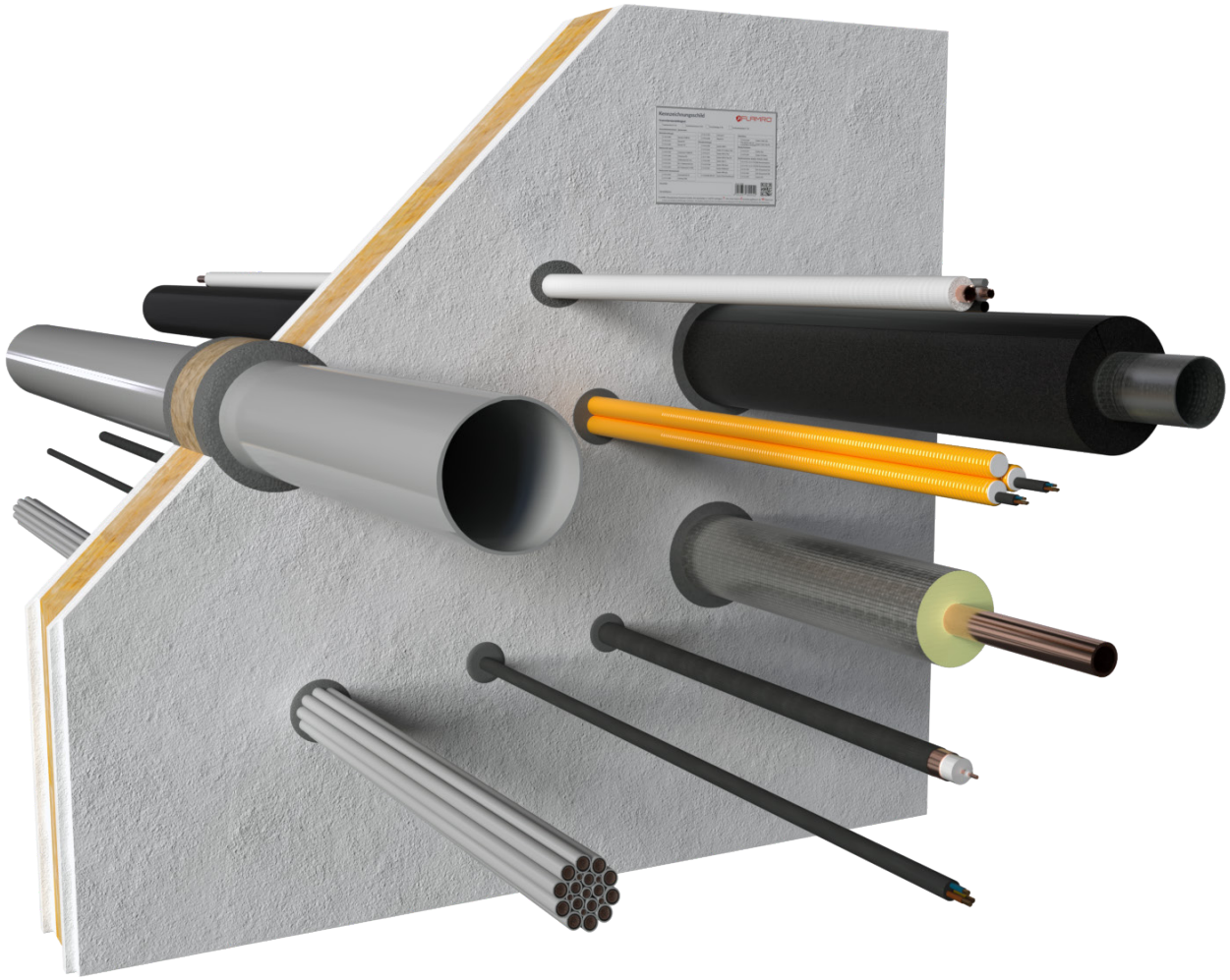
System DG-SC

Simple penetration sealing system with intumescent filler

Penetration sealing system made of intumescent filler for electrical cables of and for combustible and non-combustible pipes.

Maximum fire resistance class EI 120 as per EN 13501-2 in accordance with ETA-16/0268.



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Installation instructions Rev.: 24.01

System DG-SC

Table of contents

System DG-SC

1. Preliminary remarks / Overview

1.1 Target group

The installation instructions are intended solely for personnel trained in fire protection.

1.2 Use of the instructions

Before starting work, read through these installation instructions completely once. Pay particular attention to the following safety instructions.

The authorisation holder assumes no liability for damage caused by failure to comply with these instructions.

Pictorial representations serve as examples only. Installation results may differ in appearance.

Unless stated otherwise, all lengths are specified in mm.

All information in this document represents the state of the art at the time of writing or the current version of the standard.

Upon request, Flamro will be pleased to provide the relevant legal and technical framework and manufacturer specifications for each individual case.

1.3 Safety instructions

Consult the respective safety information for the individual penetration seal components.

Personal protective equipment:

	Wear protective clothing and non-slip shoes.
	Use safety goggles or safety glasses.
	Use a respirator with P2 particle filter in case of short-term or low level exposure. For intensive or prolonged exposure use a breathing apparatus with independent air supply. Use breathing protection in compliance with international/national standards.
	Use chemically resistant gloves. Recommended materials: Butyl rubber, nitrile rubber, fluorinated rubber, PVC.

Safety instructions for the installation of floor penetration seals

	The area below the floor penetration seal must be cordoned off against entry during penetration seal work (barrier tape and warning sign: warning of possible falling objects, do not enter the area, penetration seal work in floor component openings).
	The contractor for the production of floor penetration seals must inform the client in writing (for forwarding to the client or appointed representative) that fire protection seals installed in floors must be secured on site against loads – in particular against being walked on – by suitable measures (e.g. by fencing them off or by covering them with grating).

System DG-SC

1.4 Field of application

The usability of the penetration sealing system System DG-SC has been assessed in accordance with EAD 350005-00-1104 and EAD 350454-00-1104 in terms of the „Reaction to fire“, „Resistance to fire“, „Release of dangerous substances“ and „Durability and serviceability“ product characteristics.

Reaction to fire

The intumescent material DG-SC meets class E for reaction to fire in accordance with EN 13501-1.
The mineral wool meets class A1 and the requirements of EN 13501-1.

Resistance to fire

tested	included configurations			
	U/U	C/U	U/C	C/C
U/U	✓	✓	✓	✓
C/U	–	✓	–	✓
U/C	–	✓	✓	✓
C/C	–	–	–	✓

System DG-SC maximally meets the requirements of class EI 120.
When installed in walls or floors with a lower fire resistance duration, the fire resistance duration of the penetration seal is also reduced to that of the fire resistance class of the wall or floor.

Release of dangerous substances

The intumescent material DG-SC does not contain any substances identified as dangerous in the list of the European Commission.

The mineral wool does not contain any dangerous substances listed in Directive 67/548/EC or Regulation (EC) No. 1272/2008 or the Indicative List on Dangerous Substances.

Durability and serviceability

The intumescent material DG-SC meets the requirements of type X in accordance with EOTA TR 024 / ETA-16/0268

System DG-SC can be subjected to the conditions of interior rooms with and without exposure to moisture or atmospheric conditions, without substantial changes to the fire protection characteristics to be expected.

System DG-SC

1.5 Building elements

Plasterboard walls with steel substructure

In stud design and double-sided cladding with at least 2 layers of 12.5 mm cement or gypsum-bound building boards as per EN 520 Type F with a reaction to fire of class A1 or A2 in accordance with EN 13501-1.

The walls must be classified with the required fire resistance rating in accordance with EN 13501-2.

Plasterboard walls with wood substructure

In stud design and double-sided cladding with at least 2 layers of 12.5 mm cement or gypsum-bound building boards with a reaction to fire of class A1 or A2 in accordance with EN 13501-1.

The distance between the opening and the studs and transoms must be ≥ 100 mm and the hollow spaces between the cladding of the wall, studs and transoms and the opening reveal must be tightly sealed to a depth of ≥ 100 mm with mineral wool, reaction to fire class A1 or A2 in accordance with EN 13501-1.

The walls must be classified for the required fire resistance rating in accordance with EN 13501-2.

Solid walls

Made of concrete or masonry with a density of ≥ 650 (± 200) kg/m³.

The walls must be classified for the necessary fire resistance duration in accordance with EN 13501-2.

Solid floors

Made of concrete or masonry with a density of ≥ 650 (± 200) kg/m³.

The floors must be classified for the necessary fire resistance duration in accordance with EN 13501-2.

Shaft walls

In stud design with metal substructure with single-sided cladding with at least 2 layers of 20 mm building boards.

System DG-SC

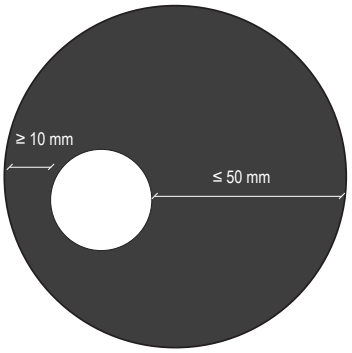
2. Thicknesses / penetration seal distances

Dimensions			
	Wall [mm]	**Floor [mm]**	**Shaft wall [mm]**
Thickness of building element	≥ 100	≥ 150	≥ 40
Thickness of penetration seal	≥ 100	≥ 150	≥ 40
Distance to other openings or installations	≥ 100	≥ 100	≥ 100
Distance of initial supports in front of seal	≤ 500	≤ 500	≤ 600

3. Annular gap

Dimensions			
	Wall [mm]	**Floor [mm]**	**Shaft wall [mm]**
Width of annular gap without backfilling	≥ 10 – ≤ 25	≥ 10 – ≤ 25	≥ 10 – ≤ 25
Width of annular gap with backfilling	≥ 10 – ≤ 50	≥ 10 – ≤ 50	–
Depth of optional backfilling	≥ 50	≥ 100	–
Filling depth of annular gap per side	≥ 25	≥ 25	≥ 20

It is possible to make a non-central annular gap, ensuring flexible adapation to penetrations which do not lead through the centre.



System DG-SC

4. Spacing distances for services

	Wall	Floor	Shaft wall
Single penetrations in general	≥ 100	≥ 100	≥ 100
Spacing distance between non-insulated steel pipes Ø ≤ 48.3 mm	≥ 100	≥ 0	≥ 100
Spacing distance between multilayer pipes KE KELIT KELOX KM 110 (Ø ≤ 32 mm in line)	–	–	≥ 0

*Dimensions in mm

5. Included products

DG-SC

310 ml cartridge – Art. no. 01157100

Mineral wool

Class of reaction to fire in acc. with EN 13501-1: A1
Melting point ≥ 1000 °C
10 kg bag – Art. no. 01183000

Section insulation made of mineral fibre mats

Class of reaction to fire in acc. with EN 13501-1 at least class A2-s1 d0
Melting point ≥ 1000°C,
Nominal bulk density ≥ 40 kg/m³

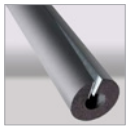
Name	Nominal bulk density [kg/m³]	DIN/ abZ/abP
Rockwool lamella mat KLIMAROCK roll, 3.05 m² – Art. no. 01187100	40-50	DE0628031801 of 14.03.2018
Isover mineral fibre mat MD2 and MD2/A	80	DE0002-Protect_ EN14303 002 of 09.02.2015
Isover mineral fibre mat MDD and MDD/A	115	

Section insulation made of pipe sleeves

Class of reaction to fire in acc. with EN 13501-1 at least class A2-s1 d0
Melting point ≥ 1000°C,
Nominal bulk density ≥ 80 kg/m³

Name	Nominal bulk density [kg/m³]	Declaration of Performance
U Tech Pipe Section / U Protect Section Alu2	80–90	DE0002-Pipe_Sections (de-en-fr) 002 of 13.03.2015
Rockwool ProRox PS 960 (formerly ROCKWOOL Lapimus Rohrschale 880)	95-150	PROPS960NL-03
Rockwool 800	90-115	DE0721011801 of 15.01.2018
Rockwool ProRox WM 950 (formerly WM 80/RTD-2)	85	PROWM950D-03 of 04.05.2017
Rockwool ProRox WM WM 960 (formerly WM 100/ RBM)	100	PROWM960D-03 of 04.05.2017
Rockwool Conlit 150 U	150	P-NDS04-417
Isover Schalen Protect 1000 S, Isover Schalen Protect 1000 S Alu	70-90	DE0002-Pipe_Sections 001 of 10.06.2013

System DG-SC



Section and protective insulations

made of flexible elastomeric foam (FEF)
in accordance with EN 14304

Name	Declaration of Performance
Armalok 50	Nr. 067-CPR-2021-104 in Verbindung mit ETA-20/0653 vom 25.11.2020
Armalok 100	
ArmaFlex XG	0543-CPR-2013-002
AF/ArmaFlex	0543-CPR-2016-001
AF/ArmaFlex Evo	0543-CPR-2020-101
SH/ArmaFlex	0543-CPR-2013-013
NH/ArmaFlex	0543-CPR-2013-015
HT/ArmaFlex	0543-CPR-2013-019
ArmaFlex Ultima	0543-CPR-2016-017
Kaiflex HT s2	DoP HT s2 01032021001
Kaiflex KK	Kaiflex KK
Kaiflex KKplus s2	DoP KKplus s2 01092021001
Kaiflex KKplus s3	DoP KKplus s3 PL092021001
FLEXEN Heizungskautschuk s2	LE_5258006015_00_M_flexen®_Heizungskautschuk_Plus
FLEXEN Kältekautschuk Plus s2	LE_5258501006_00_S_flexen®_Kältekautschuk_Plus
isopren Plus	Isopren Plus 07052013001
isopren Polar Plus	Isopren Polar Plus 07052013001
K-FLEX ST	01010104201-CPR-13, 01050104201-CPR-16, 01100104201-CPR-16, 01040104201-CPR-16
K-FLEX ST PLUS	02010104201-CPR-16, 02010304201-CPR-13, 02050104201-CPR-16, 02040104201-CPR-13
K-FLEX ECO	05010105201-CPR-13, 04050105201-CPR-13; 04100104201-CPR-18, 04040104201-CPR-18, 04060102201-CPR-18
K-FLEX H	04010105201-CPR-13, 04050105201-CPR-13, 04100104201-CPR-18, 04040104201-CPR-18, 04060102201-CPR-18
Eurobatex SC	01/2020080

5.1 Declarations of Performance

The Declarations of Performance for featured Flamro products are available for download on our website:
https://svt-global.com/downloads

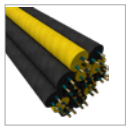
System DG-SC

6. Allowed services

6.1 Cables / cable bundles / electrical installation conduits / coaxial cables

Electrical cables of all types (including fibre optic cables)

Ø ≤ 61 mm



Cable bundles

up to Ø ≤ 180 mm with cables Ø ≤ 21 mm.
No filling of interstices necessary for tightly packed, tied cable bundles.

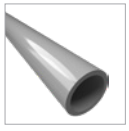
Electrical installation conduits

made of plastic, up to Ø ≤ 32 mm single or bundled up to Ø ≤ 100 mm, with/without cables (Ø ≤ 21 mm)

Coaxial cable

RFS coaxial cable CELLFLEX LCF, Ø ≤ 50.3 mm
CommScope coaxial cable HELIAX, Ø ≤ 51.1 mm
RFS coaxial cable RADIAFLEX RLK-50, Ø ≤ 48.2 mm

6.2 Combustible pipes



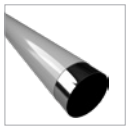
Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]
PVC-U in accordance with EN 1329-1, EN 1453-1, EN 1542-1, EN 15493, EN 1566-1, EN ISO 15877-2, EN 1566-1, DIN 8061/8062, DIN 8075	≤ 50	1.8–3.7
	≤ 110	1.8–8.1
PP-H in accordance with EN ISO 15874:2013, EN 1451-1, EN ISO 15494, DIN 8077:2007, DIN 8078/2007	≤ 50	1.8–4.6
	≤ 75	1.8–1.9
	≤ 110	1.8–10.0
PE in accordance with EN 1519-1, EN 12201-1, EN ISO 15494, EN 12666-1	≤ 50	1.8
	≤ 75	1.8–1.9
	≤ 110	1.8–10.0
PE 100 in accordance with EN 1555-2, EN 12201-2+A1, DIN 8074/8075	≤ 50	1.8–4.6
	≤ 110	2.7–10.0
PE-X in accordance with EN ISO 15875-2	≤ 50	1.8
	≤ 75	1.8–1.9
	≤ 110	1.8–10.0

System DG-SC

Pipe material / type of pipe	Pipe outer Ø [mm]	Pipe wall thickness [mm]
ABS in acc. with EN 1455-1, EN ISO 15493	≤ 50	1.8
	≤ 75	1.8–1.9
	≤ 110	1.8–10.0
SAN+PVC in acc. with ISO 19220	≤ 50	1.8
	≤ 75	1.8–1.9
	≤ 110	1.8–10.0
FRIATEC Friaphon	≤ 52 – ≤ 110	2.8–5.3
Pipelife MASTER 3	≤ 50 – ≤ 110	1.8–5.0
Pipelife MASTER 3+	≤ 50	1.8
POLOPLAST POLO-KAL 3S	≤ 75	3.8
	≤ 75 – ≤ 110	3.8–4.8
POLOPLAST POLO-KAL XS	≤ 40	1.8
	≤ 50	2.0
	≤ 110	3.4
POLOPLAST POLO-KAL NG	≤ 50	2.0
	≤ 110	2.0–3.4
Valsir Triplus	≤ 50	1.8–1.9
	≤ 110	1.8–3.4
Wavin AS+	≤ 50	3.0
Wavin SiTech+	≤ 32	1.8
	≤ 50	2.1
	≤ 110	1.8–3.4
Ostendorf Skolan SAFE dB	≤ 58	4.0
	≤ 110	4.0–5.3
Geberit Silent dB20	≤ 56	3.2
	≤ 110	3.2–6.0
Geberit Silent-Pro	≤ 50	3.0–3.2
	≤ 110	3.0–4.5
Geberit Silent-PP	≤ 50	2.0
	≤ 110	2.0–3.6
REHAU RAUPIANO PLUS	≤ 50	1.8
	≤ 110	1.8–2.7
Conel Drain	≤ 50	1.8
GF Silenta Premium	≤ 58	5.3

System DG-SC

6.3 Multilayer pipes

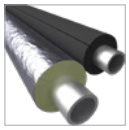


Design with 5 mm PE soundproofing tube.

Plastic pipes with a 150 µm aluminium layer, which is applied to a PP pipe and protected with a thin PP layer.

Type of pipe	Pipe outer Ø [mm]	Pipe wall thickness [mm]
Geberit Mepla	16	2.25
	25–32	3.0
	≤ 50	2.25–4.0
	≤ 75	2.25–4.7
KE KELIT KELOX KM 110	16	2.0
	20	2.5
	25	2.5
	25–32	2.5
	32	3.0
	≤ 75	2.0–7.5
Uponor Uni Pipe Plus	≤ 32	2.0–3.0
REHAU RAUTITAN stabil	25–32	3.7
	≤ 40	2.6–6.0
FRÄNKISCHE alpex F50	≤ 32	2.0–3.0
FRÄNKISCHE alpex L	40	3.5
	≤ 40	2.6–3.5
	≤ 75	3.5–5.0

6.4 Non-combustible pipes



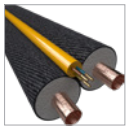
additional designs with section insulation made of mineral fibre mats or sleeves or of FEF

Type of pipe	Pipe outer Ø [mm]	Pipe wall thickness [mm]
Copper, steel, stainless steel, cast iron (without insulation)	≤ 22.0	≥ 1.0 – ≤ 14.2
Copper, steel, stainless steel, cast iron with section insulation made of mineral fibre mats or sleeves	≤ 88.9	≥ 1.0 – ≤ 14.2
Copper, steel, stainless steel, cast iron with section insulation made of FEF	≤ 54.0	≥ 1.0 – ≤ 14.2
Steel, stainless steel, cast iron (without insulation)	≤ 48.3	2.1–2.6
Steel, stainless steel, cast iron with section insulation made of mineral fibre mats or sleeves	≤ 114.0	≥ 1.0 – ≤ 14.2
Steel, stainless steel, cast iron with section insulation made of FEF	≤ 114.0	≥ 1.0 – ≤ 14.2

System DG-SC

6.5 Further services

HVAC split line combinations



e.g. Tubolit DuoSplit or Tubolit Split made by Armacell or types with identical parameters.

Double (18/18 or 22/22 mm) or single (18 or 22 mm) copper pipe and pipe insulation of 9 mm or 14 mm thickness made of PE foam in accordance with EN 14313 with optional accompanying lines (one plastic pipe (U/U) made of PVC-U or PVC-C, outer Ø 25 mm and pipe wall thickness 1.5 mm, in accordance with EN 1453-1 or EN 1452-1 and DIN 8061/ DIN 8062 and up to 2 cables with outer Ø ≤ 14)

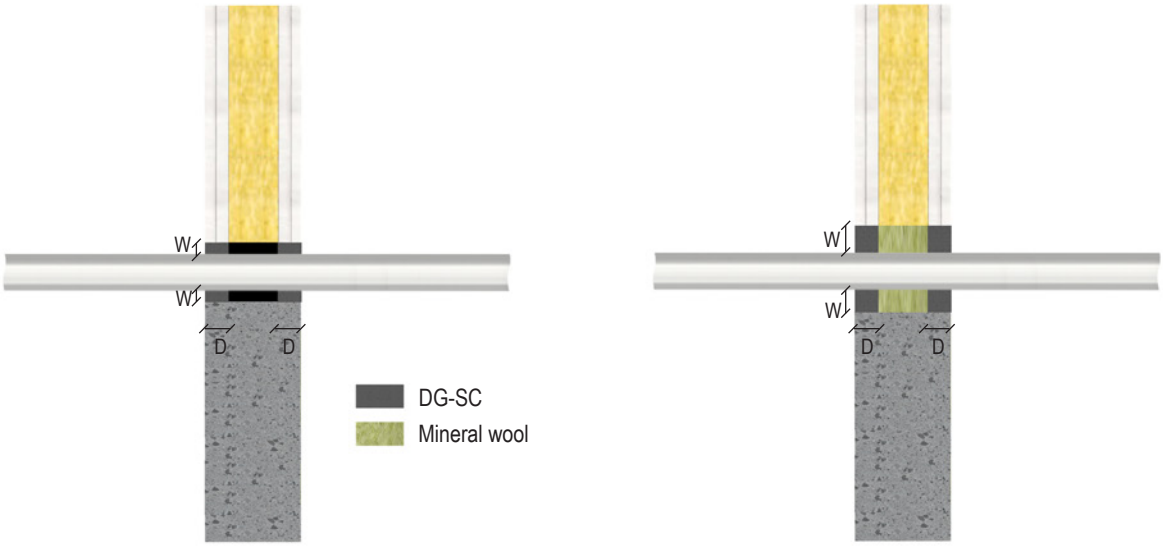
System DG-SC

7. Design variants

7.1 Design variants in walls

Sealed with DG-SC:

Width W: ≥ 10 – ≤ 25 mm (without backfilling), ≥ 10 – ≤ 50 mm (with backfilling)
Depth D: ≥ 25



7.1.1 Cables / cable bundles / electrical installation conduits / coaxial cables

Service		Backfilling with mineral wool	Fire resistance class	Source*
Cables, cable bundles	Ø ≤ 21 mm	+	EI 120	1
	Ø ≤ 47 mm E-YCWY 4x95RM		EI 90	1
	Ø ≤ 61 mm H07RN-F 4G95		EI 90	1
	Bundle Ø ≤ 100 mm, cable Ø 21 mm		EI 120	1
	Bundle Ø ≤ 180 mm, cable Ø 21 mm, solid wall		EI 120	1
	Bundle Ø ≤ 180 mm, cable Ø 21 mm, plasterboard wall		EI 90	1
Electrical installation conduits (EIC)	EIC single, Ø ≤ 32 mm, with/without cables Ø ≤ 21 mm	+	EI 120-U/U	1
	EIC bundle Ø ≤ 100 mm (EIC Ø ≤ 32 mm, with/without cables Ø ≤ 21 mm)		EI 60-U/U	1
Coaxial cables	RFS CELLFLEX LCF, Ø ≤ 50.3 mm	+	EI 120-U/C	1
	RFS RADIAFLEX RLK, Ø ≤ 48.2 mm		EI 120-U/C	1
	CommScope HELIAX AVA, Ø ≤ 51.1 mm		EI 120-U/C	1

* 1 → ETA-19/0704

System DG-SC

Design variants in walls

7.1.2 Combustible pipes

Plastic pipes with/without 5 mm PE soundproofing tube					
Pipe material / type	**Pipe outer Ø [mm]**	**Pipe wall thickness [mm]**	**Backfilling with mineral wool**	**Fire resistance class**	**Source***
PVC-U	≤ 50.0	1.8	–	**EI 120-U/U**	**1**
	≤ 75.0	1.8	–	**EI 90-U/U**	**1**
	≤ 110.0	1.8–8.1	+ / –	**EI 120-U/C**	**1**
PE, PE-X, ABS, SAN + PVC	≤ 50.0	1.8	–	**EI 120-U/U**	**1**
	≤ 75.0	1.8–1.9	–	**EI 90-U/U**	**1**
	≤ 110.0	1.8–10.0	+ / –	**EI 120-U/C**	**1**
PP-H	≤ 50.0	1.8	–	**EI 120-U/U**	**1**
	≤ 75.0	1.8–1.9	–	**EI 90-U/U**	**1**
	≤ 110.0	1.8–10.0	+ / –	**EI 120-U/C**	**1**
FRIATEC Friaphon	52.0–110.0	2.8–5.3	+ / –	**EI 120-U/C**	**1**
Pipelife MASTER 3	50.0	2.0	–	**EI 120-U/U**	**1**
	50.0–110.0	1.8–3.0	+ / –	**EI 120-U/C**	**1**
POLOPLAST POLO-KAL 3S	75.0	3.8	–	**EI 60-U/U**	**1**
	75.0–110.0	3.8–4.8	+ / –	**EI 120-U/C**	**1**
POLOPLAST POLO-KAL NG	50.0	2.0	–	**EI 120-U/U**	**1**
POLOPLAST POLO-KAL XS	50.0	2.0	–	**EI 120-U/U**	**1**
Geberit Silent-Pro	50.0	3.2	–	**EI 120-U/U**	**1**
	50.0–110.0	3.0–4.5	+ / –	**EI 90-U/C**	**1**
Geberit Silent-PP	50.0	2.0	–	**EI 120-U/U**	**1**
Geberit Silent dB20	56.0	3.2	–	**EI 120-U/U**	**1**
REHAU RAUPIANO PLUS	50.0	1.8	–	**EI 120-U/U**	**1**
CONEL DRAIN	50.0	1.8	–	**EI 120-U/U**	**1**
Ostendorf Skolan SAFE dB	58.0	4.0	–	**EI 120-U/U**	**1**
GF Silenta Premium	58.0	5.3	–	**EI 120-U/U**	**1**
Valsir Triplus	50.0	1.9	–	**EI 120-U/U**	**1**
Wavin AS+	50.0	3.0	–	**EI 90-U/U**	**1**
Wavin SiTech+	50.0	2.1	–	**EI 90-U/U**	**1**

* 1 → ETA-19/0704

System DG-SC

Design variants in walls

7.1.3 Multilayer pipes

Multilayer pipes with/without 5 mm PE soundproofing tube					
Type of pipe	**Pipe outer Ø [mm]**	**Pipe wall thickness [mm]**	**Backfilling with mineral wool**	**Fire resistance class**	**Source***
Geberit Mepla	16.0	2.25	+	**EI 120-U/C**	**1**
			–	**EI 90-U/C**	**1**
	≤ 50.0	> 2.25 – ≤ 4.0	+	**EI 90-U/C**	**1**
	≤ 75.0	2.25–4.7	+	**EI 30-U/C**	**1**
KE KELIT KELOX KM 110	16.0	2.0	+	**EI 120-U/C**	**1**
			–	**EI 90-U/C**	**1**
	≤ 75.0	2.0–7.5	+	**EI 90-U/C**	**1**
Uponor Uni Pipe Plus	≤ 32.0	2.0–3.0	+	**EI 120-U/C**	**1**
			–	**EI 90-U/C**	**1**
REHAU RAUTITAN stabil	≤ 40.0	2.6–6.0	+	**EI 120-U/C**	**1**
			–	**EI 90-U/C**	**1**
FRÄNKISCHE alpex F50	≤ 32.0	2.0–3.0	+	**EI 120-U/C**	**1**
FRÄNKISCHE alpex L	40.0	3.5	+ / –	**EI 120-U/C**	**1**
	≤ 40.0	2.6–3.5	–	**EI 90-U/C**	**1**
	≤ 75.0	3.5–5.0	+	**EI 30-U/C**	**1**

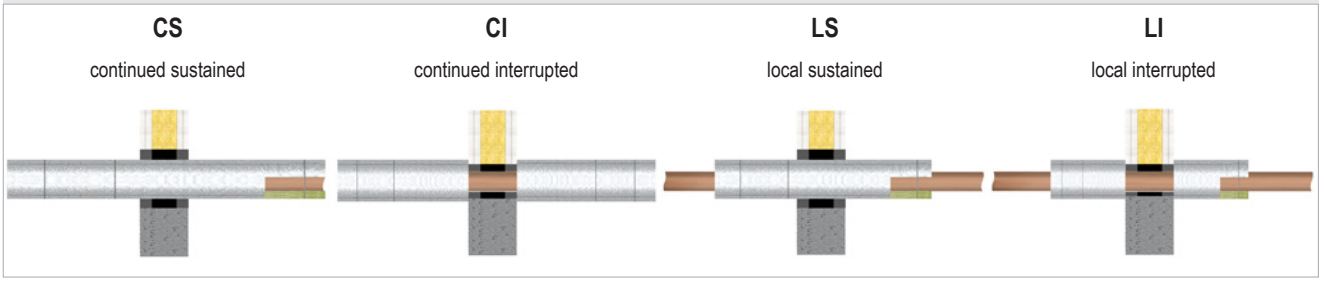
* 1 → ETA-19/0704

System DG-SC

Design variants in walls

7.1.4 Non-combustible pipes

Types of insulation



Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]	Insulation (L × W) [mm]	Backfilling with mineral wool	Fire resistance class	Source*
Non-combustible pipes with insulation						
Steel. stainless steel, cast iron	≤ 26.9	≥ 2.0	–	+	**EI 90-C/U**	1
Non-combustible pipes with lamella mat insulation (LS/CS)						
Copper, steel, stainless steel, cast iron	≤ 54.0	1.5–14.2	≥ 1000 × ≥ 30–60	+ / –	**EI 120-C/U**	1
	≤ 88.9	1.5–14.2	≥ 1500 × ≥ 30–60	+	**EI 90-C/U**	1
Steel, stainless steel, cast iron	≤ 114.0	1.0–14.2	≥ 1500 × ≥ 30–60	+ / –	**EI 120-C/U**	1
Non-combustible pipes with lamella mat insulation (LI/CI)						
Copper, steel, stainless steel, cast iron	≤ 54.0	1.5–14.2	2 × 500 × 30	–	**EI 120-C/U**	1
Steel, stainless steel, cast iron	≤ 88.9	1.5–14.2	2 × 500 × 30–60	–	**EI 120-C/U**	1
	≤ 114.0	1.5–14.2	2 × 500 × 60	–	**EI 120-C/U**	1
Non-combustible pipes with pipe sleeve insulation (CS)						
Copper, steel, stainless steel, cast iron	≤ 88.9	1.0–14.2	30	+	**EI 120-C/U**	1
	≤ 88.9	1.0–14.2	30	–	**EI 90-C/U**	1
Steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	20–30	+	**EI 120-C/U**	1
	≤ 54.0	1.0–14.2	20–30	–	**EI 90-C/U**	1
	≤ 88.9	1.0–14.2	30–40	+	**EI 120-C/U**	1
	≤ 88.9	1.0–14.2	30–40	–	**EI 90-C/U**	1
	≤ 114.0	1.0–14.2	40	+	**EI 120-C/U**	1
	≤ 114.0	1.0–14.2	40	–	**EI 90-C/U**	1
Non-combustible pipes with FEF insulation (LS/CS)						
Copper, steel, stainless steel, cast iron	≤ 28.0	1.0–14.2	≥ 1250 × 19–25	+ / –	**EI 120-C/U**	1
	≤ 42.0	1.0–14.2	≥ 1250 × 25	+ / –	**EI 120-C/U**	1
	≤ 42.0	1.0–14.2	≥ 1250 × 19–38	+	**EI 120-C/U**	1
	≤ 54.0	1.0–14.2	≥ 1250 × 38	–	**EI 60-C/U**	1
	≤ 54.0	1.0–14.2	≥ 1250 × 38	+	**EI 120-C/U**	1

* 1 → ETA-19/0704

System DG-SC

Design variants in walls

7.1.5 HVAC split line combinations

Services	Pipe outer Ø [mm]	Pipe wall thickness [mm]	Type of insulation	Insulation (L × W) [mm]	Backfilling with mineral wool	Fire resistance class	Source*
• copper pipes with 9 mm PEF insulation	≤ 2 × ≤ 18	1.0–14.2	lamella mat LI/CI	2 × 250 × 30	+	**EI 120**	**1**
• PVC-U-/PVC-C pipe	≤ 1 × ≤ 25	1.5					
• cables	≤ 2 × ≤ 14	–					
• Copper pipes with 9 mm PEF insulation	≤ 2 × ≤ 22	1.0–14.2	–	–	+	**EI 90**	**1**
• PVC-U-/PVC-C pipe	≤ 1 × ≤ 25	1.5					
• cables	≤ 2 × ≤ 14	–					
• copper pipes with 14 mm PEF insulation	≤ 2 × ≤ 22	1.0–14.2	–	–	+	**EI 120-C/U**	**1**

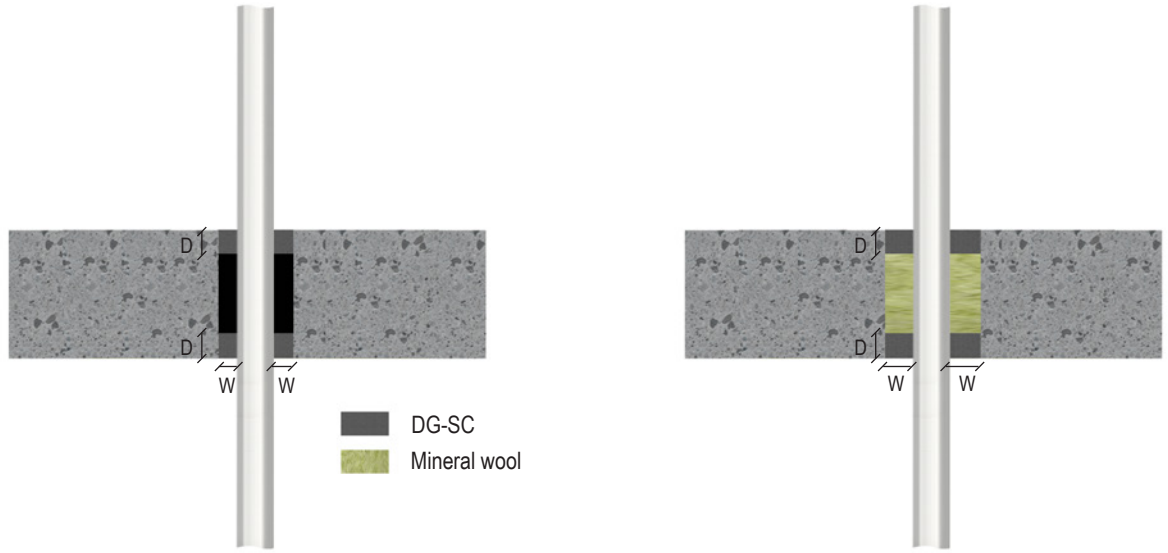
* 1 → ETA-19/0704

System DG-SC

7.2 Design variants in floors

Sealed with DG-SC:

Width W: ≥ 10 – ≤ 25 mm (without backfilling), ≥ 10 – ≤ 50 mm (with backfilling)
Depth: ≥ 25



7.2.1 Cables / cable bundles / electrical installation conduits / coaxial cables

Services		Backfilling with mineral wool	Fire resistance class	Source*
Cables, cable bundles	Ø ≤ 21 mm	+	**EI 120**	**1**
	Ø ≤ 50 mm		**EI 60**	**1**
	Bundles Ø ≤ 150 mm, cables Ø 21 mm		**EI 120**	**1**
Electrical installation conduits (EIC)	EIC single, Ø ≤ 32 mm, with/without cables Ø ≤ 21 mm	+	**EI 120-U/U**	**1**
	EIC bundles Ø ≤ 90 mm (EIC Ø ≤ 32 mm, with/without cables Ø ≤ 21 mm)		**EI 120-U/U**	**1**
Coaxial cables	RFS CELLFLEX LCF, Ø ≤ 50.3 mm	+	**EI 120-U/C**	**1**
	RFS RADIAFLEX RLK, Ø ≤ 48.2 mm		**EI 120-U/C**	**1**
	CommScope HELIAX AVA, Ø ≤ 51.1 mm		**EI 120-U/C**	**1**

* 1 → ETA-19/0704

System DG-SC

Design variants in floors

7.2.2 Combustible pipes

Plastic pipes with/without 5 mm PE soundproofing tube					
Pipe material / type	**Pipe outer Ø [mm]**	**Pipe wall thickness [mm]**	**Backfilling with mineral wool**	**Fire resistance class**	**Source***
PVC-U	≤ 75.0	1.8	–	**EI 120-U/U**	**1**
	≤ 110.0	1.8–8.1	+ / –	**EI 120-U/C**	**1**
PE , PE-X, ABS, SAN + PVC	≤ 50.0	1.8	–	**EI 120-U/U**	**1**
	≤ 110.0	1.8–10.0	+ / –	**EI 120-U/C**	**1**
PP-H	≤ 50.0	1.8	–	**EI 120-U/U**	**1**
	≤ 110.0	1.8–10.0	+ / –	**EI 120-U/C**	**1**
FRIATEC Friaphon	52.0–110.0	2.8–5.3	+ / –	**EI 120-U/C**	**1**
Pipelife MASTER 3	50.0–110.0	1.8–3.0	+ / –	**EI 120-U/C**	**1**
POLOPLAST POLO-KAL 3S	75.0–110.0	3.8–4.8	+ / –	**EI 120-U/C**	**1**
POLOPLAST POLO-KAL NG	50.0–110.0	2.0–3.4	+ / –	**EI 120-U/C**	**1**
POLOPLAST POLO-KAL XS	50.0–110.0	2.0–3.4	+ / –	**EI 120-U/C**	**1**
Geberit Silent-Pro	50.0–110.0	3.0–4.5	+ / –	**EI 120-U/C**	**1**
Geberit Silent-PP	50.0–110.0	2.0–3.6	+ / –	**EI 120-U/C**	**1**
Geberit Silent dB20	56.0–110.0	2.0–3.6	+ / –	**EI 120-U/C**	**1**
Ostendorf Skolan Safe	58.0–110.0	4.0–5.3	+ / –	**EI 120-U/C**	**1**
REHAU RAUPIANO PLUS	50.0–110.0	1.8–2.7	+ / –	**EI 120-U/C**	**1**
Valsir Triplus	50.0–110.0	1.8–3.4	+ / –	**EI 120-U/C**	**1**
Wavin SiTech+	32.0–110.0	1.8–3.4	+ / –	**EI 120-U/C**	**1**

7.2.3 Multilayer pipes

Multilayer pipes with/without 5 mm PE soundproofing tube					
Type of pipe	**Pipe outer Ø [mm]**	**Pipe wall thickness [mm]**	**Backfilling with mineral wool**	**Fire resistance class**	**Source***
Geberit Mepla	≤ 75.0	2.25–4.7	+ / –	**EI 120-U/C**	**1**
KE KELIT KELOX KM 110	≤ 75.0	2.25–4.7	+	**EI 120-U/C**	**1**
Uponor Uni Pipe Plus	≤ 32.0	2.0–3.0	+	**EI 120-U/C**	**1**
REHAU RAUTITAN stabil	≤ 40.0	2.6–6.0	+	**EI 120-U/C**	**1**
FRÄNKISCHE alpex F50	≤ 32.0	2.0–3.0	+	**EI 120-U/C**	**1**
FRÄNKISCHE alpex L	≤ 75.0	3.5–5.0	+ / –	**EI 120-U/C**	**1**

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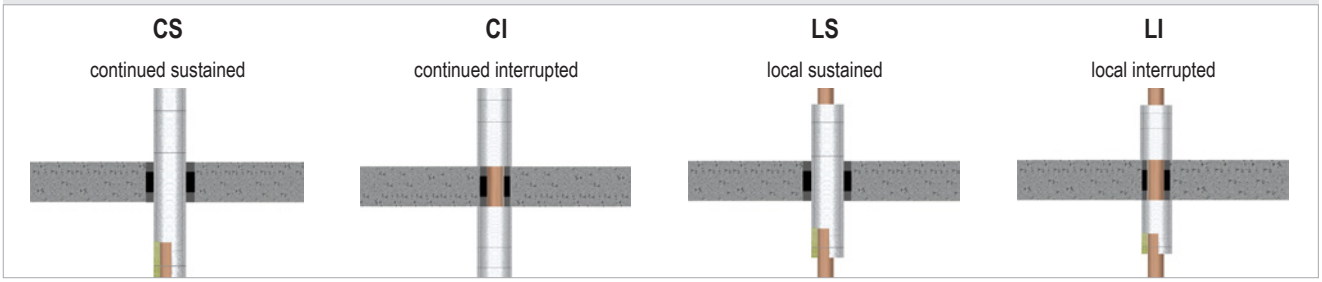
System DG-SC

Design variants in floors

7.2.4 Non-combustible pipes

Types of insulation



Pipe material	Pipe outer Ø [mm]	Pipe wall thickness [mm]	Insulation (L × T) [mm]	Backfilling with mineral wool	Fire resistance class	Source*
Non-combustible pipes with insulation						
Copper, steel, stainless steel, cast iron	≤ 15.0	1.0	–	+	**EI 120-C/U[1]**	1
	≤ 18.0				**EI 90-C/U[1]**	1
	≤ 22.0				**EI 60-C/U[1]**	1
Steel, stainless steel, cast iron	≤ 42.4	2.3–14.2	–	+ / –	**E 120-C/U**	1
	≤ 48.3	2.1–14.2		+ / –	**E 120-C/U[1]**	1
	≤ 48.3	2.1–14.2		+	**E 90-C/U[2]**	1
Non-combustible pipes with lamella mat insulation (LS/CS)						
Copper, steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	≥ 1500 × 30–60	+ / –	**E 120-C/U**	1
	≤ 76.0	1.0–14.2	≥ 1500 × 30–60	–	**E 120-C/U**	1
	≤ 88.9	1.5–14.2	≥ 1500 × 30–60	+	**E 90-C/U**	1
	≤ 88.9	1.0–14.2	≥ 1500 × 60	–	**E 120-C/U**	1
Steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	≥ 1500 × 30–60	+ / –	**E 120-C/U**	1
	≤ 114.0	1.0–14.2	≥ 1000 × 30–60	+ / –	**E 120-C/U**	1
Non-combustible pipes with lamella mat insulation (LI/CI)						
Copper, steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	2 × 500 × 30	–	**E 120-C/U**	1
Steel, stainless steel, cast iron	≤ 114.0	1.0–14.2	2 × 500 × 30–60	–	**E 120-C/U**	1
Non-combustible pipes with pipe sleeve insulation (CS)						
Copper, steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	20–30	+ / –	**E 120-C/U**	1
	≤ 88.9	1.0–14.2	30	+ / –	**E 120-C/U**	1
Steel, stainless steel, cast iron	≤ 88.9	1.0–14.2	30–40	+ / –	**E 120-C/U**	1
	≤ 114.0	1.0–14.2	40	+ / –	**E 120-C/U**	1
Non-combustible pipes with FEF insulation (LS/CS)						
Copper, steel, stainless steel, cast iron	≤ 54.0	1.0–14.2	≥ 1250 × 19–38	+ / –	**E 120-C/U**	1

[1] at a floor thickness of ≥ 200 mm
[2] zero distance between pipes

* 1 → ETA-19/0704

System DG-SC

Design variants in floors

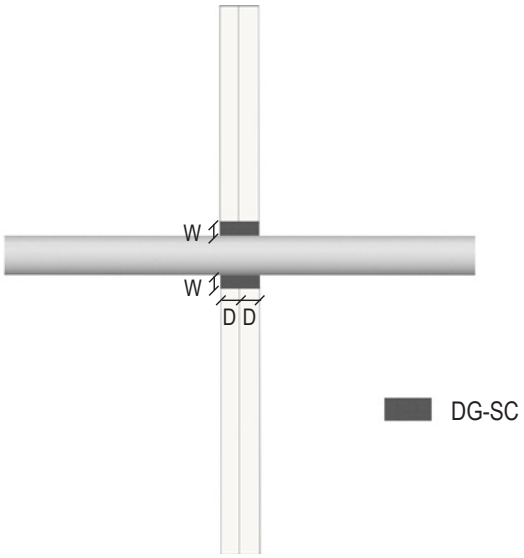
7.2.5 HVAC split line combinations

Services	Pipe outer Ø [mm]	Pipe wall thickness [mm]	Backfilling with mineral wool	Fire resistance class	Source*
• copper pipes with 9 mm PEF insulation	≤ 2 × ≤ 22	1.0–14.2	+	**EI 120**	**1**
• PVC-U-/PVC-C pipe	≤ 1 × ≤ 25	1.5			
• cables	≤ 2 × ≤ 14	–			
• copper pipes with 14 mm PEF insulation	≤ 2 × ≤ 22	1.0–14.2	+	**EI 120-C/U**	**1**

* 1 → ETA-19/0704

System DG-SC

7.3 Design variants in shaft walls



7.3.1 Combustible pipes

Type of pipe	Pipe outer Ø [mm]	Pipe wall thickness [mm]	Backfilling with mineral wool	Fire resistance class	Source*
Plastic pipes without PE soundproofing tube					
POLOPLAST POLO-KAL NG	50.0	2.0	–	**EI 90-U/U**	1
POLOPLAST POLO-KAL XS	50.0	2.0	–	**EI 90-U/U**	1
Geberit Silent-PP	50.0	2.0	–	**EI 90-U/U**	1
Plastic pipes with 19 mm FEF insulation					
POLOPLAST POLO-KAL NG	50.0	2.0	–	**EI 90-U/U**	1
POLOPLAST POLO-KAL XS	50.0	2.0	–	**EI 90-U/U**	1
Geberit Silent-PP	50.0	2.0	–	**EI 90-U/U**	1
Multilayer pipes with/without 9 mm PE soundproofing tube					
Geberit Mepla	25	3.0	–	**EI 90-U/C**	1
	32	3.0	–	**EI 90-U/C**	1
REHAU RAUTITAN stabil	25	3.7	–	**EI 90-U/C**	1
	32	4.7	–	**EI 90-U/C**	1
KE KELIT KELOX KM 110	20	2.5	–	**EI 90-U/C**[1]	1
	25	2.5	–	**EI 90-U/C**[1]	1
	32	3.0	–	**EI 90-U/C**[1]	1
Multilayer pipes with 19 mm FEF insulation					
Geberit Mepla	25	3.0	–	**EI 90-U/C**	1
	32	3.0	–	**EI 90-U/C**	1
REHAU RAUTITAN stabil	25	3.7	–	**EI 90-U/C**	1
	32	4.7	–	**EI 90-U/C**	1
KE KELIT KELOX KM 110	25	2.5	–	**EI 90-U/C**	1
	32	3.0	–	**EI 90-U/C**	1

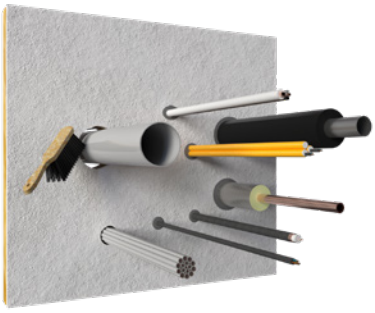
* 1 → ETA-19/0704

[1]zero distance

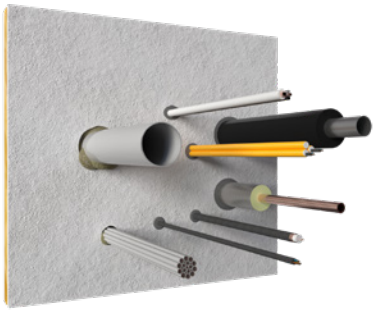
System DG-SC

8. Installation steps

1. Clean the reveal.



2. If necessary, fill the openings with mineral wool.



3. Seal on both sides with DG-SC at a depth of 25 mm (20 mm in shaft walls).

4. If required, label the penetration seal. Fill out the label neatly and attach it firmly next to/above (not on) the penetration seal.