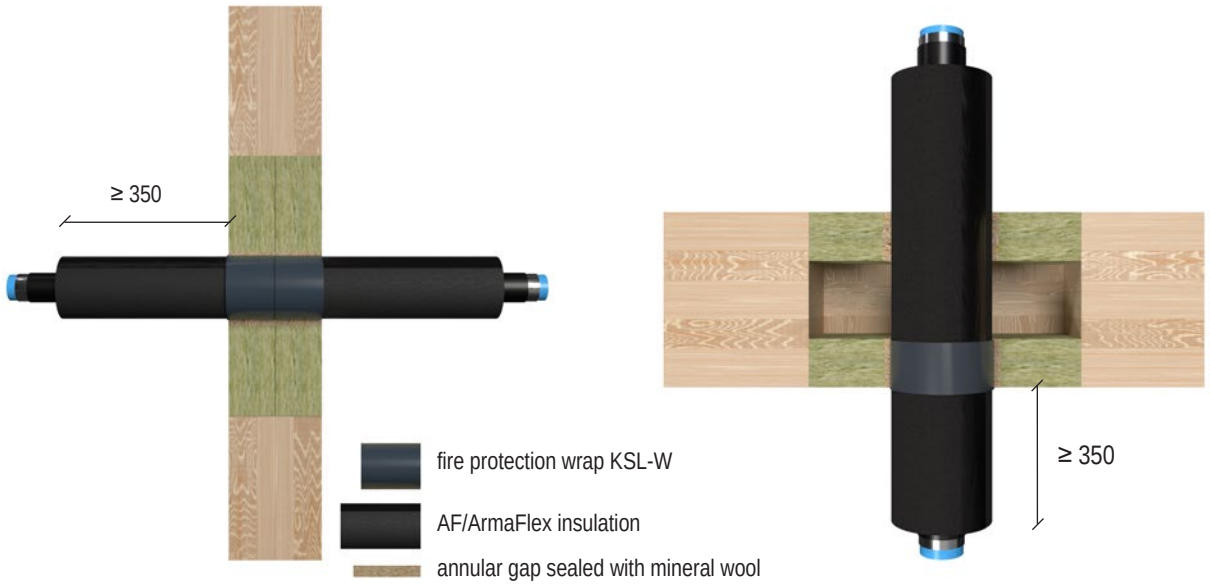


All specifications in mm

Wall and floor					
Type of pipe	Outer diameter [mm]	Pipe wall thickness [mm]	Prefabricated pipe shells*		Fire resistance class
			Length [mm]	Thickness [mm]	
Geberit Mepla	16.0	2.25	≥ 450	20–30	EI 90 U/C
	20.0	2.5			
	26.0	3.0		20–40	
	32.0	3.0		20–50	
	40.0	3.5			
	50.0	4.0			
	63.0	4.5		20–60	
	75.0	4.7		20–80	

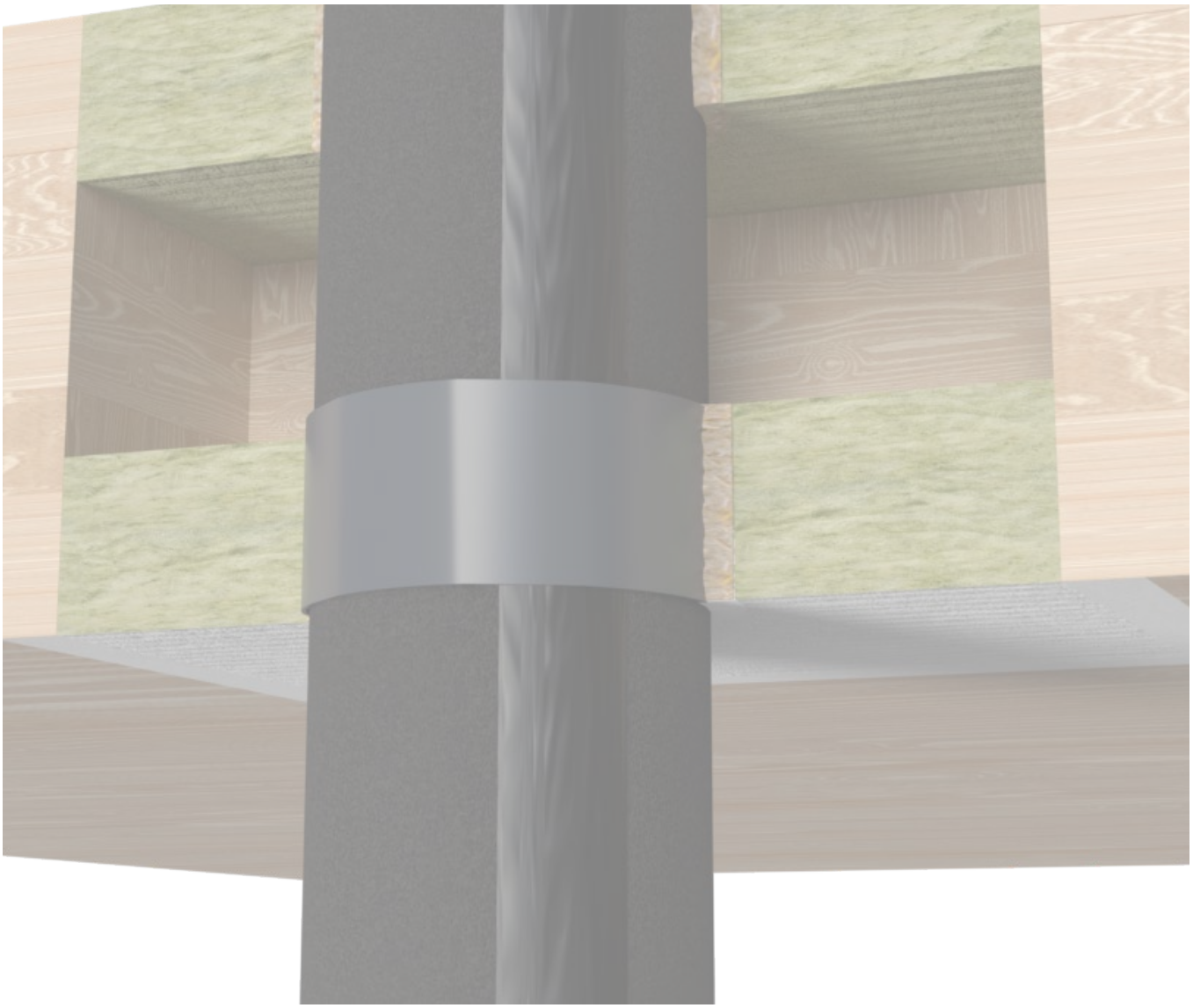
* Prefabricated pipe shells in accordance with EN 14303 made of mineral wool with classification A2L-s1,d0 or A1L as per EN 13501-1, a minimum density of 80 kg/m³, laminated with a mesh-reinforced aluminium foil and with a self-adhesive tape.

Multilayer pipes with fire protection wrap and AF/ArmaFlex insulation in wall and floor seals



All specifications in mm

The fire protection wrap KSL-W can either be installed flush with the seal surface or protrude up to 5 mm from the seal.



Wall											
Type of pipe	**Outer diameter [mm]**	**Pipe wall thick-ness [mm]**	**Type of insulation**	**Insu-lation length L [mm]**	**Insu-lation thick-ness [mm]**	**KSL-W**					**Fire resistance class**
						Wrap width [mm]	**Number of wraps [n]**	**Inside seal [mm]**	**Outside seal [mm]**	**Number of layers [n]**	
Geberit Mepla	16.0	2.25	AF/ ArmaFlex	≥ 350	8.0–32.0	50	2	50	0	1	EI 90 U/C
	20.0	2.5									
	26.0	3.0			8.5–35.0						
	32.0	3.0			9.0–35.0						
	40.0	3.5								2	
	50.0	4.0									
	63.0	4.5			9.0–39.0						
	75.0	4.7			9.5						EI 90 U/C
					9.5–40.5						EI 90 U/C
REHAU RAUTITAN stabil	16.0	2.6			8.0–32.0					1	EI 90 U/C
	20.0	2.9									
	25	3.79			8.5–35.0						
	32	4.7			9.0–35.0						
	40	6.0								2	
KE KELIT KELOX	16.0	2.0			8.0–32.0					1	EI 90 U/C
	18.0										
	20.0	2.25									
	25.0	2.5			8.5–35.0						
	32.0	3.0			9.0–35.0						
	40.0	4.0								2	
	50.0	4.5									
	63.0	6.0			9.0						EI 90 U/C
					9.0–39.0						EI 90 U/C
	75.0	7.5			9.5–40.5						

Floor											
Type of pipe	Outer diameter [mm]	Pipe wall thick-ness [mm]	Type of insulation	Insu-lation length L [mm]	Insu-lation thick-ness [mm]	KSL-W					Fire resistance class
						Wrap width [mm]	Number of wraps [n]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Geberit Mepla	16.0	2.25	AF/ ArmaFlex	≥ 350.0	8.0–32.0	50	1	50	0	1	EI 90 U/C
	20.0	2.5			8.0–32.0						EI 90 U/C
	26.0	3.0			8.5–35.0						EI 90 U/C
	32.0				9.0–35.0						EI 90 U/C
	40.0	3.5			9.0–35.0					2	EI 90 U/C
	50.0	4.0			9.0–35.0						EI 90 U/C
	63.0	4.5			9.0–39.0						EI 90 U/C
	75.0	4.7			9.5						EI 90 U/C
					9.5–40.5						EI 90 U/C
REHAU RAUTITAN stabil	16.0	2.6			8.0–32.0					1	EI 90 U/C
	20.0	2.9									EI 90 U/C
	25.0	3.79			8.5–35.0						EI 90 U/C
	32.0	4.7			9.0–35.0						EI 90 U/C
	40.0	6.0								2	EI 90 U/C
KE KELIT KELOX	16.0	2.0			8.0–32.0					1	EI 90 U/C
	18.0										EI 90 U/C
	20.0	2.25									EI 90 U/C
	25.0	2.5			8.5–35.0						EI 90 U/C
	32.0	3.0			9.0–35.0						EI 90 U/C
	40.0	4.0								2	EI 90 U/C
	50.0	4.5									EI 90 U/C
	63.0	6.0			9.0–39.0						EI 90 U/C
	75.0	7.5			9.5–40.5						EI 90 U/C

Multilayer pipes with endless collar and FEF insulation in wall and floor seals

All specifications in mm

Wall

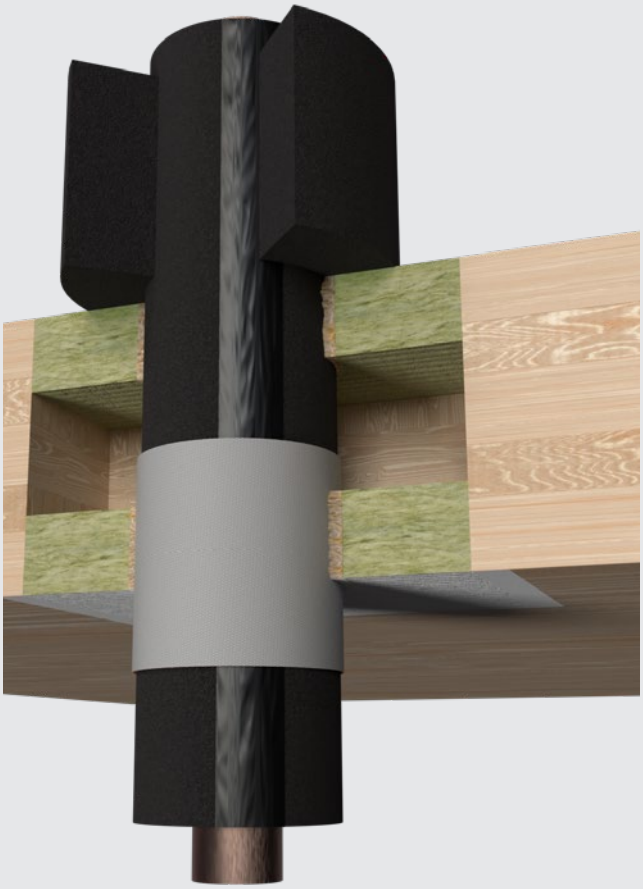
Type of pipe	Outer diameter [mm]	Pipe wall thickness [mm]	Type of insulation	Insulation length	Insulation thickness S [mm]	EC Endless Collar: Number of layers [n]	Fire resistance class
FRÄNKISCHE alpex L / FRÄNKISCHE alpex F50	16.0–20.0	2.0	FEF B-s3,d0 (e.g. AF/ArmaFlex)	CS	8.0–30.0	2	EI 90 U/C

Floor

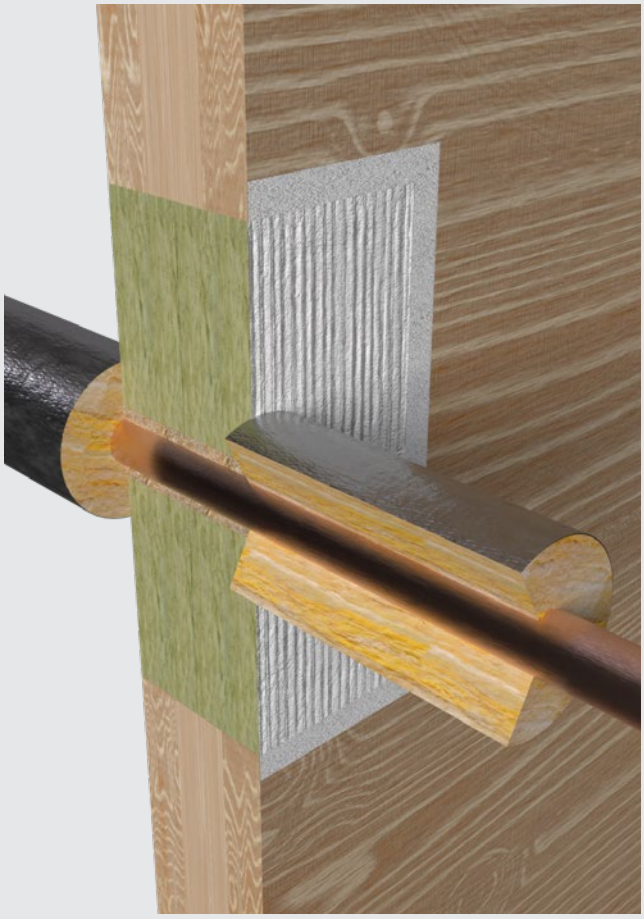
Type of pipe	Outer diameter [mm]	Pipe wall thickness [mm]	Type of insulation	Insulation length	Insulation thickness S [mm]	EC Endless Collar: Number of layers [n]	Fire resistance class
FRÄNKISCHE alpex L / FRÄNKISCHE alpex F50	16.0–75.0	2.0–5.0	FEF B-s3,d0 (e.g. AF/ArmaFlex)	CS	9.0–38.0	2	EI 90 U/C

Non-combustible pipes

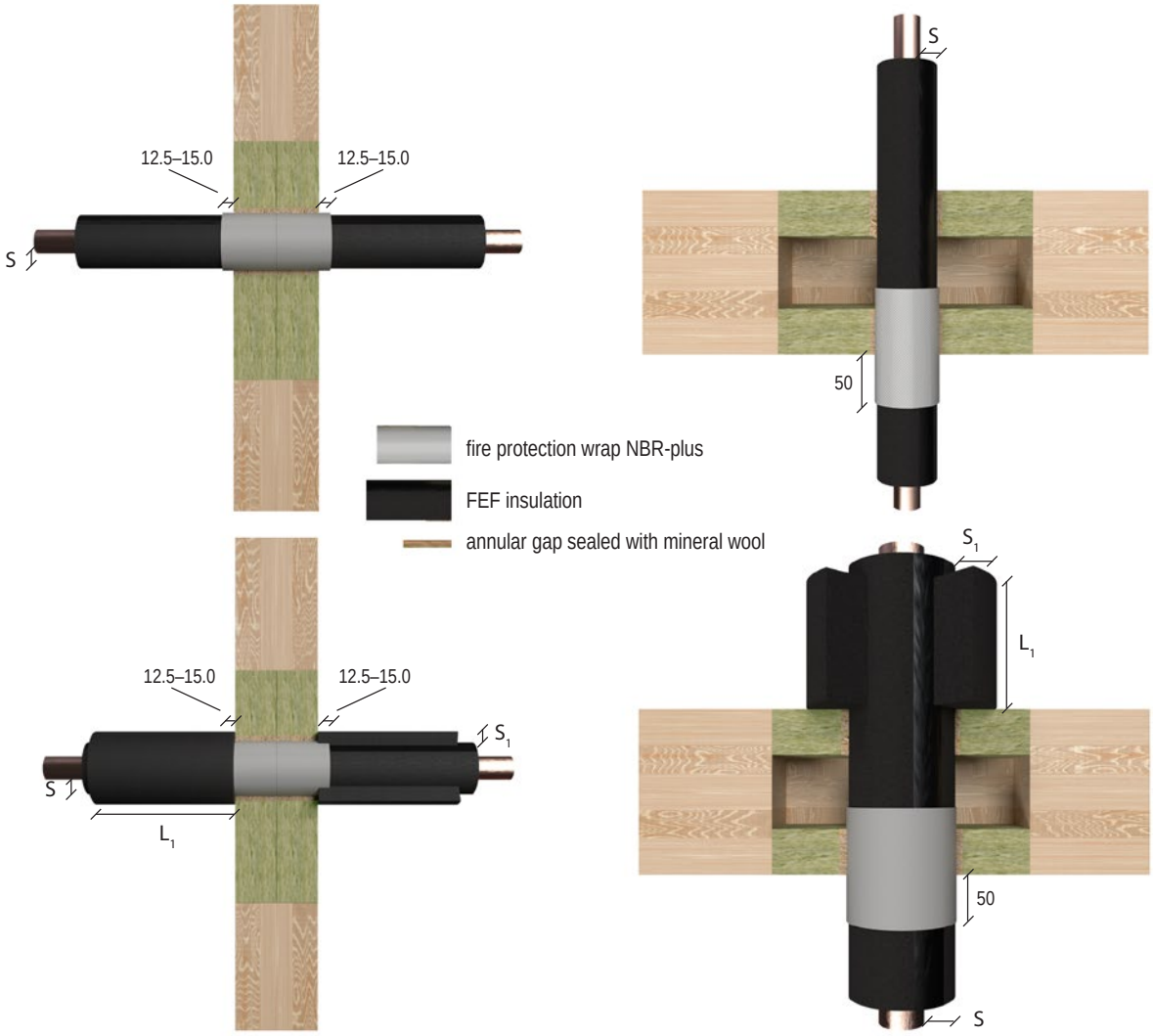
- **Seals with fire protection wrap NBR-plus**



- **Seals with lamella mat**



Non-combustible pipes with fire protection wrap in wall and floor seals



All specifications in mm

Wall

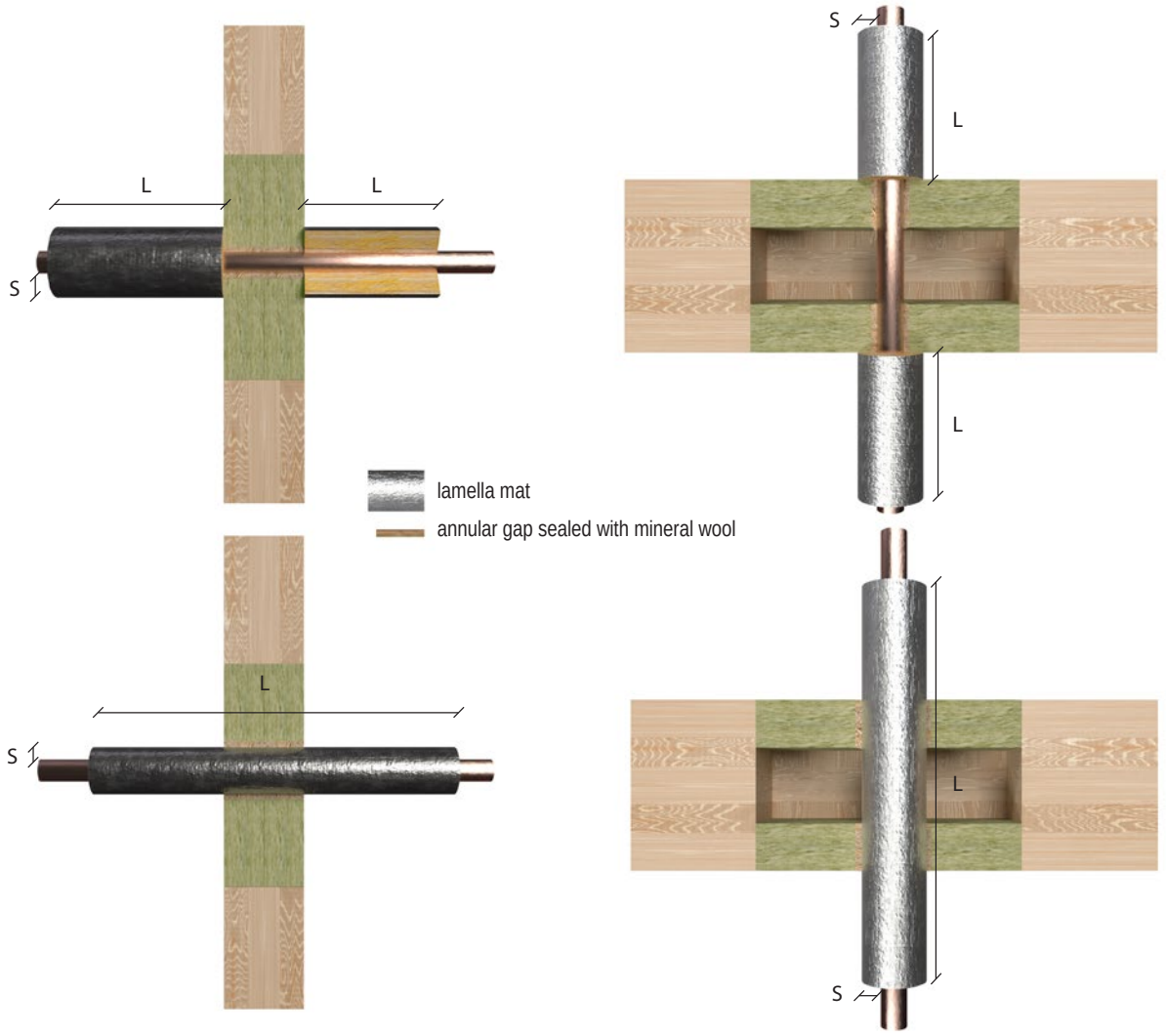
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		Fire protection wrap NBR-plus					Fire resistance class
			Length	Thickness S [mm]	Length L_1 [mm]	Thickness S_1 [mm]	Wrap width [mm]	Number of wraps [n]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Copper, steel, stainless steel, cast iron	≤ 15.0	0.8–14.2	CS	10.0	–	–	62.5	2	50	15.5	1	EI 90 U/C*
	> 15.0 – ≤ 54.0			19.0–38.0	–	–					2	
	> 54.0 – ≤ 88.9			25.0	–	–					2	
	≤ 42.0			10.0	–	–					1	
	> 42.0 – ≤ 88.9			19.0–38.0	–	–					2	EI 90 U/C
Steel, stainless steel, cast iron	≤ 15.0			10.0–38.0	–	–					2	
	> 15.0 – ≤ 88.9			19.0–38.0	–	–					2	
	> 88.9 – ≤ 114.3			19.0–38.0	250	19					2	
	> 114.3 – ≤ 159.0			25.0–38.0	250	19					2	
	> 159.0 – ≤ 219.1			25.0–38.0	600	38					2	

Floor

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Section insulation		Protective insulation		Fire protection wrap NBR-plus					Fire resistance class
			Length	Thickness S [mm]	Length L_1 [mm]	Thickness S_1 [mm]	Wrap width [mm]	Number of wraps [n]	Inside seal [mm]	Outside seal [mm]	Number of layers [n]	
Copper, steel, stainless steel, cast iron	≤ 60.0	0.6–14.2	CS	13.0–40.0	–	–	125	1	75	50	2	EI 90 U/C
	> 60.0 – ≤ 88.9			25.0	–	–					2	
	≤ 42.0			10.0	–	–					1	EI 90 U/C*
	≤ 42.0			9.0–40.0	–	–					2	
	> 42.0 – ≤ 60.0			13.0–40.0	–	–					2	EI 90 U/C
	> 60.0 – ≤ 88.9			19.0–38.0	–	–					2	
Steel, stainless steel, cast iron	≤ 159.0			25.0–38.0	250	25					2	
	> 159.0 – ≤ 219.1			25.0–38.0	250	38					2	

* Installing two mineral fibre boards with a thickness of 60 mm raises the fire resistance class to EI 120.

Non-combustible pipes with lamella mat in wall and floor seals



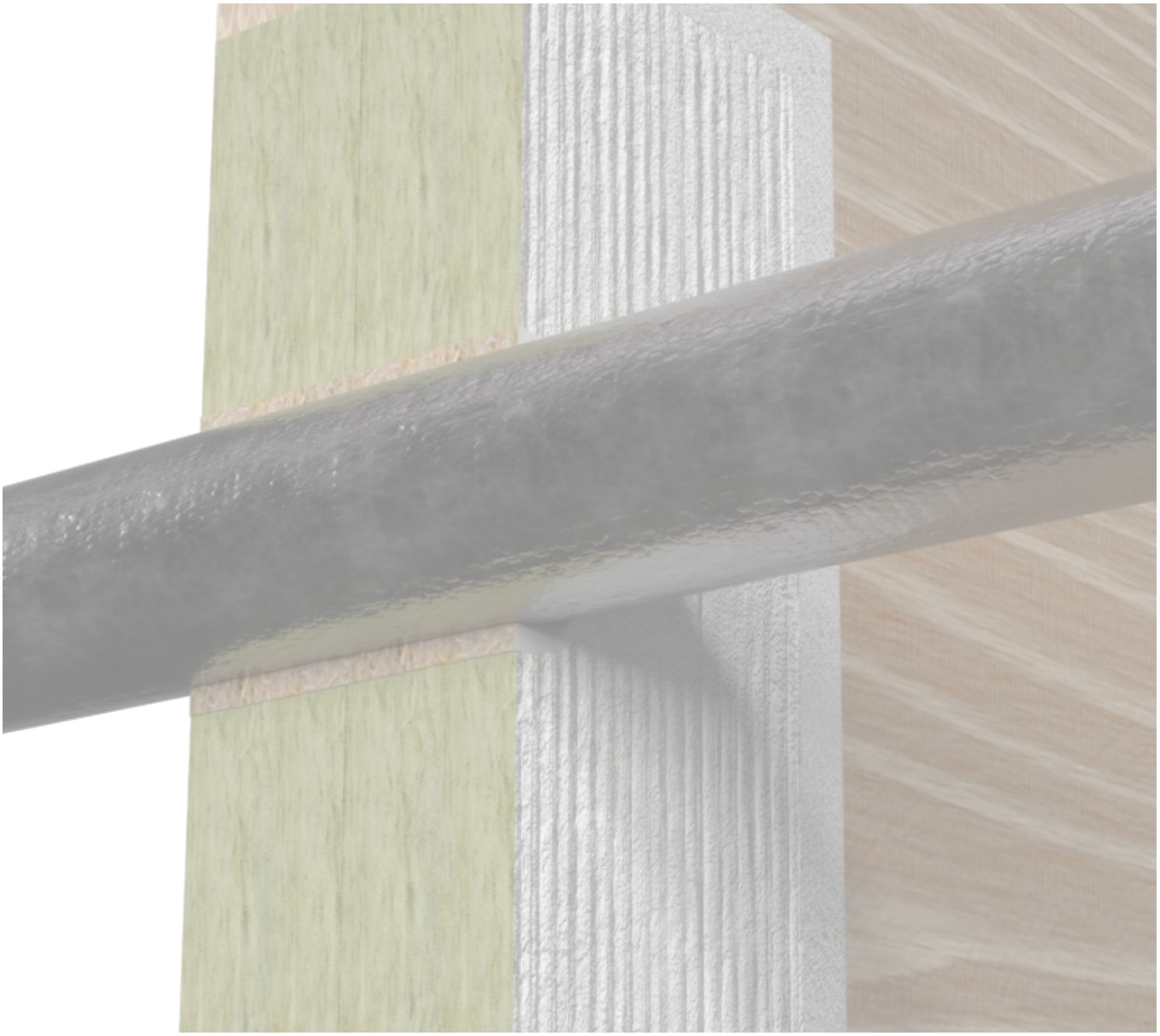
All specifications in mm

Wall

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Lamella mat		Fire resistance class
			Insulation length L [mm]	Insulation thickness S [mm]	
Copper, steel, stainless steel, cast iron	≤ 22.0	0.6–14.2	≥ 450 on both sides	20–100	EI 90 U/C*
			≥ 200 on both sides	30–100	
	> 22.0 – ≤ 60.0		≥ 450 on both sides	30–100	
	> 60.0 – ≤ 88.9		≥ 450 on both sides	100	
			≥ 700 on both sides	30–100	
Steel, stainless steel, cast iron	≤ 42.0	1.8–14.2	≥ 200 on both sides	30–100	EI 90 U/C**
	> 42.0 – ≤ 114.3	1.8/3.2–14.2	≥ 450 on both sides	30–100	
	> 114.3 – ≤ 159.0	3.2/4.0–14.2	≥ 1200 on both sides	100	
	> 114.3 – ≤ 219.1	3.2/4.5–14.2	≥ 1200 on both sides	30–100	

* For pipes ≤ 54 mm: installing two mineral fibre boards with a thickness of 60 mm raises the fire resistance class to EI 120.
**For pipes ≤ 114 mm: installing two mineral fibre boards with a thickness of 60 mm raises the fire resistance class to EI 120.

Floor					
Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Lamella mat		Fire resistance class
			Insulation length L [mm]	Insulation thickness S [mm]	
Copper, steel, stainless steel, cast iron	≤ 22.0	0.6–14.2	≥ 425.0 on both sides	20–100	EI 90 U/C
			≥ 175.0 on both sides	30–100	
	> 22.0 – ≤ 42.0		≥ 425.0 on both sides	30–100	
	> 42.0 – ≤ 88.9		≥ 675.0 on both sides	30–100	EI 90 U/C
Steel, stainless steel, cast iron	≤ 42.0	1.8–14.2	≥ 425.0 on both sides	30–100	EI 90 U/C
	> 42.0 – ≤ 114.3		≥ 1175.0 on both sides	30–100	
	> 114.3 – ≤ 159.0		≥ 1175.0 on both sides	30–100	
	> 114.3 – ≤ 219.1		≥ 1175.0 on both sides	30	EI 90 U/C
	> 114.3 – ≤ 219.1		≥ 1175.0 on both sides	30–100	EI 90 U/C



Single penetrations

Not only does Flamro offer mixed penetration sealing systems for a great variety of services, but also tested seals for single pipe and cable penetrations.

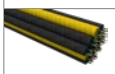
System Cable Tube

System data

Certificates of usability		**ETA-22/0053 KB 321100703-A KB 322042005-A KB 323032803-A**
Thickness of building element	Wall	≥ 100
	Floor	≥ 140
Thickness of seal	Wall	≥ 100
	Floor	≥ 140

All specifications in mm

Services

		max. diameter
	Cables	≤ 50
	Cable bundles	≤ 100 / ≤ 21
	Conduits made of steel or plastic	≤ 16
	Electrical installation conduits, single or bundled	≤ 32
	HVAC split line combinations	✓

All specifications in mm

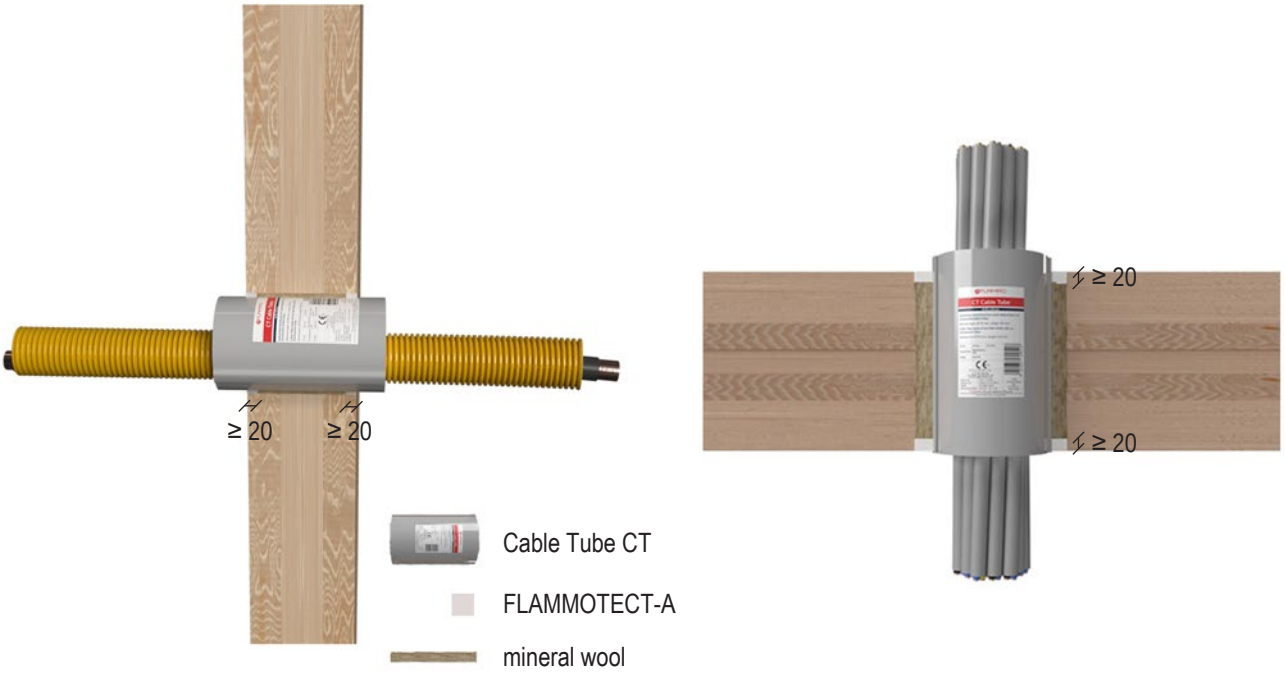
Cable tubes / cable boxes

Particularly easy to install seal made of two half shells with an inlay of fire protection fabric.

Highlights

- particularly easy to use for the construction of single penetration seals in core drill holes
- quick and clean installation
- can also be installed in existing installations
- 100% occupancy of the Cable Tube cross section possible

System Cable Tube in wall and floor seals



All specifications in mm

Cable Tube CT 150			
Wall thickness ≥ 100 mm, CLT layers: 20/20/20/20/20 Floor thickness: ≥ 100 mm, CLT layers: 20/20/20/20/20			
Services	**Outer diameter [mm]**	**Fire resistance class**	
		Wall	**Floor**
Cables	≤ 21	**EI 45 / E 60**	**EI 45 / E 60**
	> 21 – ≤ 50	**EI 45 / E 60**	**EI 45 / E 60**
Cable bundles	≤ 100	**–**	**EI 45 / E 60**
Electrical installation conduits, with or without cables	≤ 32	**EI 45 / E 60**	EI 60
Electrical installation conduits, bundled, with or without cables	3 × ≤ 32		
HVAC split line combinations	2 copper pipes Ø ≤ 18 mm, PVC-U pipe Ø ≤ 25 mm, S = 4.5 mm, single cables Ø ≤ 14 mm	EI 60	**–**

Cable Tube CT 150			
Wall thickness ≥ 100 mm, CLT layers: 30/40/30 Floor thickness: ≥ 100 mm, CLT layers: 40/20/20/20/40			
Services	**Outer diameter [mm]**	**Fire resistance class**	
		Wall	**Floor**
Cables	≤ 21	EI 30	EI 90
	> 21 – ≤ 50	EI 30	–
Cable bundles	≤ 100	EI 90	EI 90
Electrical installation conduits, with or without cables	≤ 32	EI 90	EI 90
Electrical installation conduits, bundled, with or without cables	3 × ≤ 32		
HVAC split line combinations	2 copper pipes Ø ≤ 18 mm, PVC-U pipe Ø ≤ 25 mm, S = 4.5 mm, single cables Ø ≤ 14 mm	EI 30	EI 90

Cable Tube CT 300			
Wall thickness ≥ 100 mm, CLT layers: 20/20/20/20/20 Floor thickness: ≥ 100 mm, CLT layers: 20/20/20/20/20			
Services	**Outer diameter [mm]**	**Fire resistance class**	
		Wall	**Floor**
Cables	≤ 50	EI 60	–
Electrical installation conduits, with or without cables	≤ 32	**EI 45 / E 60**	EI 60
Electrical installation conduits, bundled, with or without cables	3 × ≤ 32		

In walls Cable Tubes must be installed in the centre, in floors flush with the underside.

Combustible pipes

Seals with fire protection collar

Highlights

- zero distances possible
- separable steel sheet housing in various sizes
- double-slit seal for size adjustment
- very small housing dimensions
- small number of fastening points
- quick installation without drilling templates
- can be installed even in difficult installation situations

System data

Certificates of usability		ETA-17/0753 KB 321100703-A KB 322042005-A KB 323032803-A
Thickness of building element	Wall	≥ 100
	Floor	≥ 140
Thickness of seal	Wall	≥ 100
	Floor	≥ 140

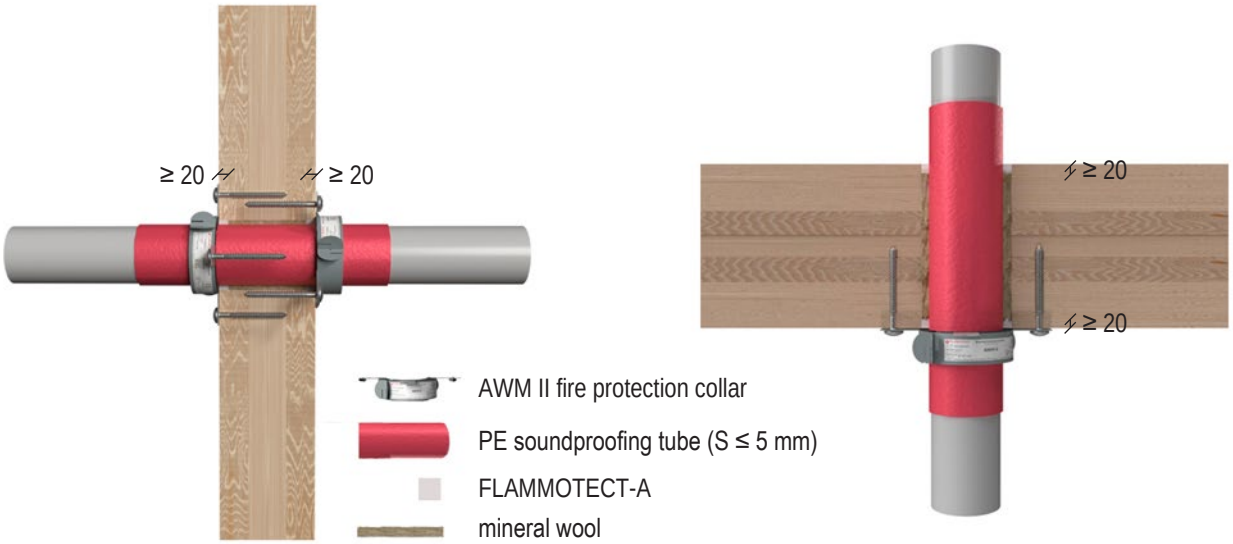
All specifications in mm

Services

	maximum diameter	maximum pipe wall thickness
Geberit Silent-db20	110.0	6.0
REHAU RAUPIANO PLUS	110.0	2.7
REHAU RAUPIANO LIGHT	110.0	2.7
CONEL DRAIN	110.0	2.7
Geberit Silent-PP	110.0	3.6
Geberit Silent-Pro	110.0	4.5
POLOPLAST POLO-KAL NG	110.0	3.4
POLOPLAST POLO-KAL XS	110.0	3.4
POLOPLAST POLO-KAL 3S	110.0	4.8
Hakan Silenta Premium	110.0	5.3
Wavin AS+	110.0	5.3
Wavin SiTech+	110.0	3.6
Ostendorf Skolan	110.0	5.3
Pipelife MASTER 3	110.0	3.0

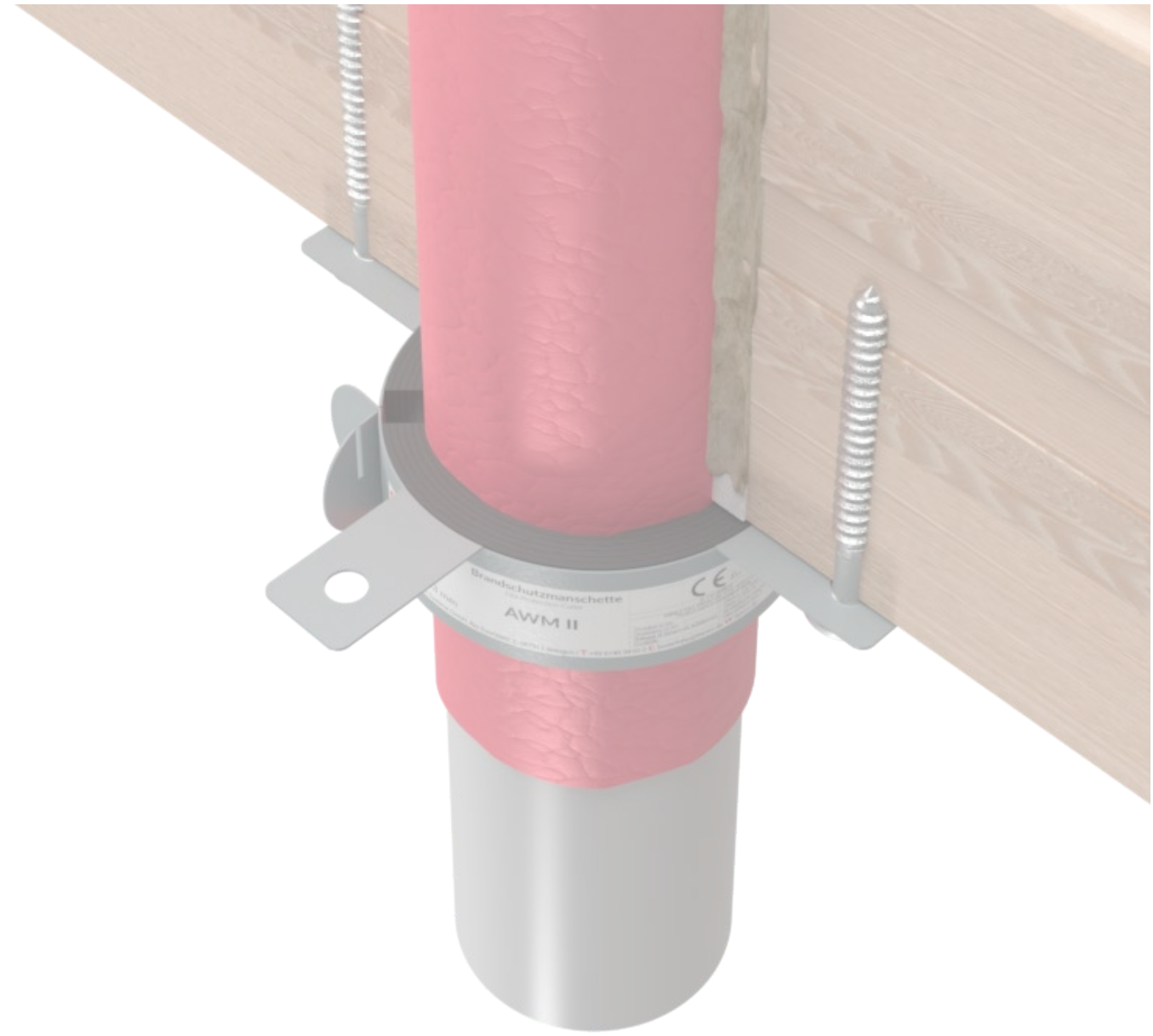
All specifications in mm

Combustible pipes with fire protection collar in wall and floor seals



All specifications in mm

The fire protection collar must be fastened with timber construction screws (on both sides of wall: length 80 mm, Ø ≥ 8 mm. On underside of floor: length 100 mm, Ø ≥ 6 mm).



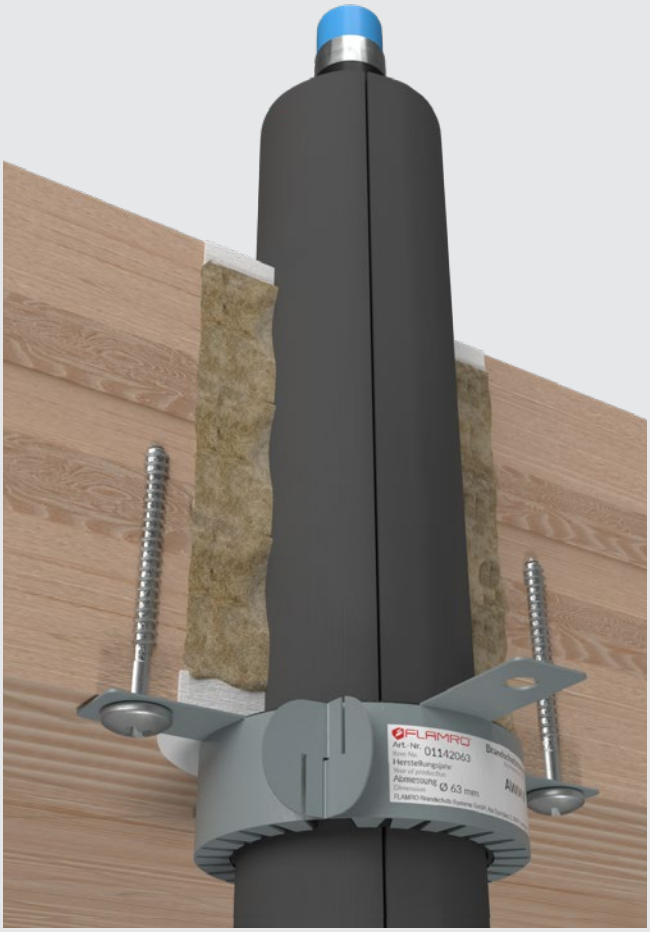
Wall thickness ≥ 100 mm, CLT layers: 20/20/20/20/20 Floor thickness: ≥ 100 mm, CLT layers: 20/20/20/20/20				
Pipe material / type	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Fire resistance class**	
			Wall	**Floor**
PP-H	≥ 32.0 – ≤ 50.0	1.8	EI 60 U/U	EI 60 U/U
	> 50.0 – ≤ 75.0	1.8–1.9		
	> 75.0 – ≤ 90.0	1.9–2.2		
	> 90.0 – ≤ 110.0	2.2–2.7	–	
REHAU RAUPIANO LIGHT CONEL DRAIN	≥ 50.0 – ≤ 75.0	1.8–2.0	EI 60 U/U	EI 60 U/U
	> 75.0 – ≤ 90.0	2.0–2.2		
	> 90.0 – ≤ 110.0	2.2–2.7		
Geberit Silent-db20	≥ 56.0 – ≤ 63.0	3.2	EI 60 U/U	EI 60 U/U
	> 63.0 – ≤ 75.0	3.2–3.6		
	> 75.0 – ≤ 90.0	3.6–5.5		
	> 90.0 – ≤ 110.0	5.5–6.0		
Geberit Silent-PP	≥ 32.0 – ≤ 50.0	2.0	EI 60 U/U	EI 60 U/U
	> 50.0 – ≤ 75.0	2.0–2.6		
	> 75.0 – ≤ 90.0	2.6–3.1		
	> 90.0 – ≤ 110.0	3.1–3.6		
Geberit Silent-Pro	≥ 50.0 – ≤ 75.0	3.0–3.8	EI 60 U/U	EI 60 U/U
	> 75.0 – ≤ 90.0	3.8–4.3		
	> 90.0 – ≤ 110.0	4.3–4.5		
POLOPLAST POLO-KAL NG POLOPLAST POLO-KAL XS	≥ 50.0 – ≤ 75.0	2.0–2.6	EI 60 U/U	EI 60 U/U
	> 75.0 – ≤ 90.0	2.6–3.0		
	> 90.0 – ≤ 110.0	3.0–3.4		
POLOPLAST POLO-KAL 3S	≥ 75.0 – ≤ 110.0	3.8–4.8	EI 60 U/U	–
REHAU RAUPIANO PLUS	≥ 50.0 – ≤ 75.0	1.8–2.0	EI 60 U/U	EI 60 U/U
	> 75.0 – ≤ 90.0	2.0–2.2		
	> 90.0 – ≤ 110.0	2.2–2.7		
Hakan Silenta Premium	≥ 58.0 – ≤ 90.0	4.1–4.7	EI 60 U/U	–
	> 90.0 – ≤ 110.0	4.7–5.3		
Wavin AS+	≥ 50.0 – ≤ 75.0	3.0–3.5	EI 60 U/U	–
	> 75.0 – ≤ 90.0	3.5–4.6		
	> 90.0 – ≤ 110.0	4.6–5.3		
Wavin SiTech+	≥ 32.0 – ≤ 40.0	2.0	EI 60 U/U	–
	> 40.0 – ≤ 50.0	2.0–2.1		
	≥ 50.0 – ≤ 75.0	2.1–2.6		
	> 75.0 – ≤ 90.0	2.6–3.1		
	> 90.0 – ≤ 110.0	3.1–3.6		
Ostendorf Skolan	≥ 50.0 – ≤ 75.0	4.0–4.5	EI 60 U/U	EI 60 U/U
	> 75.0 – ≤ 90.0	4.5		
	> 90.0 – ≤ 110.0	4.5–5.3		
Pipelife MASTER 3	≥ 50.0 – ≤ 75.0	1.8–2.1	EI 60 U/U	EI 60 U/U
	> 75.0 – ≤ 90.0	2.1–2.5		
	> 90.0 – ≤ 110.0	2.5–3.0		

Wall thickness ≥ 100 mm, CLT layers: 30/40/30 Floor thickness: ≥ 100 mm, CLT layers: 40/20/20/20/40				
Pipe material / type	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Fire resistance class**	
			Wall	**Floor**
REHAU RAUPIANO LIGHT CONEL DRAIN	≥ 50.0 – ≤ 75.0	1.8–2.0	EI 90 U/U	EI 90 U/U
	> 75.0 – ≤ 90.0	2.0–2.2		
	> 90.0 – ≤ 110.0	2.2–2.7		
Geberit Silent-db20	≥ 56.0 – ≤ 63.0	3.2	EI 90 U/U	EI 90 U/U
	> 63.0 – ≤ 75.0	3.2–3.6		
	> 75.0 – ≤ 90.0	3.6–5.5		
	> 90.0 – ≤ 110.0	5.5–6.0		
Geberit Silent-PP	≥ 32.0 – ≤ 50.0	2.0	EI 90 U/U	EI 90 U/U
	> 50.0 – ≤ 75.0	2.0–2.6		
	> 75.0 – ≤ 90.0	2.6–3.1		
	> 90.0 – ≤ 110.0	3.1–3.6		
Geberit Silent-Pro	≥ 50.0 – ≤ 75.0	3.0–3.8	EI 90 U/U	EI 90 U/U
	> 75.0 – ≤ 90.0	3.8–4.3		
	> 90.0 – ≤ 110.0	4.3–4.5		
POLOPLAST POLO-KAL NG POLOPLAST POLO-KAL XS	≥ 50.0 – ≤ 75.0	2.0–2.6	EI 90 U/U	EI 90 U/U
	> 75.0 – ≤ 90.0	2.6–3.0		
	> 90.0 – ≤ 110.0	3.0–3.4		
POLOPLAST POLO-KAL 3S	≥ 75.0 – ≤ 110.0	3.8–4.8	EI 90 U/U	–
REHAU RAUPIANO PLUS	≥ 50.0 – ≤ 75.0	1.8–2.0	EI 90 U/U	EI 90 U/U
	> 75.0 – ≤ 90.0	2.0–2.2		
	> 90.0 – ≤ 110.0	2.2–2.7		
Hakan Silenta Premium	≥ 58.0 – ≤ 90.0	4.1–4.7	EI 90 U/U	–
	> 90.0 – ≤ 110.0	4.7–5.3		
Wavin AS+	≥ 50.0 – ≤ 75.0	3.0–3.5	EI 90 U/U	–
	> 75.0 – ≤ 90.0	3.5–4.6		
	> 90.0 – ≤ 110.0	4.6–5.3		
Wavin SiTech+	≥ 32.0 – ≤ 40.0	2.0	EI 90 U/U	–
	> 40.0 – ≤ 50.0	2.0–2.1		
	≥ 50.0 – ≤ 75.0	2.1–2.6		
	> 75.0 – ≤ 90.0	2.6–3.1		
	> 90.0 – ≤ 110.0	3.1–3.6		

* In CLT walls and floors with the fire resistance class EI 120 these pipes can also attain EI 120 at a diameter of ≤ 110 mm, sometimes even at a diameter of ≤ 160 mm. Ask our service for the classification report with the respective specifications.

Multilayer pipes

Seals with fire protection collar AWM II



System data

Certificates of usability		ETA-17/0753 KB 321100703-A KB 322042005-A KB 323032803-A
Thickness of building element	Wall	≥ 100
	Floor	≥ 140

All specifications in mm

Services

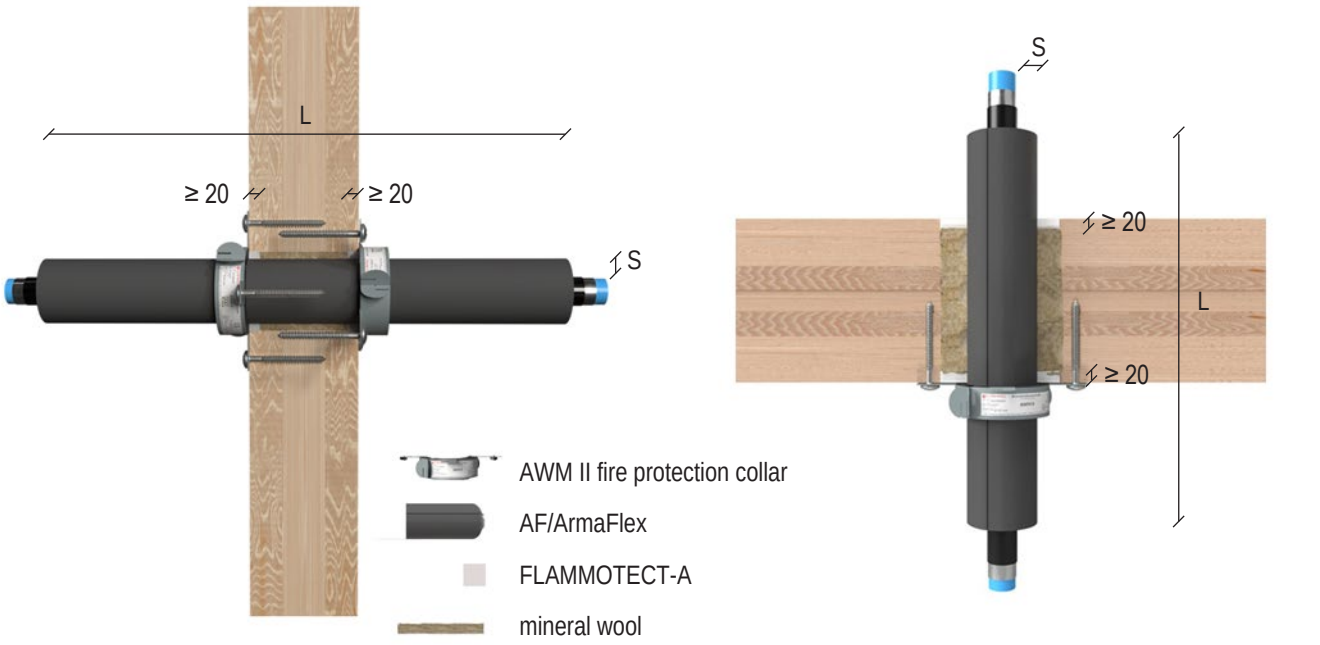
Medienleitungen		**maximum diameter**	**maximum pipe wall thickness**
	Geberit Mepla	50.0	4.0
	REHAU RAUTITAN stabil	50.0	6.0
	Viega Raxofix	50.0	4.0

All specifications in mm

Highlights

- separable steel sheet housing in various sizes
- double-slit seal for size adjustment
- very small housing dimensions
- small number of fastening points
- quick installation without drilling templates
- can be installed even in difficult installation situations

Multilayer pipes with fire protection collar in wall and floor seals



All specifications in mm

The fire protection collar must be fastened with timber construction screws (length 80 mm (wall, offset installation) or 100 mm (floor, Ø ≥ 6 mm).

Wall					
Wall thickness ≥ 100 mm, CLT layers: 30/40/30					
Type of pipe	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Insulation length L [mm]**	**Insulation thickness S [mm]**	**Fire resistance class**
Geberit Mepla	≥ 16.0 – ≤ 20.0	2.25–2.5	≥ 800	17.0–21.0	EI 90 U/C
	> 20.0 – ≤ 26.0	2.5–3.0		17.5–21.0	
	> 26.0 – ≤ 32.0	3.0		18.5–21.0	
	> 32.0 – < 40.0	3.0–3.5		19.0–20.5	
	40.0	3.5		20.5–21.0	
	> 40.0 – ≤ 50.0	3.5–4.0		21.0	
REHAU RAUTITAN stabil	≥ 16.0 – ≤ 20.0	2.6–2.9	≥ 800	17.0–21.0	EI 90 U/C
	> 20.0 – ≤ 25.0	2.9–3.7		17.5–21.0	
	> 25.0 – ≤ 32.0	3.7–4.7		18.5–21.0	
	> 32.0 – ≤ 40.0	4.7–6.0		20.5–21.0	
	> 40.0 – ≤ 50.0	6.0		21.0	
Viega Raxofix	≥ 16.0 – ≤ 20.0	2.2–2.8	≥ 800	17.0–21.0	EI 90 U/C
	> 20.0 – ≤ 25.0	2.7–2.8		17.5–21.0	
	> 25.0 – ≤ 32.0	2.7–3.2		18.5–21.0	
	> 32.0 – ≤ 40.0	3.2–3.5		20.5–21.0	
	> 40.0 – ≤ 50.0	3.5–4.0		21.0	

Floor					
Type of pipe	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Insulation length L [mm]**	**Insulation thickness S [mm]**	**Fire resistance class**
Geberit Mepla	≥ 16.0 – ≤ 20.0	2.25–2.5	≥ 840	16.0–21.0	EI 90 U/C
	> 20.0 – ≤ 26.0	2.5–3.0		17.5–21.0	
	> 26.0 – ≤ 32.0	3.0		19.0–21.0	
	> 32.0 – < 40.0	3.0–3.5		20.5–21.0	
	40.0	3.5		20.5–21.0	
	> 40.0 – ≤ 50.0	3.5–4.0		21.0	
REHAU RAUTITAN stabil	≥ 16.0 – ≤ 20.0	2.6–2.9		17.0–21.0	
	> 20.0 – ≤ 25.0	2.9–3.7		17.5–18.5	EI 90 U/C
	> 25.0 – ≤ 32.0	3.7–4.7		18.5–19.0	
	> 32.0 – ≤ 40.0	4.7–6.0		20.5–21.0	
	> 40.0 – ≤ 50.0	6.0		21.0	
Viega Raxofix	≥ 16.0 – ≤ 20.0	2.2–2.8		17.0–21.0	EI 90 U/C
	> 20.0 – ≤ 25.0	2.7–2.8		17.5–21.0	
	> 25.0 – ≤ 32.0	2.7–3.2		18.5–21.0	
	> 32.0 – ≤ 40.0	3.2–3.5		20.5–21.0	
	> 40.0 – ≤ 50.0	3.5–4.0		21.0	

Non-combustible pipes

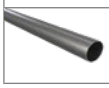
Seals with fire protection wrap

System data

Certificates of usability		ETA in preparation KB 321100703-A KB 322042005-A KB 323032803-A
Thickness of building element	Wall	≥ 100
	Floor	≥ 140
Thickness of seal	Wall	≥ 100
	Floor	≥ 140

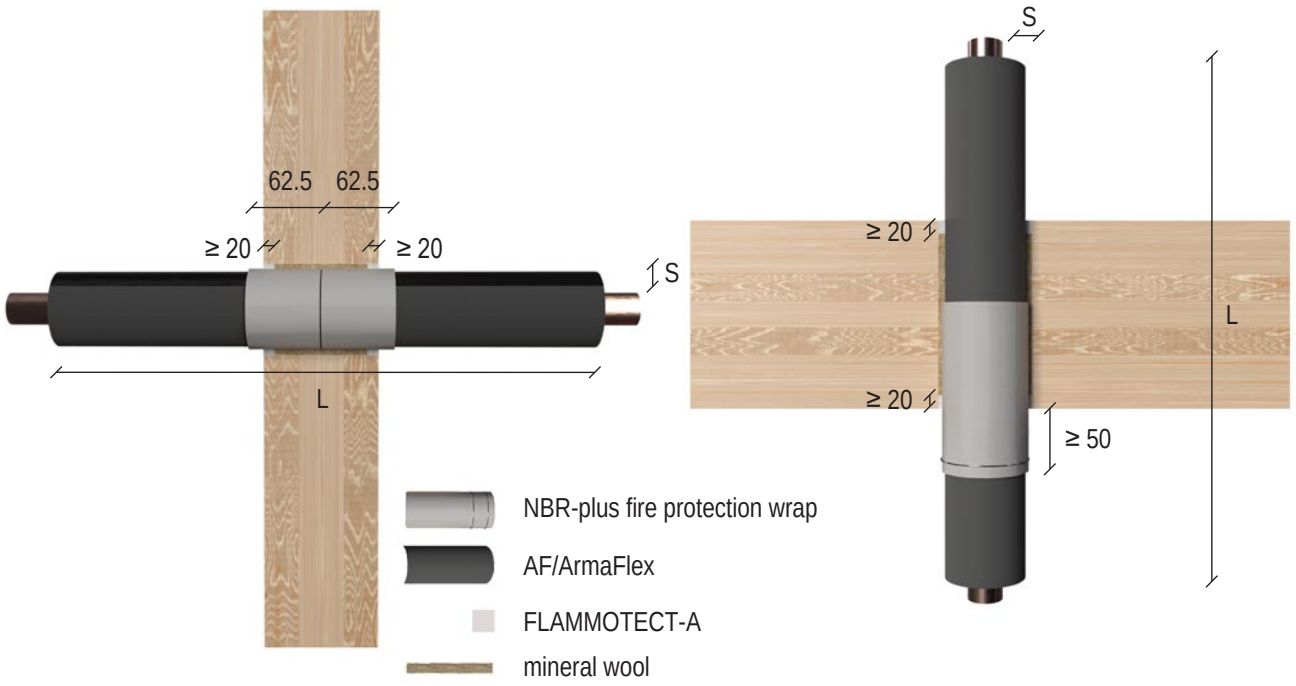
All specifications in mm

Services

Pipe material		**maximum diameter**	**maximum pipe wall thickness**
	Copper, steel, stainless steel, cast iron	54.0	14.2
	Steel, stainless steel, cast iron	110.0	14.2

All specifications in mm

Non-combustible pipes with fire protection wrap in wall and floor seals



All specifications in mm

Wall

Wall thickness ≥ 100 mm, CLT layers: 30/40/30

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Insulation length L [mm]	Insulation thickness S [mm]	Fire protection wrap NBR-plus		Fire resistance class*
					Number of layers [n]	Wrap width [mm]	
Copper, steel, stainless steel, cast iron	≤ 28.0	1.8–14.2	≥ 800	9	1	2 × 62.5	EI 90 U/C
				> 9 – 19	2		
	≤ 60.0	0.6–14.2		> 9 – 21	2		EI 60 U/C / E 90 U/C
Steel, stainless steel, cast iron	≤ 110.0	1.0–14.2	entire length of pipe	23	2		EI 60 U/C / E 90 U/C

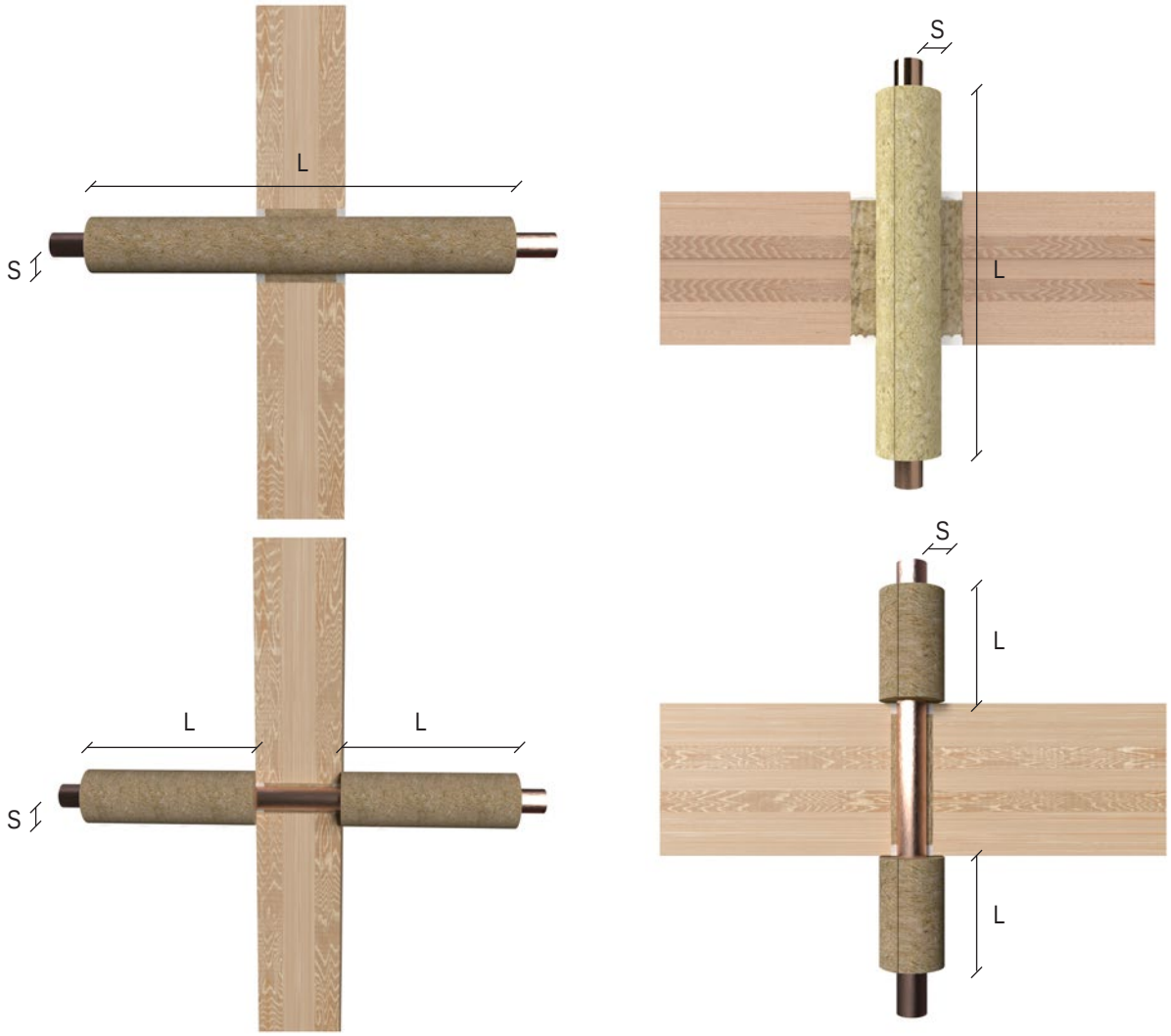
Floor

Floor thickness: ≥ 100 mm, CLT layers: 40/20/20/20/40

Pipe material	Outer diameter [mm]	Pipe wall thickness [mm]	Insulation length L [mm]	Insulation thickness S [mm]	Fire protection wrap NBR-plus		Fire resistance class*
					Number of layers [n]	Wrap width [mm]	
Copper, steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	≥ 1000	9	1	1 × 125	EI 90 U/C
				> 9–21	2		
Steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	entire length of pipe	9	1		
	≤ 110.0			23	2		
		0.6–14.2	1000	9–23	2		EI 60 U/C

* In CLT walls and floors with the fire resistance class EI 120 these pipes can also attain EI 120 at a diameter of ≤ 42 mm.

Non-combustible pipes in wall and floor seals – sustained (LS/CS) or interrupted (LI/CI) insulation



pipe shell made of mineral wool (ρ ≥ 40 kg/m³)

FLAMMOTECT-A (20 mm)

mineral wool

All specifications in mm

Wall						
Wall thickness ≥ 100 mm, CLT layers: 30/40/30						
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Insulation material**	**Insulation length L [mm]**	**Insulation thickness S [mm]**	**Fire resistance class**
Copper, steel, stainless steel, cast iron	≤ 60.0	0.6–14.2	pipe shell	> 1000 or protruding ≥ 450 from both sides of the wall	50	**EI 90 U/C***
	≤ 28.0	1.0–14.2	lamella mat		20	
Steel, stainless steel, cast iron	≤ 28.0	1.0–14.2	pipe shell	> 500 or protruding ≥ 200 from both sides of the wall	20–40	**EI 90 U/C****
	≤ 42.0	1.5–14.2	pipe shell			
	≤ 114.3	1.0–14.2	pipe shell	entire length of pipe	≥ 30	
			lamella mat		≥ 60	

Floor						
Floor thickness: ≥ 100 mm, CLT layers: 40/20/20/20/40						
Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Insulation material**	**Insulation length L [mm]**	**Insulation thickness S [mm]**	**Fire resistance class**
Copper, steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	pipe shell	> 1000 or protruding ≥ 430 from both sides of the wall	20–50	**EI 90 U/C***
Steel, stainless steel, cast iron	≤ 54.0	1.0–14.2			20–100	**EI 90 U/C****
	> 54.0 – ≤ 114.3				30–100	

* In CLT walls and floors with the fire resistance class EI 120 these pipes can also attain EI 120 at a diameter of ≤ 54 mm.
**In CLT walls and floors with the fire resistance class EI 120 these pipes can also attain EI 120 at a diameter of ≤ 114 mm.

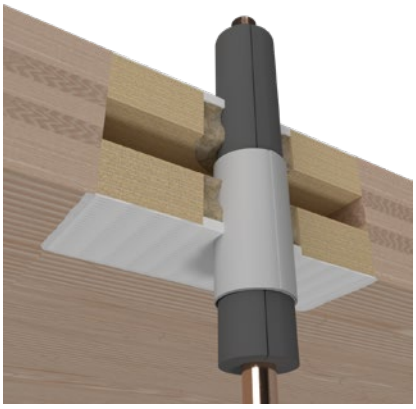
Zero clearances

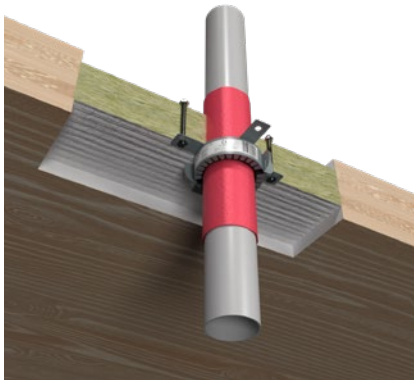
Possible zero clearances for single pipe penetrations

Wall					
	Pipe material	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Type of insulation**	**Insulation length [mm]**
Pipe 1	**Steel, stainless steel, cast iron**	≤ 28	1.0–14.2	aluminium laminated mineral wool	1000 sustained (LS)
Pipe 2		≤ 42	1.5–14.2		

Floor						
	Pipe material / type	**Outer diameter [mm]**	**Pipe wall thickness [mm]**	**Type of insulation**	**Insulation length [mm]**	**Insulation thickness [mm]**
Pipe 1	**Copper, steel, stainless steel, cast iron**	≤ 28	1.0–14.2	aluminium laminated mineral wool or Rockwool RS 800	1000 sustained (LS)	20
Pipe 2		≤ 54	1.5–14.2			
Pipe 3	**Geberit Silent-db20**	≤ 110	3.2–6.0	PE soundproofing tube ≤ 5 mm + AWM II	50 from pipe collar or 50 from building element (upper side of floor)	5
Pipe 1	**Copper, steel, stainless steel, cast iron**	≤ 28	1.0–14.2	aluminium laminated mineral wool or Rockwool RS 800	1000 sustained (LS)	20
Pipe 2		≤ 42	1.5–14.2			
Pipe 3	**POLOPLAST POLO-KAL NG**	≤ 110	2.0–3.4	PE soundproofing tube ≤ 5 mm + AWM II	50 from pipe collar or 50 from building element (upper side of floor)	5
Pipe 1	**Steel, stainless steel, cast iron**	≤ 28	1.0–14.2	aluminium laminated mineral wool or Rockwool RS 800	1000 sustained (LS)	20
Pipe 2		≤ 48	1.5–14.2			
Pipe 3	**Geberit Silent-db20**	≤ 110	3.2–6.0	PE soundproofing tube ≤ 5 mm + AWM II	50 from pipe collar or 50 from building element (upper side of floor)	5
Pipe 1	**Geberit Silent-db20**	≤ 110	3.2–6.0	PE soundproofing tube ≤ 5 mm + AWM II	50 from pipe collar or 50 from building element (upper side of floor)	5
Pipe 2						

Our product portfolio





FLAMMOTECT-A

Fire protection coating – free of solvents and halogen – which can be used indoors and outdoors.

FLAMMOTECT A is resistant to moisture, freeze-thaw changes, UV radiation and a great number of oils and chemicals.

Technical specifications

Colour		white
Density (at +20 °C)		1.34–1.48 g/cm³
Viscosity	**Coating**	6000–10 000 mPa·s
	Solid emulsion	25 000–40 000 mPa·s
	Filler	paste-like
Viscosity can be adjusted by adding water.		
Use category		Type X in acc. with EOTA TR024

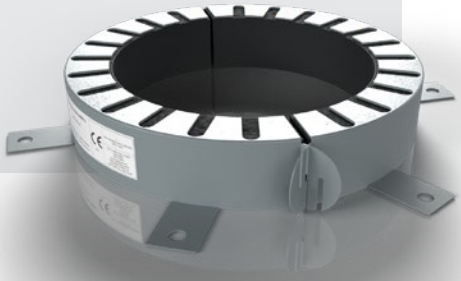
Safety information	Please observe our safety data sheet.

Delivery and packaging

FLAMMOTECT-A					
Packaging	pail				cartridge
Container size	25 kg	15 kg	12.5 kg	5 kg	310 ml
Item number					
Coating	01155133	01155150	01155131	01155132	–
Solid emulsion	01155137	01155151	01155136	01155121	–
Filler	01155138	01155152	01155134	01155135	01155115

AWM II

Externally attached fire protection collar consisting of a sheet steel housing with an intumescent inlay. For use on combustible pipes with and without insulation, suitable for a variety of non-standard pipes.



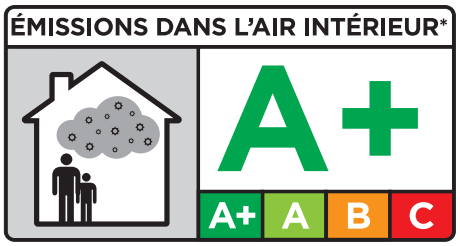
Technical specifications

Material	• powder-coated sheet steel housing up to external Ø 200 mm • galvanised sheet steel housing from external Ø 225 mm • intumescent inlay
Colour	• light grey (housing) • anthracite (inlay)
Expansion rate	18 to 38 times
Use category	Type X in acc. with EOTA TR024

Safety information	Please observe our safety data sheet for ROKU Strip.

Delivery and packaging

AWM II	
Diameter	**Item number**
Ø 32 mm	01142032
Ø 40 mm	01142040
Ø 50 mm	01142050
Ø 63 mm	01142063
Ø 75 mm	01142075
Ø 90 mm	01142090
Ø 110 mm	01142110
Ø 125 mm	01142125
Ø 140 mm	01142140
Ø 160 mm	01142160

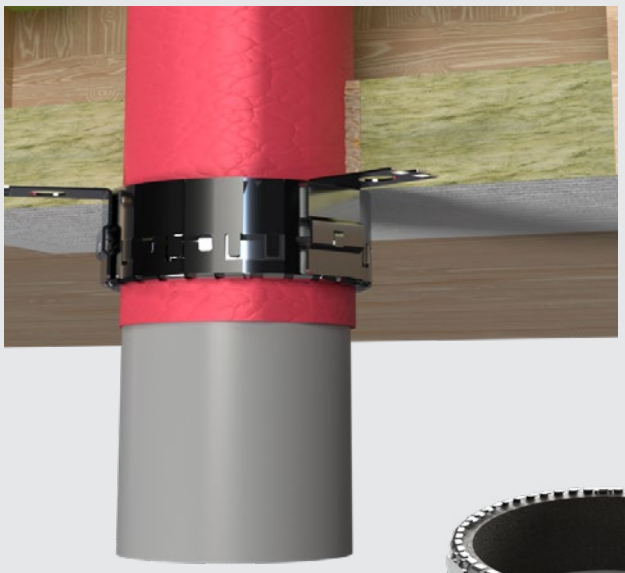


Dimensions

Collar size Ø [mm]	Internal Ø D2 [mm]	External Ø D1 [mm]	Installation height H1 [mm]	Number of tabs [n]	Size adjustable
32	40	50	26.0	2	✓
40	48	58	26.0	2	
50	57	68	26.0	2	
63	70	94	26.0	4	
75	83	106	26.0	4	
90	100	132	26.6	4	
110	120	155	26.6	4	
125	135	172	40.0	4	
140	152	200	40.0	6	
160	169	220	40.0	6	

EC Endless Collar

Endless collar with flexible design options for combustible and non-combustible pipes.
Suitable for use on combustible pipes from various manufacturers and non-combustible pipes with FEF insulation



Technical specifications

Material	• galvanized sheet steel housing • flexible intumescent strip with self-adhesive strip
Colour	• silver gray (housing) • anthracite (inlay)
Use category	Type Y_1 in acc. with EOTA TR024

Safety information	Please observe our safety data sheet for ROKU Strip.

Delivery and packaging

EC Endless Collar (U/U)	
Packaging	Box
Included in delivery	10 m fire protection wrap, 3 m metal band, 18 fastening hooks, 6 labels
Item number	
	01145303

NBR-plus

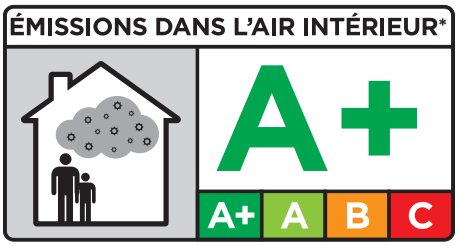
Flexible and tear-resistant composite material made of glass filament fabric with intumescent coating on the inside. With central pre-slot – easy to separate down the middle.

For services with combustible components (e.g. pipes with combustible insulation).

Technical specifications

Coating	grey (outside), red (inside)
Material	glass filament fabric with intumescent coating on the inside.
Nominal thickness	1.5 mm
Weight per unit area	2000 g/m²
Reaction temperature	from approx. 150 °C
Application temperature	+ 5 °C – + 50 °C (< + 5 °C reduction of flexibility)

Safety information	Please observe our safety data sheet.



Delivery and packaging

NBR-plus		
Packaging	box	
Width	125 mm (can be divided into 2 × 62.5 mm)	
Length	5 m	10 m
Item number		
	0760150133	01261941

KSL-W

Flexible intumescent fire protection wrap.

Suitable for use on combustible pipes with and without insulation, also for a wide range of non-standard pipes

Technical specifications

Composition	halogen-free, expanding building material based on expandable graphite
Colour	grey
Bulk density	1300 kg/m³
Expansion pressure	1.2 N/mm2
Expansion factor	up to 22 times (550 °C; 30 min; with superimposed load)
Direction of action	three-dimensional
Reaction temperature	from approx. 175 °C
Classification	E in acc. with DIN EN 13501-1
Use category	Type X in acc. with EOTA TR024

Delivery and packaging

KSL-W		
Packaging	box	box
Length	10 m	20 m
Width	50 mm	50 mm
Thickness	1.5 mm	1.5 mm
Number of pieces	1	1
Item number		
	15511	15521

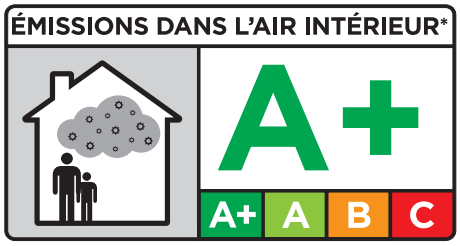
Cable Tube CT

Cable tubes/boxes consisting of two half shells with intumescent inlays.
Suitable for use as individual penetration seals or as retrofitting devices.

Technical specifications

Colour	Grey, inner lining red
Material	• PVC half shells • inner lining made of intumescent fabric • closure made of soft foam plugs
Closure of half shells	click lock
Dimensions/variants	Ø 60 mm / length 150 mm Ø 90 mm / length 150 mm Ø 90 mm / length 200 mm Ø 90 mm / length 300 mm Ø 120 mm / length 150 mm Ø 120 mm / length 200 mm Ø 120 mm / length 300 mm
Soundproofing	64 (-2;-6) dB Dn, e; Dn, w (C; Ctr)

Safety information	No hazardous material according to German Hazardous Substances Act (GefStoffV) and no hazardous material according to German Act on the Transport of Dangerous Goods (GGVS/ADR).



Delivery and packaging

	Cable Tube CT							Plug set		
Packaging	box									
Length	150			200		300		–	–	–
Diameter	60	90	120	90	120	90	120	60	90	120
Content	2 half shells and 2 melamine resin plugs							10 pcs.		
Item number										
Ø 60	01276101			–		–		01276996	–	–
Ø 90	01279101			01279201		01279301		–	01279996	–
Ø 120	01271151			01271201		01271301		–	–	01271996

All specifications in mm

We welcome your inquiries!

svt Products GmbH

Gluesinger Straße 86
21217 Seevetal
Germany
T +49 4105 4090-0
E contact@flamro.com
W flamro.com

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Registered head office: Gluesinger Strasse 86, 21217 Seevetal, Germany