



HILTI FIRESTOP FOAM CFS-F FX

European
Technical assessment
ETA No 10/109

Issue 01/2020



FIRESTOP FOAM CFS-F FX



FIELDS OF APPLICATION

Permanent firestop seals in small and medium-sized openings (optimum size range: 100 x 100 mm to 300 x 300 mm)

- Cable trays, single cables, tied cable bundles, small conduits
- Openings accommodating pipes and cables
- Plastic pipes
- Metal pipes (with combustible or non-combustible insulation)

(The seals must comply with ETA No 10/109.)

FEATURES AND BENEFITS

- 3-phase technology with optimum application characteristics (easily shapeable foam)
- Easy installation without need for formwork or other aids
- Easily applied using the ergonomically-designed Hilti dispensers
- Safety first: CFS-F FX complies with the requirements of international fire protection directives
- Neat and tidy application
- Very quick and easy to install – a reliable firestop seal with only one product
- Easy subsequent installation of additional cables
- Outstanding sound insulation properties thanks to flexible foam structure
- Smoketightness and firestopping with one system

Technical data	CFS-F FX
Colour	Red
Foil pack volume/foam yield	325 ml/2.1 liters (freely foamed)
Application temperature of pack / Storage and transport temperatures	+10 °C to +35 °C / +5 °C to +25 °C
Curing times	Can be shaped after approx. 5 min. Can be cut after approx. 10 min.
Reaction to fire, classification according to EN 13501-1	Class E
Temperature resistance of the cured foam	-20 °C to 70 °C
Shelf life	9 months (at 23 °C and stored in a dry place)

At 23° C, 50% relative humidity



The European Technical Approval (ETA) can be obtained via your local Hilti contact.

Order Description	Package content	Item number
CFS-F FX	incl. 1 mixing nozzle, instructions for use	429802



Ordering designation	Packaging content	Item number
HDM 330 manual dispenser	Manual packed in dispenser with 2 foil pack holders, packed in an impact-resistant plastic Hilti toolbox	441342
HDE 500-A22 cordless dispenser	Cordless dispenser with 2 foil pack holders, packed in an impact-resistant plastic Hilti toolbox	434724



Ordering designation	Packaging content	Item number
Firestop bandage CFS-B	1 PC	4295576

INSTALLATION INSTRUCTIONS

INSTRUCTIONS FOR USE

Firestop Foam CFS-F FX is approved as a permanent firestop seal for indoor applications. The foam can be used to form a firestop seal around cables, cable trays, combustible/non-combustible pipes passing through medium-sized openings in fire compartment walls and ceilings.

The approval must be observed. For industrial use only. The European Technical Approval and the technical data sheet can be obtained via your local Hilti contact. Store in unopened container in a dry place.

Read these instructions and safety precautions before using the product.

Expiry date: See date printed on the manifold (**DD/MMM/YY**).

Use of the foil pack after this date is not permissible!

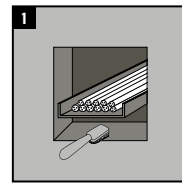
Transport and storage: Store in a cool, dry, dark place at a temperature of **+5 °C to +25 °C/+41 °F to +77 °F**.

Foil pack temperature: Must be between **+10 °C and +35 °C/+50 °F and +95 °F** during application.

Base material temperature: Must be between **0 °C and +40 °C/32 °F and +104 °F** during application.

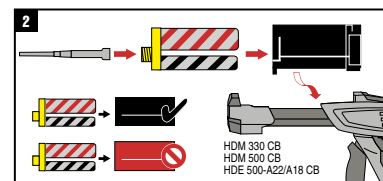
Installation instructions: The operations to be carried out are illustrated in pictograms 1 - 7/

Clean the opening to be sealed. The material around the opening must be dry, in sound condition and free from dust or grease.



Check the foil pack holder for damage and ensure that it functions correctly. **Slide the foil pack into the holder.** **Caution:** Never use damaged foil packs and/or damaged or badly soiled foil pack holders.

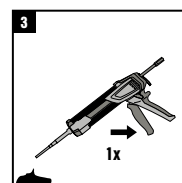
Remove the cap. **Screw the mixing nozzle all the way onto the foil pack and tighten it securely.** Check that the black mixing element is in place inside the nozzle! Do not use damaged mixing nozzles. Do not, under any circumstances, modify or tamper with the mixing nozzle. The foil pack should only be used together with the mixing nozzle supplied. A new mixing nozzle must be used with each new foil pack.



Insert the holder containing the foil pack into the dispenser: Press the release button on the dispenser, pull the piston rod back as far as it will go and then insert the holder containing the foil pack into the dispenser.

The foil pack opens automatically when dispensing begins. Never pierce a hole in the foil pack! This will cause the system to malfunction.

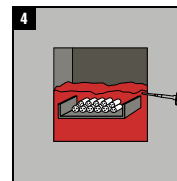
Discard the unevenly mixed initial quantity: The foam dispensed by the first stroke of the dispenser must be discarded, e.g. in the empty outer packaging material.



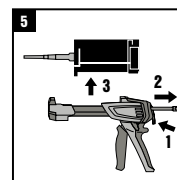
Apply the firestop foam in the opening to be sealed. The mixed components of the foam react and begin to expand approx. 30 seconds after application (at 23 °C). Fill the opening completely with firestop foam, including gaps between individual cables, etc.

Note

It is generally best to begin in the middle of the opening, building up the foam by working from bottom to top. In openings with access from only one side, begin at the rear and work toward the front. The foam will harden in the mixing nozzle during pauses (i.e. >1 minute at 23 °C; >20 seconds at 35 °C). The mixing nozzle must then be changed. Release the pressure from the piston rod before changing the mixing nozzle. Use formwork made from an air-permeable material (e.g. perforated cardboard) when filling openings in ceilings. Recommendation: Residues in the foil pack should be completely dispensed. The remaining firestop foam can then be used for the next opening.



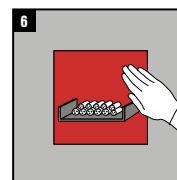
The foam can be shaped or smoothed by hand (if necessary) after approx. 5 minutes (at 23 °C). **Wear protective gloves!**



After approx. 10 minutes (at 23 °C) the foam becomes hard and it can then be cut.

Note

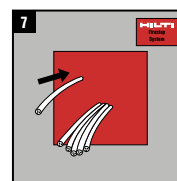
After hardening, any projecting foam can be trimmed off to the specified minimum depth. Trimmed-off scraps of hardened foam can be placed in the next opening and fresh foam applied around these.



Subsequent installation of cables or pipes

Additional cables or pipes can be installed in the opening without difficulty. Do not exceed the approved maximum number and size of cables or pipes.

1. The cable or pipe may be pushed directly through the foam. Where necessary, use a suitable tool (screwdriver or drill bit, etc.) to make a hole in the foam before pushing the cable or pipe through. Do not damage existing cables.
2. Seal any remaining gaps carefully with Firestop Foam CFS-F FX.



Additional instructions The firestop foam is **not suitable for outdoor applications**. The firestop foam is **sensitive to UV light** and is **not weather-resistant**. Do not allow the hardened foam to remain in contact with standing water.

SEAL THICKNESS

Where the required seal thickness t_A is higher than the wall or floor thickness t_E , a support frame (E_1) made from material of class A_1 or A_2 according to EN 13501-1 (e.g. gypsum board) shall be installed to support the Hilti Firestop Foam CFS-F FX as illustrated in figure 1.

The frame may be installed inside the opening, its depth being minimum the seal thickness t_A , in case of a penetration seal in a wall centred in relation to the wall. Alternatively a frame made from gypsum board may be fixed to the wall or floor around the opening (width $w_A \geq 50$ mm for wall applications, $w_A \geq 75$ mm for floor applications, total thickness wall plus frame \geq seal thickness t_A). The frame must be fixed by minimum 2 metal screws per side of the frame with a maximum distance of 150 mm between the screws. In case of a penetration seal in a wall the frame shall be installed on both sides so that the penetration seal is centred in relation to the wall.

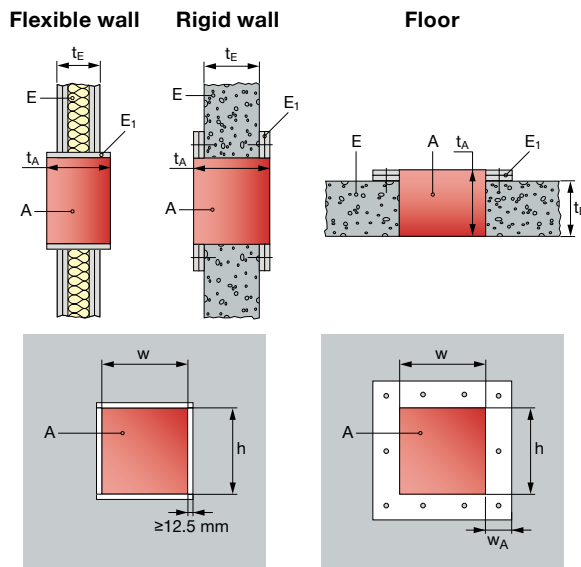


Figure 1

Options for support frames (seal thickness higher than wall/floor thickness)

For some floor applications a pipe sleeve (F) can be casted into concrete floor made from PVC-pipes, diameter 75 mm – 110 mm, with 200 mm length mounted flush to the bottom side of the floor as illustrated in figure 2.

Aperture framing: In case of a flexible wall with no insulation between the panels, an insulation that does not fill the space between the linings completely, an insulation of a density of less than 100 kg/m^3 or an insulation made from glass wool, an aperture framing has to be installed. It has to be made from material used to construct the wall, i.e. studs and boards with a minimum board thickness of 12.5 mm, as illustrated in figure 3.

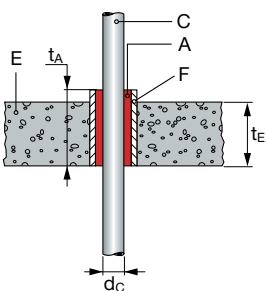


Figure 2

Sleeves for floor applications

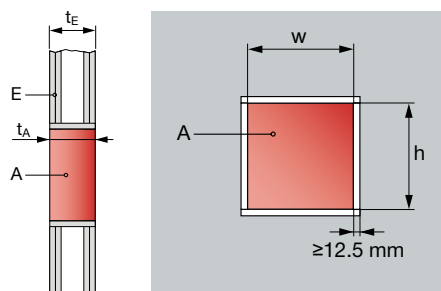


Figure 3

Aperture framing

SEAL SIZE

The results are valid for any penetration seal size equal or lower to:

	Classification	seal size		wall thickness t_E
		w x h	Ø	
Wall penetrations	EI 90	≤ 600 x 600 mm	≤ 600 mm	≥ 100 mm
	EI 120	≤ 400 x 400 mm	≤ 400 mm	≥ 150 mm
Floor penetrations	EI 120	≤ 400 x 400 mm	≤ 400 mm	≥ 150 mm

Provided that the total amount of services (including insulation) is equal or lower than 60% of the penetration surface.

MINIMUM DISTANCES FOR PENETRATIONS

The distances are valid for single, multiple and mixed penetrations.

[mm]		Wall	Floor
S₁	(distance between cables/cable supports and seal edge)	0	0
S₂	(distance between cable supports)	0	0
S₃	(distance between cables and upper seal edge)	25	0
S₄	(distance between cable supports and bottom seal edge)	0	0
S₅	(distance between cables and cable support above)	50	50
S₆	(distance between metal pipes and seal edge)	0	20
S₇	(distance between metal pipes and upper seal edge)	20	-
S₈	(distance between metal pipes) linear arrangement (distance between metal pipes) grouped arrangement	0 40	15 20
S₉	(distance between plastic pipes/pipe closure devices and seal edge)	0	20
S₁₀	(distance between plastic pipes/pipe closure devices and upper seal edge)	20	-
S₁₁	(distance between plastic pipes/pipe closure devices)	35	20
S₁₂	(distance between metal pipes and plastic pipes/pipe closure devices)	35	20
S₁₃	(distance between cables/cable supports and metal pipes)	50	80
S₁₄	(distance between cables/cable supports and plastic pipes/pipe closure devices)	50	80

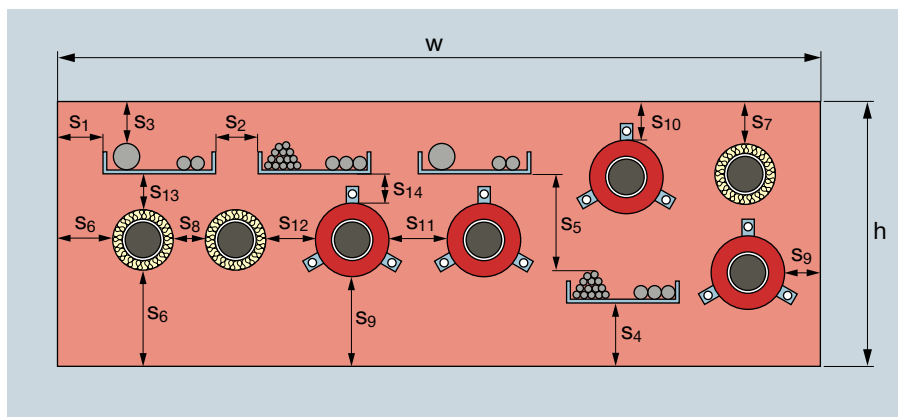


Figure 4
Distance requirements

DISTANCES FOR PIPE AND CABLE SUPPORT CONSTRUCTIONS

The distances for support constructions away from the construction elements are:

	Wall (distance from the face of the wall on both sides):	Floor (distance from upper side of floor)
Pipes	300 mm	250 mm
Cables	500 mm	415 mm

ADDITIONAL COMPONENTS FOR PIPE PENETRATIONS

In some cases of plastic pipes and metal pipes with combustible insulations (reaction to fire class B to E according to EN 13501-1) a **Hilti Firestop Bandage CFS-B** (see ETA-10/0212) is wrapped around the pipe.

The bandage is positioned with half of its width (62.5 mm) within the seal (central marking line at the surface of the seal) and fixed with wire. For necessary number of layers of the bandage see the relevant chapter (special care has to be taken to use the correct position when the required Hilti Firestop Foam CFS-F FX seal thickness is higher than the wall or floor thickness).

TYPE OF INSULATION FOR PIPES

The following types of foamed elastomeric insulation products may be used as pipe insulation:

Manufacturer	Product designation
Armacell International GmbH	Armaflex AF (CE marked according to EN 14304), Armaflex SH, Armaflex Ultima, Armaflex HT
NMC Group	Insul-Tube (nmc), Insul-Tube H-Plus (nmc)
Kaimann GmbH	Kaiflex KK plus, Kaiflex KK
L'Isolante K-Flex	L'Isolante K-Flex HT, L'Isolante K-Flex ECO, L'Isolante K-Flex ST, L'Isolante K-Flex H, L'Isolante K-Flex ST Plus

Named material may be used in make of an insulation hose, bandage/wrap or plates. If a protect insulation DP is used, it should be made from the same elastomeric material as the thermal pipe insulation itself.

ABBREVIATIONS USED IN DRAWINGS

Abbreviation	Description	Abbreviation	Description
A, A ₁ , A ₂ , ...	Firestop product	h	Height/length of penetration seal
C, C ₁ , C ₂ , ...	Penetrating services	s ₁ , s ₂	Distances
D	Pipe insulation	t _A	Thickness of penetration seal
E	Building element (wall, floor)	t _c	Pipe wall thickness
E ₁ , E ₂ , ...	Apperture or support framing	t _D	Thickness of insulation
F	casted in pipe sleeve	t _E	Thickness of the building element
L _D	Length of insulation	w	Width of penetration seal
d _c	Pipe diameter	w _A	Width of framing

BASE MATERIALS

Flexible walls and drywalls

The wall must comprise timber or steel studs lined on both faces with minimum 2 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. The cavity must be filled with minimum 100 mm insulation of Class A₁ or A₂ in accordance with EN 13501-1).

Rigid walls

The wall must comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m³.

Floors

The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 2200 kg/m³. This ETA does not cover use of this product as a penetration seal in sandwich panel constructions.

PENETRATING SERVICES

BLANK SEAL, FLEXIBLE WALL | RIGID WALL

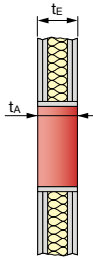
Hilti Firestop Foam CFS-F FX may be used to form blank seals.

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

If services are added later on in a blank seal only the services listed in the tables below may be added that fulfil the required classification.

Blank seal in flexible and rigid walls		Classification
seal size seal thickness	$w \times h \leq 600 \times 600 \text{ mm}$ $t_A \geq 100 \text{ mm}$	EI 90
seal size seal thickness	$w \times h \leq 400 \times 400 \text{ mm}$ $t_A \geq 150 \text{ mm}$	EI 120

Flexible wall



Rigid wall

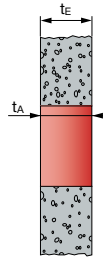


Figure 5

Blank seal in flexible wall, rigid wall

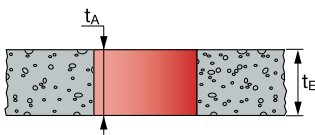
BLANK SEAL, FLOOR

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

If services are added later on in a blank seal only the services listed in the tables below may be added that fulfil the required classification.

Blank seal in rigid floors		Classification
seal size seal thickness	$w \times h \leq 400 \times 400 \text{ mm}$ $t_A \geq 150 \text{ mm}$	EI 120

Flexible wall



Rigid wall

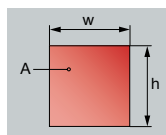


Figure 6

Blank seal in floor

CABLE PENETRATION

FLEXIBLE WALL | RIGID WALL

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Cable support construction: Perforated metal cable trays with a melting point higher than 1100 °C (e.g. galvanised steel, stainless steel). Trays with organic coatings are covered if their overall classification is minimum A₂ according to EN 13501-1.

Cables and cable trays

Penetration seal/Services	Classification	
	(multiple)	(mixed)
Seal thickness ¹	$150 \leq t_A < 200$	$t_A \geq 200$
Sheathed cables ² with		
$\varnothing \leq 21$ mm	EI 60	EI 120
$21 \leq \varnothing \leq 50$ mm	EI 60	EI 90
$50 \leq \varnothing \leq 80$ mm	EI 60	EI 90
All sheathed single core cables with		
$\varnothing \leq 21$ mm	EI 120	EI 120
Sheathed multi-core halogen free cables according to HD 604.5 with		
$\varnothing \leq 50$ mm	EI 90	
Single sheathed multi-core rubber cables according to HD 22.4 with		
$\varnothing \leq 80$ mm	EI 120	
Tied cable bundle, maximum diameter of single cable 21 mm with		
$\varnothing \leq 100$ mm	EI 60	EI 120
Non sheathed cables with		
$\varnothing \leq 24$ mm	-	EI 90

Conduits and tubes

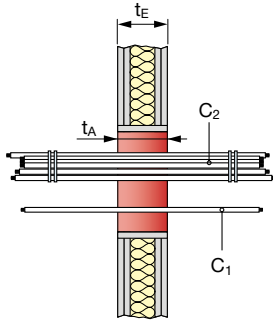
Penetration seal/Services	Classification (with and without cables)	
	(multiple)	(mixed)
Seal thickness ¹	$t_A \geq 100$	$t_A \geq 200$
Steel conduits and tubes with $\varnothing \leq 16$ mm ³	EI 90 U/U	EI 120 C/U
Plastic conduits and tubes with $\varnothing \leq 16$ mm	EI 120 U/U	EI 120 U/U
Flexible plastic conduits (Polyolefin, PVC) with $16 \text{ mm} \leq \varnothing \leq 32$ mm	-	EI 120 U/U
Rigid plastic conduits (Polyolefin, PVC) with $16 \text{ mm} \leq \varnothing \leq 32$ mm	-	EI 120 U/U
Bundle of plastic, conduits (Polyolefin, PVC, conduits flexible or rigid with $16 \text{ mm} \leq \varnothing \leq 32$ mm) with $\varnothing \leq 100$ mm	-	EI 120 U/U

¹ For maximal seal size see chapter “seal size”.

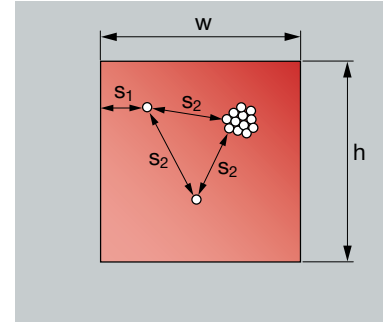
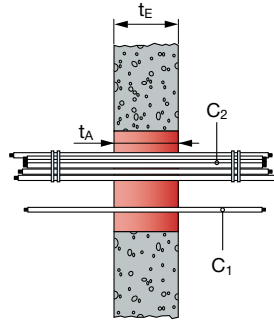
² All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables).

³ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

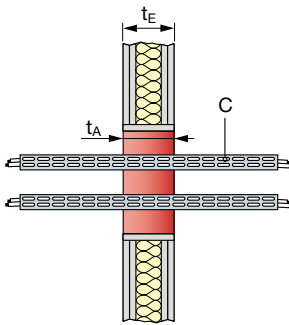
Cable/cable bundles in flexible wall



Cable/cable bundles in rigid wall



Cables on cable tray in flexible wall



Cables on cable tray in rigid wall

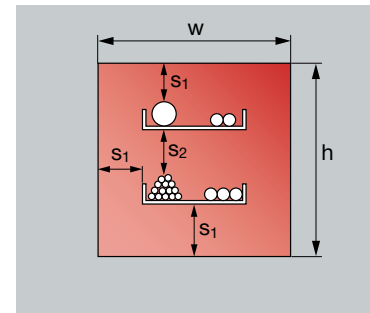
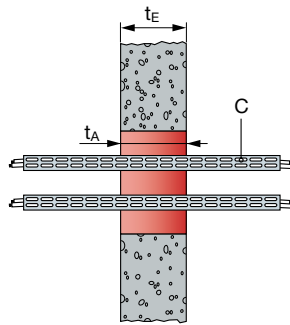


Figure 7

Cable penetration in flexible/rigid wall

Minimum distance w/o cable trays (mm):

Cable to seal edge (s_1):	0
Cable to cable (s_2):	0
Cable to cable bundle (s_2):	33

CABLE PENETRATION

FLOOR

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Cable support construction: Perforated metal cable trays with a melting point higher than 1100 °C (e.g. galvanised steel, stainless steel). Trays with organic coatings are covered if their overall classification is minimum A₂ according to EN 13501-1.

Cables and cable trays

Penetration seal/Services	Classification		
	(multiple)		(mixed)
Seal thickness ¹	$150 \leq t_A < 250$	$t_A \geq 250$	$t_A \geq 200$
Sheathed cables ² with			
$\varnothing \leq 21$ mm	EI 60	EI 120	EI 120
$21 \leq \varnothing \leq 50$ mm	EI 60	EI 90	EI 90
$50 \leq \varnothing \leq 80$ mm	EI 60	EI 90	EI 90
Tied cable bundle, maximum diameter of single cable 21 mm with			
$\varnothing \leq 100$ mm	EI 60	EI 120	EI 120
Non sheathed cables with			
$\varnothing \leq 24$ mm	-	-	EI 90

Conduits and tubes

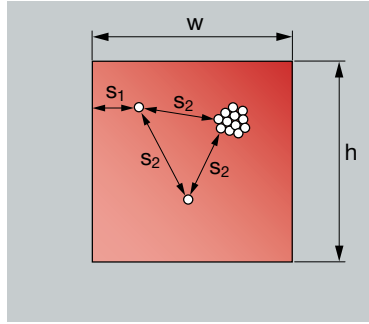
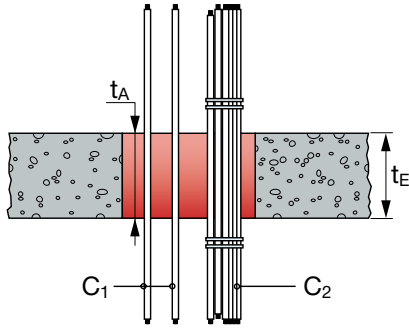
Penetration seal/Services	Classification (with and without cables)	
	(multiple)	(mixed)
Seal thickness ¹	$t_A \geq 150$ mm	$t_A \geq 200$ mm
Steel conduits and tubes with $\varnothing \leq 16$ mm ³	EI 120 U/U	EI 120 C/U
Plastic conduits and tubes with $\varnothing \leq 16$ mm	EI 120 U/U	EI 120 U/U
Flexible plastic conduits (Polyolefin, PVC) with $16 \text{ mm} \leq \varnothing \leq 32$ mm	-	EI 120 U/U
Rigid plastic conduits (Polyolefin, PVC) with $16 \text{ mm} \leq \varnothing \leq 32$ mm	-	EI 120 U/U
Bundle of plastic, conduits (Polyolefin, PVC, conduits flexible or rigid with $16 \text{ mm} \leq \varnothing \leq 32$ mm) with $\varnothing \leq 100$ mm	-	EI 120 U/U

¹ For maximal seal size see chapter “seal size”.

² All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables).

³ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

Cable/cable bundles in floor



Cables on cable tray in floor

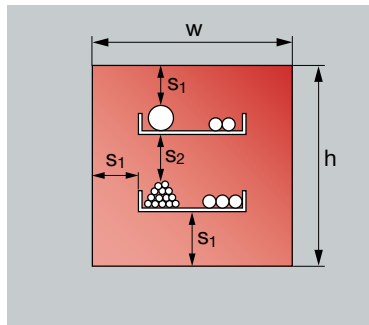
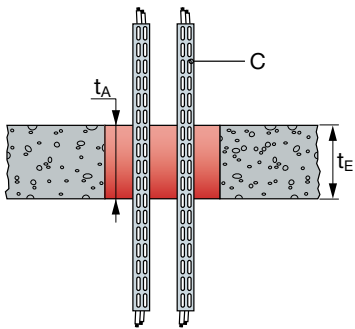


Figure 8

Cable penetration in floor

Minimum distance w/o cable trays (mm):

Cable to seal edge (s_1):	0
Cable to cable (s_2):	0
Cable to cable bundle:	33

METAL PIPE PENETRATION WITHOUT INSULATION

FLEXIBLE WALL | RIGID WALL | FLOOR

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Copper, steel and stainless without insulation ²

Seal thickness ¹		$t_A \geq 200$ mm
Pipe diameter (d_c) [mm]	Pipe wall thickness (t_c) [mm]	Classification (mixed)
28	1.0 - 14.2 ^{2,3}	EI 90-C/U

¹ For maximal seal size see chapter “seal size”.

² The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

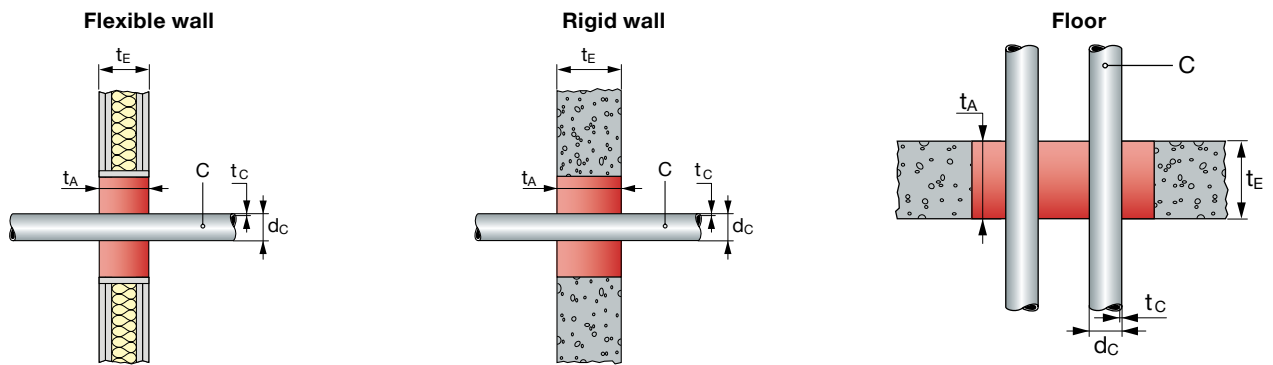


Figure 9
Metal pipe penetration without insulation

METAL PIPE PENETRATION WITH MINERAL WOOL INSULATION

FLEXIBLE WALL | RIGID WALL

Arrangement: linear or in a cluster with sustained insulation (D) made from Rockwool RS800 or equal.

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Steel pipes (C) with continued insulation (D) – sustained – C/U¹

Seal thickness ²			$t_A \geq 150$ mm
Pipe diameter (d _c) [mm]	Pipe wall thickness (t _c) [mm]	Insulation thickness (t _b) [mm]	Classification (multiple)
33.7	2.6 – 14.2 ³	30	EI 120 C/U
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	40	EI 120 C/U

Steel pipes (C) with local insulation (D) – sustained – C/U¹

Seal thickness ²				$t_A \geq 150$ mm
Pipe		Insulation		Classification (multiple)
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _b) [mm]	length (L _D) [mm]	
33.7	2.6 – 14.2 ³	30	≥ 500	EI 120 C/U
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	40	≥ 500	EI 120 C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 2.6 for diameter 33.7 and 3.6 for diameter 114.3 for pipe diameters in between, see figure 10.

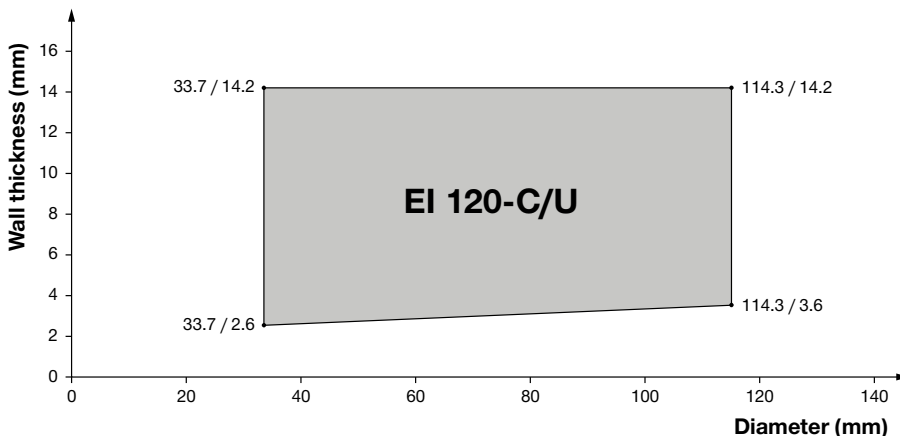


Figure 10
Covered application range for pipe wall thickness and pipe diameter

Copper, steel and stainless (C) with continued insulation (D) – sustained – C/U¹

Pipe diameter (d _c) [mm]	Pipe wall thickness (t _c) [mm]	Insulation thickness (t _b) [mm]	t _A ≥ 150 mm	t _A ≥ 200 mm
			Classification	
			(multiple)	(mixed)
28 – 88.9	1.0/2.0 – 14.2 ^{3,4}	20	EI 60 C/U	-
88.9	2.0 – 14.2 ³	20	EI 90 C/U	-
12 – 48	1.0/1.5 – 14.2 ^{3,5}	20	-	EI 120-C/U
48 – 88.9	1.5/2.0 – 14.2 ^{3,6}	40	-	EI 120-C/U

Copper, steel and stainless (C) with local insulation (D) – sustained – C/U¹

Pipe		Insulation		t _A ≥ 150 mm	t _A ≥ 200 mm
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _b) [mm]	length (L _D) [mm]	(multiple)	(mixed)
28 – 88.9	1.0/2.0 – 14.2 ^{3,4}	20	≥ 500	EI 60 C/U	-
88.9	2.0 – 14.2 ³	20	≥ 500	EI 90 C/U	-
12 – 48	1.0/1.5 – 14.2 ^{3,5}	20	≥ 500		EI 120-C/U
48 – 88.9	1.5/2.0 – 14.2 ^{3,6}	40	≥ 500		EI 120-C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 1.0 for diameter 28 and 2.0 for diameter 88.9 for pipe diameters in between.

⁵ Interpolation of minimum wall thickness between 1.0 for diameter 12 and 1.5 for diameter 48 for pipe diameters in between.

⁶ Interpolation of minimum wall thickness between 1.5 for diameter 48 and 2.0 for diameter 88.9 for pipe diameters in between.

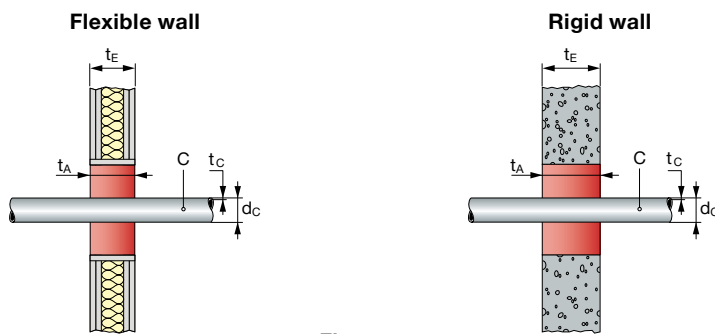


Figure 11
Metal pipe penetration with continued insulation

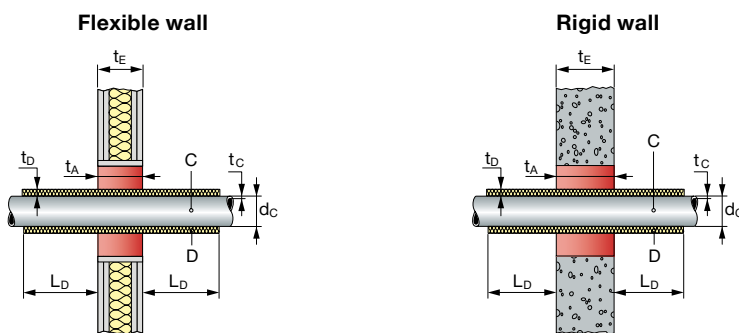


Figure 12
Metal pipe penetration with local insulation

METAL PIPE PENETRATION WITH MINERAL WOOL INSULATION

FLOOR

Arrangement: linear or in a cluster with sustained insulation (D) made from Rockwool RS800 or equal.

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Steel pipes (C) with continued insulation (D) – sustained – C/U¹

Seal thickness ²			$t_A \geq 150$ mm
Pipe diameter (d _c) [mm]	Pipe wall thickness (t _c) [mm]	Insulation thickness (t _b) [mm]	Classification (multiple)
33.7	2.6 – 14.2 ³	30	EI 120 C/U
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	40	EI 120 C/U
114.3 – 168	3.6/14 – 14.2 ^{3,5}	40	EI 120 C/U

Steel pipes (C) with local insulation (D) – sustained – C/U¹

Seal thickness ²				$t_A \geq 150$ mm
Pipe		Insulation		Classification (multiple)
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _b) [mm]	length (L _b) [mm]	
33.7	2.6 – 14.2 ³	30	≥ 500	EI 120 C/U
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	40	≥ 500	EI 120 C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 1.0 for diameter 28 and 2.0 for diameter 88.9 for pipe diameters in between.

⁵ Interpolation of minimum wall thickness between 3.6 for diameter 114.3 and 14 for diameter 168.

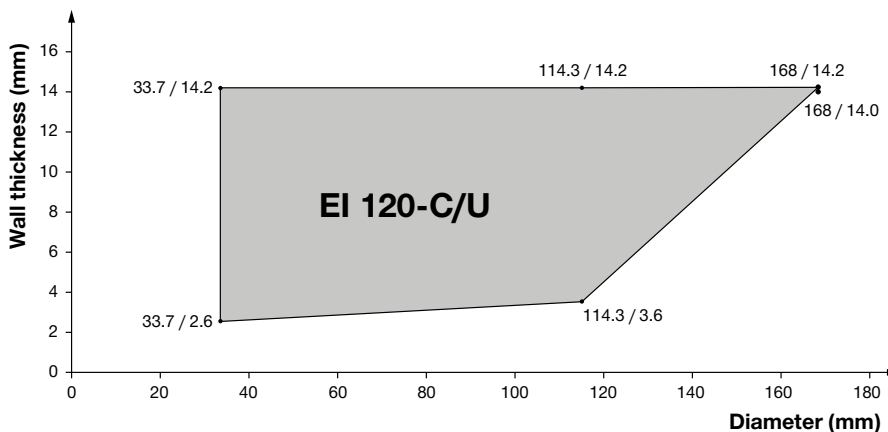


Figure 13

Covered application range for pipe wall thickness and pipe diameter

Copper, steel and stainless (C) with continued insulation (D) – sustained – C/U¹

Seal thickness ²			$t_A \geq 150$ mm	$t_A \geq 200$ mm
Pipe diameter (d _c) [mm]	Pipe wall thickness (t _c) [mm]	Insulation thickness (t _b) [mm]	Classification	
			(multiple)	(mixed)
28 – 88.9	1.0/2.0 – 14.2 ^{3,4}	20	EI 120 C/U	-
12 – 48	1.0/1.5 – 14.2 ^{3,5}	20	-	EI 90 C/U
48 – 88.9	1.5/2.0 – 14.2 ^{3,6}	40	-	EI 120-C/U

Copper, steel and stainless (C) with local insulation (D) – sustained – C/U¹

Seal thickness ²				$t_A \geq 150$ mm	$t_A \geq 200$ mm
Pipe		Insulation		Classification	
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _b) [mm]	length (L _D) [mm]	(multiple)	(mixed)
seal thickness t _A (mm)				$t_A \geq 150$ mm	$t_A \geq 200$ mm
28 – 88.9	1.0/2.0 – 14.2 ³	20	≥ 500	EI 120 C/U	-
12 – 48	1.0/1.5 – 14.2 ^{3,5}	20	≥ 500	-	EI 90-C/U
48 – 88.9	1.5/2.0 – 14.2 ^{3,6}	40	≥ 500	-	EI 120-C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 1.0 for diameter 28 and 2.0 for diameter 88.9 for pipe diameters in between.

⁵ Interpolation of minimum wall thickness between 1.0 for diameter 12 and 1.5 for diameter 48 for pipe diameters in between.

⁶ Interpolation of minimum wall thickness between 1.5 for diameter 48 and 2.0 for diameter 88.9 for pipe diameters in between.

COPPER, STEEL AND STAINLESS WITH MINERAL INSULATION FOR FLOOR CONSTRUCTIONS WITH CAST-IN SLEEVES

Hilti Firestop Foam CFS-F FX (A) in PVC sleeves, diameter 75 mm – 110 mm, length of sleeve 200 mm, build in flush to bottom side of the building element.

Copper, steel and stainless (C) with local insulation (D)– sustained – C/U¹

Seal thickness ²				$t_A \geq 200$ mm
Pipe		Insulation		Classification (multiple)
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _b) [mm]	length (L _D) [mm]	
28	1.0 – 14.2 ³	20	≥ 500	EI 120 C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

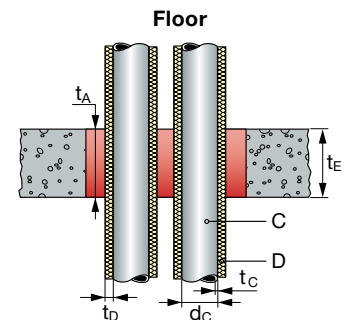


Figure 14
Metal pipe penetration with continued insulation

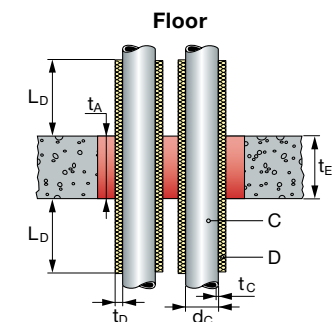


Figure 15
Metal pipe penetration with local insulation

METAL PIPE PENETRATION WITH FOAMED ELASTOMERIC INSULATION

FLEXIBLE WALL | RIGID WALL

Arrangement: linear or in a cluster with foamed elastomeric insulation (D).

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Copper, steel and stainless (C) with continued foamed elastomeric insulation (D) – sustained – C/U¹

Seal thickness ²			$t_A \geq 200$
Pipe diameter (d_c) [mm]	Pipe wall thickness (t_c) [mm]	Insulation thickness (t_c) [mm]	Classification (mixed)
6 – 42	1.0/1.2 – 14.2 ³	7.0/9.0	EI 90-C/U
6 – 18	1.0 – 14.2 ³	7.0/8.0	EI 120-C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

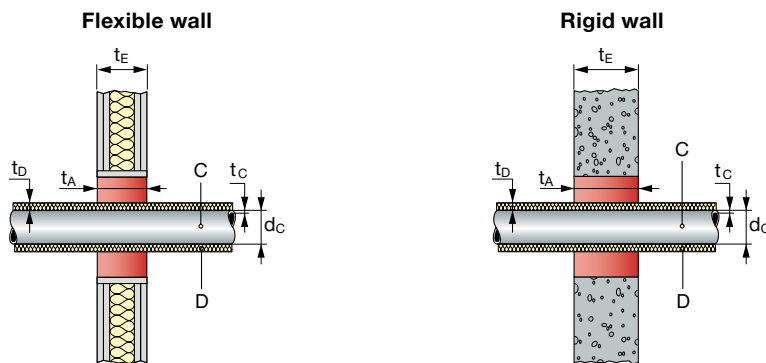


Figure 16
Metal pipe penetration with continued insulation

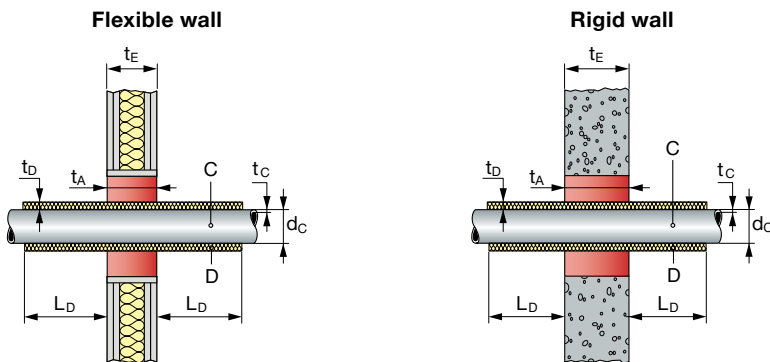


Figure 17
Metal pipe penetration with local insulation

METAL PIPE PENETRATION WITH FOAMED ELASTOMERIC INSULATION

FLOOR

Arrangement: linear or in a cluster with foamed elastomeric insulation (D).

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Copper, steel and stainless (C) with continued foamed elastomeric insulation (D) – sustained – C/U¹

Seal thickness ²			$t_A \geq 200$ mm
Pipe diameter (d _c) [mm]	Pipe wall thickness (t _c) [mm]	Insulation thickness (t _i) [mm]	Classification (mixed)
6 – 42	1.0/1.2 – 14.2 ³	7.0/9.0	EI 120-C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

STEEL PIPES WITH FOAMED ELASTOMERIC INSULATION FOR FLOOR CONSTRUCTIONS WITH CAST-IN SLEEVES

Hilti Firestop Foam CFS-F FX (A) in PVC sleeves (F) , diameter 75 mm – 110 mm, length of sleeve 200mm, build in flush to bottom side of the building element.

Steel pipes (C) with local insulation (D) – sustained – C/U¹

Seal thickness ²				$t_A \geq 200$ mm
Pipe		Insulation		Classification (multiple)
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _i) [mm]	length (L _D) [mm]	
33.7	2.6 – 14.2 ³	10	≥ 500 mm	EI 120 C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

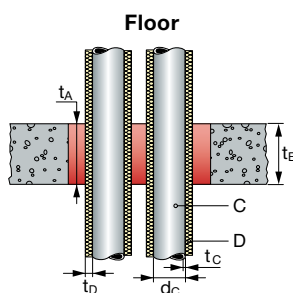


Figure 18

Metal pipe penetration with continued insulation

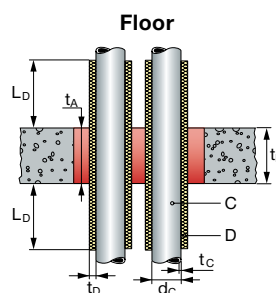


Figure 19

Metal pipe penetration with local insulation

METAL PIPE PENETRATION WITH FOAMED ELASTOMERIC INSULATION AND HILTI BANDAGE CFS-B

FLEXIBLE WALL | RIGID WALL

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Services covered by two layers of Hilti Firestop Bandage CFS-B on both sides. The bandage is positioned with its center line flush to the seal surface.

Arrangement: linear or in a cluster with foamed elastomeric thermal insulation (D)

Steel pipes (C) with continued insulation (D) – sustained – C/U¹

Seal thickness ² Building element thickness			$t_A \geq 150$ mm	
Pipe diameter (d_c) [mm]	Pipe wall thickness (t_c) [mm]	Insulation thickness (t_b) [mm]	Classification	
			(multiple)	(mixed)
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	19	EI 60-C/U	EI 60-C/U
33.7 – 114.3	2.6/3.6 – 12.5 ⁴	19	EI 90-C/U	-

Steel pipes (C) with local insulation (D) – sustained – C/U¹

Seal thickness ² Building element thickness				$t_A \geq 150$ mm	
Pipe		Insulation		Classification	
diameter (d_c) [mm]	wall thickness (t_c) [mm]	thickness (t_b) [mm]	length (L_D) [mm]	(multiple)	(mixed)
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	19	≥ 500	EI 60-C/U	EI 60-C/U
33.7 – 114.3	2.6/3.6 – 12.5 ⁴	19	≥ 500	EI 90-C/U	-

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 2.6 for diameter 33.7 and 3.6 for diameter 114.3 for pipe diameters in between.

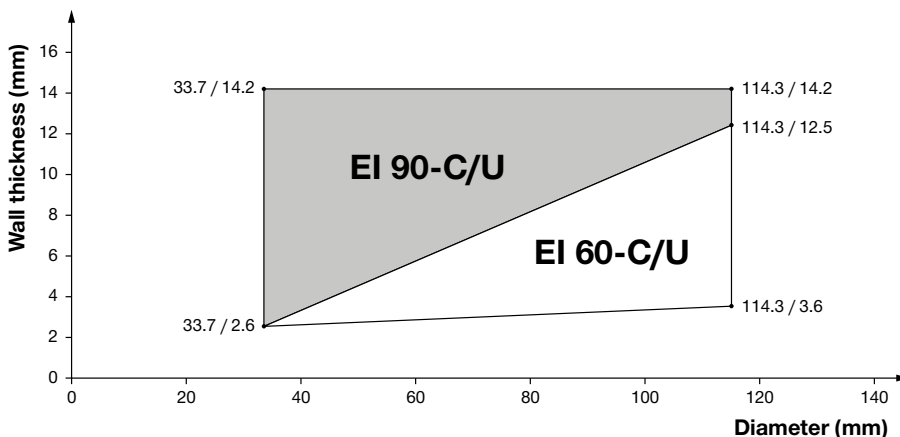


Figure 20

Covered application range for pipe wall thickness and pipe diameter

Copper, steel and stainless with continued insulation sustained ¹

Seal thickness ²			$t_A \geq 200$ mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Insulation thickness (tb) [mm]	Classification (mixed)
28 - 54	1.0/1.5 - 14.2 ^{3,4}	8.5/9.0 - 35.0/38.0	EI 90-C/U
28 - 54	1.0/1.5 - 14.2 ^{3,4}	8.5 - 35.0/38.0	EI 120-C/U

Copper, steel and stainless with local insulation sustained ¹

Seal thickness ²				$t_A \geq 200$ mm
Pipe		Insulation		Classification (mixed)
diameter (dc) [mm]	wall thickness (tc) [mm]	thickness (tb) [mm]	length (L _D) [mm]	
28 - 54	1.0/1.5 - 14.2 ^{3,4}	8.5/9.0 - 35.0/38.0	≥ 500	EI 90-C/U
28 - 54	1.0/1.5 - 14.2 ^{3,4}	8.5 - 35.0/38.0	≥ 500	EI 120-C/U

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter "seal size".

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 1.0 for diameter 28 and 1.5 for diameter 54 for pipe diameters in between.

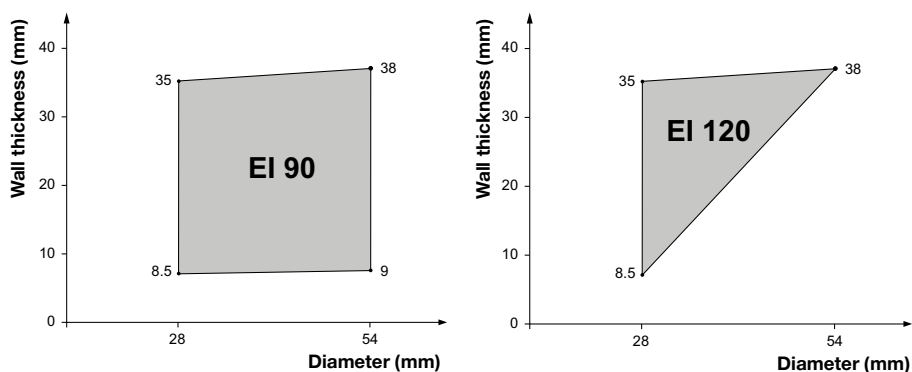


Figure 21

Covered application range for pipe wall thickness and pipe diameter.

Copper, steel and stainless with continued insulation sustained ¹

Seal thickness ² Building element thickness			$t_A \geq 150$ mm	
Pipe diameter (d_c) [mm]	Pipe wall thickness (t_c) [mm]	Insulation thickness (t_b) [mm]	Classification	
			(multiple)	(mixed)
28 – 88.9	1.0/2.0 – 14.2 ^{3,4}	19	EI 60-C/U	EI 60-C/U
28	1.0 – 14.2 ⁴	19	EI 120-C/U	-

Copper, steel and stainless with local insulation sustained ¹

Seal thickness ² Building element thickness				$t_A \geq 150$ mm	
Pipe		Insulation		Classification	
diameter (d_c) [mm]	wall thickness (t_c) [mm]	thickness (t_b) [mm]	length (L_D) [mm]	(multiple)	(mixed)
28 – 88.9	1.0/2.0 – 14.2 ^{3,4}	19	≥ 500	EI 60-C/U	EI 60-C/U
28	1.0 – 14.2 ⁴	19	≥ 500	EI 90-C/U	-

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 2.6 for diameter 33.7 and 3.6 for diameter 114.3 for pipe diameters in between.

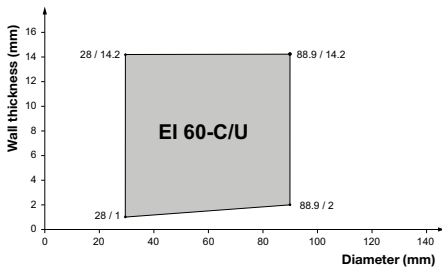


Figure 22

Covered application range for pipe wall thickness and pipe diameter.

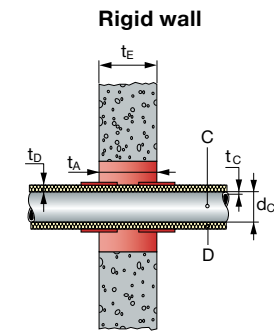
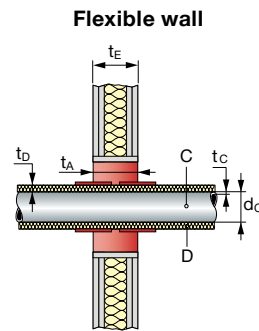


Figure 23

Metal pipe penetration with continued insulation

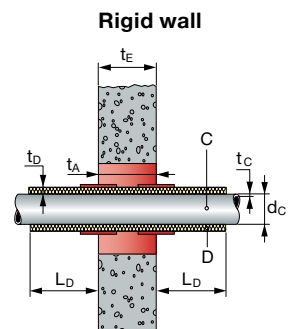
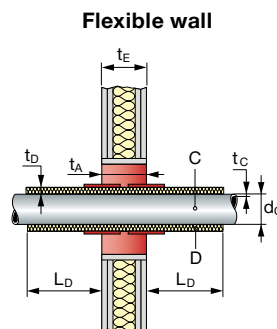


Figure 24

Metal pipe penetration with local insulation

METAL PIPE PENETRATION WITH FOAMED ELASTOMERIC INSULATION AND HILTI BANDAGE CFS-B

FLOOR

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Arrangement: linear or in a cluster with foamed elastomeric thermal insulation (D)

Steel pipes (C) with continued insulation (D) – sustained – C/U¹

Seal thickness ²			$t_A \geq 150$ mm	
Pipe diameter (d _c) [mm]	Pipe wall thickness (t _c) [mm]	Insulation thickness (t _b) [mm]	Classification	
			(multiple)	(mixed)
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	19	EI 90-C/U	EI 60-C/U
33.7 – 114.3	2.6/3.6 – 12.5 ⁴	19	EI 120-C/U	-

Steel pipes (C) with local insulation (D) – sustained – C/U¹

Seal thickness ²				$t_A \geq 150$ mm	
Pipe		Insulation		Classification	
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _b) [mm]	length (L _D) [mm]	(multiple)	(mixed)
33.7 – 114.3	2.6/3.6 – 14.2 ^{3,4}	19	≥ 500	EI 90 C/U	EI 60-C/U
33.7 – 114.3	2.6/3.6 – 12.5 ⁴	19	≥ 500	EI 120 C/U	-

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

⁴ Interpolation of minimum wall thickness between 2.6 for diameter 33.7 and 3.6 for diameter 114.3 for pipe diameters in between.

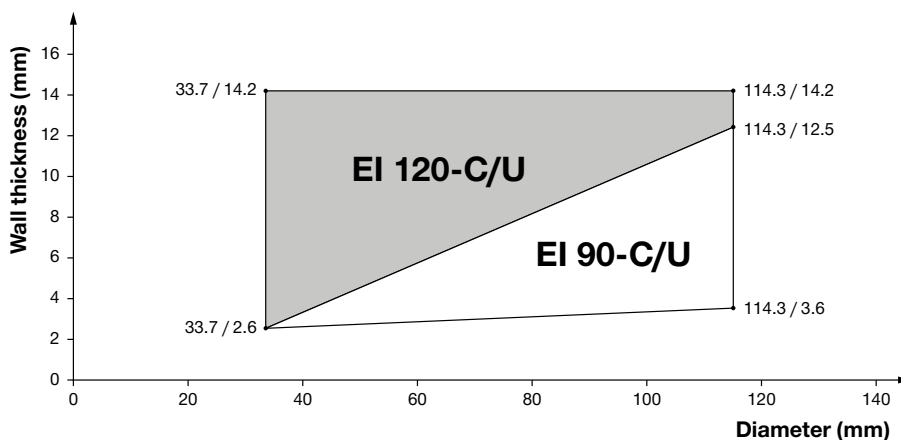


Figure 25

Covered application range for pipe wall thickness and pipe diameter.

Copper, steel and stainless (C) with continued insulation (D) – sustained – C/U¹

Seal thickness ²			$t_A \geq 150$ mm	$t_A \geq 200$ mm	
Pipe diameter (d _c) [mm]	Pipe wall thickness (t _c) [mm]	Insulation thickness (t _b) [mm]	Classification		
			(multiple)	(mixed)	
28 – 88.9	1.0/2.0 – 14.2 ³	19	EI 90-C/U	EI 60-C/U	–
28	1.0 – 14.2 ³	19	EI 120-C/U	–	–
28 – 54	1.0/1.5 – 14.2 ³	8.5/9.0 – 35.0/38.0			EI 90-C/U
28 – 54	1.0/1.5 – 14.2 ³	8.5 – 35.0/38.0			EI 120-C/U

Copper, steel and stainless (C) with local foamed elastomeric insulation (D) – sustained – C/U¹

Seal thickness ²				$t_A \geq 150$ mm	$t_A \geq 200$ mm	
Pipe		Insulation		Classification		
diameter (d _c) [mm]	wall thickness (t _c) [mm]	thickness (t _b) [mm]	length (L _D) [mm]	(multiple)	(mixed)	
28 – 88.9	1.0/2.0 – 14.2 ³	19	≥ 500	EI 90-C/U	EI 60-C/U	
28	1.0 – 14.2 ³	19	≥ 500	EI 120-C/U	–	
28 – 54	1.0/1.5 – 14.2 ³	8.5/9.0 – 35.0/38.0	≥ 500		EI 90-C/U	
28 – 54	1.0/1.5 – 14.2 ³	8.5 – 35.0/38.0	≥ 500		EI 120-C/U	

¹ The field of application given for steel conduits or tubes is also valid for other metal conduits or tubes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. low alloyed steels, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys).

² For maximal seal size see chapter “seal size”.

³ 14.2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

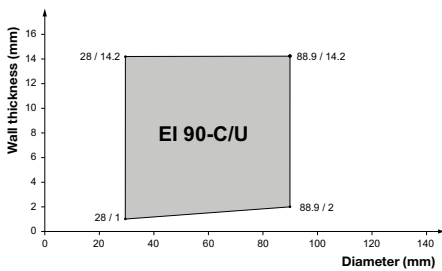


Figure 26

Covered application range for pipe wall thickness and pipe diameter seal thickness $t_A \geq 150$ mm

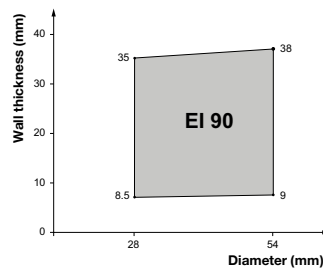


Figure 27

Covered application range for pipe wall thickness and pipe diameter seal thickness $t_A \geq 200$ mm

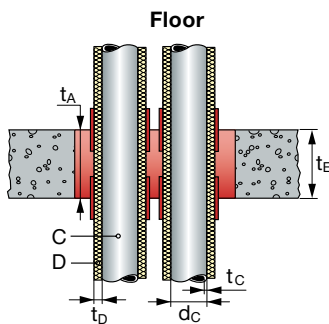
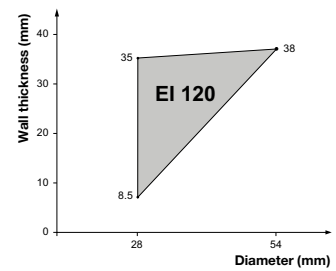


Figure 28

Metal pipe penetration with continued insulation

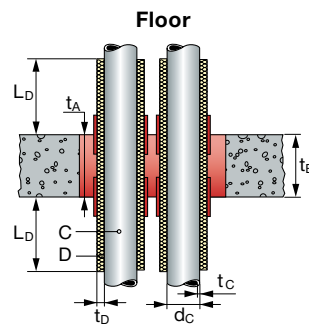


Figure 29

Metal pipe penetration with local insulation

ALUMINUM COMPOSITE PIPE PENETRATION WITH FOAMED ELASTOMERIC INSULATION

FLEXIBLE WALL | RIGID WALL | FLOOR

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Arrangement: linear or in a cluster with foamed elastomeric thermal insulation (D).

Al composite pipes (C) with continued insulation (D) – sustained – C/U			
Al composite pipes «Mepla» (C) Manufacturer: Geberit			
Seal thickness ¹			$t_A \geq 200$ mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Insulation thickness (td) [mm]	Classification (mixed)
16 – 32	2.0 – 3.0	8.0 – 9.0	EI 120-C/U
Al composite pipes «Alplex duo» (C) Manufacturer: Fränkische Rohrwerke			
Seal thickness ¹			$t_A \geq 200$ mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Insulation thickness (td) [mm]	Classification (mixed)
16 – 32	2.0 – 3.0	8.0 – 9.0	EI 120-C/U

¹ For maximal seal size see chapter “seal size”.

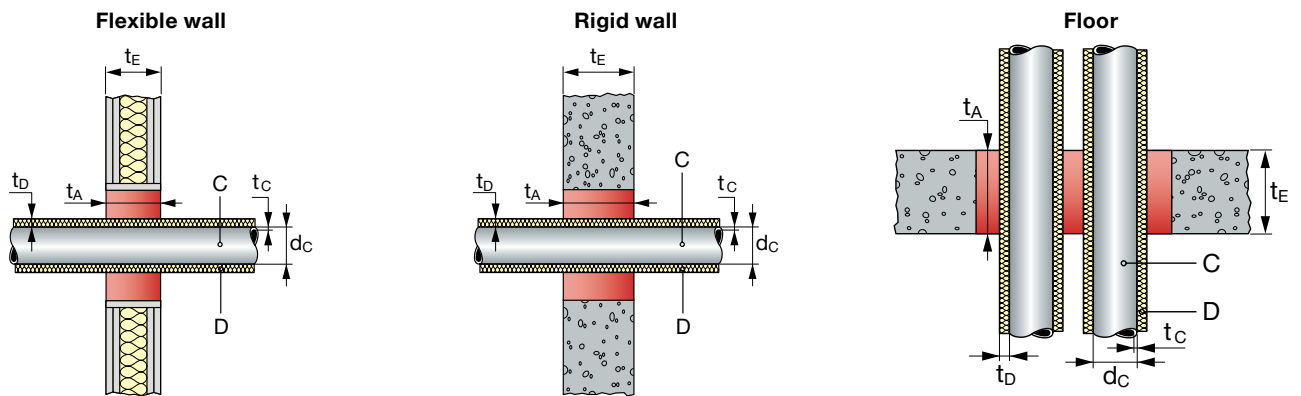


Figure 30
Al composite pipe penetration with continued insulation

PLASTIC PIPE PENETRATION

FLEXIBLE WALL | RIGID WALL | FLOOR

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

PE PIPES

PE pipes (C) according to EN ISO 15494 and DIN 8074/8075 – U/U

Seal thickness ¹		$t_A \geq 200$ mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Classification (mixed)
≤ 40	2.3 – 3.7	EI 120-U/U

PE pipes (C) according to EN 1519-1 and DIN 8074/8075 – U/C arranged linear

Seal thickness ¹		$t_A \geq 150$ mm	$t_A \geq 150$ mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Classification	
		(multiple)	(mixed)
50	2.9 – 4.6	EI 120-U/C	EI 60-U/C

¹ For maximal seal size see chapter “seal size”.

PE pipes (C) according to EN ISO 15494 and DIN 8074/8075 – U/U with Hilti Firestop Bandage CFS-B

Seal thickness ¹		$t_A \geq 200$ mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Classification (mixed)
50 – 110	2.9/2.7 – 10.0	EI 120-U/U

¹ For maximal seal size see chapter “seal size”.

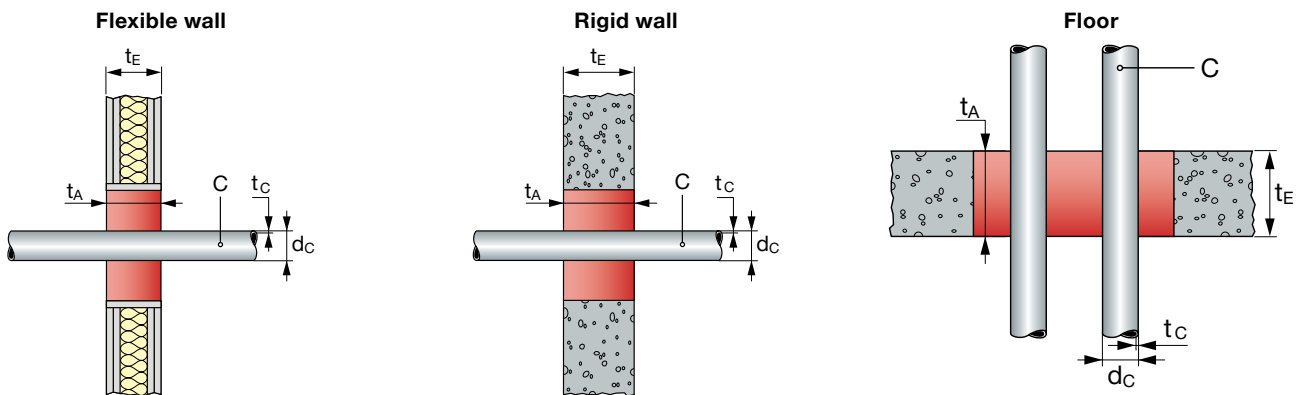


Figure 31
PE pipe penetration

PVC PIPES

In some cases of floor applications a PVC sleeves, diameter 75mm – 110mm, length 200mm, is build in flush to bottom side of the building element. Hilti Firestop Foam CFS-F FX is then applied inside of that sleeve, resulting in seal thickness $t_A = 200$ mm

Minimum distance with sleeve in floor applications (mm):

between pipe and edge of PVC sleeve: 10
between two PVC-sleeves: 200

PVC-U pipes (C) according to EN ISO 1452-2, EN ISO 15493 and DIN 8061/8062 – U/U

Seal thickness ¹		≥ 150 mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Classification (mixed)
≤ 40	1.9 – 3.0	EI 120-U/U

PVC-U pipes (C) according to EN 1452-2 and DIN 8061/8062 – U/U arranged linear

Seal thickness ¹		$t_A \geq 150$ mm	
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Classification	
		(multiple)	(mixed)
50	3.7	EI 120-U/U	-

PVC-U pipes (C) according to EN 1452-2 and DIN 8061/8062 – U/C arranged linear

Seal thickness ¹		$t_A \geq 150$ mm	
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Classification	
		(multiple)	(mixed)
50	3.7 – 5.6	EI 120-U/C	EI 60-U/C

¹ For maximal seal size see chapter "seal size".

In some cases the services are covered by two layers of **Hilti Firestop Bandage CFS-B** on both sides. The bandage is positioned with its centre line flush to the seal surface.

PVC-U pipes (C) according to EN 14493 and DIN 8061/8062 – U/U with Hilti Firestop Bandage CFS-B

Seal thickness ¹		$t_A \geq 150$ mm
Pipe diameter (dc) [mm]	Pipe wall thickness (tc) [mm]	Classification (mixed)
for wall applications		
50 – 110	1.8/2.2 – 12.3	EI 120-U/U
for floor applications		
50 – 110	1.8 – 12.3	EI 120-U/U

¹ For maximal seal size see chapter "seal size".

PVC PIPES FLOOR CONSTRUCTIONS WITH CAST-IN SLEEVES

Hilti Firestop Foam CFS-F FX (A) in PVC sleeves (F), diameter 75mm – 110mm, length of sleeve 200mm., build in flush to bottom side of the building element.

PVC pipes (C)

Seal thickness ¹				$t_A \geq 150 \text{ mm}$
Pipe		Insulation		Classification (multiple)
diameter (d_c) [mm]	wall thickness (t_c) [mm]	thickness (t_b) [mm]	length (L_D) [mm]	
32	1.9	-	-	EI 120-U/U

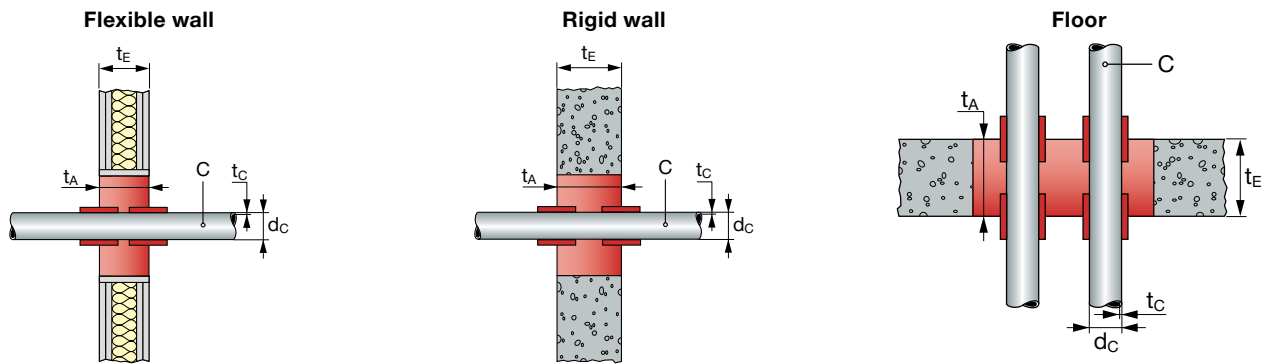


Figure 32
PVC pipe penetration

SPECIAL APPLICATIONS

“CLIMASPLIT” BUNDLES OF PIPES AND CABLES

FLEXIBLE WALL | RIGID WALL

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Special applications				$t_A \geq 100$ mm
Seal thickness ¹				Classification (mixed)
penetrant	type/ dimensions	pipe end		
Bundle (C) consisting of: 2 cooper pipes (C ₁) with continued sustained foamed elastomeric (t ₀ = 7–9 mm) insulation 2 cables (C ₂) 1 PVC pipe (C ₃)	cooper pipes (C ₁)	6 to 42 x 1	C/U	EI 90
	diameter × wall thickness (mm)			
	cables (C ₂)	5 × 6 mm ²	-	
	PVC pipes (C ₃) diameter × wall thickness (mm)	16 × 3.7 flex 25 × 4.3 flex 40 × 2.4	U/U	
Bundle (C) consisting of: 2 cooper pipes (C ₁) with continued sustained foamed elastomeric (t ₀ = 7–9 mm) insulation 2 cables (C ₂) 1 PVC pipe (C ₃)	cooper pipes (C ₁)	6 to 18 x 1	C/U	EI 90
	diameter × wall thickness (mm)			
	cables (C ₂)	5 × 6 mm ²	-	
	PVC pipes (C ₃) diameter × wall thickness (mm)	16 × 3.7 flex 25 × 4.3 flex 40 × 2.4	U/U	

¹ For maximal seal size see chapter “seal size”.

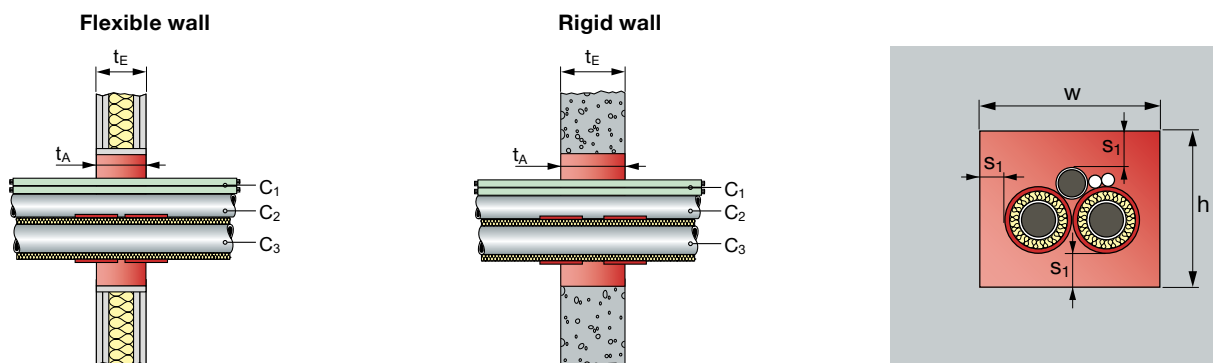


Figure 33
“Climasplit” penetration

Minimum distances (mm):	wall	floor
between services and seal edge (s ₁):	0	20
between all services inside clima split bundle (s ₂):	0	0
between services and upper seal edge	20	-

“CLIMASPLIT” BUNDLES OF PIPES AND CABLES

FLOOR

Hilti Firestop Foam CFS-F FX of thickness t_A centred regarding the thickness of the building element. In case of seal thickness $t_A >$ building element thickness t_E , see chapter “seal thickness”.

Climasplit bundles (C)

Seal thickness ¹				$t_A \geq 200$ mm
	penetrants	type/dimensions	pipe end	Classification (mixed)
Bundle (C) consisting of: 2 cooper pipes (C ₁) with continued sustained foamed elastomeric insulation ($t_0 = 7 - 9$ mm) 2 cables (C ₂) 1 PVC pipe (C ₃)	cooper pipes (C ₁)	6 to 42 x 1	C/U	EI 120
	diameter x wall thickness (mm)			
	cables (C ₂)	5 x 6 mm ²	-	
	PVC pipes (C ₃) diameter x wall thickness (mm)	16 x 3.7 flex 25 x 4.3 flex 40 x 2.4	U/U	

¹ For maximal seal size see chapter “seal size”.

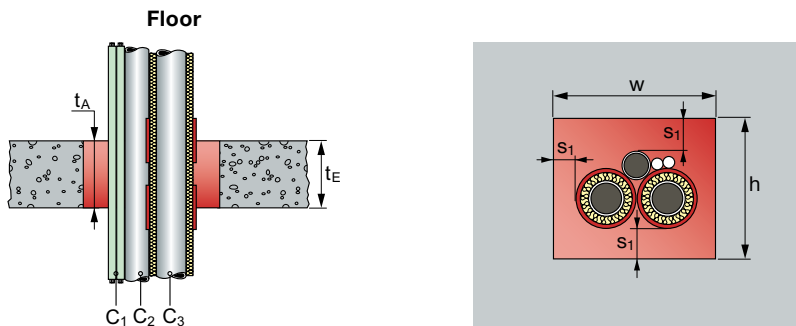


Figure 34
“Climasplit” penetration

Minimum distances (mm):	wall	floor
between services and seal edge (s_1):	0	20
between all services inside clima split bundle (s_2):	0	0
between services and upper seal edge	20	-

CHARACTERISTICS OF CFS-F FX

ADDITIONAL ATTRIBUTES

Hilti Firestop products are comprehensively tested and individually tailored to the technical requirements of a building's mechanical and electric installations. In addition to their superior behaviour in passive fire protection, Hilti Firestop products also meet the requirements in building technology that continue to gain significance and also help the designer and installer in meeting these additional requirements. The assessment of fitness for use has been made in accordance with EOTA ETAG N° 026 – Part 2.



Charecteristics	Assessment of charecteristics	Norm, standard, test
Health and the environment Air permeability (gas thightness)	Δp 50 Pa \Rightarrow 0.0007 q/A [m ³ /(h x m ²)] (174 mm thickness of layer) Δp 250 Pa \Rightarrow 0.0033 q/A [m ³ /(h x m ²)] Permeability regarding air	EN 1026
Dangerous substances	below any respective occupational exposure limits as far as such limits exist	Material safety data sheet
Safety in use Resistance to impact/movement / Mechanical resistance and stability / Adhesion	Soft body impact: Energy 1200 Nm Hard body impact: Energy 10 Nm fullfills requirements of zones Type I, II, III and IV maximum opening 400 x 400 mm	EOTA Technical Report TR001, A ₁
Protection against noise (Air borne sound insulation)	R_w (C; Ctr) = 61 (-2;-6) dB $D_{n,e,w}$ (C; Ctr) = 69 (-2; -7) dB	EN ISO 10140-1:2010+A1:2012, EN ISO 10140-2:2010 and EN ISO 717-1: 2013
Durability and serviceability	Category Y2 (suitable for penetration seals intended for use at temperatures between -20 °C and +70 °C) no exposure to rain or UV May be coated with acrylic dispersion, alkyd resin, polyurethan/acrylic and epoxy resin)	EOTA Technical Report TR024 ETAG 026-2
Reaction to fire	Class E	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).



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