HILTI

Technical Data Sheet

Hilti CFS-S ACR Firestop Acrylic Sealant

European Technical Approval
ETA N° 10/0389
(linear joint seals)
ETA N° 10/0292
(penetration seals)

Issue 04/2013

Firestop acrylic sealant CFS-S ACR

An acrylic based firestop sealant that provides movement capability in fire rated linear joint seals and penetration seals

Applications

- Within or between flexible wall constructions
- Vertical joints in / between wall constructions
- Horizontal joints in a wall abutting a floor, ceiling or roof
- Joints in floor construction
- Penetration seals (steel and copper pipes)

Advantages

- Easy to dispense, apply and tool
- Strong adhesion to various base materials
- Low shrinkage after curing
- Excellent airborne sound insulation property
- Broad application temperature range

Technical data

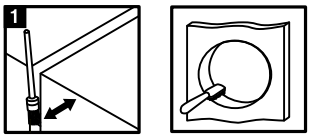
	CFS-S ACR
Chemical basis	Water-based acrylic dispersion
Volume shrinkage	< 20 %
Movement	12.5 % (ISO 11600)
Cure Time (at 23° C / 50 % r.H.)	~ 3 mm / 72 h
Application temperature range	5° C – 40° C
Storage and transportation temperature - range	5° C – 25° C
Shelf life (@73° F / 23° C and 50 % relative humidity)	24 month(s)
Reaction to fire class	D-s1d0 (EN13501-1)
Approvals*	ETA 10 / 0292, ETA 10 / 0389

* The European Technical Approval (ETA) can be obtained via your local Hilti contact or www.hilti.com

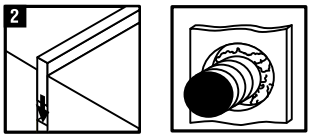
Package	Volume	Color	Order designation	Sales Quantity	Item Number
Cartridge	310 ml	white	**Firestop acrylic sealant CFS-S ACR**	1 pc	435859
Cartridge	310 ml	white	**Firestop acrylic sealant CFS-S ACR**	1 pc	435860
Cartridge	310 ml	grey	**Firestop acrylic sealant CFS-S ACR**	1 pc	435862
Foil pack	580 ml	white	**Firestop acrylic sealant CFS-S ACR**	20 pc	435863
Pail	5 l	white	**Firestop acrylic sealant CFS-S ACR**	1 pc	435864
Pail	10 l	white	**Firestop acrylic sealant CFS-S ACR**	1 pc	2046766

Installation instructions

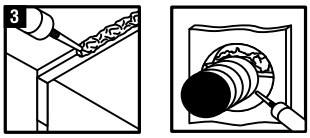
Joint **Penetration**



Clean opening. Surfaces to which CFS-S ACR will be applied should be dry, cleaned of loose debris, dirt, oil, wax and grease. Use wire brushing for cleaning.

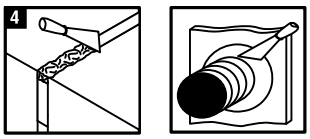


Insert backing material if required. Make sure proper backing material is used and compressed according European Technical Approval (see ETA Annex)



Apply CFS-S ACR using a dispenser.

CFS-S ACR adheres to most substrates (concrete, masonry, drywall, plaster, etc.) without using a primer. For best adhesion on porous substrates, use CFS-S ACR diluted with water as primer. Other primers are not necessary.



Smooth joint with water using a narrow spatula or finger.

Notes on Cleaning:

- Surfaces with cured acrylic sealant can only be cleaned mechanically e.g. using a knife, but not with a solvent.
- Remove uncured sealant first mechanically then clean with water.
- CFS-S ACR cannot be completely cleaned off porous surfaces – joints may be taped off to avoid staining.
- Dispenser equipment and tools have to be cleaned if a work break lasts longer than approximately 20 minutes.

Linear joint seals
Rigid walls | floors

Hilti CFS-S ACR Firestop Acrylic Sealant may be used to form linear joint seals in rigid walls or floors (E) , minimum thickness 150 mm (t_E), minimum density 2400 kg/m^3.

Backfilling material (B): Stone wool, CE marked in accordance with EN 13162 or EN 14303 with a density of 30 to 70 kg/m^3.

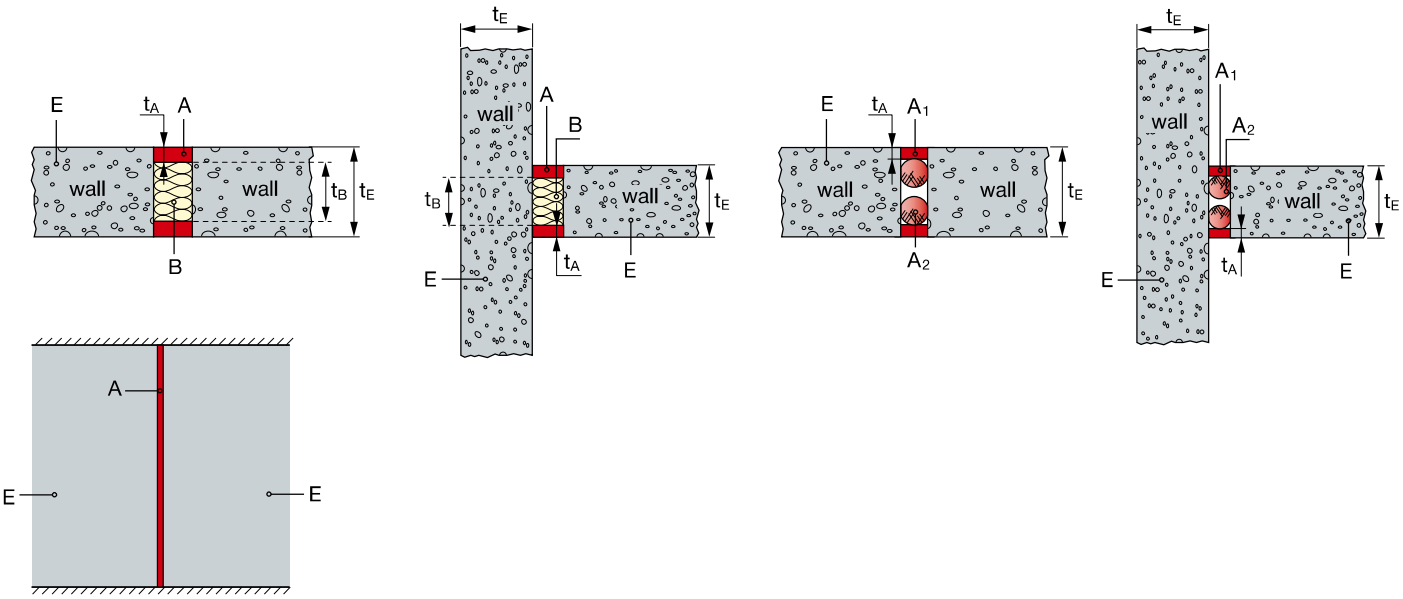
Joint orientation	Classification E = integrity I = insulation	Joint width W (mm)	Thickness of sealant t_A (mm)	Movement capability	Other criteria Description
Vertical joints (A) in or between wall constructions**	EI 180-V-M 12,5-F-W 6 to 20 (E 240-V-M 12,5-F-W 6 to 20)	6 to 20	6	± 12.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 60 %
Joints (A) in floor constructions* Horizontal joints (A) in a wall abutting a floor, ceilingor roof (head of wall)**	EI 180-H-M 12,5-F-W 6 to 20	6 to 20	6	± 12.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 60 %
	EI 120-H-M 12,5-F-W 20 to 100 (E 180-H-M 12,5-F-W 20 to 100)	20 to 100	10	± 12.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 50 %

Backfilling material (B): Hilti Firestop Round Cord CFS-CO

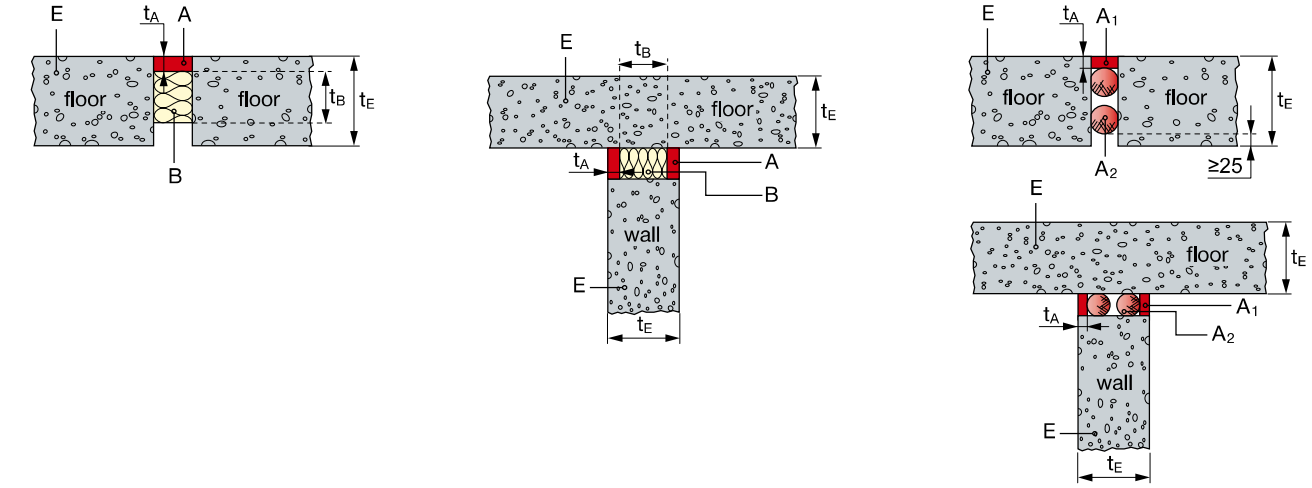
Joint orientation	Classification E = integrity I = insulation	Joint width W (mm)	Round Cord size (mm)	Thickness of sealant t_A (mm)	Movement capability	Other criteria Description
Vertical joints (A) in or between wall constructions**	EI 180-V-X-F-W 12 to 17 (E 240-V-X-F-W 12 to 17) EI 180-V-X-F-W 17 to 27 (E 240-V-X-F-W 17 to 27) EI 180-V-X-F-W 27 to 37 (E 240-V-X-F-W 27 to 37) EI 180-V-X-F-W 37 to 47 (E 240-V-X-F-W 37 to 47) EI 180-V-X-F-W 47 to 55 (E 240-V-X-F-W 47 to 55)	12 to 17 17 to 27 27 to 37 37 to 47 47 to 55	20 30 40 50 60	6 10 10 10 10	± 7.5 %	In case of two round cord layers: air gap between rods Splice distance: ≥ 140 mm (joint width ≤ 17 mm), ≥ 450 mm (joint width > 17 mm)
Joints (A) in floor constructions* Horizontal joints (A) in a wall abutting a floor, ceiling or roof (head of wall)**	EI 180-H-X-F-W 12 to 17 EI 180-H-X-F-W 17 to 27 EI 180-H-X-F-W 27 to 37 EI 180-H-X-F-W 37 to 47 EI 180-H-X-F-W 47 to 55	12 to 17 17 to 27 27 to 37 37 to 47 47 to 55	20 30 40 50 60	6 10 10 10 10	± 7.5 %	In case of two round cord layers: air gap between rods Splice distance: ≥ 645 mm
	EI 90-H-M 12.5-F-W 12 to 17 EI 90-H-M 12.5-F-W 17 to 27 EI 90-H-M 12.5-F-W 27 to 37 EI 90-H-M 12.5-F-W 37 to 47 EI 90-H-M 12.5-F-W 47 to 55	12 to 17 17 to 27 27 to 37 37 to 47 47 to 55	20 30 40 50 60	6 10 10 10 10	± 12.5 %	Minimum two round cords with an air gap in betweeen, minimum 25 mm distance from surfaces of the floor. Minimum distance of splices in the two rod layers: 100 mm (joint width ≤ 30 mm)

* sealant on upper side, ** sealant on both sides
V = vertical, M = movement, F = splice, field, W = joint width, H = horizontal, X = non-movement joint (± 7.5 %)

Vertical joints in or between wall constructions



Joints in floor constructions and horizontal (head of wall) joints



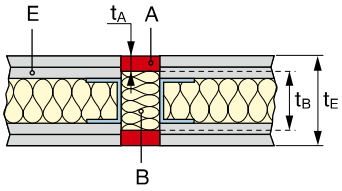
Linear joint seals
Flexible walls | rigid walls

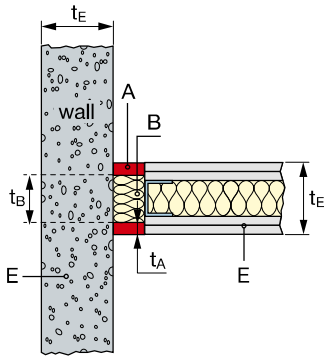
Hilti CFS-S ACR Firestop Acrylic Sealant may be used to form linear joint seals (A) in flexible walls/drywall (E) and rigid walls (minimum density 650 kg/m³) with a minimum thickness of 100 mm (t_E) with stone wool backfilling material CE marked in accordance with EN 13162 or EN 14303 with a density of 30 to 70 kg/m³.

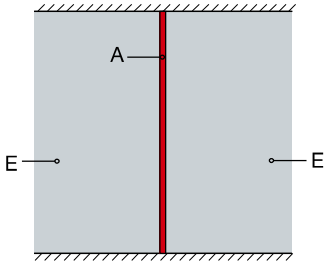
Joint orientation	Classification E = integrity I = insulation	Joint width W (mm)	Thickness of sealant t_A (mm)	Movement capability	Other criteria Description
Vertical joints (A) in or between wall constructions**	EI120-V-X-F-W 10 to 30	10 to 30	10	± 7.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 60 %, splice distance minimum 1250 mm
Vertical joints (A) between flexible and rigid wall constructions**	EI120-V-X-F-W 10 to 20	10 to 20	10	± 7.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 60 %, splice distance minimum 1250 mm

* sealant on upper side, ** sealant on both sides
V = vertical, F = splice, field, W = joint width, X = non-movement joint (± 7.5 %)

Vertical joints in or between wall constructions







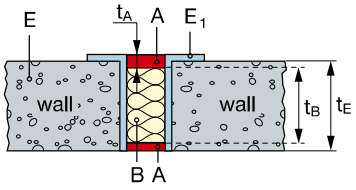
Linear joint seals
Steel constructions / elements

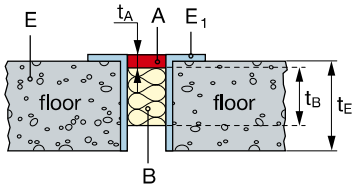
Hilti CFS-S ACR Firestop Acrylic Sealant may be used to form linear joint seals (A) between steel structural elements forming a joint depth of minimum 150 mm or between steel elements as joint faces in rigid constructions (E) with minimum thickness of 150 mm (t_E) with stone wool backfilling material CE marked in accordance with EN 13162 or EN 14303 with a density of 30 to 70 kg/m^3.

Joint orientation	Classification E = integrity I = insulation	Joint width W (mm)	Thickness of sealant t_A (mm)	Movement capability	Other criteria Description
Vertical joints (A)**	EI 60-V-X-F-W 6 to 20 (E 240-V-X-F-W 6 to 20)	6 to 20	6	± 7.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 60%, splice distance minimum 1250 mm
	EI 60-V-X-F-W 20 to 100 (E 240-V-X-F-W 20 to 100)	20 to 100	10	± 7.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 50%, splice distance minimum 1250 mm
Joints (A) in floor constructions* Horizontal joints (A) in a wall abutting a floor, ceilingor roof (head of wall)**	EI 120-H-X-F-W 6 to 20	6 to 20	6	± 7.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 60%, splice distance minimum 1250 mm
	EI 60-H-X-F-W 20 to 100 (E 120-H-X-F-W 20 to 100)	20 to 100	10	± 7.5 %	Stone wool backfilling (≥ 100 mm thickness t_B) compression of mineral wool min. 50%, splice distance minimum 1250 mm

* sealant on upper side, ** sealant on both sides
V = vertical, F = splice, field, W = joint width, H = horizontal, X = non-movement joint (± 7.5 %)

Steel constructions / elements



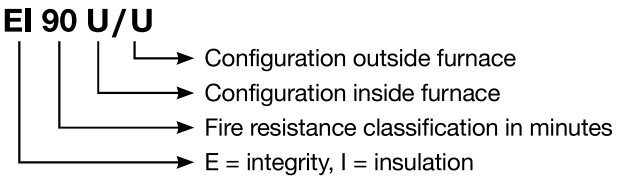


Metal pipe penetrations

Hilti CFS-S ACR Firestop Acrylic Sealant may be used for different insulation types and mineral wool products readily suitable being used as pipe insulation.

Pipe end configurations

All pipes tested according to EN 1366-3 have been tested with a specific pipe end configuration. In the fire classification, the first letter of the end configuration refers to the end conditions within the furnace (fire-side), the second letter to the end conditions outside the furnace (non-fire-side).



Test condition	Pipe end configuration	
	Inside furnace	Outside furnace
U/U	Uncapped	Uncapped
C/U	Capped	Uncapped
U/C	Uncapped	Capped
C/C	Capped	Capped

As the EN test standard EN 1366-3 states, “it is important to ensure that sealing systems have been tested with appropriate pipe end conditions.” The conditions the pipe and sealing system must endure in a fire situation depend on whether one or both ends of the pipe are sealed in practice, as pressures and the flow of hot gases will vary depending on whether the pipe is ventilated or not.

There are rules that determine which tested end configurations are valid for additional pipe end situations.

Metal pipes		Tested		
		U/C	C/U	C/C
Covered	U/C	Y	N	N
	C/U	Y	Y	N
	C/C	Y	Y	Y

Y = acceptable, N = not acceptable

So, for example, a (metal) pipe tested with the end configuration U/C will cover all possible end conditions. But a (metal) pipe tested C/U will only cover the conditions C/U or C/C.

Pipe end configurations according to intended use

As previously stated, it is important to ensure that the tested pipe configuration corresponds to the intended use of the pipe.

The table below outlines recommended end configurations for various intended pipe uses as per suggestions laid out in EN 1366-3 2009 H.4.2.2. In the event that a national regulation conflicts with this table, the national regulation takes precedence.

Intended use of penetrations
(list not exhaustive, other pipes uses possible)

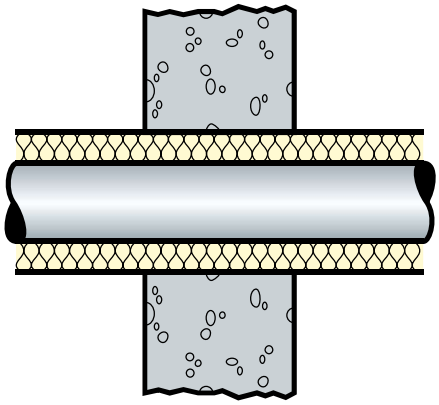
Application	Penetration material	Manufacturer, product (examples)	Recommended pipe end classification
Heating pipes	Copper		U/C
	Steel, Stainless steel		
	Al-Composite	Geberit: Mepla	
Potable water pipes	Copper		U/C
	Stainless steel		
	Al-Composite pipes	Geberit: Mepla	
Refrigeration pipes	Copper		U/C
	Steel, Stainless steel		
Ventilated waste water/ Storm water / Roof drainage pipes	Cast iron, SML		U/U
Pneumatic pipes	Steel		U/C
Industry pipes	Copper		Varies depending upon application, i.e. consider whether pipe is pressurized (U/C), ventilated (U/U) or unventilated (U/C)
	Steel, stainless steel		
	Al-Composite pipes	Geberit: Mepla	

Pipe end configurations

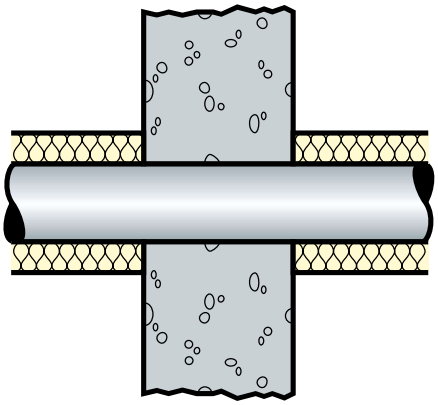
When sealing pipes, the insulation configuration must be considered. The following configurations are possible:

Insulation over the entire length of the pipe (i.e. thermal insulation)

Continued sustained

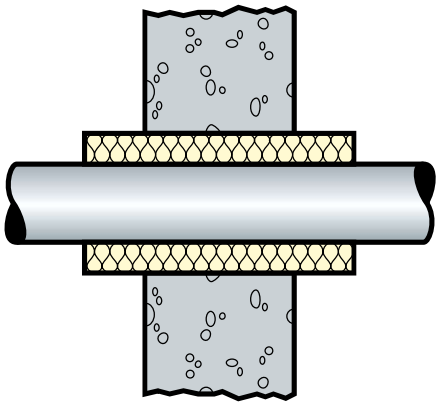


Continued interrupted

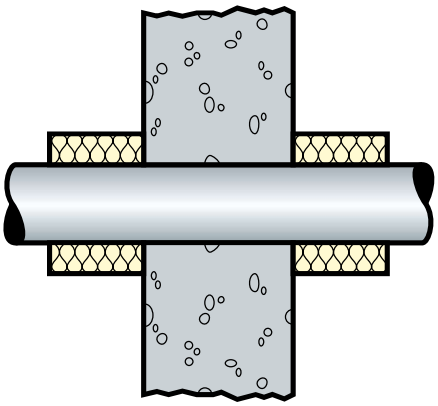


Insulation only required in the area of the penetration seal

Local insulation, sustained



Local insulation, interrupted



Pipe insulation products

Isover (Protect BSR 90 alu), Paroc (Section AluCoat T), Rockwool (Conlit 150P, Klimarock, 800 pipe sections).

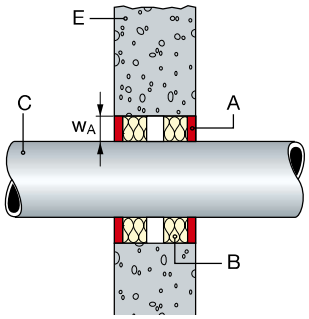
Non-insulated metal pipe penetrations

Rigid walls | rigid floor

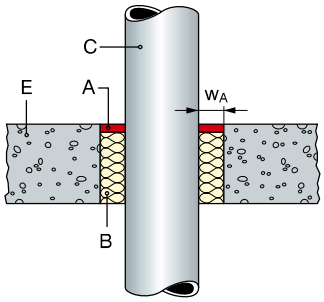
Hilti CFS-S ACR Firestop Acrylic Sealant may be used to form single penetration seals (A) (minimum distance between seals 200 mm). Stone wool with density ≥ 45 kg/m³ must be used as backfilling material (B).

- Rigid walls (E) concrete, masonry, minimum density of 2400 kg/m³, minimum thickness 150 mm.
- Rigid floor (E) concrete minimum density of 2400 kg/m³, minimum thickness 150 mm.

Non-insulated pipes, rigid walls



Non-insulated pipes, rigid floor



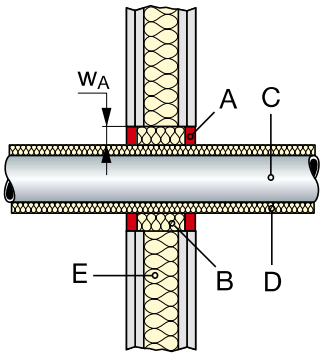
	Substrate (E)	Pipe (C) diameter (mm)	Pipe wall thickness (mm)	Classification E = integrity I = insulation	Other criteria description
	Steel pipes Also valid for cast iron, stainless steel, Ni alloys (NiCu, NrCr, NiMO alloys)				
Non-insulated	Rigid wall	32–159	1.8/4.5–14.2	E 180-C/U	Annular space (w_A) 10.5 – 35.5 mm, ≥ 50 mm of stone wool on each side, 15 mm of sealant (A) thickness on each side
	Rigid floor	32–159	1.8/4.5–14.2	E 180-C/U	Seal diameter ≤ 260 mm, gap completely filled with stone wool, 15 mm of sealant (A) thickness on upper side

Insulated metal pipe penetrations
Flexible walls | rigid walls

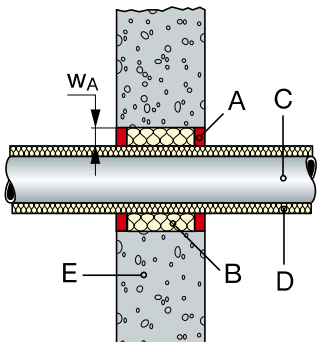
Hilti CFS-S ACR Firestop Acrylic Sealant may be used to form single penetration seals (A) up to a maximum seal diameter of 300 mm with annular space (w_A) depending on Pipe (C) diameter (minimum distance between seals 200 mm). Openings must be completely filled with stone wool backfilling (B), and with 10 mm of sealant (A) on both sides.

- Rigid walls (E) concrete, aerated concrete or masonry, minimum density of 650 kg/m³, minimum thickness 100 mm.
- Flexible walls / drywall (E), minimum thickness 100 mm with timber or steel studs lined on both faces with a minimum of two layers of 12.5 mm thick boards. For timber stud walls there must be a minimum distance of 100 mm between the seal and any stud, and the cavity must be filled with a minimum of 100 mm insulation Class A1 or A2 insulation in accordance with EN 13501-1.

Insulated metal pipes, rigid walls



Insulated metal pipes, flexible walls



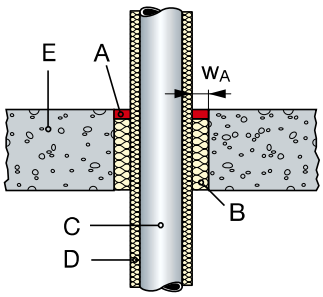
	Pipe (C) diameter (mm)	Pipe wall thickness (mm)	Insulation (D) thickness (mm)	Classification E = integrity I = insulation	Other criteria description
	Copper pipes Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NrCr, NiMO alloys)				
Continued insul.	28–42	1.0/1.5–14.2	≥20	EI 120-C/U	Interrupted or sustained insulation
	42–88.9	1.5/2.0–14.2	≥40	EI 120-C/U	Interrupted
				EI 90-C/U	Sustained insulation
Local insulation	28–42	1.0/1.5–14.2	20	EI 120-C/U	Sustained insulation, length on each side ≥450 mm
			20	EI 120-C/U	Interrupted insulation, length on each side ≥500 mm
	42	1.5–14.2	20–40	EI 120-C/U	Sustained or Interrupted insulation, length on each side ≥500 mm
	42–88.9	1.5/2.0–14.2	40	EI 120-C/U	Interrupted insulation, length on each side ≥500 mm
				EI 90-C/U	Sustained insulation, length on each side ≥500 mm
	88.9	2.0–14.2	40	EI 120-C/U	Interrupted insulation, length on each side ≥700 mm

	Pipe (C) diameter (mm)	Pipe wall thickness (mm)	Insulation (D) thickness (mm)	Classification E = integrity I = insulation	Other criteria description
	Steel pipes Also valid for cast iron, stainless steel, Ni alloys (NiCu, NrCr, NiMO alloys)				
Continued insul.	26.9–48.3	1.4/1.6–14.2	≥20	EI 120-C/U	Interrupted or sustained
	26.9–168.3	1.4/2.6–14.2	≥40	EI 120-C/U	Interrupted or sustained
Local insulation	26.9–48.3	1.4/1.6–14.2	20	EI 120-C/U	Sustained insulation, length on each side ≥450 mm
			20	EI 120-C/U	Interrupted insulation, length on each side ≥500 mm
	48.3	1.6–14.2	20–40	EI 120-C/U	Sustained insulation, length on each side ≥500 mm
	48.3–168.3	1.6/2.6–14.2	40	EI 90-C/U	Sustained insulation, length on each side ≥450 mm
			40	EI 120-C/U	Sustained insulation, length on each side ≥700 mm
			40	EI 90-C/U	Interrupted insulation, length on each side ≥700 mm
	168.3	2.6–4.5	40	EI 90-C/U	Interrupted insulation, length on each side ≥500 mm
	168.3	4.5–14.2	40	EI 120-C/U	Interrupted insulation, length on each side ≥500 mm
	168.3	2.6–14.2	40	EI 120-C/U	Interrupted insulation, length on each side ≥700 mm

Insulated metal pipe penetrations
Floor

Hilti CFS-S ACR Firestop Acrylic Sealant may be used to form single penetration seals (A) in rigid floors (E). Gap must be filled completely with stone wool backfilling (B) of density ≥ 45 kg/m³, and covered on the upper side with 10 mm of sealant (A).

Insulated metal pipes, floor



• Floor (E): Concrete or aerated concrete, minimum density of 550 kg/m³, minimum thickness 150 mm.

	Pipe (C) diameter (mm)	Pipe wall thickness (mm)	Insulation (D) thickness (mm)	Classification E = integrity I = insulation	Other criteria description
	Copper pipes Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NrCr, NiMO alloys)				
Continued insulation	28–42	1.0/1.5–14.2	≥20	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation
	42	1.5–14.2	≥20	EI 120-C/U	Seal diameter ≤ 300 mm, sustained insulation
			≥40	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation
	42–88.9	1.5/2.0–14.2	≥40	EI 90-C/U	Seal diameter ≤ 300 mm, sustained insulation
Local insulation	28–42	1.0/1.5–14.2	20–40	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation, length on each side ≥ 600 mm
			40	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation, length on each side ≥ 500 mm
	42	1.5–14.2	20	EI 120-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥ 450 mm
			20–40	EI 120-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥ 700 mm
			20–40	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation, length on each side ≥ 500 mm
	42–88.9	1.5/2.0–14.2	40	EI 120-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥ 700 mm
	88.9	2.0–14.2	40	EI 90-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥ 500 mm
	88.9	2.0–14.2	40	EI 180-C/U	Annular space (w_A) 13–48 mm, sustained insulation, length on each side ≥ 700 mm

	Pipe (C) diameter (mm)	Pipe wall thickness (mm)	Insulation (D) thickness (mm)	Classification E = integrity I = insulation	Other criteria description
	Steel pipes Also valid for cast iron, stainless steel, Ni alloys (NiCu, NrCr, NiMO alloys)				
Continued insul.	26.9–48.3	1.4/1.6–14.2	≥20	EI 180-C/U	Annular space (w_A) 13–48 mm, sustained or interrupted insulation.
	26.9–168.3	1.4/2.6–14.2	≥40	EI 120-C/U	Seal diameter ≤300 mm, sustained or interrupted insulation.
Local insulation	26.9–48.3	1.4/1.6–14.2	20	EI 180-C/U	Annular space (w_A) 13–48 mm, sustained insulation, length on each side ≥450 mm
			20	EI 180-C/U	Annular space (w_A) 13–48 mm, interrupted insulation, length on each side ≥450 mm
	168.3	2.6–4.5	40	EI 90-C/U	Seal diameter ≤300 mm, sustained insulation, length on each side ≥500 mm
	168.3	2.6–4.5	40	EI 120-C/U	Seal diameter ≤300 mm, sustained insulation, length on each side ≥700 mm
	168.3	2.6–4.5	40	EI 120-C/U	Seal diameter ≤300 mm, interrupted insulation, length on each side ≥500 mm

• Floor (E): Concrete, minimum density of 2400 kg/m³, minimum thickness 150 mm.

	Pipe (C) diameter (mm)	Pipe wall thickness (mm)	Insulation (D) thickness (mm)	Classification E = integrity I = insulation	Other criteria description
	Copper pipes Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NrCr, NiMO alloys)				
Continued insulation	28	1.0–14.2	≥20	EI 180-C/U	Seal diameter ≤ 260 mm, sustained insulation
	28–42	1.0/1.5–14.2	≥20	EI 120-C/U	Seal diameter ≤ 300 mm, sustained or interrupted insulation
	42–88.9	1.5/2.0–14.2	≥40	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation
				EI 90-C/U	Seal diameter ≤ 300 mm, sustained insulation
	88.9	2.0–14.2	≥40	EI 180-C/U	Seal diameter ≤ 260 mm, interrupted insulation
Local insulation	28	1.0–14.2	20	EI 180-C/U	Seal diameter ≤ 260 mm, sustained insulation, length on each side ≥425 mm
	28–42	1.0/1.5–14.2	20	EI 120-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥450 mm
			20–40	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation, length on each side ≥500 mm, or Sustained insulation, length on each side ≥700 mm
	42 mm	1.5–14.2	20–40	EI 120-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥700 mm
	42–88.9	1.5/2.0–14.2	40	EI 120-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥700 mm
			40	EI 120-C/U	Seal diameter ≤ 300 mm, interrupted insulation, length on each side ≥500 mm
	88.9	2.0–14.2	40	EI 90-C/U	Seal diameter ≤ 300 mm, sustained insulation, length on each side ≥500 mm
			40	EI 180-C/U	Seal diameter ≤ 260 mm, sustained insulation, length on each side ≥700 mm
			40	EI 180-C/U	Seal diameter ≤ 260 mm, interrupted insulation, length on each side ≥500 mm

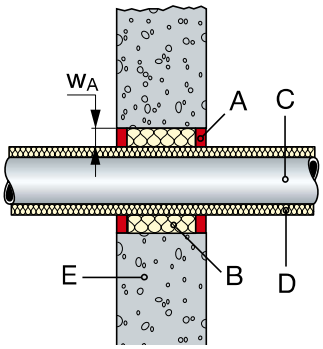
Insulated composite pipe penetrations

Flexible walls | rigid walls | rigid floor

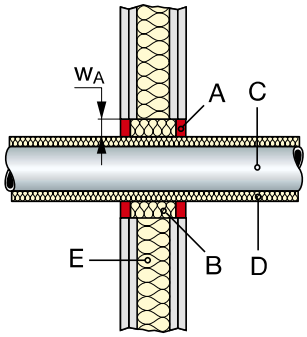
Hilti CFS-S ACR Firestop Acrylic Sealant may be used to form single penetration seals (A) up to a maximum seal diameter of 300 mm with annular space (w_A) depending on Pipe (C) diameter (minimum distance between seals 200 mm). Openings must be completely filled with stone wool backfilling (B) with density ≥ 45 kg/m³. Wall openings must be covered with 10 mm of sealant (A) on both sides, whereas floor openings require 15mm of sealant (A) on upper side only.

- Rigid walls (E) concrete, aerated concrete or masonry, minimum density of 650 kg/m³, minimum thickness 100 mm.
- Flexible walls / drywall (E), minimum thickness 100 mm with timber or steel studs lined on both faces with a minimum of two layers of 12.5 mm thick boards. For timber stud walls there must be a minimum distance of 100 mm between the seal and any stud, and the cavity must be filled with a minimum of 100 mm insulation Class A1 or A2 insulation in accordance with EN 13501-1.
- Floor (E): Concrete or aerated concrete, minimum density of 550 kg/m³, minimum thickness 150 mm.

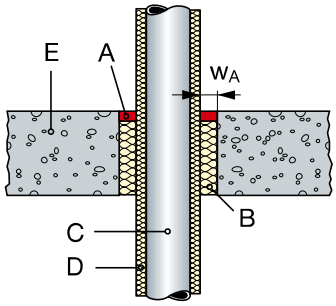
Insulated composite pipes, rigid walls



Insulated composite pipes, flexible walls



Insulated composite pipes, floor



	Wall/Floor (E)	Pipe (C) diameter (mm)	Pipe wall thickness (mm)	Insulation (D) thickness (mm)	Classification E = integrity I = insulation	Other criteria description
	Geberit Mepla pipes produced by Geberit Int., Jona, CH					
Continued insulation	Flexible/Rigid wall	16	2.25	≥20	EI 120-U/C	Sustained continued insulation.
		20	2.50			
		26	3.00			
		32	3.50			
	Rigid floor	16	2.25	≥20	EI 90-U/C	Sustained continued insulation.
		20	2.50			
		26	3.00			
		32	3.50			
Local insulation	Flexible/Rigid wall	16	2.25	20	EI 120-U/C	Sustained local insulation with length of ≥500 mm on each side.
		20	2.50			
		26	3.00			
		32	3.50			
	Rigid floor	16	2.25	20	EI 90-U/C	Sustained local insulation with length of ≥500 mm on each side.
		20	2.50			
		26	3.00			
		32	3.50			

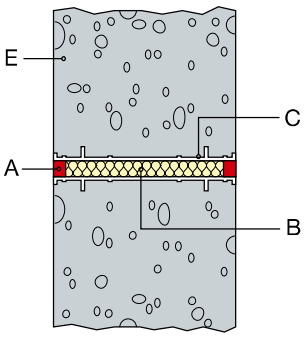
Form-work pipe penetrations
Rigid walls

Hilti CFS-S ACR Firestop Acrylic Sealant may be used on both sides of the opening of the formwork tie system and/or distance pipe through rigid walls (E) concrete, aerated concrete or masonry, with a minimum density of 550 kg/m^3, minimum thickness 200 mm.

Completely fill the gap with stone wool backfilling (B), density ≥ 45 kg/m^3 and covered with 15 mm of sealant on both sides.

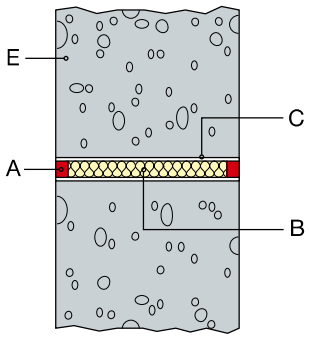
Manufacturer:
Nevoga Gmbh

OKTAGON formwork tie rod



Manufacturer:
Nevoga Gmbh

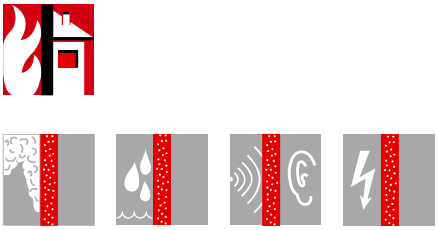
Formwork distance pipe



Pipe type	Pipe (C) inner diameter (mm)	Pipe wall thick-ness (mm)	Classification E = integrity I = insulation	Other criteria description
OKTAGON Produced by Nevoga Gmbh, Germany	22	–	EI 120	–
Formwork distance pipe Produced by Nevoga Gmbh, Germany	26	6	EI 120	

Characteristics of CFS-S ACR
Additional Attributes

Hilti firestop products are comprehensively tested and individually matched to the technical requirements of a building's mechanical and electric installations. In addition to their superior passive fire protection behaviour, Hilti firestop products also meet increasingly significant requirements in building technology and also help designers and installers to meet these additional requirements. The assessment of fitness for use has been made in accordance with EOTA ETAG N° 026 – Part 2 and Part 3.



Charecteristics	Assessment of charecteristics	Norm, standard, test
Health and the environment Air/gas permeability	q/A [m^3/(h x m^2)] at Δ p50 Pa: Air: 1.9×10^{-6} Nitrogen (N_2): 1.1×10^{-6} CO_2: 6.4×10^{-5} Methane (CH_4): 4.3×10^{-5} q/A [m^3/(h x m^2)] at Δ p250 Pa: Air: 9.7×10^{-6} Nitrogen (N_2): 5.5×10^{-6} CO_2: 3.2×10^{-4} Methane (CH_4): 2.1×10^{-4} (10 mm thickness of CFS-S ACR)	EN 1026
Water permeability	Water tight to 1m head of water or 9806 Pa	ETAG 026-2
Dangerous substances	CFS-ACR is in compliance concerning the registration, evaluation, authorization and restriction of chemicals (REACH) Toxic, carcinogenic, toxic for reproduction and mutagenic chemical substances of category 1 and 2 ≥ 0.1 % are not used.	Material safety datasheet
Protection against noise (Air borne sound insulation)	Flexible wall R_w = 53 dB $D_{n,w}$ = 60 dB Rigid wall R_w = 51 dB $D_{n,w}$ = 58 dB	EN ISO 140-3 EN ISO 20140-10 EN ISO 717-1
Durability and serviceability	Category $Y_{2,(-5/+70)°C}$ (suitable for intended use at temperatures between –5° C and +70° C) no exposure to rain or UV	ETAG 026-2 and 3
Movement capability (linear joints)	Class ISO 11600-F-12.5P	ISO 11600
Electrical properties	Volume resistivity $11.3 \times 10^{11} \pm 3.6 \times 10^{11}$ Ohm Surface resistivity $8.5 \times 10^{6} \pm 2.4 \times 10^{6}$ Ohm	DIN IEC 60093 (VDE 0303 Part 30)
Reaction to fire	Class D-s1 d0	EN 13501-1

Service

With more than 20 years of experience worldwide, Hilti is one of the leading suppliers of firestop systems. We actively help you manage your firestop projects better by providing:

- Quick engineering judgements
- Extensive technical literature
- On-site training and demonstration
- Sophisticated jobsite logistics
- Assurance of conformity with specific application requirements
- International network of Hilti firestop specialists

Our network of experienced sales representatives, field engineers, firestop specialists and customer service representatives is just a phone call away (use the local toll-free Hilti number).

Hilti. Outperform. Outlast.

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