

# HILTI

**Technical  
Data Sheet**

## **Hilti Firestop Collar CFS-C EL**

European Technical  
Assessment  
ETA N° 14/0085



Issue 06/2016

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# Firestop Collar Endless - CFS-C EL

Endless solution: One product for all applications



## Applications

- Approved for use with PVC, PP, PE and a wide array of standard acoustic pipes
- Configurations tested include pipe elbows, inclined pipes, pipes with limited clearance to the wall
- Acoustic pipes tested with insulation and sound decoupling
- Zero distance required to CFS-B firestop bandage, CFS-C EL firestop endless collar and Conlit
- Suitable for use on shaft walls, coated board, drywall, aerated concrete, masonry and concrete

## Advantages

- Flexible solution for waste water, roof drainage and pneumatic pipes
- Easy installation
- Problem solver for non-standard applications
- Zero distance required to CFS-B firestop bandage, CFS-C EL firestop endless collar and Conlit
- Well-suited to complex pipe configurations

The ETA (European Technical Assessment) and the Technical data sheet can be obtained via your local Hilti contact.

## Technical data

CFS-C EL	
<b>Pipe diameter range</b>	16 – 160 mm
<b>Intumescent</b>	Yes
<b>Length</b>	2580 mm
<b>Width</b>	52 mm
<b>Thickness</b>	17 mm
<b>Expansion temperature</b>	210°C
<b>Application temperature range</b>	-5°C – 50°C
<b>Temperature resistance</b>	-30°C – 80°C



## Ordering

Ordering designation	Sales quantity	Item number
Firestop Collar Endless CFS-C EL	2.58 meters of Inlay 18 Closure Plates 22 Short Hooks	2075120

## Accessories CFS-C EL

Accessories for the Hilti Firestop Collar Endless CFS-C EL are available separately.



### Ordering

Ordering designation	Sales quantity	Item number
<b>Closure plate CFS-C EL</b>	<b>18 Closure Plates</b>	<b>2075121</b>
<b>Hook CFS-C EL short</b>	<b>22 Short Hooks</b>	<b>2075122</b>
<b>Hook CFS-C EL long</b>	<b>2 Long Hooks</b>	<b>2075123</b>

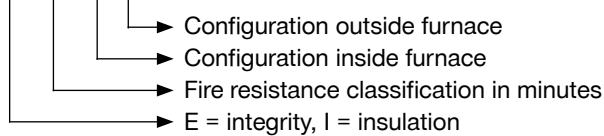


# 1. General information

## 1.1 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).

### EI 90 U/U



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.

### For 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

### For plastic pipes:

		Tested			
		U/U	C/U	U/C	C/C
Covered	U/U	Y	N	N	N
	C/U	Y	Y	N	N
	U/C	Y	Y	Y	N
	C/C	Y	Y	Y	Y

Y = acceptable, N = not acceptable

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

## 1.2 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.

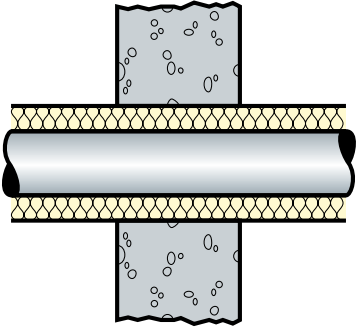
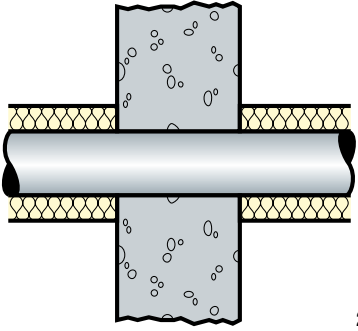
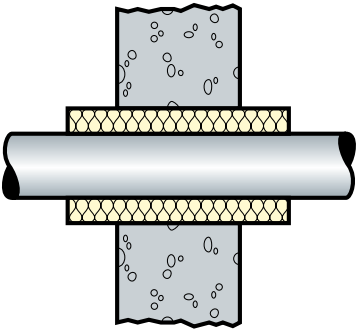
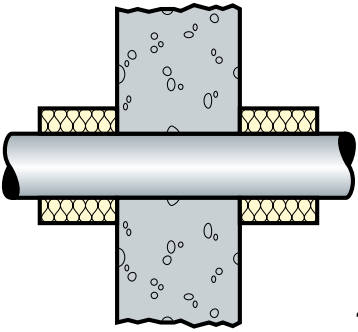
### Intended use of penetrations

(list not exhaustive, other pipes uses possible)

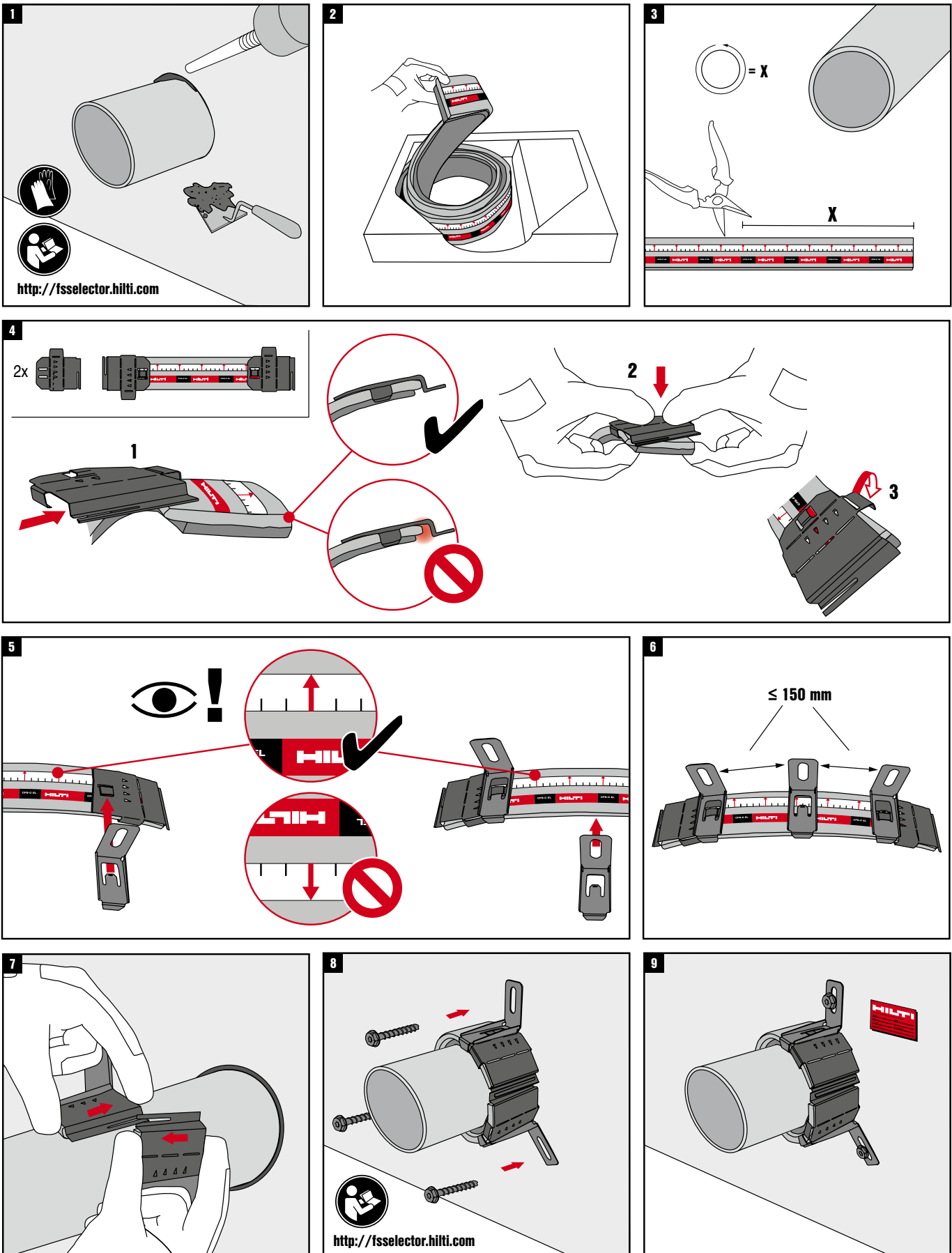
<b>(List not exhaustive, other pipe uses possible)</b>				
<b>Application</b>	<b>Pipe material</b>	<b>Manufacturer, product</b>	<b>Insulation (Typically)</b>	<b>Recommended pipe end configuration</b>
<b>Ventilated Waste water</b>	PE	EN 1519-1 EN 12666-1 EN 12201-2	Flammable (Sound decoupling PE hose)	<b>U/U</b>
	PE	Geberit db20		
	PP	EN 1451-1		
	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1		
	Mineralized PP-pipes (Acoustic Pipes)	Coes blue power		
		Coes PhoNoFire		
		Geberit Silent PP		
		Kekelit PhonEX AS		
		Marley Silent		
		Ostendorf- Gruppe Skolan db		
		Pipelife Master 3		
		Poloplast Polokal NG		
		Poloplast Polokal 3S		
		Rehau Raupiano Plus		
Valsir Triplus				
Valsir Silere				
Wavin SiTech				
Wavin AS				
<b>Roof drainage</b>	PE	EN 1519-1 EN12666-1 EN12201-2	Flexible, elastomeric thermal insulation	<b>U/U</b>
<b>Pneumatic Dispatch</b>	PVC-U	DIN 6660	Flammable (Sound decoupling PE hose)	<b>U/U</b>
<b>Industry</b>	PE	EN 15494 EN 12201-2 DIN 8074/75  Wavin W	various	Varies depending upon application, i.e. consider whether pipe is pressurized (U/C), ventilated (U/U) or unventilated (U/C)
<b>Various</b>	ABS	EN 1455-1 EN 15493		<b>U/U</b>
	SAN+PVC	EN 1565-1		
<b>Heat- ing/ Sprinkler/ Fresh water supply</b>	PP-R	EN 15874	Flexible, elastomeric thermal insulation	U/C
	PE-X	EN15875	Flexible, elastomeric thermal insulation	U/C

**1.3 Pipe insulation 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
 <p style="text-align: right;"><b>1</b></p>	 <p style="text-align: right;"><b>2</b></p>
Insulation only required in the area of the penetration seal	
Local sustained	Local interrupted
 <p style="text-align: right;"><b>3</b></p>	 <p style="text-align: right;"><b>4</b></p>

### 1.4 General IFU




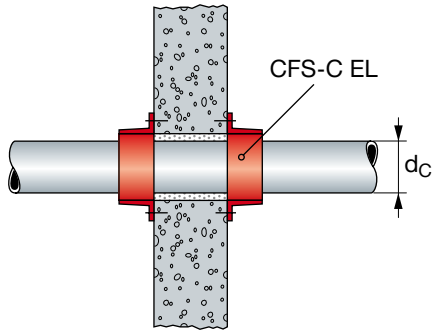
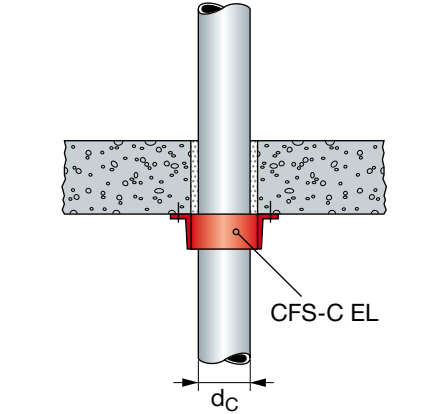

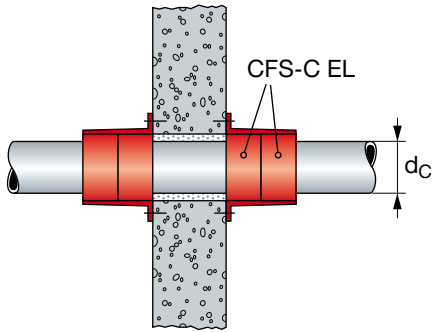
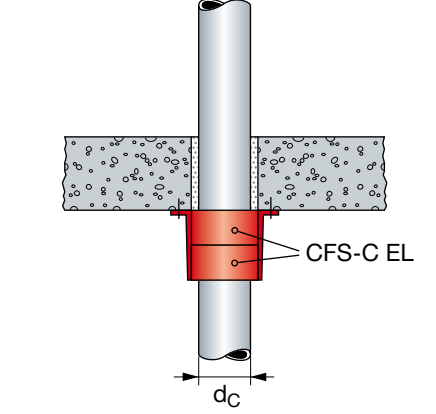
## 2. Firestop Collar Endless CFS-C EL - General Information

The Firestop Collar Endless CFS-C EL is a very versatile solution that can be used to Firestop a vast list of pipe types, installed in different configurations and in various base materials. For this reason it's important to have an overview of the range of application before displaying the classification for all the combinations.

### 2.1 Pipe group

The Firestop Collar Endless is intended to be used for single penetrations; on both sides of all walls and on the bottom side of the floor (soffit).

For a clearer overview of the field of application of the Firestop Collar Endless the first separation that needs to be considered is the pipe diameters covered, as displayed below:

<p><b>Pipe group 1</b>  <math>d_c = (32,0 \text{ mm} \leq d_c \leq 110,0 \text{ mm})</math></p> 		
<p><b>Base Materials:</b></p>	<p>Flexible Wall            Shaft Wall            Rigid Wall</p>	<p>Rigid Floor</p>
<p><b>Pipe group 2</b>  <math>d_c = (125,0 \text{ mm} \leq d_c \leq 160,0 \text{ mm})</math></p> 		
<p><b>Base Materials:</b></p>	<p>Rigid Wall</p>	<p>Rigid Floor</p>

## 2.2 Collar Fixing

When installing the Firestop Collar Endless CFS-C EL for all the different combinations, it's always required to use hooks that can be short or long. For each hook it's obligatory to use a fixing element that varies according to the material where it's being installed. The table describing the right fixing is shown below:

Type of wall/Floor (material)	screw anchor Hilti HUS H6 and P6	hollow wall metallic anchor Hilti HTB-S	cavity anchor Hilti HHD-S	threaded rod M6 with disc and nut
Drywall	x	x	x	x
Rigid wall	x			x
Rigid floor	x			x
Shaft wall	x	x		
Coated Board				x

It's also possible to bend the hooks and press them into the wet gap seal in concrete walls and floors. For more details refer to 3.18.

### 2.3 Pipe support

Straight pipes up to 110 mm have to be supported at maximum 400 mm away from both faces of any walls. In floor penetrations, straight pipes up to 110 mm have to be supported on the top only, maximum 400 mm above floor level. All other configurations have to be fixed at maximum 250 mm.

### 2.4 Sound decoupling insulation:

Plastic pipes can have sound decoupling insulation with the following approved materials:

- Foamed polyethylene based sound decoupling insulation, thickness (4 mm – 9 mm)
- Thermaflex, ThermoVließ B2 (Polyester), thickness 4 mm

Sound decoupling insulation penetrates the wall/floor element and the collar CFS-C EL too and it could be used with all configurations; Local Sustained, Local Interrupted, Continued Sustained or Continued Interrupted.

**2.5 Abbreviations used in drawings**

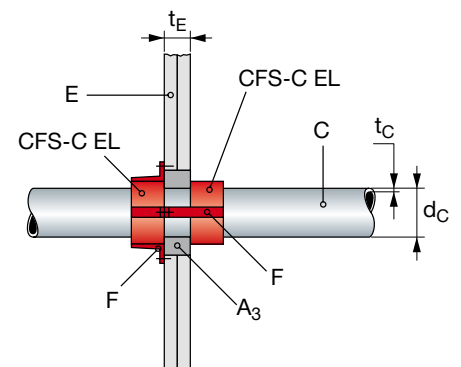
Abbreviation	Description
A <sub>1</sub>	Hilti Firestop Collar Endless CFS-C EL
A <sub>1,0</sub>	Hilti Firestop Collar Endless CFS-C EL with oddment
A <sub>2</sub>	Annular gap seal with Hilti Firestop Acrylic Sealant CFS-S ACR
A <sub>3</sub>	Annular gap seal with Hilti CFS-FIL
A <sub>4</sub>	Annular gap seal with gypsum plaster
A <sub>5</sub>	Annular gap seal with cementious mortar acc. EN 998-2, group M10
B	Backfilling material (mineral wool)
C	Plastic Pipe
C <sub>1</sub>	Sound decoupling insulation
D	Pipe insulation
D <sub>w</sub>	Pipe insulation, incombustible, based on mineral wool
D <sub>e</sub>	Pipe insulation, combustible, based on elastomeric foamed material
D <sub>p</sub>	Pipe insulation, Protect insulation
d <sub>c</sub>	Pipe diameter (nominal outside diameter) for plastic pipes
d <sub>M</sub>	Pipe diameter (nominal outside diameter) for metal pipes
E	Building element (wall, floor)
F	Hooks (long or short) for Fixing of the collar
M	Metal pipe
S <sub>1</sub>	Minimum distance between single penetration seals
S <sub>2</sub>	Minimum distance between clustered pipe
S <sub>3</sub>	Minimum distance between penetrating pipe and building element
t <sub>A2</sub>	Thickness of Hilti Firestop Acrylic Sealant CFS-S ACR
t <sub>A3</sub>	Thickness of Hilti CFS-FIL
t <sub>C</sub>	Plastic Pipe wall thickness
t <sub>M</sub>	Metal Pipe wall thickness
t <sub>D</sub>	Insulation thickness
t <sub>E</sub>	Thickness of the building element
L <sub>D</sub>	Length of Insulation
ρ <sub>E</sub>	Density of the building element
n	amount, number of pieces

**2.6 Base materials**

**2.6.1 Shaft Walls**

Hilti Firestop Collar Endless CFS-C EL (A<sub>1</sub>) can be used to seal plastic pipes installed in shaft wall systems classified at least with EI 90 according EN 13501-2. The shaft wall is made of two layers each of 25 mm Knauf Fireboard plates (acc. EN 15283-1), combustibility class A1 acc. EN 13501-1. The annular gap around penetrating pipes should be 5 to 40 mm and filled with the CFS-FIL applied from one side over the entire thickness of the wall.

For more information refer to section 3.5 of the ETA 14/0085.





### 2.6.2 Drywalls

The wall must have a minimum thickness of 100 mm and 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).

For more information refer to section 3.2 of the ETA 14/0085.

<p>Plastic Pipe, penetrating a flexible wall construction, with or without sound decoupling insulation (C<sub>1</sub>).</p> <p>Annular gaps around pipes in flexible walls should be filled with either:</p> <ul style="list-style-type: none"> <li>• Gypsum based mortar</li> <li>• Hilti Firestop Acrylic sealant CFS-S ACR.</li> </ul> <p>Joint filler has to be installed from both sides of the flexible wall with a minimum installation depth of (<math>t_{A2,A4} &gt; 25</math> mm), a gap width : 0 – 15 mm. Backfilling is not requested.</p>	
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### 2.6.3 Rigid walls

The wall must have a minimum thickness of ( $t_E > 100$  mm) and minimum density of ( $\rho_E > 650$  kg/m<sup>3</sup>) and comprise concrete, aerated concrete, brickwork, lime malm bricks or masonry.

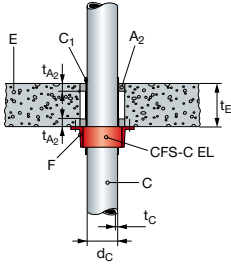
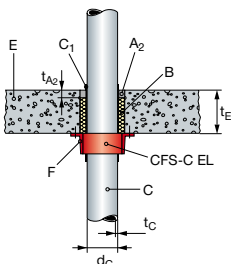
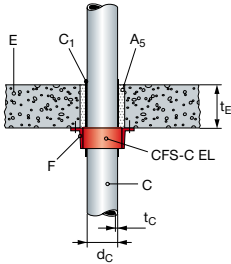
For more information refer to section 3.3 of the ETA 14/0085.

<p>Plastic Pipe, penetrating a rigid wall construction, with or without sound decoupling insulation (C<sub>1</sub>).</p> <p><b>Gap With: 0 – 15 mm</b></p> <p>The annular gaps around pipes should be filled with Hilti Firestop Acrylic Sealant CFS-S ACR (A<sub>2</sub>) only with a depth of (<math>t_{A2} &gt; 25</math> mm) from the surface of the wall.</p>	
<p>Plastic Pipe, penetrating a rigid wall construction, with or without sound decoupling insulation (C<sub>1</sub>).</p> <p><b>Gap With: 0 – 40 mm</b></p> <p>The annular gaps around pipes should be filled with Hilti Firestop Acrylic Sealant CFS-S ACR (A<sub>2</sub>) on both sides with a depth of minimum (<math>t_{A2} &gt; 25</math> mm) from the surface of the wall, backfilled with mineral wool</p>	
<p>Plastic Pipe, penetrating a rigid wall construction, with or without sound decoupling insulation (C<sub>1</sub>).</p> <p><b>Gap With: 0 – 40 mm</b></p> <p>The annular gaps around pipes should be filled with Cementitious mortar acc. EN 998-2 group M10 over the entire thickness of the wall</p>	

**2.6.4 Rigid floors**

The floor must have a minimum thickness of 150 mm with a minimum density of  $\rho_E > 650 \text{ kg/m}^3$  and comprise concrete, aerated concrete, or masonry.

For more information refer to section 3.4 of the ETA 14/0085.

<p>Plastic Pipe, penetrating a rigid floor construction, with or without sound decoupling insulation (<math>C_1</math>).</p> <p><b>Gap With: 0 – 15 mm</b></p> <p>The annular gaps around pipes should be filled with Hilti Firestop Acrylic Sealant CFS-S ACR (<math>A_2</math>) only, installation depth <math>t_{A_2} = (t_{A_2} &gt; 25 \text{ mm})</math>, installed on both sides of floor</p>	 <p>The diagram shows a vertical plastic pipe (C) passing through a rigid floor (E) of thickness <math>t_E</math>. The pipe has an outer diameter <math>d_C</math> and a collar (CFS-C EL) with a thickness <math>t_C</math>. The annular gap between the pipe and the floor is filled with sealant (<math>A_2</math>) on both the top and bottom surfaces. The sealant installation depth is <math>t_{A_2}</math>. The floor construction includes sound decoupling insulation (<math>C_1</math>) and a firestop collar (F). Labels E, <math>C_1</math>, <math>A_2</math>, F, C, and <math>d_C</math> are present.</p>
<p>Plastic Pipe, penetrating a rigid floor construction, with or without sound decoupling insulation (<math>C_1</math>).</p> <p><b>Gap With: 0 – 40 mm</b></p> <p>The annular gaps around pipes should be filled with Hilti Firestop Acrylic Sealant CFS-S ACR (<math>A_2</math>) on top side of floor only with a depth of minimum (<math>t_{A_2} &gt; 25 \text{ mm}</math>), backfilled with mineral wool</p>	 <p>The diagram shows a vertical plastic pipe (C) passing through a rigid floor (E) of thickness <math>t_E</math>. The pipe has an outer diameter <math>d_C</math> and a collar (CFS-C EL) with a thickness <math>t_C</math>. The annular gap between the pipe and the floor is filled with sealant (<math>A_2</math>) on the top surface only, with a minimum depth <math>t_{A_2} &gt; 25 \text{ mm}</math>. The gap is backfilled with mineral wool (B). The floor construction includes sound decoupling insulation (<math>C_1</math>) and a firestop collar (F). Labels E, <math>C_1</math>, <math>A_2</math>, B, F, C, and <math>d_C</math> are present.</p>
<p>Plastic Pipe, penetrating a rigid floor construction, with or without sound decoupling insulation (<math>C_1</math>).</p> <p><b>Gap With: 0 – 40 mm</b></p> <p>The annular gaps around pipes should be filled with Cementitious mortar acc. EN 998-2 group M10 over the entire thickness of the wall</p>	 <p>The diagram shows a vertical plastic pipe (C) passing through a rigid floor (E) of thickness <math>t_E</math>. The pipe has an outer diameter <math>d_C</math> and a collar (CFS-C EL) with a thickness <math>t_C</math>. The annular gap between the pipe and the floor is filled with cementitious mortar (<math>A_5</math>) over the entire thickness of the wall. The floor construction includes sound decoupling insulation (<math>C_1</math>) and a firestop collar (F). Labels E, <math>C_1</math>, <math>A_5</math>, F, C, and <math>d_C</math> are present.</p>

### 3. Fire classification details per application

#### 3.1 Straight pipes (Group 1)



Pipe diameters	$\varnothing \leq 110$ mm
Allowable sound decoupling thickness	4 or 9 mm
Base Materials	Flexible wall ( $t_E \geq 100$ mm)
	Rigid wall ( $t_E \geq 100$ mm)
	Floor ( $t_E \geq 150$ mm)

**Description:** All pipes up to 110 mm going through walls or floors with only one layer of Firestop Collar Endless.

#### Recommended length and number of hooks:

Length to cut (mm)					
Pipe outside nominal diameter $d_c$ (mm)	Acoustic Pipe Insulation Thickness (mm)				
	0	4	9	13	25
16	130	130	160	180	260
32	150	180	205	230	310
40	180	200	230	260	340
50	210	230	270		
56	230	250	290		
63	250	280	310		
75	290	310	340		
90	340	360	390		
110	400	420	450		

Number of hooks					
Pipe outside nominal diameter $d_c$ (mm)	Acoustic Pipe Insulation Thickness (mm)				
	0	4	9	13	25
16	2	2	2	2	3
32	2	2	2	2	3
40	2	2	2	3	3
50	2	2	2		
56	3	3	3		
63	3	3	3		
75	3	3	3		
90	3	3	3		
110	3	3	3		

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

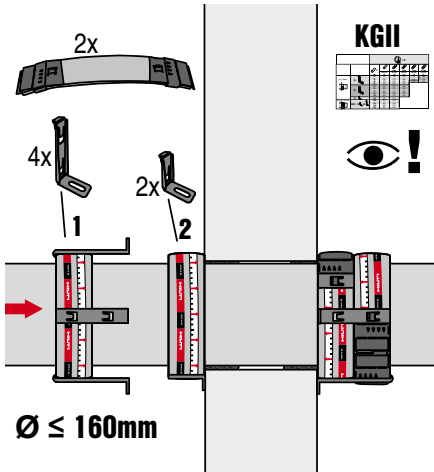
Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	flexible wall	EI 120 U/U	3.2.2.1
			rigid wall	EI 120 U/U	3.2.2.1
			floor	EI 120 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	flexible wall	EI 120 U/U	3.2.2.12
			rigid wall	EI 120 U/U	3.2.2.12
			floor	EI 120 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	flexible wall	EI 120 U/U <b>EI 120 U/C</b>	3.2.2.10 3.2.2.11
			rigid wall	EI 120 U/U <b>EI 120 U/C</b>	3.2.2.10 3.2.2.11
			floor	EI 120 U/U <b>EI 90 U/U</b> <b>EI 120 U/C</b>	3.4.2.7 3.4.2.8 3.4.3.9
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 90 U/U	3.2.2.9
			rigid wall	EI 120 U/U	3.2.2.9
			floor	EI 120 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 120 U/U	3.2.2.8
			rigid wall	EI 120 U/U	3.2.2.8
			floor	EI 120 U/U EI 90 U/U	3.4.2.4 3.4.2.5
Waste water	Friatec Friaphon	PVC non-regulated	flexible wall	EI 90 U/U	3.2.2.13
			rigid wall	EI 90 U/U	3.2.2.13
			floor	EI 180 U/U	3.4.2.11
Letter shots	PVC	DIN 6660	flexible wall	EI 90 U/U	3.2.2.13
			rigid wall	EI 90 U/U	3.2.2.13
			floor	EI 120 U/U	3.4.2.10
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	flexible wall	EI 120 U/U EI 90 U/U	3.2.2.4 3.2.2.5
				EI 120 U/C <b>EI 90 U/C</b>	3.2.2.6 3.2.2.7
				rigid wall	EI 120 U/U EI 90 U/U
			EI 120 U/C <b>EI 90 U/C</b>		3.2.2.6 3.2.2.7
			floor		EI 120 U/U
			Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1
rigid wall	EI 90 U/U <b>EI 60 U/U</b>	3.2.2.2 3.2.2.3			
	floor	EI 120 U/U			

### 3.2 Straight pipes (Group 2)



Pipe diameters	125 mm ≤ Ø ≤ 160 mm
Allowable sound decoupling thickness	4 or 9 mm
Base Materials	Rigid wall (tE ≥ 150 mm)
	Floor (tE ≥ 150 mm)

**Description:** Pipes bigger than 110mm going through rigid walls and rigid floors, need to be firestopped with two Firestop Collar Endless CFS-C EL.



**Installation overview:** It's necessary to cut two identical pieces with the recommend length (See table below) and install the closure plates at each end.

**Collar 1** – Install two long hooks into the closure plates and two more long hooks on the collar. The distance between all of them must be similar.

**Collar 2** – Install only two short hooks into the closure plates and fix it first to the base material.

Pipe group 2  
video instruction



#### Recommended length and number of hooks:

Pipe outside nominal diameter d <sub>c</sub> (mm)	Length to cut (mm)		
	Acoustic Pipe Insulation Thickness (mm) identical on both sides of the flexible wall/rigid wall		
	0	4	9
125	450	470	500
135	480	500	530
140	490	520	550
160	560	580	610

Number of hooks
2 Short and 4 Long

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

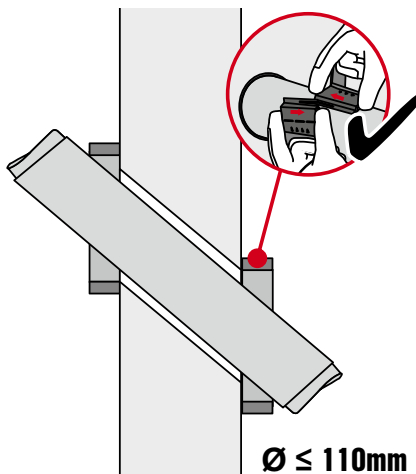
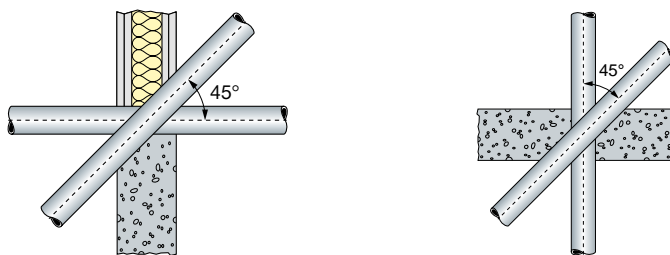
Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	rigid wall	EI 120 U/U	3.2.2.19
			floor	EI 120 U/U	3.4.2.12
Waste water	PE Geberit silent DB	non-regulated	rigid wall	EI 120 U/U	3.2.2.29
			floor	EI 120 U/U	3.2.2.22
Waste water	PP	EN 1451-1, DIN 8077/78	rigid wall	EI 120 U/U <b>EI 30 U/U</b> <b>EI 120 U/C</b>	3.3.2.25 3.3.2.26 3.3.2.27
			floor	EI 120 U/U	3.4.2.20
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	rigid wall	EI 120 U/U	3.3.2.24
			floor	EI 120 U/U	3.4.2.19
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	rigid wall	EI 120 U/U	3.3.2.23
			floor	<b>EI 90 U/U</b> <b>EI 120 U/C</b>	<b>3.4.2.18</b> <b>3.4.2.23</b>
Waste water	Friatec Friaphon	PVC non-regulated	rigid wall	EI 120 U/U	3.3.2.31
			floor	EI 180 U/U	3.4.2.26
Letter shots	PVC	DIN 6660	rigid wall	EI 90 U/U	3.2.2.28
			floor	EI 120 U/U	3.4.2.21
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	rigid wall	EI 120 U/U	3.3.2.22
			floor	<b>EI 90 U/U</b> <b>EI 120 U/C</b> <b>EI 120 U/U</b>	3.4.2.15 3.4.2.16 3.4.2.17
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	rigid wall	EI 90 U/U <b>EI 120 U/C</b>	3.3.2.20 3.3.2.21
			floor	EI 120 U/U <b>EI 60 U/U</b>	3.4.2.13 3.4.2.14

### 3.3 Inclined pipes



Angle with the support	45–90°
Pipe diameters	Ø ≤ 110 mm
Allowable sound decoupling thickness	4 or 9 mm
Base Materials	Flexible Wall (tE ≥ 100 mm)
	Rigid wall (tE ≥ 100 mm)
	Floor (tE ≥ 150 mm)

**Description:** Inclined pipes may be used in flexible walls, rigid walls and rigid floors. The inclination has to be between 45 and 90 degrees as displayed below:



**Installation overview:** For this application it's necessary to measure the length of the Hilti Firestop Collar Endless CFS-C EL directly on the pipe. It's crucial that there is no space between the Collar and the pipe. The recommended number of hooks is shown below.

**Inclined pipe video instruction**



**Recommended length and number of hooks:**

Length to cut (mm)
Measure directly on the pipe

Pipe outside nominal diameter d <sub>c</sub> (mm)	Number of hooks		
	Acoustic Pipe Insulation Thickness t <sub>b</sub> (mm) identical on both sides of the flexible wall/rigid wall		
	0	4	9
32	3	3	3
50	3	3	3
75	3	4	4
90	4	4	5
110	5	5	5



**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**For Flexible/Rigid walls: 3.2.2.20**
**For Rigid Floors: 3.4.2.29**

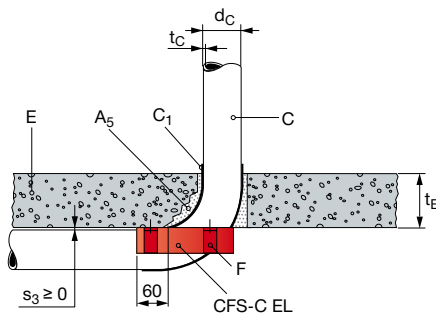
Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	flexible wall	EI 90 U/U	3.2.2.1
			rigid wall	EI 90 U/U	3.2.2.1
			floor	EI 90 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	flexible wall	EI 90 U/U	3.2.2.12
			rigid wall	EI 90 U/U	3.2.2.12
			floor	EI 90 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	flexible wall	EI 90 U/U	3.2.2.10
			rigid wall	EI 90 U/U	3.2.2.10
			floor	EI 90 U/U	3.4.2.8
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 90 U/U	3.2.2.9
			rigid wall	EI 90 U/U	3.2.2.9
			floor	EI 90 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 90 U/U	3.2.2.8
			rigid wall	EI 90 U/U	3.2.2.8
			floor	EI 90 U/U	3.4.2.5
Waste water	Friatec Friaphon	PVC non-regulated	floor	EI 180 U/U	3.4.2.32
Letter shots	PVC	DIN 6660	flexible wall	EI 90 U/U	3.2.2.13
			rigid wall	EI 90 U/U	3.2.2.13
			floor	EI 120 U/U	3.4.2.10
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	flexible wall	EI 90 U/U	3.2.2.5
			rigid wall	EI 90 U/U	3.2.2.5
			floor	EI 90 U/U	3.4.2.3
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	flexible wall	EI 90 U/U	3.2.2.2
			rigid wall	EI 90 U/U	3.2.2.2
			floor	EI 90 U/U	3.4.2.2

### 3.4 Elbow 87 degrees

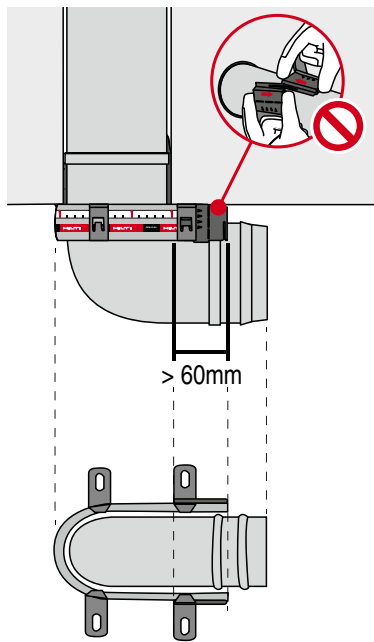
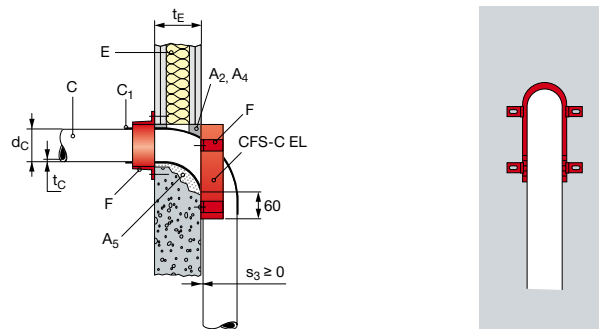
Pipe diameters	$\text{Ø} \leq 110 \text{ mm}$
Allowable sound decoupling thickness	4 or 9 mm
Base Materials	Flexible Wall ( $t_E \geq 100 \text{ mm}$ )
	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** It's possible to have an elbow immediately after the penetration on the construction support. This elbow with 87 degrees is also a coupling element that increases the total diameter of the pipe. In cases where the elbow is too close to the construction material with very limited space it's possible to install the CFS-C EL with a U-Shape around the elbow using a slightly longer length in conjunction with the closure plates and the small hooks.

#### For rigid floors:

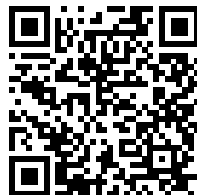


#### For Flexible and rigid walls:



**Installation overview:** To the recommended length of the diameter it's necessary to add 120mm. The reason for that is that the hooks of the closure plates (Which are absolutely crucial for this application) need to be fixed in the base material and with a safe distance from the final of the opening. The collar doesn't need to be closed for this application; it's installed with a U-Shape around the collar.

#### Elbow pipe video instruction



$$X = \text{Ø} + 120 \text{ mm}$$

$$\text{Ø} \leq 110 \text{ mm}$$

**Recommended length and number of hooks:**

Length to cut (mm)			
Pipe outside nominal diameter $d_c$ (mm)	Acoustic Pipe Insulation Thickness (mm) identical on both sides of the flexible wall/rigid wall		
	0	4	9
16	250	250	280
32	270	300	330
40	300	320	350
50	330	350	390
56	350	370	410
63	370	400	430
75	410	430	460
90	460	480	510
110	520	540	570

**Note:** The length to cut for this application is equal to the length of a straight penetration of group 1 plus 120 mm.

Number of hooks			
Pipe outside nominal diameter $d_c$ (mm)	Acoustic Pipe Insulation Thickness (mm) (no elbow side - horizontal running pipe/elbow side - vertical running pipe)		
	0	4	9
32	2/2	2/2	2/2
50	2/2	2/2	2/3
75	3/3	3/3	3/3
90	3/3	3/3	3/3
110	3/4	3/4	3/4

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 90 U/U	3.2.2.17
			rigid wall	EI 90 U/U	3.2.2.17
			floor	EI 120 U/U	3.4.2.30
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 120 U/U	3.2.2.27
			rigid wall	EI 120 U/U	3.2.2.27
			floor	EI 120U/U	3.4.2.47
Waste water	PP	EN 1451-1 DIN 8077/78	flexible wall	EI 90 U/U	3.2.2.28
			rigid wall	EI 90 U/U	3.2.2.28
			floor	EI 120U/U	3.4.2.46

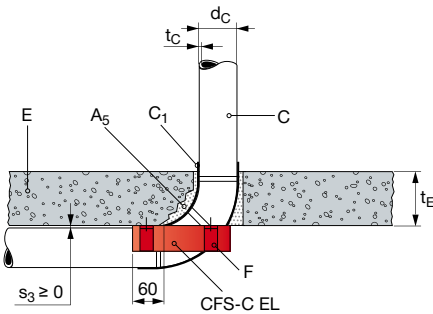
**3.5 Elbow 2x45 degrees**



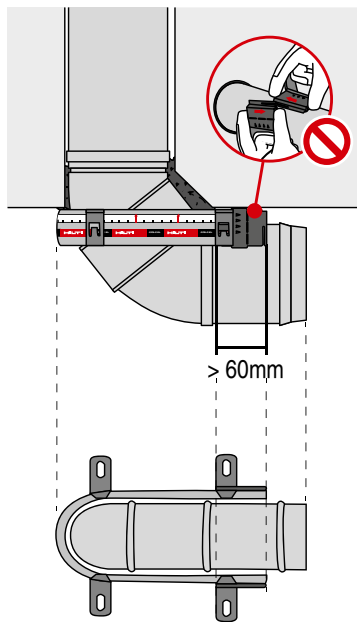
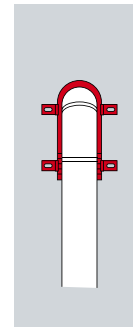
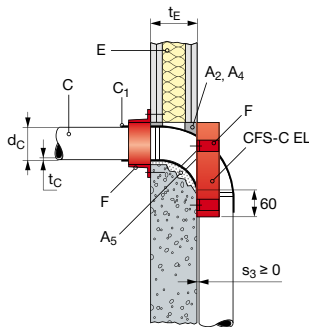
3 ISHIGDP HMLV	$\varnothing \leq 110 \text{ mm}$
ØZ DE Ø1VRXQG GHFRXS ØQJ IWKIENQHW	4 or 9 mm
Base Materials	) Ø IEØI: DØ (tE ≥ 100 mm)
	5 UJGIZ DØ (tE ≥ 100 mm)
	Floor (tE ≥ 150 mm)

**Description:** The firestop collar is used for sealing the penetration of a 2x45 degree elbow pipe through a wall or floor. It consists of a collar with a fire-resistant core and a metal frame. The collar is installed around the pipe and secured with screws. The fire-resistant core is made of mineral wool or a similar fire-resistant material. The metal frame is made of galvanized steel. The collar is available in two sizes: 4 mm and 9 mm. The collar is used for walls and floors with a thickness of at least 100 mm. For floors, the thickness should be at least 150 mm. The collar is used for pipes with a diameter of up to 110 mm. The collar is used for pipes with a wall thickness of at least 6 mm. The collar is used for pipes with a wall thickness of at least 6 mm. The collar is used for pipes with a wall thickness of at least 6 mm.

**For rigid floors:**



**For Flexible and rigid walls:**



**Installation overview:** The firestop collar must be fixed to the base material (wall or floor) with screws. It is crucial that the collar is not fixed to the pipe. The collar must be fixed to the base material with a safe distance from the final edge of the opening. The collar does not need to be fixed to the pipe. The collar must be fixed to the base material with a safe distance from the final edge of the opening. The collar does not need to be fixed to the pipe.

**Elbow pipe video instruction**



$X = \varnothing + 120 \text{ mm}$

$\leq 110 \text{ mm}$

**Recommended length and number of hooks:**

Length to cut (mm)			
Pipe outside nominal diameter $d_c$ (mm)	Acoustic Pipe Insulation Thickness (mm) identical on both sides of the flexible wall/rigid wall		
	0	4	9
16	250	250	280
32	270	300	330
40	300	320	350
50	330	350	390
56	350	370	410
63	370	400	430
75	410	430	460
90	460	480	510
110	520	540	570

**Note:** The length to cut for this application is equal to the length of a straight penetration of group 1 plus 120 mm.

Number of hooks			
Pipe outside nominal diameter $d_c$ (mm)	Acoustic Pipe Insulation Thickness (mm) (no elbow side – horizontal running pipe/elbow side – vertical running pipe)		
	0	4	9
32	2/2	2/2	2/2
50	2/2	2/2	2/3
75	3/3	3/3	3/3
90	3/3	3/3	3/3
110	3/4	3/4	3/4

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE Geberit silent DB <sup>1</sup>	non-regulated	rigid wall <sup>2</sup>	EI 120 U/U	3.3.2.12A
			floor	EI 120 U/U	3.4.2.11A
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 60 U/U	3.2.2.19
			rigid wall <sup>2</sup>	EI 120 U/U	3.3.2.17
			floor	EI 120 U/U	3.4.2.31
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 60 U/U	3.2.2.19
			rigid wall	EI 60 U/U	3.2.2.19

<sup>1</sup> Ellbow connector 45°: Geberit Silent dB20 based on PE electro-welding wire inside.

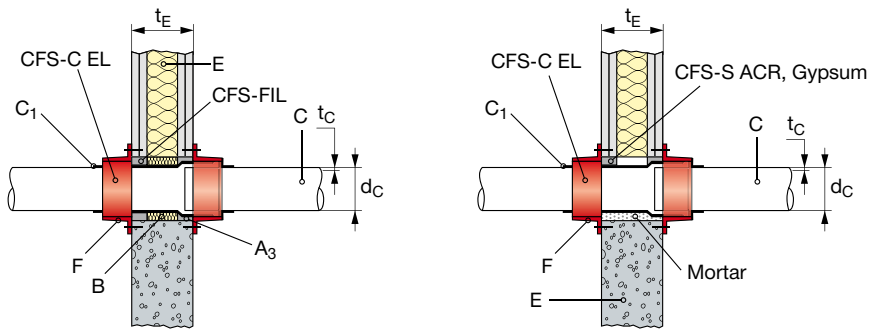
<sup>2</sup> The gap filler for this application is CFS-FIL. Please refer to the ETA 14/0085 section for more details.



### 3.6 Pipe coupling

Pipe diameters	$\varnothing \leq 110 \text{ mm}$
Allowable sound decoupling thickness	4 or 9 mm
Base Materials	Flexible Wall ( $t_E \geq 100 \text{ mm}$ )
	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** Hilti Firestop Collar Endless CFS-C EL can be used for pipe coupling penetrations inside the wall, half in the wall or outside the wall.



**Installation overview:** It's necessary to measure the length directly on the coupling perimeter and use the recommended number of hooks, as displayed below:

**Recommended length and number of hooks:**

Length to cut (mm)
Measure directly on the pipe

Pipe outside nominal diameter $d_C$ (mm)	Number of hooks		
	Acoustic Pipe Insulation Thickness $t_D$ (mm) (incoming pipe/outgoing pipe)		
	0	4	9
32	2/2	2/2	2/2
50	2/2	2/2	2/2
75	3/3	3/3	3/3
90	3/3	3/3	3/3
110	3/4	3/4	3/4

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

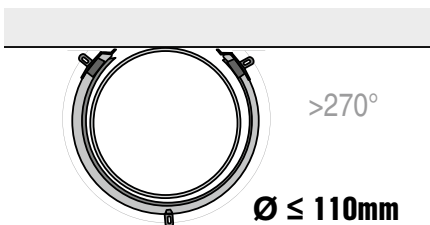
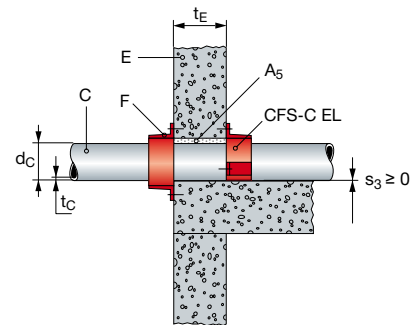
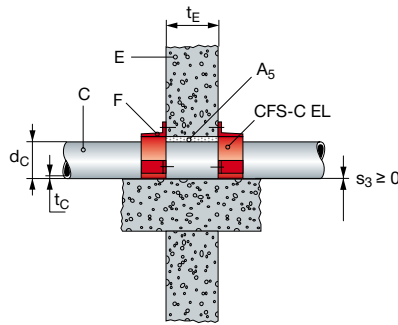
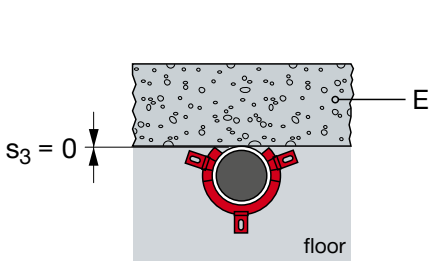
Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE Geberit silent DB	non-regulated	rigid wall <sup>1</sup>	EI 120U/U	3.3.2.12A
			rigid wall	EI 30U/U	3.3.2.12B
			floor	EI 120U/U	3.4.2.11B
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 120 U/U <sup>1</sup> EI 60 U/U	3.2.2.16 3.2.2.18
			rigid wall	EI 120 U/U <sup>1</sup> EI 60 U/U	3.2.2.16 3.2.2.18
			floor	EI 120 U/U	3.4.2.34
Waste water	PP	EN 1451-1 DIN 8077/78	flexible wall	EI 120 U/U	3.2.2.26
			rigid wall	EI 120 U/U	3.2.2.26
			floor	EI 120 U/U	3.4.2.45

<sup>1</sup> The gap filler for this application is CFS-FIL. Please refer to the ETA section for more details.

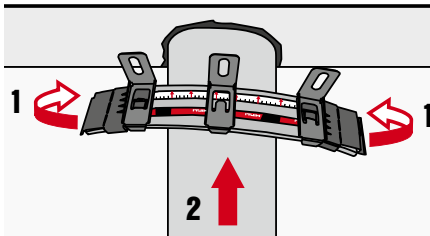
### 3.7 Pipe on the wall

Pipe diameters	$\varnothing \leq 110 \text{ mm}$
Allowable sound decoupling thickness	4 or 9 mm
Base Materials	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** Pipes directly mounted on the wall or floor with zero distance to it.



**Installation overview:** Measure the length needed for the pipe diameter directly on the penetration. It has to cover more than  $\frac{3}{4}$  of the total perimeter of the pipe.



**Recommended length and number of hooks:**

Length to cut (mm)
Measure directly on the pipe

Number of hooks					
Pipe outside nominal diameter d <sub>c</sub> (mm)	Acoustic Pipe Insulation Thickness (mm)				
	0	4	9	13	25
16	2	2	2	2	3
32	2	2	2	2	3
40	2	2	2	3	3
50	2	2	2		
56	3	3	3		
63	3	3	3		
75	3	3	3		
90	3	3	3		
110	3	3	3		

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**For Rigid Walls: 3.3.2.8**

**For Rigid Floors: 3.4.2.33**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	rigid wall	EI 120 U/U	3.3.2.1
			floor	EI 120 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	rigid wall	EI 120 U/U	3.2.2.12
			floor	EI 120 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	rigid wall	EI 120 U/U	3.3.2.6
			floor	EI 120 U/U	3.4.2.7 3.4.2.8
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	rigid wall	EI 120 U/U	3.3.2.5
			floor	EI 120 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	rigid wall	EI 120 U/U	3.3.2.4
			floor	EI 120 U/U	3.4.2.4 3.4.2.5
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	rigid wall	EI 120 U/U	3.3.2.2
			floor	EI 120 U/U	3.4.2.3
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	floor	EI 120 U/U	3.4.2.2

### 3.8 Pipe on the corner

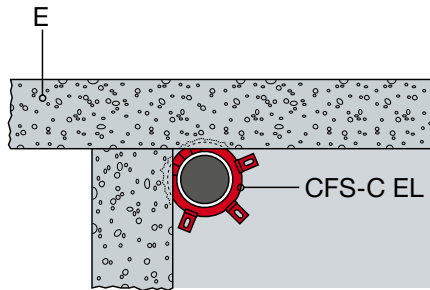


Pipe diameters	$\text{Ø} \leq 110 \text{ mm}$
Allowable sound decoupling thickness	4 or 9 mm
Base Materials	Rigid wall (Only with additional chisel work) ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** Pipes directly mounted on the corner with zero distance to two rigid support construction elements.

#### On the wall

(Chisel work required – The collar must cover completely the perimeter of the collar)



#### Recommended length and number of hooks:

Length to cut (mm)
Measure directly on the pipe

Pipe outside nominal diameter $d_c$	Number of hooks				
	(mm)	0	4	9	13
16	2	2	2	2	3
32	2	2	2	2	3
40	2	2	2	3	3
50	2	2	2		
56	3	3	3		
63	3	3	3		
75	3	3	3		
90	3	3	3		
110	3	3	3		

**Pipes covered:**

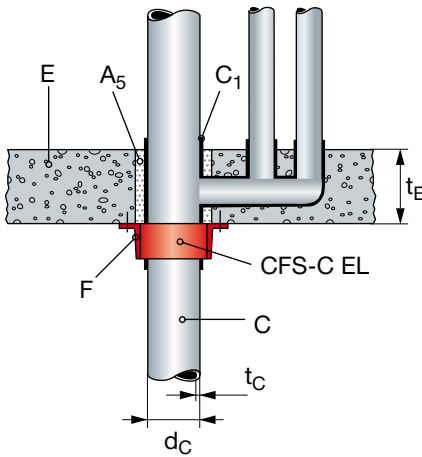
Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**For Rigid Walls: 3.3.2.18**
**For Rigid Floors: 3.4.2.32**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	rigid wall	EI 120 U/U	3.3.2.1
			floor	EI 90 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	rigid wall	EI 120 U/U	3.2.2.12
			floor	EI 90 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	rigid wall	EI 120 U/U	3.3.2.6
			floor	EI 90 U/U	3.4.2.7 3.4.2.8
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	rigid wall	EI 120 U/U	3.3.2.5
			floor	EI 90 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	rigid wall	EI 120 U/U	3.3.2.4
			floor	EI 90 U/U	3.4.2.4 3.4.2.5
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	rigid wall	EI 120 U/U	3.3.2.2
			floor	EI 90 U/U	3.4.2.3
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	floor	EI 90 U/U	3.4.2.2

### 3.9 Pipe junction in floors (Manifold)

Pipe diameters	$\text{Ø} \leq 160 \text{ mm}$ Pipe group 1 and 2
Allowable sound decoupling thickness	PE foam 4 or 9 mm
Base Materials	Floor ( $t_E \geq 150 \text{ mm}$ )



**Description:** Inside the floor there are one or more pipe junctions/manifolds into the central waste water pipe, where horizontal running minor pipes flow to. Those minor pipes have a U/C end configuration and they can be installed in line on an unlimited amount. The Firestop Collar Endless CFS-C EL shall be installed only on the bottom part of the central waste water pipe.

**Installation overview:** The installation should follow the same procedure as straight pipes in group 1 and in group 2. Refer to 3.1 and 3.2.

**Recommended length and number of hooks:** The same as straight pipes in group 1 and in group 2. Refer to 3.1 and 3.2.



**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

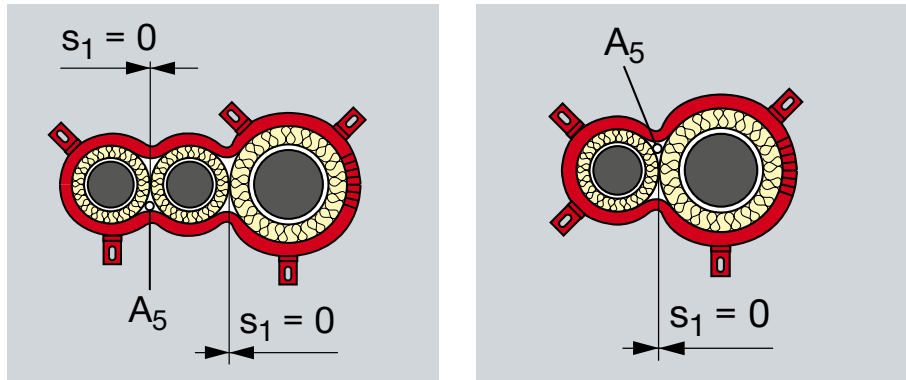
**For Rigid Floors: 3.4.2.41**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	floor (pipe group 1)	EI 120 U/U	3.4.2.1
			floor (pipe group 2)	EI 120 U/U	3.4.2.12
Waste water	PE Geberit silent DB	non-regulated	floor (pipe group 1)	EI 120 U/U	3.4.2.11
			floor (pipe group 2)	EI 120 U/U	3.4.2.22
Waste water	PP	EN 1451-1, DIN 8077/78	floor (pipe group 1)	EI 120 U/U EI 90 U/U	3.4.2.7 3.4.2.8
			floor (pipe group 2)	EI 120 U/U	3.4.2.20
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	floor (pipe group 1)	EI 120 U/U	3.4.2.6
			floor (pipe group 2)	EI 120 U/U	3.4.2.19
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	floor (pipe group 1)	EI 120 U/U EI 90 U/U	3.4.2.4 3.4.2.5
			floor (pipe group 2)	EI 90 U/U	3.4.2.18
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	floor (pipe group 1)	EI 120 U/U	3.4.2.3
			floor (pipe group 2)	EI 90 U/U EI 120 U/U	3.4.2.15 3.4.2.17
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	floor (pipe group 1)	EI 120 U/U	3.4.2.2
			floor (pipe group 2)	EI 120 U/U EI 60 U/U	3.4.2.13 3.4.2.14

### 3.10 Multiple pipes in one Collar

Base Materials	Rigid Wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** Hilti Firestop Collar Endless CFS-C EL can firestop up to three pipes together within one bigger jacket. This configuration includes one PE pipe with an outside diameter between 40 and 90 mm plus one or two PP-R and/or PE-X pipes with an outside diameter of 40 mm and an Elastomeric foamed thermal insulation.



**Installation overview:** The length should be measured directly on the penetrating pipes. It's very important that the distance between two hooks is never bigger than 150 mm.

**Pipes covered:**

Confirm the coverage and the detailed application for each pipe type in the relevant ETA 14/0085 section.

**For Rigid Walls: 3.3.2.9**

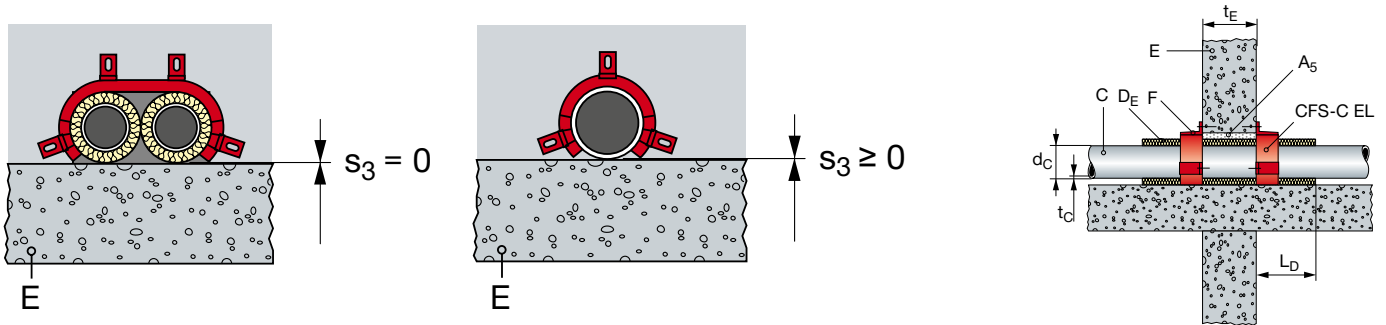
**For Rigid Floors: 3.4.2.26**

PE pipe acc. EN 1519-1, EN 12666-1, EN 12201-2 (EI 120 U/U)	
Pipe outside diameter	$40 \text{ mm} < d_c < 90 \text{ mm}$
Pipe thickness	$t_c = 3,5 \text{ mm}$
Allowable sound decoupling thickness	4 or 9 mm

PP-R or PE-X pipes acc. EN 15874 and EN 15875 (EI 120 U/C)	
Pipe outside diameter	40 mm
Pipe Types	Aquatherm fusiolen (aquatherm green pipe S) Rehau Rautitan flex
Pipe thickness	$t_c = 3,5 \text{ mm}$
Elastomeric foamed thermal insulation	LS or CS with minimum length (LD > 250 mm) on both sides of the wall
Elastomeric foamed thermal insulation thickness	$9 \text{ mm} < t_b < 32 \text{ mm}$

**3.11 Two pipes in one collar (Pipes running on the floor)**

**Description:** Collar CFS-C EL can firestop up to two pipes, even when there's no space to cover them completely. The pipes are mounted directly on the floor ( $s_3 > 0\text{ mm}$ ) and located side by side ( $s_1 > 0\text{ mm}$ )



**Installation overview:** The length should be measured directly on the penetrating pipes. It's very important that the distance between two hooks is never bigger than 150 mm.

**Pipes covered:**

Confirm the coverage and the detailed application for each pipe type in the relevant ETA 14/0085 section.

**For Rigid Walls: 3.3.2.10**

PP-R or PE-X pipes acc. EN 15874 and EN 15875 (EI 120 U/C)	
Pipe Types	Aquatherm fusiolen (aquatherm green pipe S) Rehau Rautitan flex
Pipe outside diameter	40 mm
Pipe thickness	$t_c = 3,5\text{ mm}$
Elastomeric foamed thermal insulation	LS or CS with minimum length ( $LD > 250\text{ mm}$ ) on both sides of the wall
Elastomeric foamed thermal insulation thickness	$9\text{ mm} < t_D < 32\text{ mm}$

### 3.12 Zero distances to other systems

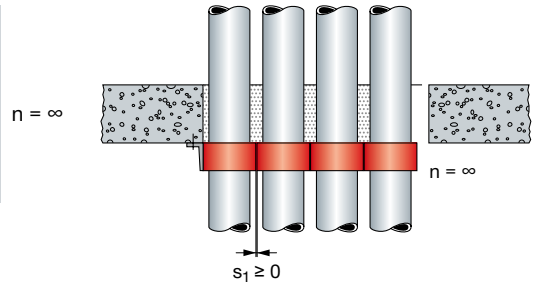
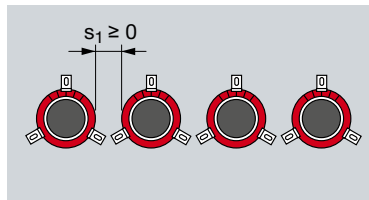
#### 3.12.1 Zero distance to other CFS-C EL Firestop Collar Endless



Pipe diameters	$\varnothing \leq 110 \text{ mm}$ $\varnothing \leq 160 \text{ mm}$
Sound decoupling	PE foam 4 or 9 mm
Base Materials	Flexible wall ( $t_E \geq 100 \text{ mm}$ )
	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )

For pipes in group 1 ( $\varnothing \leq 110 \text{ mm}$ ):

**Description:** The distance between two Firestop Collar Endless can be zero ( $s_1 > 0 \text{ mm}$ ) and the maximum number of pipes installed in a line is unlimited. This is valid for Flexible wall and rigid wall with thicknesses  $\geq 100 \text{ mm}$  and also for rigid floors  $\geq 150 \text{ mm}$ .



**Pipes covered:**

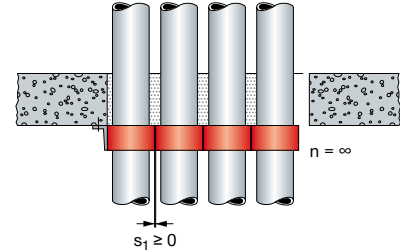
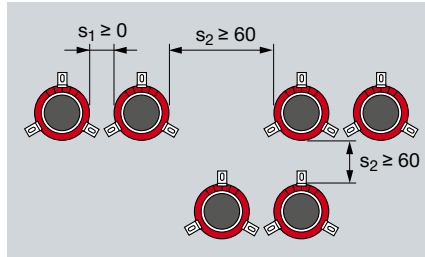
Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**For Flexible and Rigid walls: 3.2.2.24**
**For Rigid Floors: 3.4.2.35**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	flexible wall	EI 90 U/U	3.2.2.1
			rigid wall	EI 90 U/U	3.2.2.1
			floor	EI 120 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	flexible wall	EI 90 U/U	3.2.2.12
			rigid wall	EI 90 U/U	3.2.2.12
			floor	EI 120 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	flexible wall	EI 90 U/U	3.2.2.10
			rigid wall	EI 90 U/U	3.2.2.10
			floor	EI 120 U/U	3.4.2.7
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 90 U/U	3.2.2.9
			rigid wall	EI 90 U/U	3.2.2.9
			floor	EI 120 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 90 U/U	3.2.2.8
			rigid wall	EI 90 U/U	3.2.2.8
			floor	EI 120 U/U	3.4.2.4
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	flexible wall	EI 90 U/U	3.2.2.4 3.2.2.5
			rigid wall	EI 90 U/U	3.2.2.4 3.2.2.5
			floor	EI 120 U/U	3.4.2.3
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	flexible wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			rigid wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			floor	EI 120 U/U	3.4.2.2

**For pipes in group 2 ( $\varnothing \leq 160$  mm):**

**Description:** The distance between two Firestop Collar Endless can be zero ( $s_1 > 0$  mm). For rigid wall with thicknesses  $\geq 150$  mm the maximum number of pipes is 2 and the distance between clusters is 60 mm while in rigid floors  $\geq 150$  mm the maximum number of pipes is unlimited.



**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**For Rigid Walls: 3.2.2.30**

**For Rigid Floors: 3.4.2.36**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	rigid wall	EI 90 U/U	3.3.2.1
			floor	EI 120 U/U	3.4.2.12
Waste water	PE Geberit silent DB	non-regulated	rigid wall	EI 90 U/U	3.3.2.29
			floor	EI 120 U/U	3.4.2.22
Waste water	PP	EN 1451-1, DIN 8077/78	rigid wall	EI 30 U/U	3.3.2.26
			floor	EI 120 U/U	3.4.2.20
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	rigid wall	EI 90 U/U	3.3.2.24
			floor	EI 120 U/U	3.4.2.19
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	rigid wall	EI 90 U/U	3.3.2.23
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	rigid wall	EI 120 U/U	3.3.2.22
			floor	EI 120 U/U	3.4.2.17
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	floor	EI 120 U/U	3.4.2.13

**3.12.2 Zero distance to Conlit**

Pipe diameters	$\varnothing \leq 110 \text{ mm}$
Sound decoupling	PE foam 4 or 9 mm
Base Materials	Flexible wall ( $t_E \geq 100 \text{ mm}$ )
	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )



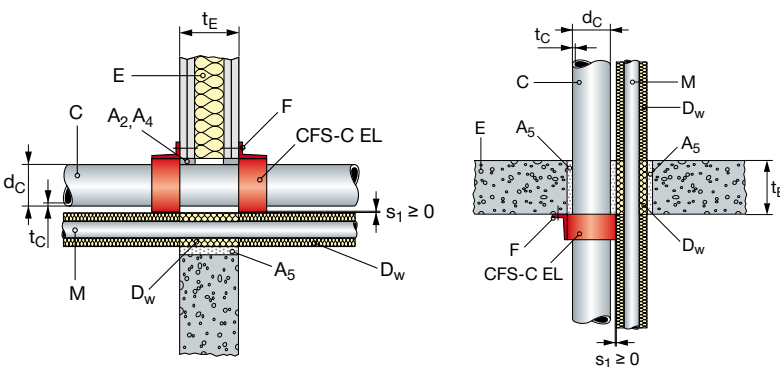
**Description:** CFS-C EL collar on any pipe in pipe group 1 may be in direct contact to Conlit 150 and Rockwool 800 as a thermal insulation on metallic pipes. ( $s_1 \geq 0 \text{ mm}$ ).

**Approved pipes and insulation to be used with Conlit 150 and Rockwool 800:**

Pipe Types <sup>1</sup>	<b>Copper</b> <b>Unalloyed steel</b> <b>Alloyed steel</b> <b>Cast iron</b> <b>Stainless steel</b>
Pipe outside diameter	$d_M < 42 \text{ mm}$
Pipe thickness	$1,2 \text{ mm} < t_M < 14,2 \text{ mm}$
Incombustible thermal insulation, based on mineral wool (Combustibility class A1 or A2 in accordance with EN 13501)	Conlit 150 inside the wall/floor only with Insulation thickness ( $t_d > 19 \text{ mm}$ )  Rockwool 800, covering the metal pipe outside the wall/floor with Insulation thickness ( $t_d > 20 \text{ mm}$ )

<sup>1</sup> The field of application given above for copper pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050 °C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.

**For more details of the pipe types and insulation, please consult the ETA, section 3.1.10**



**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**For Flexible and Rigid walls: 3.2.2.21****For Rigid Floors: 3.4.2.37**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	flexible wall	EI 90 U/U	3.2.2.1
			rigid wall	EI 90 U/U	3.2.2.1
			floor	EI 120 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	flexible wall	EI 90 U/U	3.2.2.12
			rigid wall	EI 90 U/U	3.2.2.12
			floor	EI 120 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	flexible wall	EI 90 U/U	3.2.2.10
			rigid wall	EI 90 U/U	3.2.2.10
			floor	EI 120 U/U	3.4.2.7
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 90 U/U	3.2.2.9
			rigid wall	EI 90 U/U	3.2.2.9
			floor	EI 120 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 90 U/U	3.2.2.8
			rigid wall	EI 90 U/U	3.2.2.8
			floor	EI 120 U/U	3.4.2.4
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	flexible wall	EI 90 U/U	3.2.2.4 3.2.2.5
			rigid wall	EI 90 U/U	3.2.2.4 3.2.2.5
			floor	EI 120 U/U	3.4.2.3
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	flexible wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			rigid wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			floor	EI 120 U/U	3.4.2.2



**3.12.3 Zero distance to CFS-Bandage**

Pipe diameters	$\varnothing \leq 110 \text{ mm}$
Sound decoupling	PE foam 4 or 9 mm
Base Materials	Flexible wall ( $t_E \geq 100 \text{ mm}$ )
	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )



**Description:** CFS-C EL collar on any pipe in pipe group 1 may be in direct contact to metal pipes with insulated flexible elastomeric foam and fire stopped with Hilti CFS-B. ( $S_1 > 0 \text{ mm}$ ). The use of Hilti CFS-B is described in detail in ETA -10/0212.

**Approved pipes and insulation to be used with CFS-B:**

Pipe Types <sup>1</sup>	<b>Copper</b> <b>Unalloyed steel</b> <b>Alloyed steel</b> <b>Cast iron</b> <b>Stainless steel</b>
Pipe outside diameter	$15 \text{ mm} \leq d_M \leq 35 \text{ mm}$
Pipe thickness	$1,0 \text{ mm} \leq t_M \leq 14,2 \text{ mm}$
Elastomeric foamed thermal insulation	CS with minimum length ( $L_D > 250 \text{ mm}$ ) on both sides of the wall
Elastomeric foamed thermal insulation thickness	$(9 \text{ mm} < D_E < 35 \text{ mm})$

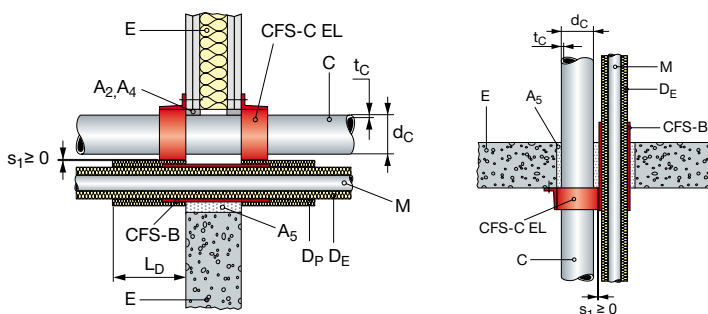
<sup>1</sup> The field of application given above for copper pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1050°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni.

**For more details of the pipe types and insulation, please consult the ETA, section 3.1.11**

In wall application (flexible wall and solid wall  $t_E > 100 \text{ mm}$ ) an additional protect insulation  $D_P$  has to be used on top of installed insulation hose and CFS-B.

Additional protect insulation (Elastomeric foamed thermal insulation)  $D_P$ :

- length of ( $L_D > 250 \text{ mm}$ ) on each side of the wall
- $D_P$  thickness  $> 19 \text{ mm}$
- Local interrupted insulation (LI), does not pass through the wall.



In floor application ( $t_E > 150 \text{ mm}$ ) there is no need for an additional protect insulation  $D_P$

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**For Flexible and Rigid walls: 3.2.2.22**

**For Rigid Floors: 3.4.2.38**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	flexible wall	EI 90 U/U	3.2.2.1
			rigid wall	EI 90 U/U	3.2.2.1
			floor	EI 90 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	flexible wall	EI 90 U/U	3.2.2.12
			rigid wall	EI 90 U/U	3.2.2.12
			floor	EI 90 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	flexible wall	EI 90 U/U	3.2.2.10
			rigid wall	EI 90 U/U	3.2.2.10
			floor	EI 90 U/U	3.4.2.7 3.4.2.8
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 90 U/U	3.2.2.9
			rigid wall	EI 90 U/U	3.2.2.9
			floor	EI 90 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 90 U/U	3.2.2.8
			rigid wall	EI 90 U/U	3.2.2.8
			floor	EI 90 U/U	3.4.2.4 3.4.2.5
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	flexible wall	EI 90 U/U	3.2.2.4 3.2.2.5
			rigid wall	EI 90 U/U	3.2.2.4 3.2.2.5
			floor	EI 90 U/U	3.4.2.3
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	flexible wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			rigid wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			floor	EI 90 U/U	3.4.2.2

**3.13 Hilti Firestop Collar endless CFS-C EL in Coated Board**

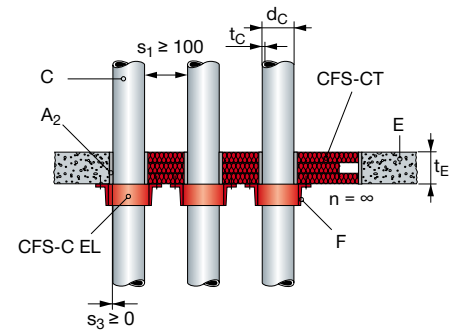
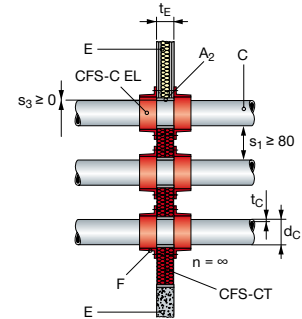
Pipe diameters	$\varnothing \leq 100 \text{ mm}$
Sound decoupling	PE foam 4 or 9 mm
Base Materials	Coated Board CFS-CT

**Description:** Hilti Firestop Collar endless CFS-C EL can be used to firestop plastic pipes penetrating a wall seal made of mineral wool.

**Installation:** The installation is the same as for the straight pipes in pipe group 1. The gap filler is CFS-S ACR and the elements should be fixed with threaded rods M6 with disc and nut.

**On the wall:** The pipes penetrating the board have to be grouped in line only and the minimum distance between them is ( $s_1 > 80 \text{ mm}$ ) however the distance to the building element is zero ( $s_3 > 0 \text{ mm}$ ).

**On the wall:** The pipes penetrating the board have to be grouped in line only and the minimum distance between them is ( $s_1 > 100 \text{ mm}$ ) however the distance to the building element is zero ( $s_3 > 0 \text{ mm}$ ).



**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/ 0085 section.

**For Flexible and Rigid walls: 3.2.2.23****For Rigid Floors: 3.4.2.39**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	flexible wall	EI 90 U/U	3.2.2.1
			rigid wall	EI 90 U/U	3.2.2.1
			floor	EI 90 U/U	3.4.2.1
Waste water	PE Geberit silent DB	non-regulated	flexible wall	EI 90 U/U	3.2.2.12
			rigid wall	EI 90 U/U	3.2.2.12
			floor	EI 90 U/U	3.4.2.11
Waste water	PP	EN 1451-1, DIN 8077/78	flexible wall	EI 90 U/U	3.2.2.10
			rigid wall	EI 90 U/U	3.2.2.10
			floor	EI 90 U/U	3.4.2.8
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	flexible wall	EI 90 U/U	3.2.2.9
			rigid wall	EI 90 U/U	3.2.2.9
			floor	EI 90 U/U	3.4.2.6
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	flexible wall	EI 90 U/U	3.2.2.8
			rigid wall	EI 90 U/U	3.2.2.8
			floor	EI 90 U/U	3.4.2.4 3.4.2.5
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	flexible wall	EI 90 U/U	3.2.2.4 3.2.2.5
			rigid wall	EI 90 U/U	3.2.2.4 3.2.2.5
			floor	EI 90 U/U	3.4.2.3
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	flexible wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			rigid wall	EI 90 U/U EI 60 U/U	3.2.2.2 3.2.2.3
			floor	EI 90 U/U	3.4.2.2

3.14 Hilti Firestop Collar endless CFS-C EL in Shaftwall

3 ISH GDP HMV	Ø ≤ 110 mm (Pipe group 1)
6 FXGG GHFXS	PE foam 4 or 9 mm
Base Materials	Shaft wall (tE = 50 mm)

**Description:** 7KHILQV DDMRQRI (MH) LHMRS RDU (GGMV) 6 ( / RQDVKD V ZDKDV MREHP DGHURP RGHVIGHRQO EHFDXVHMHRM HUVGHVIGRQ DFFHVEG

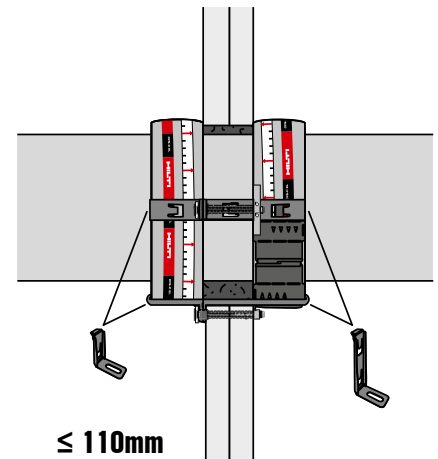
**Installation:** ,WIGFHVDV MRSUSDUHVZ RIEDQGDJHMZ LKMHVDP HIGQVMDGGIQ V DDKRUKRRN/LQRGHIDGGIGQ KRRN/RQHIMHRMH

The bandage with the long hooks must be inserted first into the shaft, leaving the base of the hooks against the wall. Afterwards the gap is completely filled with ) 6) ,/ 7KHVFRGGIEDQGDJHIV DMLQV DGGIGDYQ MHIEDVHRI MHIHVKRUKRRN touching the base of the long hooks and the fixing elements are finally installed.

Shaftwall video instruction



**Recommended length and number of hooks:** 7KHKRRN/RIMHIFRDLQVGHM wall and the collar outside the wall must be fixed by the same fixing element to DYRGH FHVYHGUC QGDUMHISHCHMDRQDGGFRQ/HXHQ P DNU MHIRYHDC VVWFP IPRUHIDU



Length to cut (mm)					
3 ISH RWMGHICRP LCD GDP HMUC	FRXW 3 ISH, QXDMRQ 7 KIENQHW P P				
PP					
16	100	000	000	000	000
32	100	000	000	000	000
	100	000	000	000	000
	000	000	000		
	000	000	000		
63	000	000	000		
	000	000	000		
	000	000	000		
110	000	000	000		
	000	000	000		

Number of hooks Collar 1 – Long Hooks Collar 2 – Short Hooks					
Pipe outside nominal diameter $d_c$ (mm)	Acoustic Pipe Insulation Thickness (mm)				
	0	4	9	13	25
16	2	2	2	2	3
32	2	2	2	2	3
40	2	2	2	3	3
50	2	2	2		
56	3	3	3		
63	3	3	3		
75	3	3	3		
90	3	3	3		
110	3	3	3		

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	Shaft Wall	EI 90 U/U	3.5.2.1
Waste water	PE Geberit silent DB	non-regulated	Shaft Wall	EI 90 U/U	3.5.2.6
Waste water	PP	EN 1451-1, DIN 8077/78	Shaft Wall	EI 90 U/U	3.5.2.5
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	Shaft Wall	EI 90 U/U	3.5.2.4
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	Shaft Wall	EI 90 U/U	3.5.2.3
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	Shaft Wall	EI 90 U/U	3.5.2.2
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	Shaft Wall	EI 90 U/U	3.5.2.7

**3.15 Roof drainage pipes**

Pipe diameters	$\varnothing \leq 110 \text{ mm}$
Sound decoupling	PE foam 4 or 9 mm
Base Materials	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** Hilti Firestop Collar Endless CFS-C EL can firestop roof drainage PE-pipes (U/U) insulated with elastomeric foamed insulation penetrating the wall with any inclination between 45° and 90°. The number of hooks and anchors must be:

- For perpendicular situation (90°): The same as straight pipes from group 1.
- For inclined pipes: five short hooks

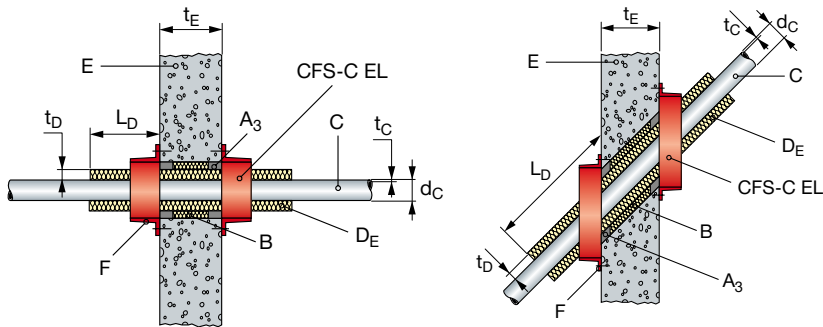
**Pipes covered:**

Confirm the coverage and the detailed application for each pipe type in the relevant ETA 14/0085 section.

**For Rigid Walls: 3.3.2.11**

**For Rigid Floors: 3.4.2.40**

<b>PE acc. EN1519-1 (EI 120 U/U for straight pipes and EI 90 U/U for inclined pipes)</b>	
Pipe outside diameter	$40 \leq d_c \leq 110 \text{ mm}$
Pipe thickness	$t_c = 4.2 \text{ mm}$
Elastomeric foamed thermal insulation	LS or CS with minimum length ( $LD > 250 \text{ mm}$ ) on both sides of the wall
Elastomeric foamed thermal insulation thickness	9 mm



### 3.16 Pneumatic dispatch (PVC Letter Shot)

**Description:** Hilti Firestop Collar Endless CFS-C EL can firestop letter shot systems going through drywalls, rigid walls and rigid floors. The pipe is PVC pipe acc. DIN 6660 and it's allowed to have a mixed penetration with maximum three cables with the maximum size of:

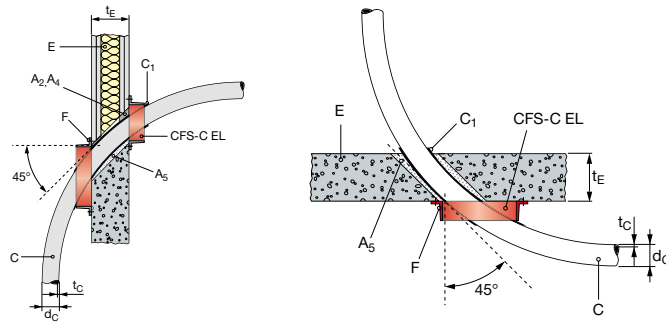
- NYM-J 3 × 2,5 mm<sup>2</sup>
- J-Y (St) Y 6 × 2 × 0,6 mm<sup>2</sup>
- 2 × 2,5 mm<sup>2</sup>

**Pipe Group 1**

Pipe inclination: (45° ≤ pipe inclination ≤ 90°)

Flexible/Rigid Wall	≥ 100 mm
Rigid Floor	≥ 150 mm

**Installation overview:** Hilti Firestop Collar endless CFS-C EL needs to be measured directly around the pipe and installed without leaving any space between the pipe and the Collar. Please refer to inclined pipes 3.3 for more details.



**Recommended length and number of hooks:**

Pipe outside nominal diameter d <sub>C</sub> (mm)	Number of hooks		
	Acoustic Pipe Insulation Thickness t <sub>D</sub> (mm) identical on both sides of the flexible wall/rigid wall		
	0	4	9
32	3	3	3
50	3	3	3
75	3	4	4
90	4	4	5
110	5	5	5

**Note:** If the pipe is completely straight (90°= pipe inclination), please refer to the section straight pipes pipe group one for the Recommended length and number of hooks.



**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

Application	Pipe material	Standard	Base material	Classification	ETA Section
Letter shots	PVC	DIN 6660	flexible wall	EI 90 U/U	3.2.2.13
			rigid wall	EI 90 U/U	3.2.2.13
			rigid floor	EI 120 U/U	3.4.2.10

**Pipe Group 2**

Pipe inclination: (pipe inclination ≤ 90° = Straight pipe)

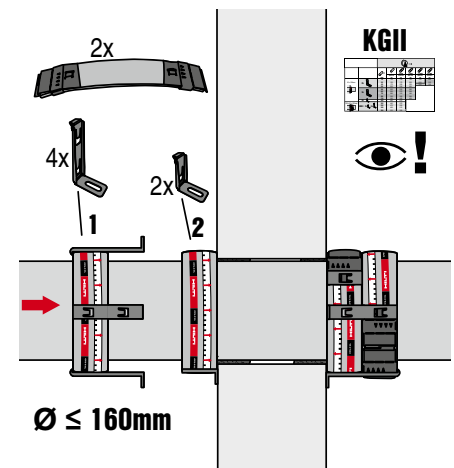
Rigid Wall	≥ 150 mm
Rigid Floor	≥ 150 mm

**Installation overview:** It's necessary to cut two identical pieces with the recommend length (See table below) and install the closure plates at each end.

**Collar 1** – Install two long hooks into the closure plates and two more long hooks on the collar. The distance between all of them must be similar.

**Collar 2** – Install only two short hooks into the closure plates and fix it first to the base material.

**Pipe group 2 video instruction**



**Recommended length and number of hooks:**

Pipe outside nominal diameter d <sub>c</sub> (mm)	Length to cut (mm)		
	Acoustic Pipe Insulation Thickness (mm) identical on both sides of the flexible wall/rigid wall		
	0	4	9
125	445	470	500
135	475	500	530
140	490	515	545
160	555	580	610

Number of hooks
2 Short and 4 Long

**Pipes covered:**

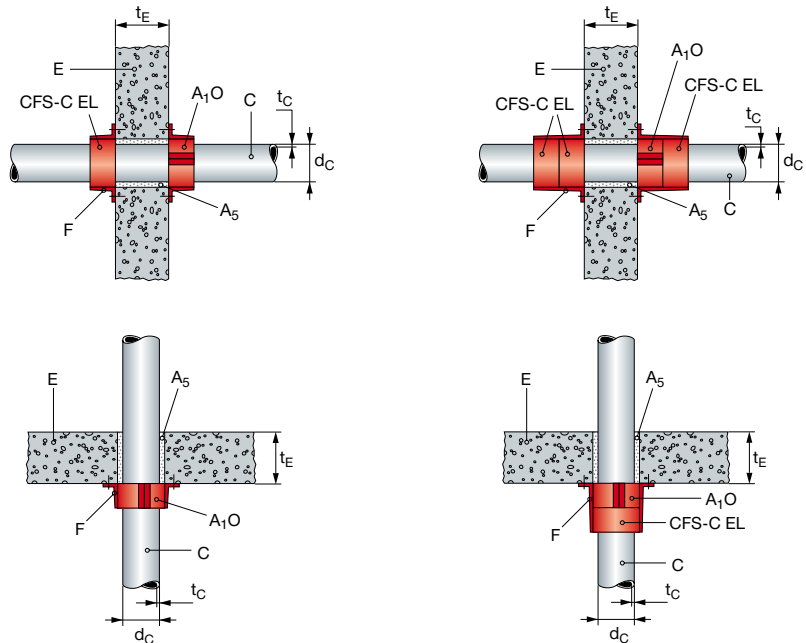
Validate the range coverage for each pipe type in the relevant ETA 14/0085section.

Application	Pipe material	Standard	Base material	Classification	ETA Section
Letter shots	PVC	DIN 6660	rigid wall	EI 90 U/U	3.2.2.13
			rigid floor	EI 120 U/U	3.4.2.21

3.17 Use of Left overs

Pipe group 1	$\text{Ø} \leq 110 \text{ mm}$
Pipe group 2	$\text{Ø} \leq 160 \text{ mm}$
Base Materials	Rigid wall ( $t_E \geq 150 \text{ mm}$ )
	Rigid floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** Left-overs with a minimum length of 120 mm can be used for both pipe groups (pipe group 1 and pipe group 2) in rigid walls and rigid floor applications. The leftover piece and the additional intumescent section have to be equipped identically with the closure plates and the respective short hooks.



Pipes containing oddments (A<sub>1,0</sub>) in application group 1 and 2 in wall and floor penetration

**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

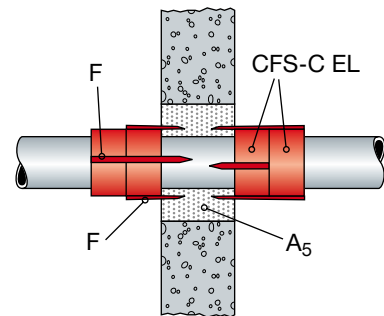
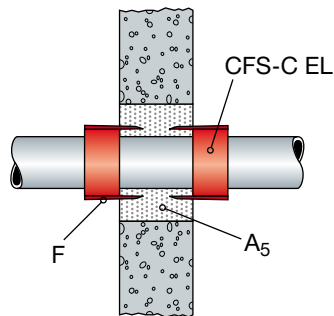
**Rigid Walls: 3.3.2.13**
**Rigid Floors: 3.4.2.27**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	Rigid wall, Pipe group 1	EI 120 U/U	3.2.2.1
			Rigid wall, Pipe group 2	EI 90 U/U	3.2.2.19
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.1
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.12
Waste water	PE Geberit silent DB	non-regulated	Rigid wall, Pipe group 1	EI 120 U/U	3.2.2.12
			Rigid wall, Pipe group 2	EI 90 U/U	3.3.2.29
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.11
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.22
Waste water	PP	EN 1451-1, DIN 8077/78	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.6
			Rigid wall, Pipe group 2	EI 90 U/U	3.3.2.26
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.7
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.20
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.5
			Rigid wall, Pipe group 2	EI 90 U/U	3.3.2.24
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.6
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.19
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.4
			Rigid wall, Pipe group 2	EI 90 U/U	3.3.2.23
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.4
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.2
			Rigid wall, Pipe group 2	EI 90 U/U	3.3.2.22
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.3
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.17
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	Rigid wall, Pipe group 2	EI 90 U/U	3.3.20
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.2
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.13

### 3.18 Bended Hooks grouted into mortar

Pipe group 1	$\text{Ø} \leq 110 \text{ mm}$
Pipe group 2	$\text{Ø} \leq 160 \text{ mm}$
Base Materials	Rigid wall ( $t_E \geq 100 \text{ mm}$ )
	Rigid wall ( $t_E \geq 150 \text{ mm}$ )
	Rigid floor ( $t_E \geq 150 \text{ mm}$ )

**Description:** Bended hooks could be pressed into the wet gap seal, made of cementitious mortar in rigid walls, ( $t_E > 100 \text{ mm}$ ) and rigid floors ( $t_E > 150 \text{ mm}$ ).



**Pipes covered:**

Validate the range coverage for each pipe type in the relevant ETA 14/0085 section.

**Rigid Walls: 3.3.2.14**

 Pipe Group 1 – Rigid walls  $\geq$  100 mm

 Pipe Group 2 – Rigid Walls  $\geq$  150 mm

**Rigid Walls: 3.4.2.28**

Application	Pipe material	Standard	Base material	Classification	ETA Section
Waste water	PE	EN 1519-1 EN 12666-1 EN 12201-2	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.1
			Rigid wall, Pipe group 2	EI 120 U/U	3.3.2.19
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.1
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.12
Waste water	PE Geberit silent DB	non-regulated	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.12A
			Rigid wall, Pipe group 2	EI 120 U/U	3.3.2.29
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.11
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.22
Waste water	PP	EN 1451-1, DIN 8077/78	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.6
			Rigid wall, Pipe group 2	EI 120 U/U	3.3.2.26
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.7
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.20
Waste water	Coes PhoNoFire® Coes blue power Geberit Silent PP Ke Kelit Phonex AS Marely Silent Maincor Mainpower Ostendorf-Gruppe Skolan db Pipelife Master 3 Poloplast Polokal NG Poloplast Polokal 3S Raupiano Plus Valsir Triplus Wavin SiTech Wavin AS	non-regulated	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.5
			Rigid wall, Pipe group 2	EI 120 U/U	3.3.2.24
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.6
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.19
Waste water	PVC	EN 1452-1 EN 1329-1 EN 1453-1 EN 1566-1 EN ISO 15493	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.4
			Rigid wall, Pipe group 2	EI 120 U/U	3.3.2.23
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.4
Industrial	PE	EN 15494 EN 12201-2 DIN 8074/75	Rigid wall, Pipe group 1	EI 120 U/U	3.3.2.2
			Rigid wall, Pipe group 2	EI 120 U/U	3.3.2.22
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.3
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.17
Various	ABS and SAN+PVC pipes	EN 1455-1 EN 15493 EN 1565-1	Rigid wall, Pipe group 2	EI 90 U/U	3.3.2.20
			Rigid Floor, Pipe group 1	EI 120 U/U	3.4.2.2
			Rigid Floor, Pipe group 2	EI 120 U/U	3.4.2.13

## 4. Specification

### 4.1 Approved backfilling material

Lose mineral wool products suitable for being used as backfilling material of Hilti Firestop Acrylic Sealant CFS-S ACR and CFS-FIL:

Product	Manufacturer
Heralan LS	Knauf Insulation
Isover loose wool SL	Saint-Gobain Isover
Isover Universal-Stopfwole	Saint-Gobain Isover
Rockwool RL	Rockwool
Paroc Pro Loose Wool	Paroc OY AB

### 4.2 Approved flexible elastomeric foam products

**Specification of flexible elastomeric foam products suitable for being used as pipe insulation:**

Product	Manufacturer
Armacell GmbH	Armaflex AF, 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

### 4.3 Characteristics of CFS-C EL

#### Additional Attributes

Hilti firestop products are comprehensively tested and individually matched to the technical requirements of a building's mechanical installations. In addition to their superior passive fire protection behavior, 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 No 026 – Part 2.



Charecteristics	Assessment of charecteristics	Norm, standard, test
<b>Health and the environment</b> Air permeability (gas thightness) Water permeability	Air tightness / smoke tightness and water tightness for a single penetration of a plastic pipe firestopped with Hilti Firestop Collar Endless CFS-C EL can be achieved when the annular gap is sealed with Hilti Firestop Acrylic Sealant CFS-S ACR (10 mm thickness). $q/A [m^3/(h \times m^2)]$ at $\Delta p 50 Pa / \Delta p 250 Pa$ Air: $1.9 \times 10^{-6} / 9.7 \times 10^{-6}$ Nitrogen: $1.1 \times 10^{-6} / 5.5 \times 10^{-6}$ CO2: $6.4 \times 10^{-5} / 3.2 \times 10^{-4}$ Methane: $4.3 \times 10^{-5} / 2.1 \times 10^{-4}$ Watertight to 1m head of water or 9806 Pa	EN 1026 ETAG 026-2
Dangerous substances	CFS-C EL is in compliance concerning the registration, evaluation, authorization and restriction of Chemicals (REACH). The product does not contain any constituents contained in the list of dangerous substances of the European Commission above the acceptable limits.	Material safety data sheet
<b>Protection against noise</b> (Air borne sound insulation)	$D_{n,e,w} (C; C_{tr}) = 64 (-3; -3) dB$ Hilti Firestop Acrylic Sealant CFS-S ACR: Flexible wall: $R_w = 53 dB$ $D_{n,w} = 60 dB$ Rigid wall : $R_w = 51 dB$ $D_{n,w} = 58 dB$	IFT – Rosenheim ETAG 026-2  EN ISO 140-3 EN ISO 20140-10 EN ISO 717-1
<b>Durability and serviceability</b>	Category Y2 (suitable for penetration seals intended for use at temperatures between – 20 °C and + 70 °C) no exposure to rain or UV	EOTA Technical Report TR024 ETAG 026-2
<b>Reaction to fire</b>	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).

## 4.4 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.)	~ 3mm/72h
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



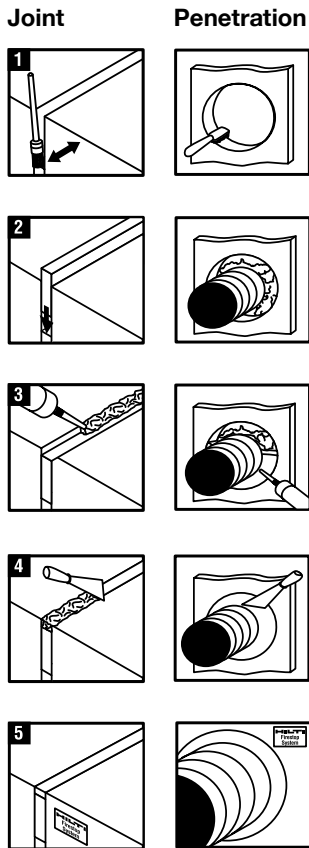
\* The European Technical Approval (ETA) can be obtained via your local Hilti contact or [www.hilti.com](http://www.hilti.com)



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



### 4.4.1 Installation instructions



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.

Fasten identification plate if required

**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.



**Hilti. Outperform. Outlast.**

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