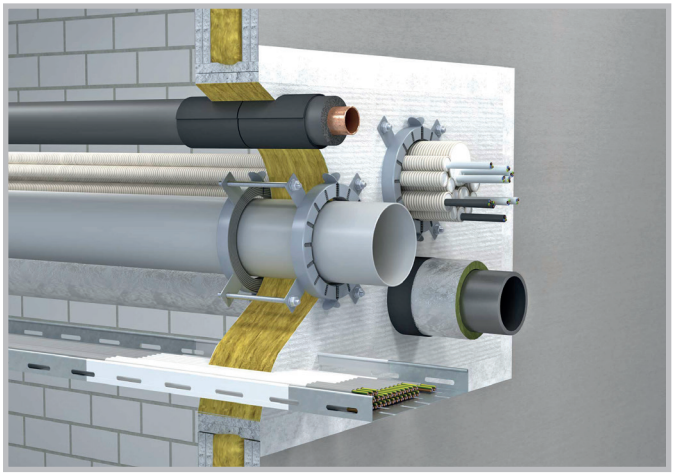
Assembly Instruction

FLAMRO KSL Combi seal

according to ETA-16/0320



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09/2016, Rev. 0

Assembly Instruction

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Target audience
This assembly instruction is addressed exclusively to trained experts on fire technology.

Usage of assembly instruction

- Please read through the lot of this assembly instruction carefully prior to work start. Regard in particular the following safety information.
- The holder of assessment assumes no liability for damages which are caused by disregard for this assembly instruction.
- Graphic depictions serve as examples only. Assembly results may vary visually.

Safety information
For processing of partition components, please regard the safety data sheets.

Protection and hygiene measures:

- Observe the usual precautions when handling chemicals. Wash hands before work breaks and immediately after handling the product. Avoid contact with skin, eyes and clothing. Take off stained or soaked clothes immediately.

Eye wash with clean water (EN 15154).

Wear closed work clothing.

	Respiratory protection - Dust mask When exposure limit is exceeded (e.g. possible when turning on), use particle-filtering half mask FFP 1 (white).
	Hand protection - Protective gloves Use waterproof, abrasion- and alkali-restistant nitrile gloves. Different requirements can result depending on application. Therefore observe additional recommendations by the protective gloves' manufacturer.
	Eye protection – Use safety goggles
	Body protection – Use protective work wear

Safety information for installation of floor partitions

- The area beneath the floor partition is to be blocked during construction work and during cure time (28 days) (barrier tape and warning sign: beware of potentially falling object, do not enter this area, construction work in floor component opening).
- The contractor for the manufacture of floor insulations must inform the client in writing (for onward transmission to the building contractor or his representative), that fire protection insulation in floors must be secured with appropriate measures against burdens, especially the entering by trespassers (e.g. through fencing or grating covers).

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Components

Rigid walls

The wall must have a minimum thickness of ≥ 100 mm mm and consist of concrete, aerated concrete or masonry. The wall shall be classified in accordance to EN 13501 - 2 for the required fire resistance period.

Rigid floors

The floor must have a minimum thickness of ≥ 150 mm and consist of concrete or aerated concrete with a minimum raw density of 550 kg / m³ bestehen. The rigid floor shall be classified in accordance with EN 13501 – 2 for the required fire resistance period.

Penetration seals in floors must be secured against burdens / the entering by means of protective devices or fencing.

Lightweight partition walls

Lightweight partition walls must have a minimum thickness of ≥ 94 mm and consist of steel stands (U and C profiles; 0,5 - 1,5 mm thickness) which are to be coated on both sides with at least two layers of 12,5 mm thick panels of classification A2-s1, d0 or A1 in accordance to EN 13501-1.

Additionally, wood stands can be used instead of steel stands. In this context, it should be noted that there must be a minimum distance of 100 mm between wood stands and partition. The insulation in between those stands must be at least comply with the building material class A1 or A2 (in accordance to EN 13501-1) and have a raw denssity of 85 - 115 kg/m³ (in accordance to EN 1363-1).

The soffit revetment must be built from steel stands with a minimum thickness of 0,6 mm and panels of the same specifications as of the wall.

The supporting structure shall be classified in accordance with EN13501 - 2.

The required fire protection measures depicted on the following pages also apply for subsequent installations.

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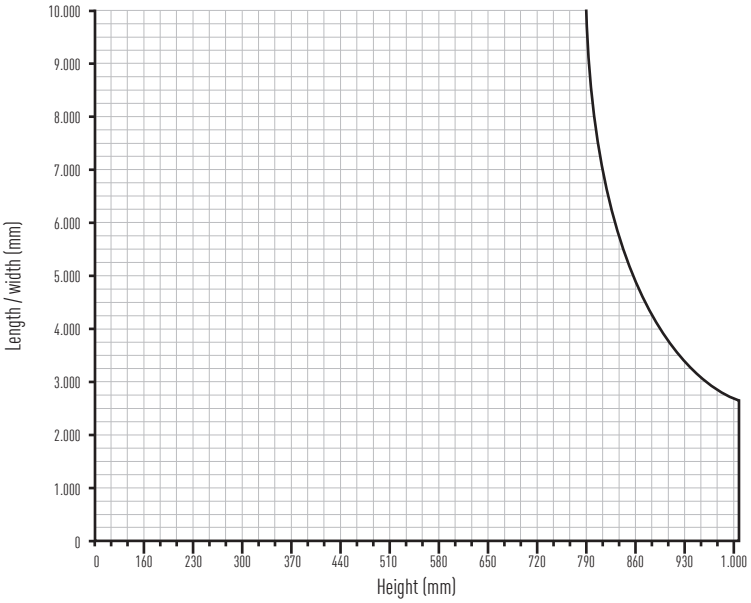
Application area

Identifier	WALL	LIGHTWEIGHT PARTITION WALL	FLOOR
Thickness of the component	⩾ 100 mm	⩾ 94 MM	⩾ 150 mm
Thickness of the penetration seal	⩾ 100 mm	⩾ 100 mm	⩾ 100 mm
Maximal size of component opening (width x height)	1,100 x 2,200 mm	1,100 x 2,200 mm	See following diagram
Distance to other cable / pipe penetrations	200 mm	200 mm	200 mm
Abstand zu anderen Öffnungen oder Einbauten	200 mm	200 mm	200 mm

Maximum dimensions of FLAMRO KSL in rigid floors:



The maximum height of the penetration seal in rigid floors is 1000 mm.
The maximum length (width) of the penetration seal in rigid floors must be calculated as followed:

$$Length(Width) = \frac{Height}{(((a_{audited}/2) * height) - 1)}$$

$$c_{audited} = \frac{Scope_{audited}}{Surface\ of\ penetration\ seal_{audited}} = 2.769\ m/m^2;\ or\ 0.002769\ mm/mm^2$$

The minimum ratio of scope and surface of the the reveal in rigid floors is 2.769 m/m², or 0.002769 mm/mm².

$C_{audited}$ was calculated from the dimensions of the audited penetration seal (2600 mm x 1000 mm).

The surface on the right side of the diagramm provides an overview of all possible combinations of length (width) and height if the minmimum ratio of scope and surface is ⩾ $c_{auditedr}$. For a length (width) of e.g. 2600, the approved height is 1000 mm; for a length (width) of e.g.3500 mm, he approved height is 910 mm. For a height smaller than 724 mm, no limitation of the length (width) is necessary.
Note: the diagram is not true to dimension (source: DIN EN 1366-3)

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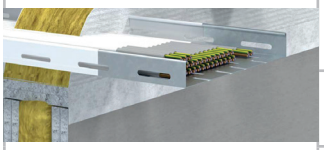
Approved assignments and classifications

Cable - wall					
Image	Assignment	Additional fire protection measures	E	I	Pipe end configuration
	All cable types Ø ≤ 80 mm	FLAMR BML 150 x 1.0 mm (L x TH) applied on both sides of cable racks/ ladders, cables and conduits **For cables ≥ 21 mm FLAMRO BML 150 x 1.5 mm (L x TH) on both sides**	90	90	-
	Cable bundles up to Ø ≤ 100 mm mit Einzelkabeln Ø ≤ 21 mm		90	90	-
	Core lines Ø ≤ 24 mm		90	90	-
	Plastic or steel conduits Ø ≤ 16 mm without assignment		90	90	U/U
	Plastic ducts Ø ≤ 32 mm**		90	90	U/U

* Conduits made of plastic, Ø ≤ 32 mm (with / without cable occupation Ø ≤ 21 mm) according to EN 61386-22, wall thickness 0.3 mm to 0.8 mm (for polyolefins) or 0.3 mm to 0.6 mm (for PVC-U)

Cable - floor					
Image	Assignment	Additional fire protection measures	E	I	Pipe end configuration
	All cable types Ø ≤ 80 mm	FLAMRO BML 150 x 1.0 mm (L x TH) applied on both sides of cable racks/ ladders, cables and conduits **Coating as well on the centre of the penetration seal**	120	120	-
	Cable bundles up to Ø ≤ 100 mm with single cables Ø ≤ 21 mm		120	120	-
	Core lines Ø ≤ 24 mm		120	120	-
	Plastic or steel conduits Ø ≤ 16 mm without assignment		120	120	U/U
	Plastic ducts Ø ≤ 32 mm**		90	90	U/U

* Conduits made of plastic, Ø ≤ 32 mm (with / without cable occupation Ø ≤ 21 mm) according to EN 61386-22, wall thickness 0.3 mm to 0.8 mm (for polyolefins) or 0.3 mm to 0.6 mm (for PVC-U)

Steel cable trays (perforated or unperforated) or cable ladders can be led through the penetration seal or end on its surface.

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Conduits- wall and floor					
Image	Assignment	Additional fire protection measures	E	I	Pipe end configuration
	Conduits Ø 16 to 63 mm up to a bundle diameter of 115 mm Diameter of single cables ≤ 21 mm	Wall: FLAMRO Variant N II A fire protection collar on both sides Floor: FLAMRO Variant N II A fire protection collar on both sides	90	90	C/C

* Conduits according to EN 61386-22 with Ø 16 mm to 63 mm, wall thickness 0.3 mm to 0.8 mm (for polyolefins) or 0.3 mm to 0.6 mm (for PVC-U)

Combustible pipes- wall						
Pipe material	Outer diameter [mm]	Wall thickness [mm]	Additional fire protection measures	E	I	Pipe end configuration
PVC-U-Rohre	32 to 50	1.8 to 5.6	Floor: FLAMRO Variant N II A fire protection collar on both sides	90	90	U/U
	> 50 to 75	1.8 to 12.3		90	90	
	> 75 to 110	1.8 to 12.3		90	90	
	> 110 to 125	2.5 to 11.4		90	90	
	> 125 to 160	3.2 to 11.9		90	90	
PE-HD Rohre	32 to 50	1.8 to 4.6		120	120	U/U
	> 50 to 75	1.9 to 10.0		90	90	
	> 75 to 110	2.7 to 10.0		90	90	
	> 110 to 125	3.1 to 11.4		90	90	
	> 125 to 160	4.0 to 14.6		90	90	
PP Rohre	32 to 50	1.8 to 4.6		120	120	U/U
	> 50 to 75	1.9 to 10.0		90	90	
	> 75 to 110	2.7 to 10.0		90	90	
	> 110 to 125	3.1 to 11.4		90	90	
	> 125 to 160	4.0 to 14.6		90	90	

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Combustible pipes - floor						
Pipe material	Outer diameter [mm]	Wall thickness [mm]	Additional fire protection measures	E	I	Pipe end configuration
PVC-U pipes	32 to 50	1.8 to 5.6	Floor: FLAMRO Variant N II A fire protection collar on both sides	120	90	U/U
	> 50 to 75	1.8		120	120	
	> 50 to 75	> 1.8 to 12.3		120	120	
	> 75 to 110	1.8 to 12.3		90	90	
	> 110 to 125	2.5 to 11.4		90	90	
	> 125 to 160	3.2 to 11.9		90	90	
PE-HD pipes	32 to 50	1.8 to 4.6		120	120	U/U
	> 50 to 75	1.9 to 10.0		120	120	
	> 75 to 110	2.7 to 10.0		120	120	
	> 110 to 125	3.1 to 11.4		120	120	
	> 125 to 160	4.0 to 14.6		90	90	
PP pipes	32 to 50	1.8 to 4.6		120	120	U/U
	> 50 to 75	1.9 to < 10.0		90	90	
	> 50 to 75	10		120	120	
	> 75 to 110	2.7 to 10.0		90	90	
	> 110 to 125	3.1 to < 11.4		90	90	
	> 110 to 125	11,4		120	120	
	> 125 to 160	4.0 to 14.6		120	120	

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Multi-layer composite piping „Geberit Mepla Systemrohr" - wall + floor						
Image	Outer diameter [mm]	Wall thickness [mm]	Additional fire protection measures	E	I	Pipe end configuration
	16	2.25	prefabricated pipe clamps*: length ≥ 450 mm*, on both sides of the penetration seal thickness 20 mm to 30 mm	120	120	U/C
	20	2.5		120	120	
	26	3.0	prefabricated pipe clamps*: length ≥ 450 mm*, on both sides of the penetration seal thickness 20 mm to 40 mm	120	120	
	32	3.0	prefabricated pipe clamps*: length ≥ 450 mm*, on both sides of the penetration seal thickness 20 mm to 50 mm	120	120	
	40	3.5		120	120	
	50	4.0		120	120	
	63	4.5	prefabricated pipe clamps*: length ≥ 450 mm*, on both sides of the penetration seal thickness 20 mm to 60 mm	120	120	
	75	4.7	prefabricated pipe clamps*: length ≥ 450 mm*, on both sides of the penetration seal thickness 20 mm to 80 mm	120	120	

* Prefabricated pipe clamps according to EN 14303 made of steelwook of classification A2L-s1,d0 or A1L according to EN 13501-1, a minimum density of 80 kg/m³, laminated with grid-strengthened aluminium foil and a self-adhesive strip (e.g. „ASTRATHERM® Steinwoll-Rohrschale alukaschiert" of manufacturer „Austroflex Rohr-Isoliersysteme GmbH")

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Non-combustible pipes - wall						
Pipe material	Outer diameter [mm]	WALL THICKNESS [MM]	Additional fire protection measures	E	I	Pipe end configuration
Copper pipes	10	1.0 to 14.2	AF/Armaflex* AF-2 (tube): length ≥ 550 mm, on both sides of the penetration seal, thickness 11.0 mm + FLAMRO Variant N-RM	90	90	C/U
	> 10 to 28	1.0 to 14.2	steel wool**: length ≥ 550 mm, on both sides of the penetration seal, thickness 30 mm + FLAMRO Variant N-RM	90	90	
	> 28 to 54	1.5 to 14.2	steel wool**: length ≥ 550 mm, on both sides of the penetration seal, thickness 40 mm + FLAMRO Variant N-RM	90	90	
	> 54 to 89	2.0 to 14.2	steel wool**: length ≥ 550 mm, on both sides of the penetration seal, thickness 60 mm + FLAMRO Variant N-RM	90	90	
Steel pipes	10	1.0 to 14.2	steel wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 20 mm + FLAMRO Variant N-RM	90	90	C/U
	> 10 to 76	2,6 to 14.2	steel wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 30 mm + FLAMRO Variant N-RM	90	90	
	> 76 to 160	2.0 to < 4.0	mineral wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 40 mm + FLAMRO Variant N-RM	90	60 or. 90 at CS***	
	> 76 to 160	4.0 to 14.2	mineral wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 50 mm + FLAMRO Variant N-RM	90	90	

* Closed-cell, flexible elastomer foam insulation in form of (sliced) tubes (can be equipped with a self-adhesive gluing device), of classification BL-s3,d0 – including „Armaflex Kleber 520" – according to EN 13501-1 of manufacturer „Armacell GmbH" (see annex B-2 of ETA)

** Lamella mats or prefabricated pipe clamps (can be laminated with grid-strengthened aluminium foil) according to EN 14303 made of glass wool or steel wool of classification A2-s1,d0 or A1 resp.. A2L-s1,d0 or A1L according to EN 13501-1 and a minimum density of 23 kg/m³ (e.g. „Lamellenmatte ML 3" of manufacturer „Saint-Gobain Isover G+H AG")

*** Pipeline insulated at total length

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Non-combustible pipes - floor						
Pipe material	Outer diameter [mm]	Wall thickness [mm]	Additional fire protection measures	E	I	Pipe end configuration
Copper pipes	10	1.0 to 14.2	AF/Armaflex* AF-2 (tube): length ≥ 550 mm, on both sides of the penetration seal, thickness 11.0 mm + FLAMRO Variant N-RM	120	120	C/U
	> 10 to 28	1.0 to 14.2	AF/Armaflex* AF-2 (tube): length ≥ 550 mm, on both sides of the penetration seal, thickness 11.0 mm to 12.5mm+ FLAMRO Variant N-RM	120	120	
	> 28 to 54	1.5 to 14.2	AF/Armaflex AF-4* (tube): length ≥ 550 mm, on both sides of the penetration seal, thickness 19.0 mm to 21.0 mm + FLAMRO Variant N-RM	120	120	
	> 54 to 89	2.0 to 14.2	AF/Armaflex AF-6* (tube): length ≥ 550 mm, on both sides of the penetration seal, thickness 38.5 mm to 41.5 mm + FLAMRO Variant N-RM	120	90	
	10 to 88.9	2.0 to 14.2	Mineral wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 40 mm + FLAMRO Variant N-RM	90	90	

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Non-combustible pipes - floor						
Pipe material	Outer diameter [mm]	Wall thickness [mm]	Additional fire protection measures	E	I	Pipe end configuration
Steel pipes	10	1.0 to 14.2	AF/Armaflex* AF-2 (tube): length ≥ 550 mm, on both sides of the penetration seal, thickness 11.0 mm + FLAMRO Variant N-RM	120	120	C/U
	> 10 to 76	2.6 to 14.2	steel wool**: length ≥ 550 mm, on both sides of the penetration seal, thickness 30 mm + FLAMRO Variant N-RM	90	120	
	> 76 to 88.9	2.0 to 14.2	steel wool**: length ≥ 550 mm, on both sides of the penetration seal, thickness 40 mm + FLAMRO Variant N-RM	90	90	
	> 88.9 to 160	4.0 to 14.2	steel wool**: length ≥ 550 mm, on both sides of the penetration seal, thickness 60 mm + FLAMRO Variant N-RM	120	120	
	10	1.0 to 14.2	steel wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 20 mm + FLAMRO Variant N-RM	120	120	
	> 10 to 76	2.6 to 14.2	steel wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 30 mm + FLAMRO Variant N-RM	120	90	
	> 76 to 88.9	2.0 to 14,2	mineral wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 40 mm + FLAMRO Variant N-RM	90	90	
	> 76 to 160	2.0 to 14.2	mineral wool***: length ≥ 550 mm, on both sides of the penetration seal, thickness 50 mm + FLAMRO Variant N-RM	90	90	

* Closed-cell, flexible elastomer foam insulation in form of (sliced) tubes (can be equipped with a self-adhesive gluing device), of classification BL-s3,d0 – including „Armaflex Kleber 520" – according to EN 13501-1 of manufacturer „Armacell GmbH" (see annex B-2 of ETA)

** Lamella mats or prefabricated pipe clamps (can be laminated with grid-strengthened aluminium foil) according to EN 14303 made of steel wool of classification A1 or A1L according to EN 13501-1 and a minimum density of 42 kg/m^3 (z.B. „Rockwool Klimarock" of manufacturer „Rockwool Mineralwoll GmbH & Co. OHG")

*** Lamella mats or prefabricated pipe clamps (can be laminated with grid-strengthened aluminium foil) according to EN 14303 made of glass wool or steel wool of classification A2-s1,d0 or A1 resp.. A2L-s1,d0 or A1L according to EN 13501-1 and a minimum density of 23 kg/m^3 (e.g. „Lamellenmatte ML 3" of manufacturer „Saint-Gobain Isover G+H AG")

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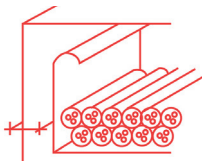
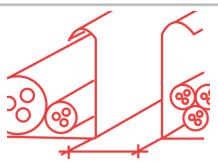
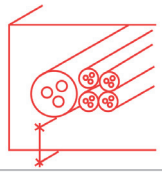
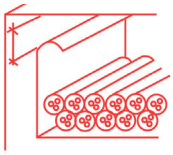
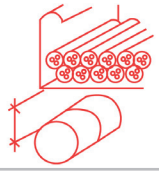
Distance regulations for rigid walls, lightweight partition walls and rigid floors

Cable / cable bundle / cable trays / ladders		Distance
	Sideways distance to component reveal	≥ 25 mm
	Side by side distance	≥ 35 mm
	Lower / back distance to component reveal	≥ 50 mm
	Upper / front distance to component reveal	≥ 25 mm
	One below the other distance	≥ 100 mm
	Distance to combustible pipes	≥ 20 mm
	Distance to non-combustible pipes	≥ 50 mm

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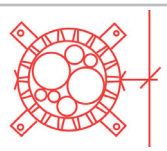
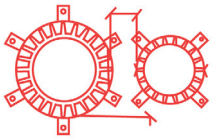
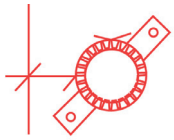
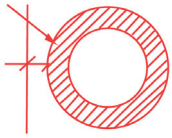
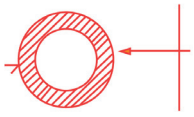
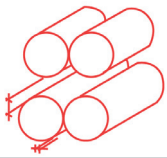
Distance regulations for rigid walls, lightweight partition walls and rigid floors

Cable / cable bundle / cable trays / ladders		Distance
	Distance bundle to bundle conduits	≥ 0 mm
	Distance from bundle of conduits to building reveal	≥ 50 mm
	Distance combustible pipes	≥ 35 mm
	Distance combustible pipes to building reveal	≥ 50 mm
	Distance non-combustible pipes	≥ 0 mm
	Distance non-combustible pipes to building reveal	≥ 45 mm
	Distance multi-layer composite piping to all other installations and building reveals	≥ 100 mm
Control lines made of steel or plastic		
	Side by side distance	≥ 0 mm

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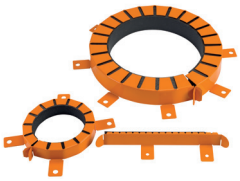
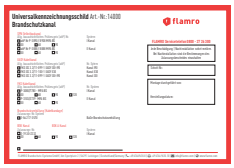
Applied products

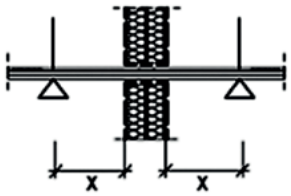
Image	Article Identifier	Art.-No.:
	FLAMRO BML 5 kg 12,5 kg 25 kg	 40050 40125 40250
	FLAMRO BMS / BMK 0,4 kg 1 kg Cartridge 1 kg 5 kg 12,5 kg	 30004 30010 10010 10500 10125
	FLAMRO Variant N-RM / Rohrummantelung M 10.000 x 100 x 1,5 mm self-adhesive 10.000 x 100 x 1,5 mm niot self-adhesive incl. assembly strips	 15015 15115
	FLAMRO BSL 50-1	50050
	FLAMRO Variant N II A Fire protection collar, up to Ø 160 mm	
	Identification sign	14000

FLAMRO KSL Combi seal
according to ETA-16/0320

Arrangement of the first support (backings)

Supports/Backings of the installations in front of the wall insulation must consist of essentially non-combustible components and be arranged with a distance according to the following overview.

Installations	Wall	FLOOR
Cable trays	≤ 500 mm on both sides	≤ 420 mm above
Combustible pipes	≤ 500 mm on both sides	≤ 420 mm above
Geberit Mepla Systemrohr	≤ 500 mm on both sides	≤ 420 mm above
Non-combustible pipes	≤ 500 mm on both sides	≤ 420 mm above
Conduits	≤ 500 mm on both sides	≤ 420 mm above

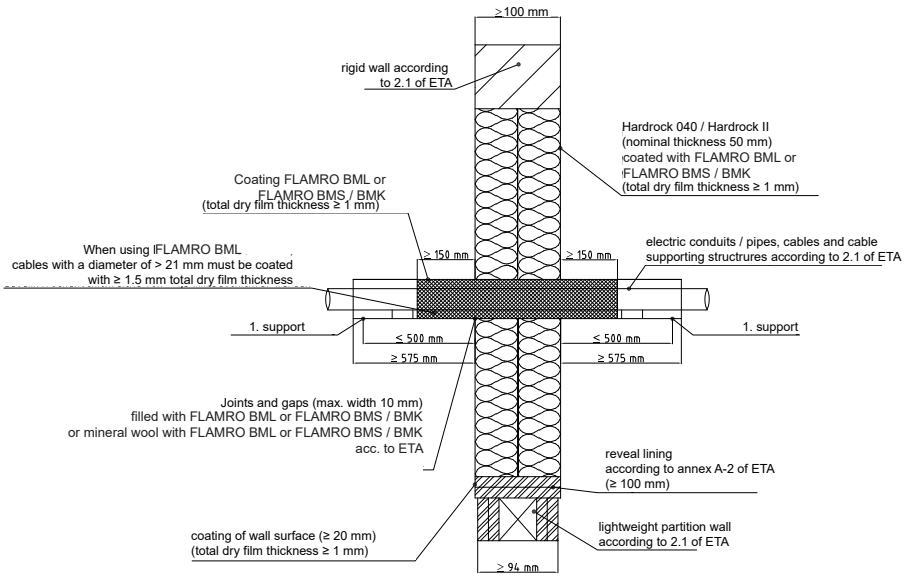


Assembly Instruction

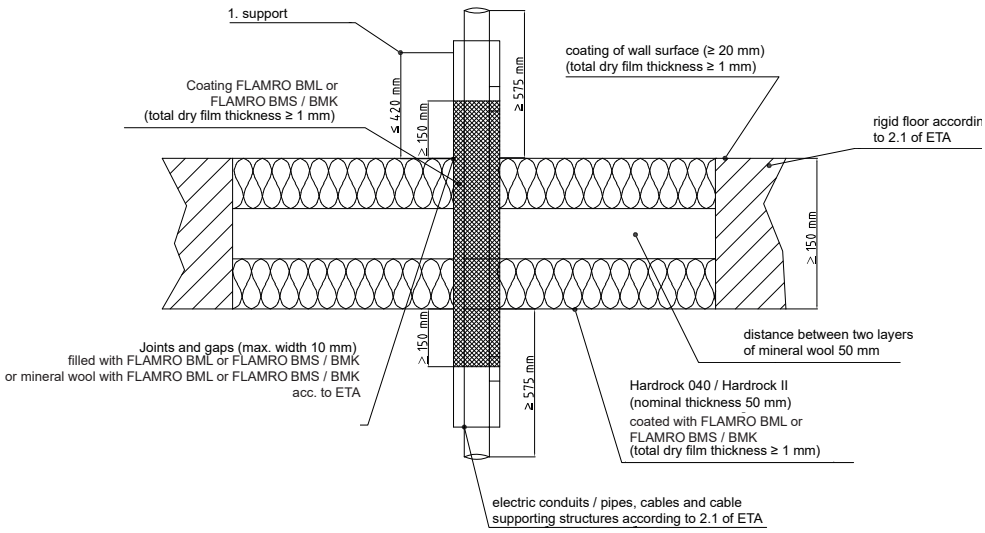
FLAMRO KSL Combi seal
according to ETA-16/0320

Fire protection measures in walls and floors
Cables

Upper image:
Cable
Wall



Lower image:
Cable
Floor



FLAMRO KSL Combi seal

according to ETA-16/0320

> All cable trays / cable ladders (ground and sides), cable and conduits / pipes (except bundles of conduits) must be coated with on both sides of the reveal. The coating with „FLAMRO BML" should be at a length of ≥ 150 mm (measured from the reveal surface) and have a thickness of ≥ 1 mm (total dry film thickness). At the reveal area (underneath and between the mineral wool panels), there must be coating with a thickness of ≥ 1 mm (total dry film thickness).
For cables with a diameter of > 21 mm, the dry film thickness on cables and around the reveal area is at least 1.5 mm.

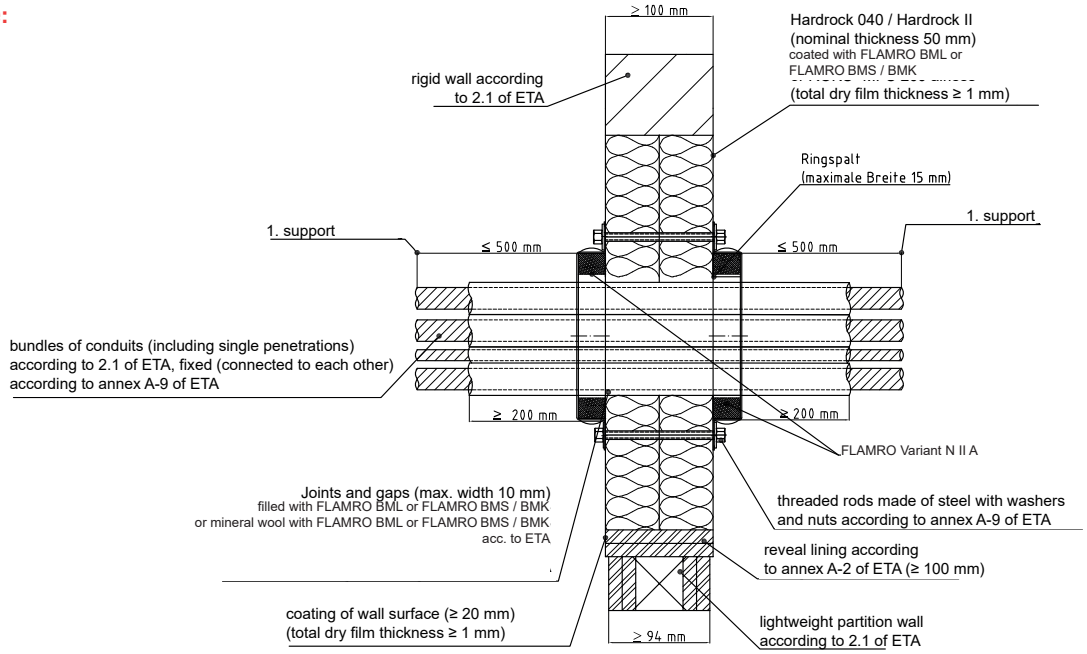
> All conduits / pipes (including bundles of conduits) or the annular gap between the cable(s) and the conduit / pipe must be filled with „FLAMRO BMS / BMK" with a depth of 10 mm at least on one side of the reveal. Unoccupied conduits / pipes (including bundles of conduits) must be filled at a depth of 10 mm with „FLAMRO BMS / BMK" or mineral wool (steel wool of classification A1 according to EN 13501-1, a minimum apparent density of 50 kg/m³ and a melting point of ≥ 1000 °C according to DIN 4102-17) and additionally with „FLAMRO BMS / BMK" at a thickness of ≥ 1 mm (total dry film thickness)

Assembly Instruction

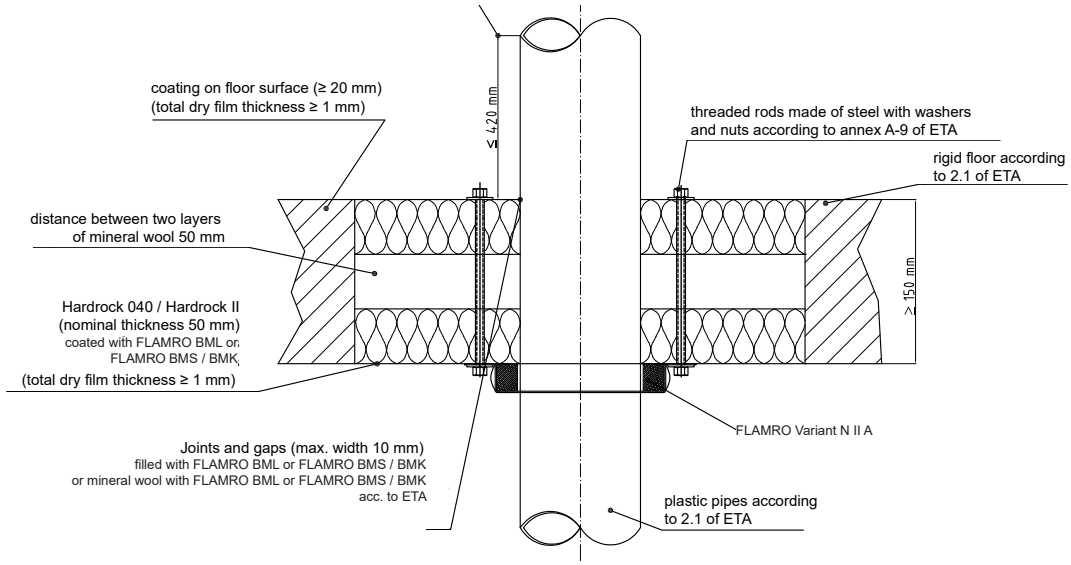
FLAMRO KSL Combi seal
according to ETA-16/0320

Fire protection measures in walls and floors
Conduits

Upper image:
Conduits
Wall



Lower image:
Conduits
Floor



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09/2016, Rev. 0

Assembly Instruction

FLAMRO KSL Combi seal

according to ETA-16/0320

> Bundles of conduits must be equipped with „FLAMRO Variant N II A".

> For the respective diameter of bundles of conduits, the smallest, appropriate pipe collar must be used.

> For bundles of conduits, the annular gap between bundle of conduits and the active component (FLAMRO Variant N-RM) of the pipe collar can be max.15 mm.

> Bundles of conduits (minimum length on both sides of the reveal must be 200 mm; measured from the surface of the reveal) must be fixed on both sides of the reveal with at least one winding of e.g. self-adhesive gluing tape or plastic cable binders after 100 mm (measured from the surface of the reveal).

> For vertical space-enclosing building components, the pipe collars must be installed on both sides of the reveal.

> For horizontal space-enclosing building components, the pipe collars must be installed on the side underneath of the reveal.

> The pipe collars must be mounted with threaded rods made of steel (size M6 for type DN 32 to DN 75 or size M8 for Typ DN 90 to DN 160, appropriate for hole diameter inside the mounting lugs; length ≥ thickness of reveal) on both sides of the reveal and with washers and nuts (appropriate for the outer diameter of the threaded rods made of steel)

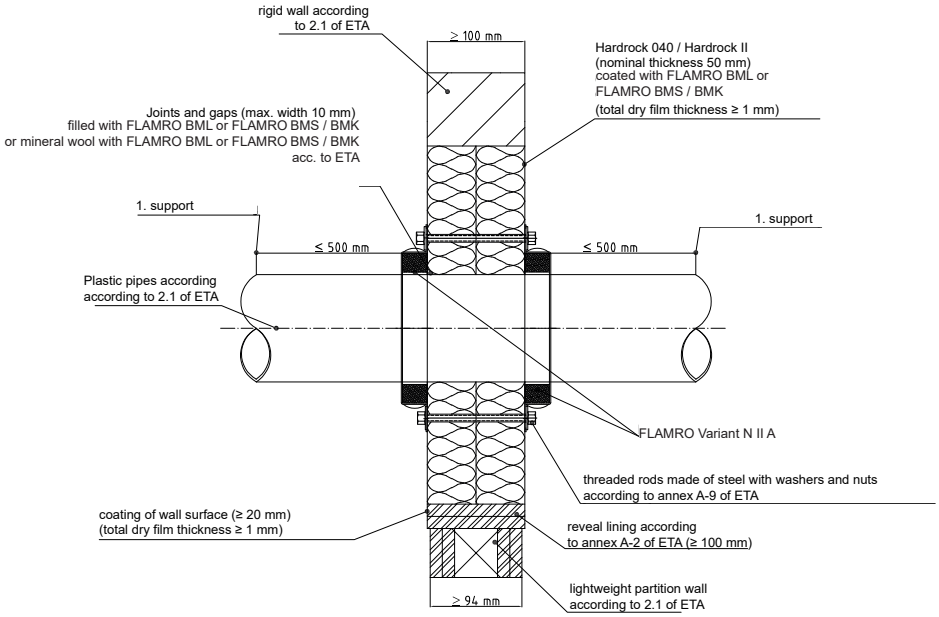
> The number of mounting lugs can not be reduced.

Assembly Instruction

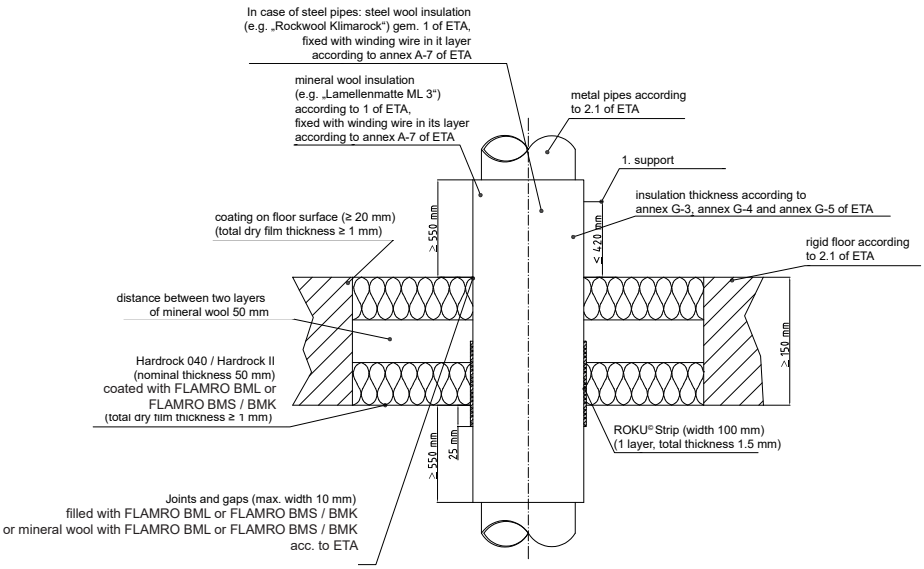
FLAMRO KSL Combi seal
according to ETA-16/0320

Fire protection measures in walls and floors
Combustible pipes

Upper image:
Combustible pipes
Wall



Lower image:
Combustible pipes
Floor



Assembly Instruction

FLAMRO KSL Combi seal

according to ETA-16/0320

> Plastic pipes must be equipped with „FLAMRO Variant N II A".

> For the respective diameter of bundles of conduits, the smallest, appropriate pipe collar must be used.

> For vertical space-enclosing building components, the pipe collars must be installed on both sides of the reveal.

> For horizontal space-enclosing building components, the pipe collars must be installed on the side underneath of the reveal.

> The pipe collars must be mounted with threaded rods made of steel (size M6 for type DN 32 to DN 75 or size M8 for Typ DN 90 to DN 160, appropriate for hole diameter inside the mounting lugs; length ≥ thickness of reveal) on both sides of the reveal and with washers and nuts (appropriate for the outer diameter of the threaded rods made of steel)

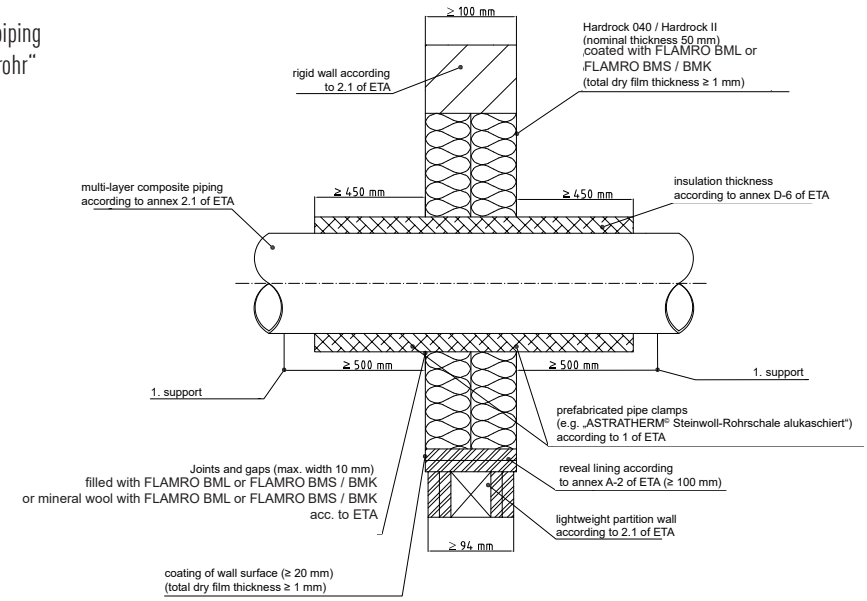
> The number of mounting lugs can not be reduced.

Assembly Instruction

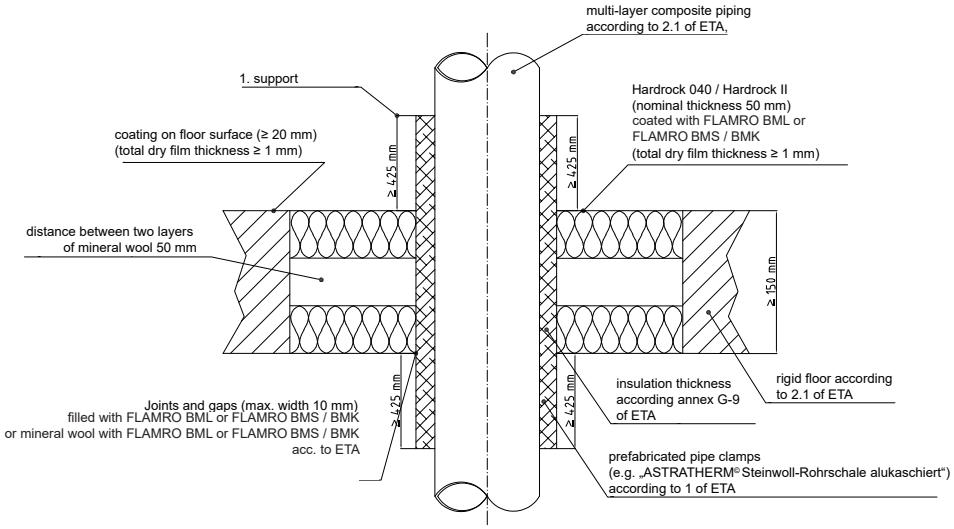
FLAMRO KSL Combi seal
according to ETA-16/0320

Fire protection measures in walls and floors
Multi-layer composite piping „Geberit Mepla Systemrohr“

Upper image:
Multi-layer composite piping
„Geberit Mepla Systemrohr“
Floor



Lower image:
Multi-layer composite piping
„Geberit Mepla Systemrohr“
Floor



Assembly Instruction

FLAMRO KSL Combi seal

according to ETA-16/0320

> Multi-layer composite piping must be insulated with prefabricated pipe clamps (e.g. „ASTRATHERM® Steinwoll-Rohrschale alukaschiert“) according to point 1 of the ETA (locally continuous or continuous across pipe length).

> In vertical space-enclosing building components, the prefabricated pipe clamps (e.g. „ASTRATHERM® Steinwoll-Rohrschale alukaschiert“)must be installed in the centre of the reveal, so that the reveal protrudes on both sides by ≥ 450 mm (measured from the surface of the reveal) and is continuous along the required minimum insulation length.

> In horizontal space-enclosing building components, the prefabricated pipe clamps (e.g. „ASTRATHERM® Steinwoll-Rohrschale alukaschiert“)must be installed in the centre of the reveal, so that the reveal protrudes on both sides by ≥ 425 mm (measured from the surface of the reveal) and continuous along the required minimum insulation length.

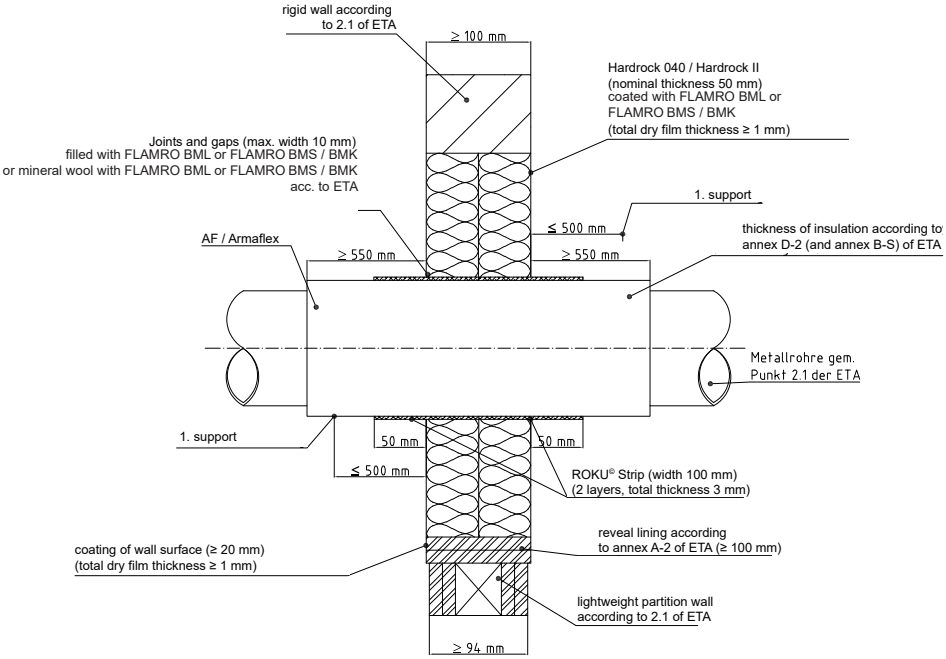
> Junctions or pipe bow must also be equipped with prefabricated pipe clamps (e.g. „ASTRATHERM® Steinwoll-Rohrschale alukaschiert“) on both sides of the reveal and along the required minimum insulation length (≥ 450 mm in vertical space-enclosing building components ≥ 425 mm or in horizontal space-enclosing building components – measured from the surface of the reveal).

Assembly Instruction

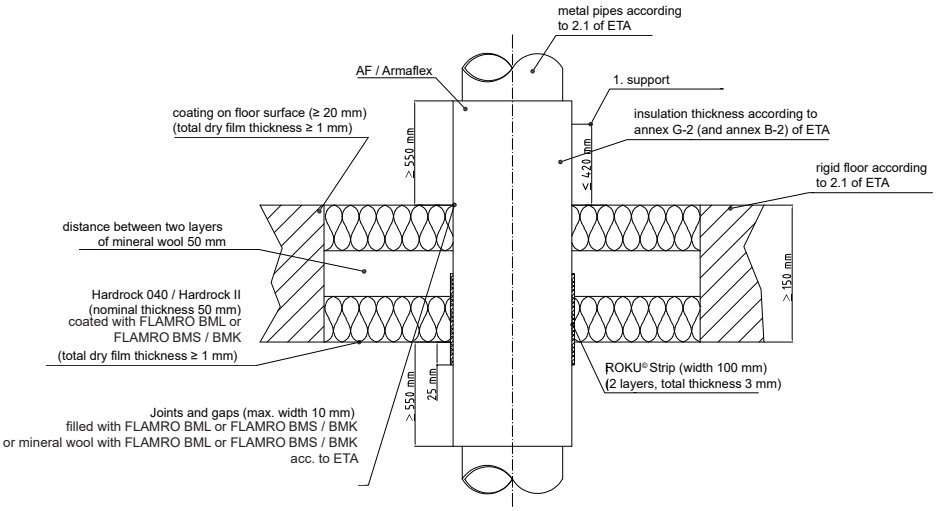
FLAMRO KSL Combi seal
according to ETA-16/0320

Fire protection measures in walls and floors
Non-combustible pipes with AF/Armaflex

Upper image:
Non-combustible pipes
with AF/Armaflex
Wall



Lower image:
Non-combustible pipes
with AF/Armaflex
Floor



Assembly Instruction

FLAMRO KSL Combi seal

according to ETA-16/0320

> The tube of „AF/Armaflex“ must be installed in the centre of the reveal, so that the reveal protrudes on both sides by ≥ 550 mm (measured from the surface of the reveal) and is continuous along the required minimum insulation length.

> The tube's thickness of „AF/Armaflex“ must be determined proportionally to the outer diameter of the insulated pipe and its respective inner diameter of „AF/Armaflex“ (e.g. for pipes with an outer diameter 10 mm, the nominal thickness of the insulation must be 11 mm)

> During installation work of „AF/Armaflex“, all splices and longitudinal seams (except „AF/Armaflex“ with self-adhesive gluing device) must be glued with „Armaflex Kleber 520“ and can be covered with „AF/Armaflex Band selbstklebend“.

> The application amount of „Armaflex Kleber 520“ must not exceed 300 g/m².

> The strip's dimensions of „AF/Armaflex Band selbstklebend“ must be 50 mm x 3 mm (width x thickness).

> The tube of „AF/Armaflex“ can either be inserted through the pipe, or if sliced, be wrapped around the pipe and glued to the longitudinal seam.

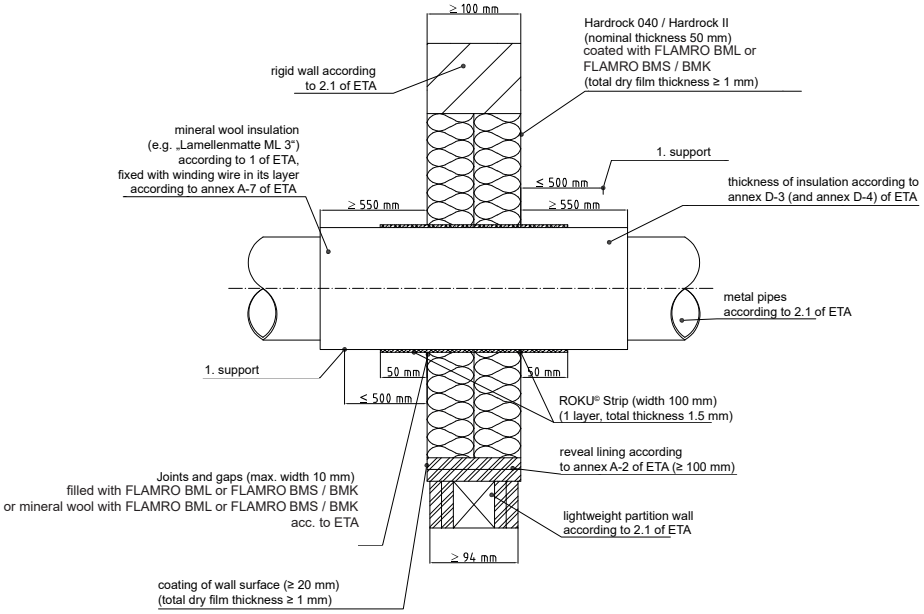
> Joints and pipe bows must also be equipped with „AF/Armaflex“ on both sides and along the required minimum insulation length (≥ 550 mm – measured by the surdace of the reveal).

Assembly Instruction

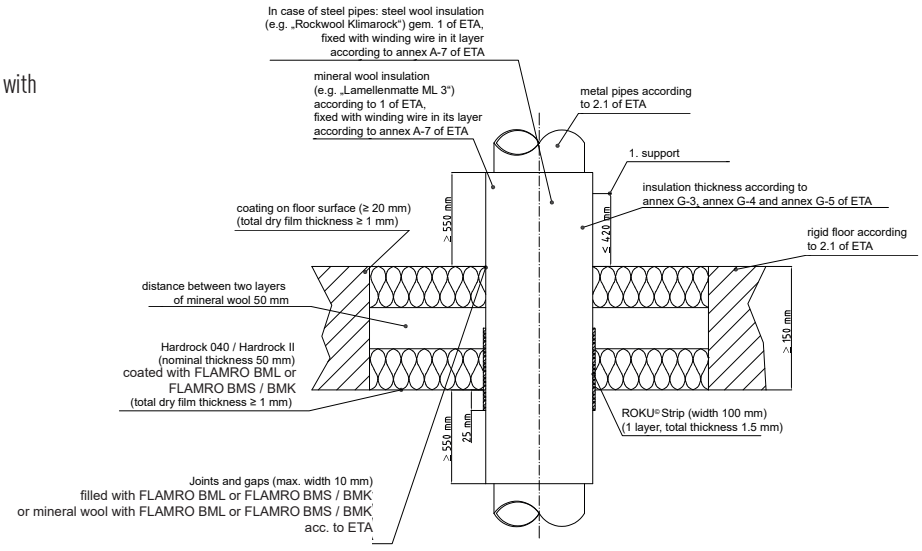
FLAMRO KSL Combi seal
according to ETA-16/0320

Fire protection measures in walls and floors
Non-combustible pipes with mineral wool insulation

Upper image:
Non-combustible pipes with mineral wool insulation
Wall



Lower image:
Non-combustible pipes with mineral wool insulation
Floor



Assembly Instruction

FLAMRO KSL Combi seal

according to ETA-16/0320

Installation of mineral wool insulation (e.g. „Lamellenmatte ML 3“)

> The mineral wool insulation (e.g. „Lamellenmatte ML 3“) must be wrapped around the pipe which is to be insulated, so that the reveal protrudes on both sides by ≥ 550 mm (measured from the surface of the reveal) and is continuous along the required minimum insulation length.

> The insulation thickness must be – depending on the respective insulated pipe – 20 mm, 30 mm, 40 mm or 50 mm.

> The mineral wool insulation (e.g. „Lamellenmatte ML 3“) must be mounted with winding wire along the required minimum insulation length (steelwire with a diameter of ≥ 0.8 mm; 5 windings per metre, e.g. in a distance of 200 mm, 400 mm etc. – measured from the surface of the reveal)

> Junctions and pipe bows must also be insulated with mineral wool (z.B. „Lamellenmatte ML 3“) on both sides of the reveal and along the required minimum insulation length (≥ 550 mm – measured from the surface of the reveal).

Installation of steel wool insulation (e.g. „Rockwool Klimarock“)

> The steel wool insulation (e.g. „Rockwool Klimarock“) must be wrapped around the pipe which is to be insulated, so that the reveal protrudes on both sides by ≥ 550 mm (measured from the surface of the reveal) and is continuous along the required minimum insulation length.

> The insulation thickness must be – depending on the respective insulated pipe – 20 mm, 30 mm, 40 mm oder 60 mm.

> The steel wool insulation (e.g. „Rockwool Klimarock“) must be mounted with winding wire along the required minimum insulation length (steelwire with a diameter of ≥ 0.8 mm; 5 windings per metre, e.g. in a distance of 200 mm, 400 mm etc. – measured from the surface of the reveal)

> unctions and pipe bows must also be insulated with steel wool (z.B. „Rockwool Klimarock“) on both sides of the reveal and along the required minimum insulation length (≥ 550 mm – measured from the surface of the reveal).

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Assembly Instruction

FLAMRO KSL Combi seal
according to ETA-16/0320

Assembly

Guidelines for installation
Before the installation of the penetration seal, the reveal is to be cleaned thoroughly. Subsequently, the area revolving the reveal must be glued with adhesive tape. The adhesive tape must fixed at least 2 cm from the reveal.

For walls with a thickness of 94 mm to 100 mm, two layers of mineral wool panels must be installed at the centre of the wall. For walls with a thickness of > 100 mm, two layers of mineral wool can be installed flush to the wall surface, central within the wall or in all position in between. The panels must have a distance of 0 mm..

For floors with a thickness of 150 mm, two layers of mineral wool panels must be installed flush to the floor's upper and lower surface. For floors with a thickness of > 150 mm, two layers of mineral wool panels must be installed flush to the upper side of the floor. The two panels must have a distance of 50 mm.

Cables, cable bundles, cable trays, cable ladders and conduits which were led through the penetration seal must be coated with ablation coating FLAMRO BML at a length of min. 150 mm on both sides of the wall or floor.

Copper pipes must be insulated with a synthetic rubber insulation (insulation thickness 11.0 mm - 41.5 mm).The synthetic rubber insulation is to be wrapped with the bulding material "FLAMRO Variant N-RM" whose foam will expand in a case of fire. After installation is finished, the building material must protrude 50 mm from both sides of the wall / 25 mm underneath the floor.

Steel pipes are to be insulated with a mineral wool or steel wool mat, , Raumgewicht Mineralwolle ≥ 23 kg/m³; (density steel wool ≥ 42 kg/m³, optionally pipe clams are possible as well), with a thickness of 20 mm - 60 mm. For the usage of „mats", the mats must be mounted in a distance of 10 mm with wire across their entire length. Subsequently, the building material Baustoff ROKU® Strip is wrapped around the insulation in one layer. After installation is finished, the building material must protrude 50 mm from both sides of the wall / 25 mm underneath the floor.

After mounting cables, cable ladder, conduits or pipes, the reveal must be coated with ablation coating FLAMRO BML. The reveal is to be sealed with in each case 50 mm thick mineral fibre panels on both sides (density ≥ 150 kg/m³). The mineral fibre panels are to be coated with ablation coating FLAMRO BML either before or after installation. When the installation is finished, they must have a dry film thickness of ≥ 1 mm.

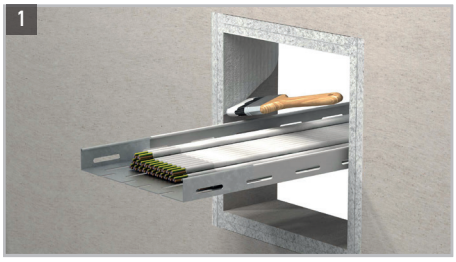
Plastic pipes are equipped with fire protection of type FLAMRO VARIANT N II A appropriately to their respective diameter. The pipe collars are to be mounted with threaded rods M6 or M8 befestigt. For penetration seals in floors, only one collar is to be mounted underneath the floor. For penetration seals in walls, one collar on each side of the wall is to be mounted.

Conduits or bundles of conduits are equipped with fire protection of type FLAMRO VARIANT N II A appropriately to their respective diameter. (single ≤ 63 mm, bundle of conduits ≤ 125 mm). The pipe collars are to be mounted with threaded rods M6 or M8 befestigt. For penetration seals in floors, only one collar is to be mounted underneath the floor. For penetration seals in walls, one collar on each side of the wall is to be mounted.

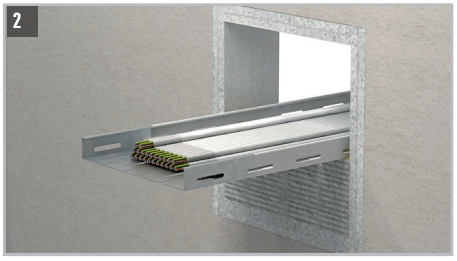
Assembly Instruction

FLAMRO KSL Combi seal
according to ETA-16/0320

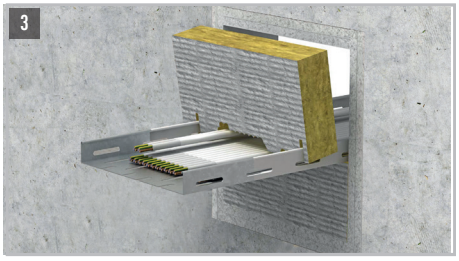
Assembly steps



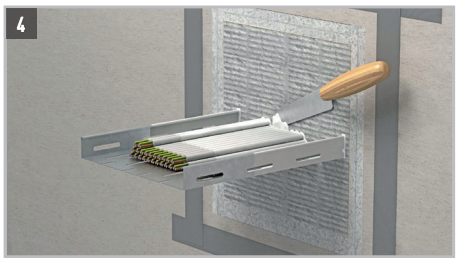
Clean the reveal and remove all lose parts. It is then to be coated with fire protection coating FLAMRO BML.



Cable and cable racks must be coated with FLAMRO BML and FLAMRO BSL mineral fibre panels (nominal thickness 50 mm) are to be fit into the wall / floor.

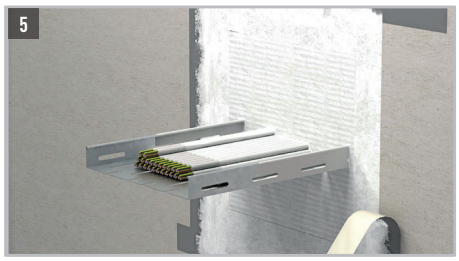


Close the reveal completely. All remaining joints and gaps are to be sealed with soaked mineral wool. For firmly knotted cable bundles, the space in between single cables does not neet to be filled.

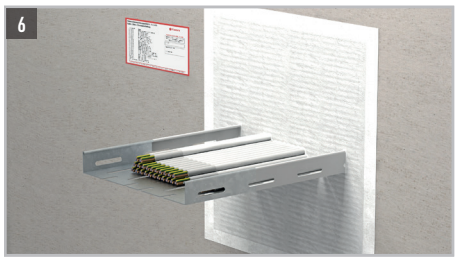


Mask the area around the reveal 2 cm from the opening of the structural element. Joints and gaps (5 mm) must be filled completely with „FLAMRO BML" or „FLAMRO BMS/BMK" on both sides of the reveal. Joints and gaps (10 mm) must be filled completely with „FLAMRO BMS/BMK" on both sides of the reveal.

Alternatively, mineral wool (steel wool of classification A1 according to EN 13501-1, a minimum apparent density of 50 kg/m³ and a melting point of ≥ 1000 °C according to DIN 4102-17) which is soaked with „FLAMRO BML" or „FLAMRO BMS / BMK" can be used for filling. There must be a minimum of 1 mm dry film thickness.



The entire surface inside the masking must be coated with FLAMRO BML, so that a dry film thickness of 1 mm.



Remove masking tapes and mark the penetration seal with an identification plate. Clean work area.

FLAMRO KSL Combi seal
according to ETA-16/0320

Subsequent installation and dismantling

Subsequent installation and dismantling of cables, conduits, pipes and cable supporting trays is approved.

Dismantling must be performed according to the assembly instruction.

If cables, conduits, pipes, cable supporting structures are to be removed, the remaining reveal (hole) must be sealed completely with a form-fitting piece of „FLAMRO BSL" or „Hardrock 040" / „Hardrock II" (nominal thickness 50 mm) on both sides of the penetration seal.

Joints and gaps (max. width 5 mm) between the form-fitting piece of „FLAMRO BSL" or „Hardrock 040" / „Hardrock II" and the mineral wool panels must be filled completely with „FLAMRO BML" or „FLAMRO BMS / BMK" on both sides of the reveal. The form-fitting piece must be coated on its visible surface with „FLAMRO BML" at a thickness of min. 1 mm (dry film thickness) on both sides of the wall.

DECLARATION OF PERFORMANCE

for the product **FLAMRO KSL**
No. 16062016 KSL

1.	Unique identification code of the product-type:	**KA-16-0320**
2.	Intended use:	**Combi seal**
3.	Manufacturer:	**FLAMRO Brandschutz-Systeme GmbH** **Am Sportplatz** **56291 Leiningen**
4.	Authorised representative:	**Not relevant**
5.	System(s) of AVCP:	**System 1**
6.a)	Harmonised standard	**Not relevant**
6.b)	European Assessment Document:	**ETAG-026, Part 2,** **August 2011**
	European Technical Assessment:	**ETA-16/0320**
	Technical Assessment Body:	**OIB - Österreichisches Institut für Bautechnik, Vienna**
	Notified bod/ies:	**Materialprüfanstalt für das Bauwesen** **Braunschweig, Nr. 0761**

7. Declared performances

Essential characteristics	Performance	Harmonised technical specification
Combi seal for conduct of: Core lines, sheathed cables, firmly strapped cable bundles, electric installation pipes made of steel and plastic, combustible pipes made of PVS, PP and PE, composite pipes, metall pipes with section insulation made of mineral fibre pipe shell, metall pipes with section insulation made of synthetic rubber and cable construction made of steel. Suitable for installation in openings of min. 94 mm thick lightweight construction- and min. 100 mm thick rigid walls as in min. 150 mm thick rigid floors.*)	Depending on occupancy and building component maximal EI 120 or EI 120 U/U, EI 120 C/U or EI 120 U/C	ETA-16/0320
Durability and serviceability	Use category type Y_2	
Air permeability	NPD	
Water permeability	NPD	
Release of dangerous substances	None	
Mechanical resistance and stability	NPD	
Resistance to impact / movement	NPD	
Adhesion	NPD	
Airborne sound insulation	NPD	
Thermal properties	NPD	
Water vapour permeability	NPD	
Components - reactions to fire	Class acc. to EN 13501-1	
FLAMRO BML	E	
FLAMRO BMS	E	
FLAMRO BMK	E	
FLAMRO Variant N-RM	E	
FLAMRO Variant N II A (intumescent inlay)	E	
FLAMRO Variant N II A (Steel sheet housing)	A1	
Mineral fibreboard Hardrock 040 / Hardrock II	A1	
*) according to ETA-16/0320		

8. Appropriate Technical Documentation / Specific Technical Documentation: **Not relevant**

Website where Declaration of Performance can be viewed:
www.flamro.com

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is isssued in accordance with Regulation (EU) No. 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dr. Hemp, Head of R&D / Authorised officer, FLAMRO Brandschutz-Systeme
(Name and position)

Leiningen, 27.10.2017
(Place and date of issue)

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(signature)