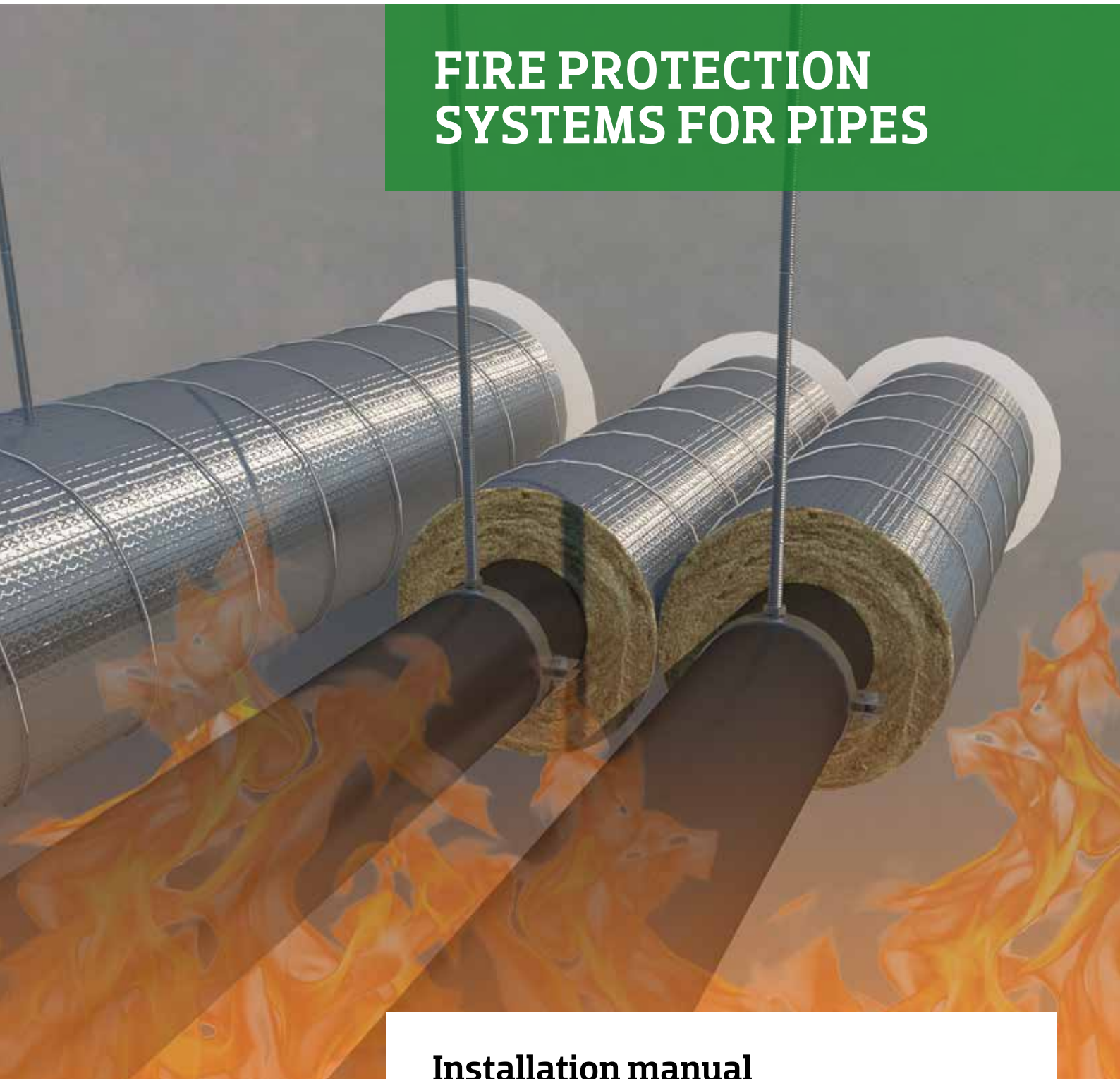


# FIRE PROTECTION SYSTEMS FOR PIPES



**Installation manual  
of Thermo-teK PS Pro ALU**  
tested in accordance with EN 1366-3

## SAFETY DURING FIRE

Fire safety is one of the primary considerations in building design. Larger buildings are frequently divided into so-called fire compartments, which are separated by fire-resistant walls and ceilings. In the event of fire, these constructions must guarantee full fire and smoke resistance for prescribed fire resistance.



### FIRE COMPARTMENTS IN BUILDING

If supply pipes have to pass through fire compartment constructions, these penetrations must also maintain the fire resistance demanded for the primary constructions. All leakages must be clogged and installation must follow to the conditions described in fire testing certificates.

## FIRE TESTING

The testing standard EN 1366-3 (Fire resistance tests for service installations – Part 3: Penetration seals) can be considered as the main requirement for pipe penetration systems. Systems tested to this standard are consequently classified in accordance to harmonized norm EN 13501-2 (Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services). The expected use of pipes (rain water, waste water, heating water, ...) determines the required test conditions prescribed by EN 1366-3. This test provides information on the safe use of pipes. End pipe closing can be capped (closed) or uncapped (open).



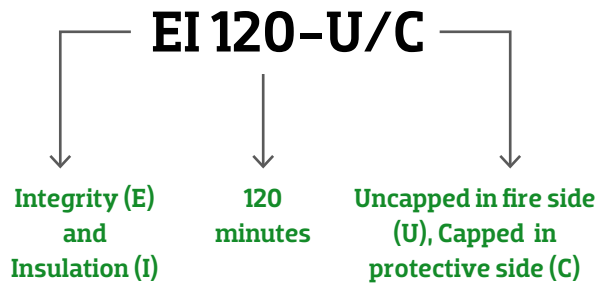
**FIRE TESTING OF CAPPED SYSTEMS**



**FIRE TESTING OF UNCAPPED SYSTEMS**

# NATIONAL REQUIREMENTS

Products and systems used for fire resisting constructions must fulfill both national and European building codes. For pipes, national requirements usually differ between 30 to 180 minutes of specific fire resistance, mainly in categories E (integrity) and I (insulation). In addition to this basic classification, fire resistance of pipes is further determined by the type of end pipe closing. Following table shows requirements by the European standard EN 1366-3.



## EXAMPLE OF FINAL CLASSIFICATION OF PIPE SYSTEM

METAL PIPES (TABLE H.2 FROM EN 1366-3)	INSIDE OVEN	OUTSIDE OVEN	COVERED BY KI SYSTEMS
HANGED PIPE SYSTEMS WITH FIRE CLASSIFICATION	C	U	YES
HANGED PIPE SYSTEMS WITHOUT FIRE CLASSIFICATION	U	C	YES
WASTE SHAFTS CREATED BY PIPES	U	C	YES

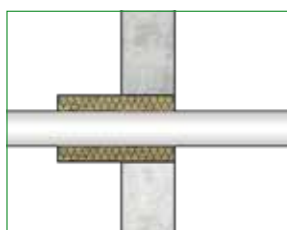
COMPOSITE PLASTIC PIPES (TABLE H.1 FROM EN 1366-3)		INSIDE OVEN	OUTSIDE OVEN	COVERED BY KI SYSTEMS
RAIN WATER PIPES	–	U	U	NO
WASTE WATER PIPES	VENTILATED	U	U	NO
	UNVENTILATED	U	C	YES
PIPES FOR GAS, DRINKING WATER, HEATING WATER		U	C	YES

	SUSTAINED	INTERRUPTED
<b>CONTINUED</b>	<b>CS</b> 	<b>CI</b> 
<b>LOCALISED</b>	<b>LS</b> 	<b>LI</b> 

« According to EN 1366-3, fire protection pipe systems are split into these 4 scenarios.

All current systems from Knauf Insulation are sustained, therefore Insulation always runs through the walls and ceilings.

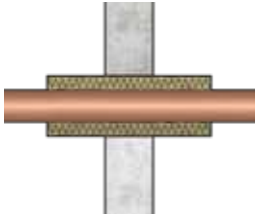
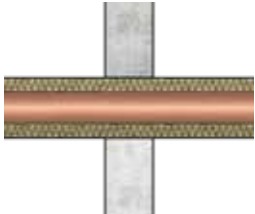
A major advantage of Thermo-teK PS Pro ALU is, that only one piece of pipe section is needed in the middle of the wall/ceiling to achieve fire resistance up to EI120. Details of use are on the next pages.



Knauf Insulation also offers these one-side insulated pipe systems (so called asymmetrical installation) for composite plastic pipes. Details of use are on the next pages.

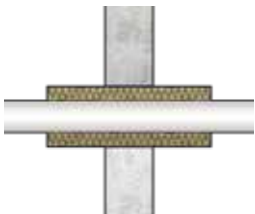
# WALL PENETRATION SYSTEMS WITH KNAUF INSULATION PS PRO ALU

## METAL PIPES

PIPE MATERIAL	PIPE DIAMETER (MM)	INSULATION THICKNESS** (MM)	FIRE CLASSIFICATION WITH 1 PS IN THE MIDDLE OF THE PENETRATION*	FIRE CLASSIFICATION FOR COMPLETE PIPE INSULATION*
				
COPPER, STEEL, STAINLESS STEEL, CAST IRON	≤ 54	20–100	EI 120-C/U	EI 120-C/U
	54–89	30–120	EI 120-C/U	
	89–108	30–110	EI 90-C/U	
STAINLESS STEEL CAST IRON	≤ 115	30–110	EI 90-C/U	
	115–140	30–90	EI 90-C/U	
	140–168	50	EI 90-C/U	
		50–80	EI 60-C/U	

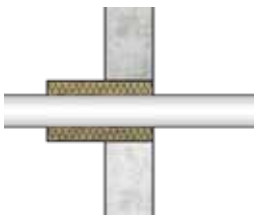
\*C/U classified systems can be used also for U/C and C/C requirements.

## PLASTIC PIPES (MULTILAYER COMPOSITE PIPES) FOR COMPLETE WALL PENETRATION

PIPE NAME	PIPE DIAMETER (MM)	PIPE WALL THICKNESS (MM)	INSULATION THICKNESS** (MM)	FIRE CLASSIFICATION*	
AQUATHERM GREEN PIPE MS	≤ 50	≤ 6,9	20–100	EI 120-U/C	
	≤ 110	≤ 15,2	30	EI 120-U/C	
30–100			EI 90-U/C		
ALPEX F50 PROFI	≤ 32	≤ 3,0	20–80	EI 120-U/C	
ALPEX L	≤ 75	≤ 5,0	30–80	EI 120-U/C	
UPONOR MLC PIPE, WHITE	≤ 50	≤ 4,5	20–100	EI 120-U/C	
	≤ 110	≤ 10,0	30–100	EI 120-U/C	

\*U/C classified systems can be used also for C/C requirements.

## PLASTIC PIPES (MULTILAYER COMPOSITE PIPES) FOR PARTIAL WALL PENETRATION

PIPE NAME	PIPE DIAMETER (MM)	PIPE WALL THICKNESS (MM)	INSULATION THICKNESS** (MM)	FIRE CLASSIFICATION*	
AQUATHERM GREEN PIPE MS	≤ 32	≤ 4,5	20–50	EI 60-U/C	
ALPEX F50 PROFI	≤ 32	≤ 3,0	20–50	EI 90-U/C	
UPONOR MLC PIPE, WHITE	≤ 32	≤ 3,0	20–50	EI 60-U/C	

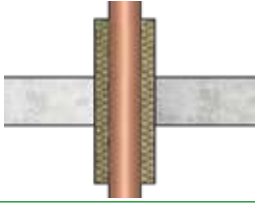
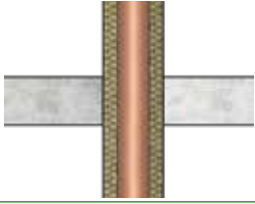
\*U/C classified systems can be used also for C/C requirements.

\*\*Insulation thickness depends on the temperature inside the pipe (to avoid heat losses and to comply maximal surface temperature requirements).



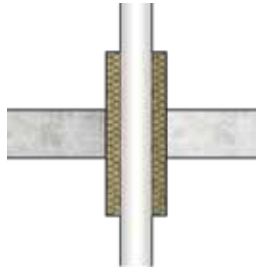
# CEILING PENETRATION SYSTEMS WITH KNAUF INSULATION PS PRO ALU

## METAL PIPES

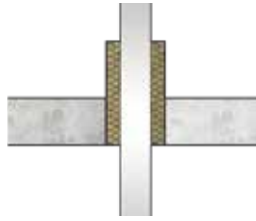
PIPE MATERIAL	PIPE DIAMETER (MM)	INSULATION THICKNESS** (MM)	FIRE CLASSIFICATION WITH 1 PS IN THE MIDDLE OF THE PENETRATION*	FIRE CLASSIFICATION FOR COMPLETE PIPE INSULATION*
				
COPPER, STEEL, STAINLESS STEEL, CAST IRON	≤ 54	20–100	EI 120-C/U	EI 120-C/U
	54–89	30–120	EI 120-C/U	
	89–108	30–110	EI 90-C/U	
STAINLESS STEEL CAST IRON	≤ 115	30–110	EI 120-C/U	
	115–140	30–90	EI 120-C/U	
	140–168	50–80	EI 120-C/U	

\*C/U classified systems can be used also for U/C and C/C requirements.


## PLASTIC PIPES (MULTILAYER COMPOSITE PIPES) FOR COMPLETE CEILING PENETRATION

PIPE NAME	PIPE DIAMETER (MM)	PIPE WALL THICKNESS (MM)	INSULATION THICKNESS** (MM)	FIRE CLASSIFICATION*	
AQUATHERM GREEN PIPE MS	≤ 50	≤ 6,9	20–100	EI 120-U/C	
	≤ 110	≤ 15,2	30–100		
ALPEX F50 PROFI	≤ 32	≤ 3,0	20–80		
ALPEX L	≤ 75	≤ 5,0	30–80		
UPONOR MLC PIPE, WHITE	≤ 50	≤ 4,5	20–100		
	≤ 110	≤ 10,0	30–100		

## PLASTIC PIPES (MULTILAYER COMPOSITE PIPES) FOR PARTIAL CEILING PENETRATION – TOP SIDE

PIPE NAME	PIPE DIAMETER (MM)	PIPE WALL THICKNESS (MM)	INSULATION THICKNESS** (MM)	FIRE CLASSIFICATION*	
AQUATHERM GREEN PIPE MS	≤ 32	≤ 4,5	20–50	EI 120-U/C	
ALPEX F50 PROFI	≤ 32	≤ 3,0	20–50		
UPONOR MLC PIPE, WHITE	≤ 32	≤ 3,0	20–50		

## PLASTIC PIPES (MULTILAYER COMPOSITE PIPES) FOR PARTIAL CEILING PENETRATION – BOTTOM SIDE

PIPE NAME	PIPE DIAMETER (MM)	PIPE WALL THICKNESS (MM)	INSULATION THICKNESS** (MM)	FIRE CLASSIFICATION*	
AQUATHERM GREEN PIPE MS	≤ 32	≤ 4,5	20–50	EI 60-U/C	
ALPEX F50 PROFI	≤ 32	≤ 3,0	20–50	EI 120-U/C	
UPONOR MLC PIPE, WHITE	≤ 32	≤ 3,0	20	EI 120-U/C	
	≤ 32	≤ 3,0	20–50	EI 90-U/C	

\*U/C classified systems can be used also for C/C requirements.

\*\*Insulation thickness depends on the temperature inside the pipe (to avoid heat losses and to comply maximal surface temperature requirements).

# INSTALLATION INSTRUCTIONS

## BASIC REQUIREMENTS

- All adhesion surfaces must be dry and free from dust, grease and dirt.
- The protective strip must be removed from the pipe section before it is closed with longitudinal self-adhesive overlap coating.
- Pipe section joints must be sealed with self-adhesive aluminium tape, equally covering both sides.
- Thermo-teK PS Pro ALU is manufactured with a slight slit on the side opposite to the longitudinal opening. This makes it much easier to push the section over the pipe which is to be insulated.

## 1. WALL STRUCTURE

Knauf Insulation seal systems for pipes penetrating wall might be used both in light weight and massive walls. The same fire resistance intended for pipe insulation must be applied to the wall. The thickness of the wall must be a minimum of 100 mm for dense walls, 94 mm for lightweight walls and no part of the penetration seal may be located less than 100 mm from the light weight wall post.

## 2. GAP FILLING

The remaining gap between the insulation and supporting structure must be filled with mineral

construction materials with Euroclass Reaction to Fire classification of A1. Suitable materials might be cement mortars, gypsum, etc. The gap width must be in a range of 1–5 cm (requirement only for light weight walls).

## 3. SUSPENSION SYSTEM

Firstly brackets (supports) for the pipes must be positioned at spacings of  $\leq 650$  mm from the wall. The brackets must be non-combustible.

## 4. PIPES

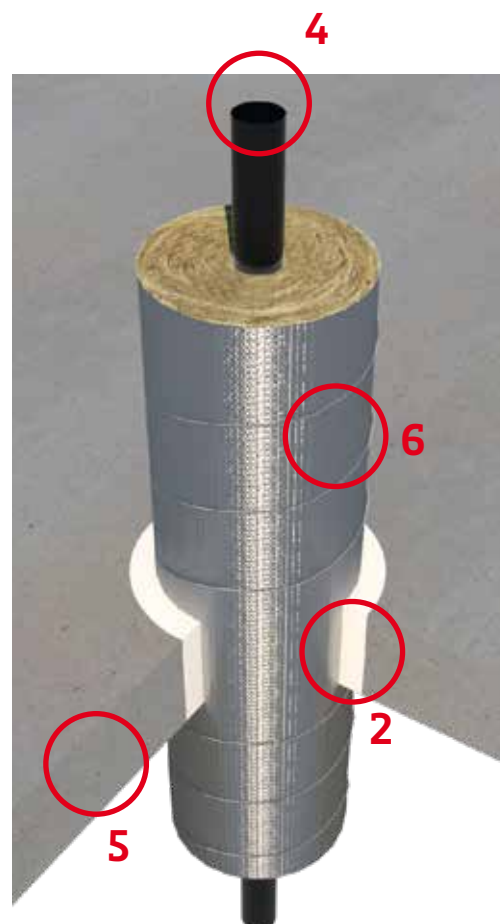
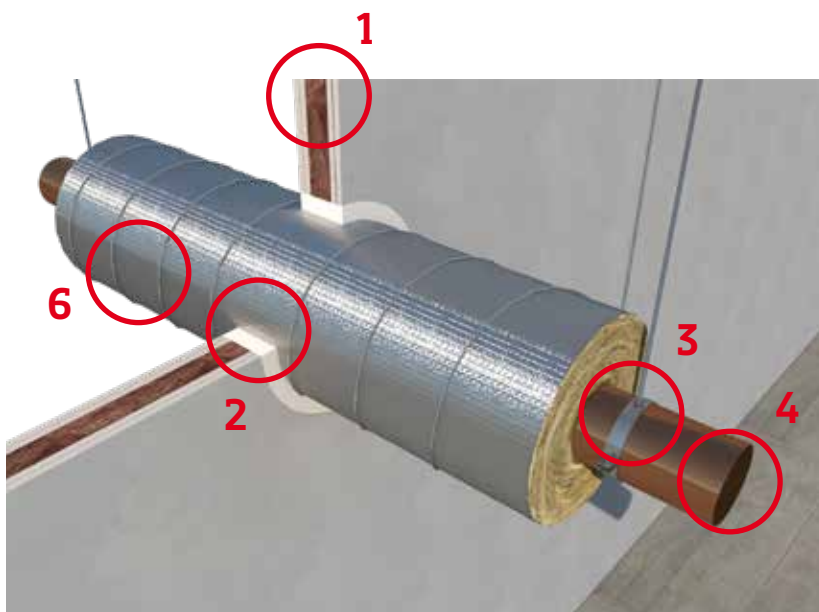
Pipe dimensions and material must be in harmony with materials listed in pages 4 and 5.

## 5. CEILING STRUCTURE

Ceiling structures are dense. Their thickness must be  $\geq 150$  mm and their density  $\geq 550$  kg/m<sup>3</sup>.

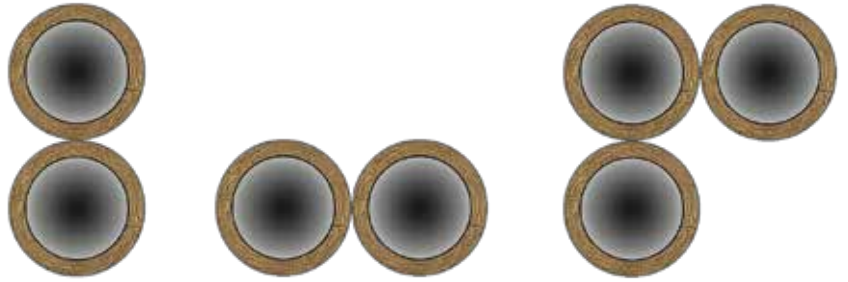
## 6. GENERAL REQUIREMENTS

All pipes must only be passed through the wall/ceiling at right angles. In addition, pipe insulation must be wound by steel wire with a thickness of  $\varnothing \geq 0,6$  mm and at least 6 turns/m. The spacing between wire loops must be  $< 200$  mm.



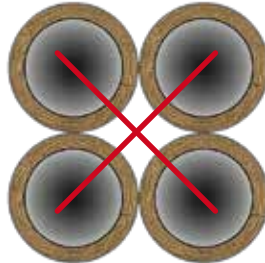
### 7. ALLOWED PIPE ASSEMBLIES

Pipes can be easily grouped in existing holes. The distance between grouped insulated pipes is 0 mm. This pipe assembly will have fire resistance equal to the shortest classification period. Spacing of  $\geq 100$  mm must be observed from other installations/penetration seals.

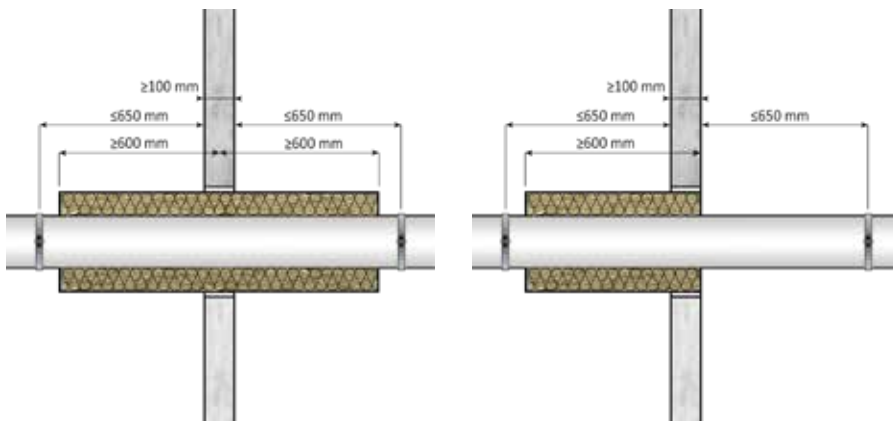


### 8. FORBIDDEN PIPE ASSEMBLIES

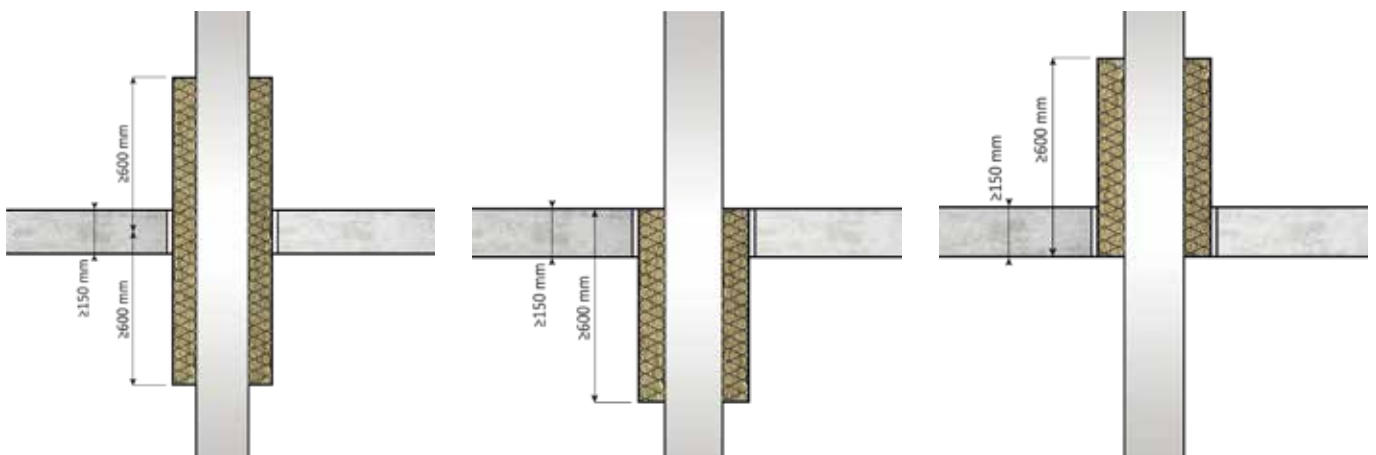
Closed circle grouping is not allowed, because the space between the individual pipes cannot be sealed.



### 9. WALL INSTALLATION DIMENSIONS



### 10. CEILING INSTALLATION DIMENSIONS



Product properties and supportive documentation of Knauf Insulation Thermo-teK PS Pro ALU with ECOSE® technology are available on [www.ki-ts.com](http://www.ki-ts.com).

Knauf Insulation Mineral Wool products with ECOSE® Technology benefit from a no added formaldehyde binder made from rapidly renewable bio-based materials instead of petroleum-based chemicals.



## CONTACT

**Knauf Insulation d.o.o.**

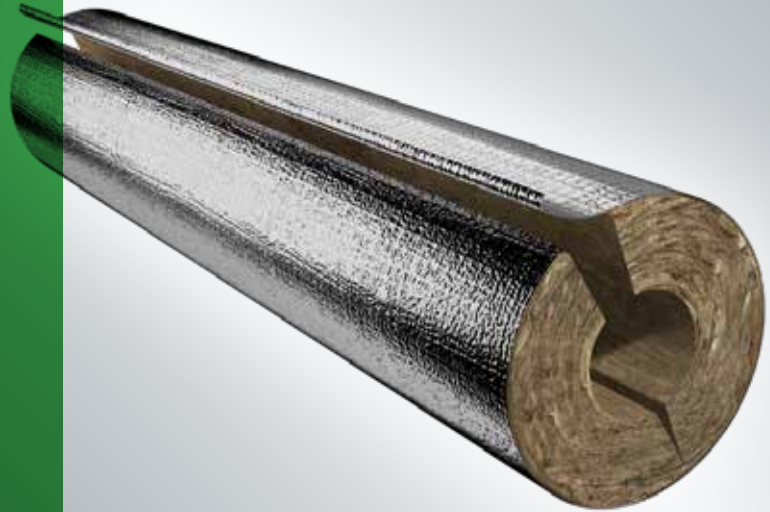
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### **COMPANY PROFILE**

Knauf Insulation is one of the most respected names in the insulation industry worldwide with over 40 years of experience and still growing fast. Over 5.500 employees in more than 35 countries and 38 manufacturing sites. Being part of the family-owned Knauf group Knauf Insulation Technical Solutions provides solutions for customers' requirements in industry, marine applications, heating, ventilation and air conditioning. A profound market understanding and insulation know-how enables us to provide a broad range of products to meet your specific needs.

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