



**ETA N° 11/0429**



23-04-2020 Ven L

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## ANCILLARY PRODUCTS

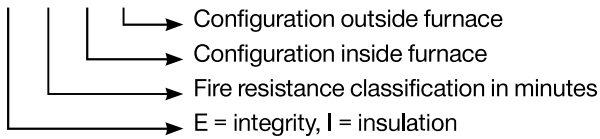
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## PIPE END CONFIGURATIONS

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 Designation | 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/U | 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.

## RECOMMENDED END CONFIGURATIONS

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.

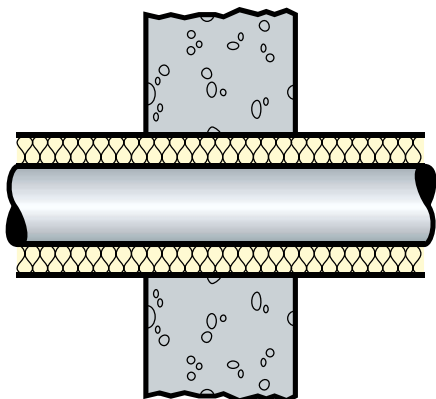
| Intended use of penetrations<br>(list not exhaustive, other pipes applications possible) |                                |                                                                                                                                                                                                                                                  |              |              |                                                                                                                            |
|------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|----------------------------------------------------------------------------------------------------------------------------|
| Application                                                                              | Penetration material           | Manufacturer, product (examples)                                                                                                                                                                                                                 | Pages        |              | Recommended pipe end classification                                                                                        |
|                                                                                          |                                |                                                                                                                                                                                                                                                  | Wall         | Floor        |                                                                                                                            |
| Heating                                                                                  | Copper, steel, stainless steel |                                                                                                                                                                                                                                                  | 16-19        | 32-34        | U/C                                                                                                                        |
|                                                                                          | Al-Composite                   | Geberit: Geberit Mepla<br>Ke Kelit: Kelox KM 110<br>Rehau: Rautitan stabil                                                                                                                                                                       | 26-27        | 41           |                                                                                                                            |
| Potable water                                                                            | Copper, stainless steel        |                                                                                                                                                                                                                                                  | 16-19        | 32-34        | U/C                                                                                                                        |
|                                                                                          | Al-Composite                   | Geberit: Geberit Mepla<br>Ke Kelit: Kelox KM 110<br>Rehau: Rautitan stabil                                                                                                                                                                       | 26-27        | 41           |                                                                                                                            |
|                                                                                          | Plastic                        | Aquatherm: Fusiotherm<br>Friatec: Friatherm starr<br>Rehau: Rautitan flex<br>Wavin: Wavin TS                                                                                                                                                     | 21, 25       | 37, 40       |                                                                                                                            |
| Refrigeration                                                                            | Copper, steel, stainless steel |                                                                                                                                                                                                                                                  | 16-19        | 32-34        | U/C                                                                                                                        |
|                                                                                          | Plastic – normed               | PE: EN ISO 15494, DIN 8074/8075                                                                                                                                                                                                                  | 20, 23-24    | 35, 37-39    |                                                                                                                            |
|                                                                                          | Plastic – branded              | Aquatherm: Climatherm, Fusiotherm<br>Georg Fischer: Coolfit<br>Wavin: Wavin TS                                                                                                                                                                   | 21-22, 25    | 37, 40       |                                                                                                                            |
| Ventilated waste water / Storm water / Roof drainage                                     | Cast iron, SML                 |                                                                                                                                                                                                                                                  | 16-19        | 32-34        | U/U                                                                                                                        |
|                                                                                          | Plastic - normed               | PE: EN 1519<br>PVC-C: EN 1566<br>PVC-U: EN ISO 1452                                                                                                                                                                                              | 20, 23-25    | 35, 37-39    |                                                                                                                            |
|                                                                                          | Plastic – branded              | Geberit: Silent -db20<br>Ke Kelit: Phonex AS<br>Magnaplast: Skolan-dB<br>Pipelife: Master 3<br>Poloplast: Polokal 3S, NG<br>Rehau: Raupiano Plus<br>Wavin: Wavin AS, SiTech                                                                      | 21-22, 24    | 36, 39       |                                                                                                                            |
| Pneumatic                                                                                | Steel                          |                                                                                                                                                                                                                                                  | 16-19        | 32-34        | C/C                                                                                                                        |
|                                                                                          | Plastic                        | PVC-U: EN ISO 1452                                                                                                                                                                                                                               | 20, 23-24    | 35, 37-39    |                                                                                                                            |
| Industry                                                                                 | Copper, steel, stainless steel |                                                                                                                                                                                                                                                  | 16-19        | 32-34        | Varies depending upon application, i.e. consider whether pipe is pressurized (U/C), ventilated (U/U) or unventilated (U/C) |
|                                                                                          | Al-Composite                   | Geberit: Geberit Mepla<br>Rehau: Rautitan stabil<br>Ke Kelit: Kelox KM 110                                                                                                                                                                       | 26-27        | 41           |                                                                                                                            |
|                                                                                          | Plastic – normed               | PE: EN ISO 15494, DIN 8074/8075<br>PVC-U: EN ISO 15493, DIN 8061/8062                                                                                                                                                                            | 20, 23-24    | 35, 37-39    |                                                                                                                            |
|                                                                                          |                                | Aquatherm: Climatherm, Fusiotherm<br>Friatec: Friatherm starr<br>Geberit: Silent -db20<br>Ke Kelit: Phonex AS<br>Magnaplast: Skolan-dB<br>Pipelife: Master 3<br>Poloplast: Polokal 3S, NG<br>Rehau: Raupiano Plus<br>Wavin: Wavin AS, SiTech, TS | 21-22, 24-25 | 36-37, 39-40 |                                                                                                                            |

## PIPE INSULATION CONFIGURATIONS

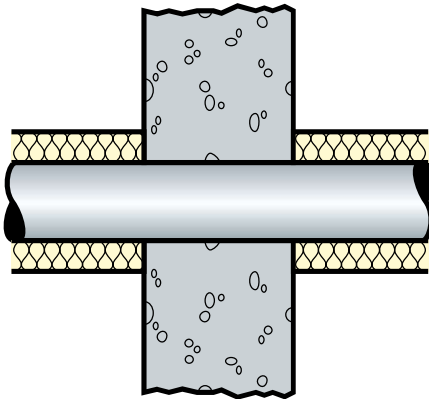
When sealing pipes, the insulation configuration must be considered.  
The following configurations are possible:

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

**Continued sustained**

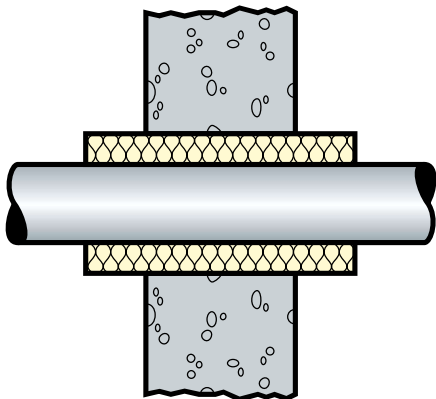


**Continued interrupted**

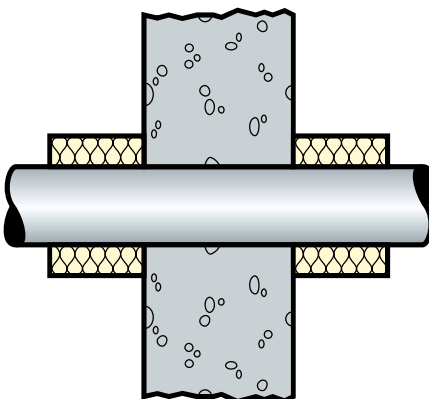


### Insulation only required in the area of the penetration seal

**Local sustained**



**Local interrupted**



See page 43 for specification of suitable insulation products.

## HILTI FIRESTOP COATING CFS-CT

A cost-effective system for permanent firestopping of mixed penetrations in medium to large wall and floor openings.



### Applications

- Mixed penetrations in flexible and rigid walls from 100 mm and rigid floors from 150 mm
- Cables, cable bundles, cable trays and cable conduits
- Non-combustible (metal) pipes with non-combustible insulation
- Non-combustible (metal) and composite pipes with combustible insulation in combination with firestop bandage CFS-B or firestop collar CFS-C P
- Combustible pipes in combination with firestop collars CFC-C P or CFS-C or firestop wrap CFS-W
- Suitable for use with a wide variety of mineral wool boards

### Advantages

- Extensive EN testing ensures wide range of application
- Single-layer coating for up to 50% time savings
- Up to 30% less coating required
- Easy to apply, even on rough surfaces
- Highly flexible coating dries quickly to form an elastic protective layer

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

### Technical data

|                                                           | CFS-CT                                       |
|-----------------------------------------------------------|----------------------------------------------|
| Approvals                                                 | ETA-11/0428 and ETA-11/0429                  |
| Reaction to fire class                                    | Class D-s2 d0 according to EN 13501-1:2007   |
| Base materials                                            | Drywall, concrete, aerated concrete, masonry |
| Density                                                   | 1.47 kg/l                                    |
| Density (Imperial)                                        | 12.3 lb/gal (US)                             |
| Cure Time (at 23°C/50% r.H)                               | ~ 1 mm / day                                 |
| Shelf life (@73°F/23°C and 50% relative humidity)         | 15 month(s)                                  |
| Application temperature range                             | 5°C – 40°C                                   |
| Application temperature range (Imperial)                  | 41°F – 104°F                                 |
| Storage and transportation temperature – range            | 5°C – 30°C                                   |
| Storage and transportation temperature – range (Imperial) | 41°F – 86°F                                  |



### Ordering

| Ordering designation               | Sales quantity | Item number |
|------------------------------------|----------------|-------------|
| Firestop coating CFS-CT 18kg white | 1 PC           | 02036607    |
| Firestop coating CFS-CT 6kg white  | 1 PC           | 02036605    |

## HILTI FIRESTOP COATED BOARD CFS-CT B

A cost-effective system for permanent firestopping of mixed penetrations in medium to large wall and floor openings.



### Applications

- Mixed penetrations in flexible and rigid walls from 100 mm and rigid floors from 150 mm
- Cables, cable bundles, cable trays and cable conduits
- Non-combustible (metal) pipes with non-combustible insulation
- Non-combustible (metal) and composite pipes with combustible insulation in combination with firestop bandage CFS-B or firestop collar CFS-C P
- Combustible pipes in combination with firestop collars CFS-C P or CFS-C or firestop wrap CFS-W

### Advantages

- Extensive EN testing ensures wide range of application
- Board pre-coated for immediate use
- Easy cutting, no fraying of edges and no mineral fiber exposure thanks to extremely low delamination of elastic firestop surface

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

### Technical data

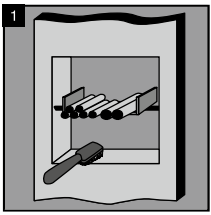
|                        | CFS-CT B                                                    |
|------------------------|-------------------------------------------------------------|
| Approvals              | ETA-11/0428 and ETA-11/0429                                 |
| Approx. board density  | 140 kg/m³                                                   |
| Dimensions (LxWxH)     | 1000 × 600 × 50 mm                                          |
| Color                  | White                                                       |
| Base materials         | Drywall, concrete, aerated concrete, masonry                |
| Reaction to fire class | Class D-s2 d0 according to EN 13501-1:2007                  |
| Complementary products | Firestop coating CFS-CT, firestop acrylic sealant CFS-S ACR |



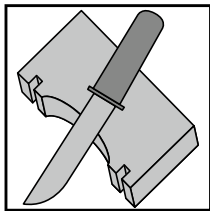
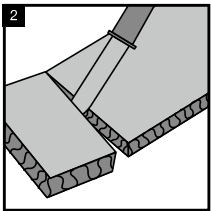
### Ordering

| Ordering designation               | Number of sides coated | Item number |
|------------------------------------|------------------------|-------------|
| Firestop coating CFS-CT 18kg white | 1 PC                   | 02036607    |
| Firestop coating CFS-CT 6kg white  | 1 PC                   | 02036605    |

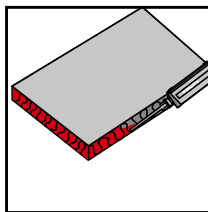
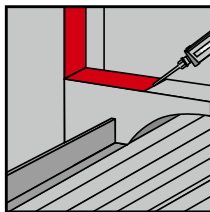
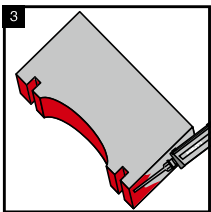
## INSTALLATION INSTRUCTIONS CFS-CT



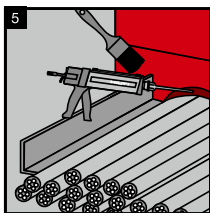
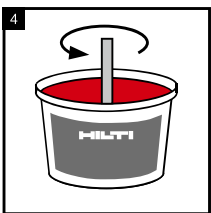
Clean the opening. Cables and supporting structures must be free of dust, grease or oil and installed in compliance with local building and electrical standards.



Cut mineral wool board to size. Cut out required space for any penetrating items.

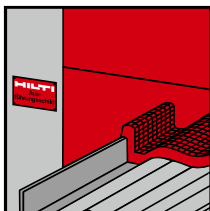
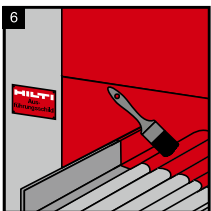


Coat cut edges, surface of the opening and joints between panels with Hilti Firestop Acrylic Sealant CFS-S ACR. Fit mineral wool board tightly into the opening.



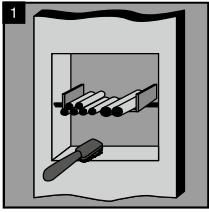
Thoroughly stir Hilti Firestop Coating CFS-CT.

Fill any gaps with loose mineral wool. Coat mineral wool as well as packed gaps and voids with Hilti Firestop Coating CFS-CT (required dry film thickness: 0.7 mm). Apply Hilti Firestop Coating to a wet film thickness of ca. 1.1 mm to achieve a dry film thickness of 0.7 mm. Hilti Firestop Coating CFS-CT may be applied using a brush, roller or airless sprayer. (Alternatively, Hilti Firestop Coating CFS-CT may be sprayed or painted onto the outward-facing surface of the mineral wool panels prior to installation.) Fill gaps and seal between cables with Hilti Firestop Acrylic Sealant CFS-S ACR.

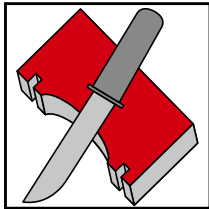
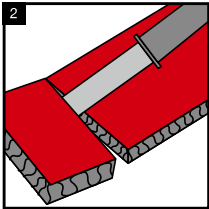


Apply Hilti Firestop Coating CFS-CT to penetrating items on all surfaces over the required length. Depending on the application and fire rating to be achieved, additional protection (i.e. increased coating thickness or a mineral wool mat) may be required (see ETA for details). In the event that an application requires a dry film thickness of 2 mm, the Hilti Firestop Coating CFS-CT must be applied in two layers, allowing the first layer to cure completely before applying an additional coat. Hilti Firestop Coating CFS-CT may be applied using a brush, roller or airless sprayer. For installation of additional components (e.g. Hilti Firestop Collar CFS-C P and Hilti Firestop Bandage CFS-B) see ETA. If required by national prescriptions, mark the penetration seal with an identification plate containing the required information. In such a case fasten the identification plate in a visible position next to the seal.

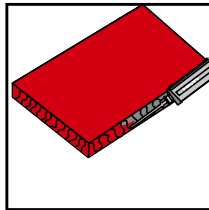
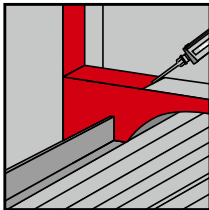
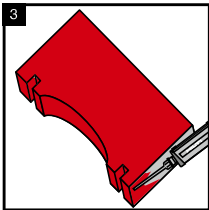
## INSTALLATION INSTRUCTIONS CFS-CT B



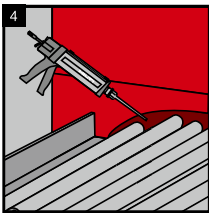
Clean the opening. Cables and supporting structures must be free of dust, grease or oil and installed in compliance with local building and electrical standards.



Cut mineral wool board to size. Cut out required space for any penetrating items.

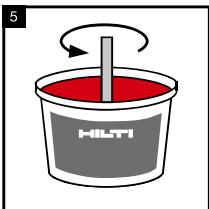


Coat cut edges, surface of the opening and joints between panels with Hilti Firestop Acrylic Sealant CFS-S ACR. Fit mineral wool board tightly into the opening.

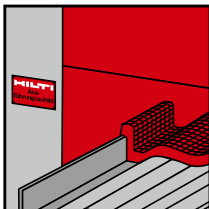
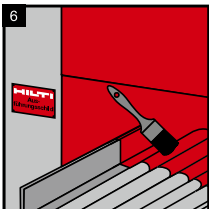


Hilti Firestop Coated Boards are pre-coated to 0.7 mm dry film thickness. In the event that cutting exposes mineral wool, re-coat with Hilti Firestop Coating CFS-CT.

Fill gaps and seal between cables with Hilti Firestop Acrylic Sealant CFS-S ACR.

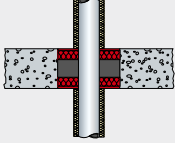
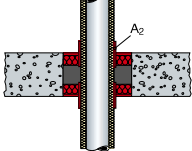
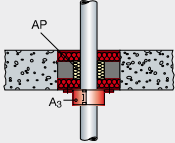
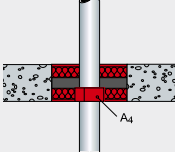
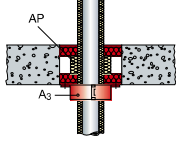
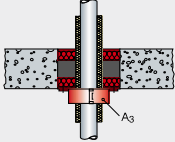
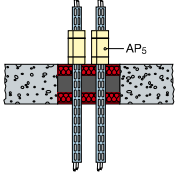


Thoroughly stir Hilti Firestop Coating CFS-CT.



Apply Hilti Firestop Coating CFS-CT to penetrating items on all surfaces over the required length. Depending on the application and fire rating to be achieved, additional protection (i.e. increased coating thickness or a mineral wool mat) may be required (see ETA for details). In the event that an application requires a dry film thickness of 2 mm, the Hilti Firestop Coating CFS-CT must be applied in two layers, allowing the first layer to cure completely before applying an additional coat. Hilti Firestop Coating CFS-CT may be applied using a brush, roller or airless sprayer. For installation of additional components (e.g. Hilti Firestop Collar CFS-C P and Hilti Firestop Bandage CFS-B) see ETA. If required by national prescriptions, mark the penetration seal with an identification plate containing the required information. In such a case fasten the identification plate in a visible position next to the seal.

| Wall application                             |  | Pipe closure device            | Pipe end configuration | Page                  |
|----------------------------------------------|--|--------------------------------|------------------------|-----------------------|
| Blank seals                                  |  | -                              | -                      | <a href="#">15</a>    |
| Metal pipes with mineral wool insulation     |  | -                              | U / C                  | <a href="#">16</a>    |
|                                              |  |                                | C / U                  | <a href="#">17</a>    |
| Metal pipes with combustible insulation      |  | Hilti firestop bandage CFS-B   | U / C                  | <a href="#">18</a>    |
|                                              |  |                                | C / U                  | <a href="#">18-19</a> |
| Plastic pipes                                |  | Hilti firestop collar CFS- C P | U / U                  | <a href="#">20-21</a> |
|                                              |  |                                | U / C                  | <a href="#">22</a>    |
|                                              |  | Hilti firestop collar CFS-C    | U / C                  | <a href="#">23</a>    |
|                                              |  | Hilti firestop wrap CFS-W      | C / U                  | <a href="#">24</a>    |
|                                              |  |                                | U / C                  | <a href="#">24</a>    |
| Plastic pipes with combustible insulation    |  | Hilti firestop collar CFS-C P  | U / C<br>(resp. U / U) | <a href="#">25</a>    |
| Composite pipes with mineral wool insulation |  | -                              | U / C                  | <a href="#">26</a>    |
| Composite pipes with combustible insulation  |  | Hilti firestop collar CFS-C P  | U / C                  | <a href="#">26</a>    |
|                                              |  | Hilti firestop bandage CFS-B   | U / C                  | <a href="#">27</a>    |
| Cables                                       |  | -                              | -                      | <a href="#">28-29</a> |
|                                              |  | Hilti firestop sleeve CFS-SL M | -                      | <a href="#">28</a>    |
| Cables                                       |  | -                              | -                      | <a href="#">28-29</a> |
|                                              |  | Hilti firestop sleeve CFS-SL M | -                      | <a href="#">28</a>    |

| Floor application                           |                                                                                     | Pipe closure device           | Pipe end configuration | Page                  |
|---------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------|------------------------|-----------------------|
| Blank seals                                 |    | -                             | -                      | <a href="#">31</a>    |
| Metal pipes with mineral wool insulation    |    | -                             | U/C                    | <a href="#">32</a>    |
|                                             |                                                                                     | -                             | C/U                    | <a href="#">33</a>    |
| Metal pipes with combustible insulation     |    | Hilti firestop bandage CFS-B  | U/C                    | <a href="#">34</a>    |
|                                             |                                                                                     |                               | C/U                    | <a href="#">34</a>    |
| Plastic pipes                               |    | Hilti firestop collar CFS-C P | U/U (resp. C/U)        | <a href="#">35-36</a> |
|                                             |                                                                                     |                               | U/C                    | <a href="#">37</a>    |
|                                             |                                                                                     | Hilti firestop collar CFS-C   | U/C                    | <a href="#">38</a>    |
|                                             |    | Hilti firestop wrap CFS-W     | C/U                    | <a href="#">39</a>    |
|                                             |                                                                                     |                               | U/C                    | <a href="#">39</a>    |
| Plastic pipes with combustible insulation   |   | Hilti firestop collar CFS-C P | U/C                    | <a href="#">40</a>    |
| Composite pipes with combustible insulation |  | Hilti firestop collar CFS-C P | U/C                    | <a href="#">41</a>    |
| Cables                                      |  | -                             | -                      | <a href="#">42</a>    |

## FLEXIBLE AND RIGID WALLS

### Construction and minimum distance requirements

Penetration seal: Two 50 mm Hilti firestop boards CFS-CT B 1S1 or suitable mineral wool boards<sup>2</sup> positioned flush to the surface of the building element on each side of the wall and coated with Hilti firestop coating CFS-CT to a dry film thickness of 0.7 mm on the outer face. All cut edges sealed with Hilti firestop acrylic sealant CFS-S ACR. Remaining gaps around cables/cable supports (i.e. trays, ladders) and other services filled with Hilti firestop acrylic sealant CFS-S ACR.

All penetrating items (cables, cable trays, conduits, metal, plastic and composite pipes) may be installed in a single, multiple or mixed configuration.

Installations must be fixed to the adjacent building elements (not to the seal) in accordance with the relevant regulations in such a way that no additional mechanical load is imposed on the seal.

### FLEXIBLE AND RIGID WALLS $\geq 100$ MM

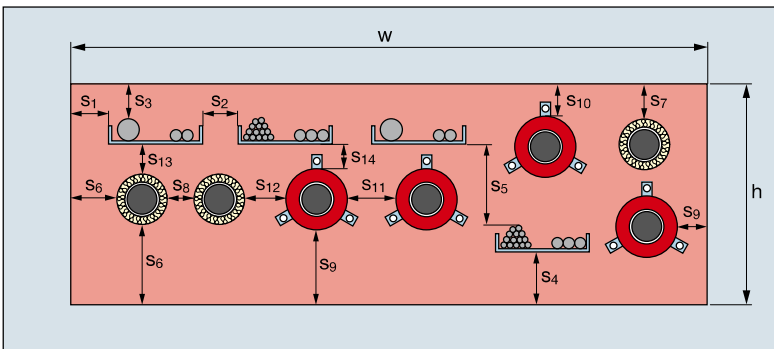
Flexible walls / Drywalls: minimum thickness 100, 112 or 135 mm respectively, with timber or steel studs lined on both faces with one or several layers of boards with a minimum 25 mm overall thickness. For timber stud walls there must be a minimum distance of 100 mm between the seal and any stud and the cavity must be filled with minimum 100 mm Class A1 or A2 insulation in accordance with EN 13501-1. An aperture framing must be installed made of C-studs and boards that have been used for the lining of the wall, minimum thickness of the board 12.5 mm.

Rigid walls comprised of concrete, blockwork or masonry with a minimum thickness of 100 mm and minimum density of 650 kg/m<sup>3</sup>.

Maximum seal size (width x height): 1200 x 1200 mm for classification EI 120, 1200 x 2000 mm for classification EI 90.

Maximum distance for first service support: 250 mm.

Minimum distances in mm:<sup>3</sup>



- $s_1 = 0$  (distance between cables/cable supports and seal edge)
- $s_2 = 0$  (distance between cable supports)
- $s_3 = 0$  (distance between cables and upper seal edge)
- $s_4 = 0$  (distance between cable supports and bottom seal edge)
- $s_5 = 50$  (distance between cables and cable support above)
- $s_6 = 3$  (distance between metal pipes and seal edge)
- $s_7 = 3$  (distance between metal pipes and upper seal edge)
- $s_8 = 0$  (distance between metal pipes)
- $s_9 = 17$  (distance between plastic pipes/pipe closure devices and seal edge)
- $s_{10} = 17$  (distance between plastic pipes/pipe closure devices and upper seal edge)
- $s_{11} = 0$  (distance between plastic pipes/pipe closure devices)
- $s_{12} = 30$  (distance between metal pipes and plastic pipes/pipe closure devices)
- $s_{13} = 3$  (distance between cables/cable supports and metal pipes)
- $s_{14} = 40$  (distance between cables/cable supports and plastic pipes/pipe closure devices)

<sup>1</sup> Hilti firestop board CFS-CT B 2S (coated on both faces) may also be used

<sup>2</sup> See specification on page 43

<sup>3</sup> Composite pipes follow the same minimum distance requirements as plastic pipes

In addition to the classifications for walls  $\geq 100$  mm, there are some penetrants which may only be installed in other wall types or thicknesses. These penetrants may be combined with penetrants classified for walls  $\geq 100$  mm within one penetration seal, provided these are installed in the more restrictive wall type/thickness. When doing so, ensure that all separations meet the largest minimum distance requirement from all relevant supporting constructions. Likewise, only the smaller maximum opening size and lesser distance for first service support may be used when combining penetrants from varying wall thicknesses/types.

### **FLEXIBLE AND RIGID WALLS $\geq 135$ MM**

Flexible walls<sup>4</sup> or rigid walls comprised of concrete, blockwork or masonry with a minimum thickness of 135 mm and minimum density of 650 kg/m<sup>3</sup>.

Maximum seal size (width x height): 1200 x 1200 mm.

Maximum distance for first service support: 150 mm.

Minimum distances in mm:<sup>3</sup>

$s_6 = 0$  (distance between metal pipes and seal edge)

$s_8 = 0$  (distance between metal pipes)

$s_9 = 15$  (distance between plastic pipes/pipe closure devices and seal edge)

$s_{11} = 0$  (distance between plastic pipes/pipe closure devices)

$s_{12} = 0$  (distance between metal pipes and plastic pipes/pipe closure devices)

$s_{13} = 96$  (distance between cables/cable supports and metal pipes)

$s_{14} = 69$  (distance between cables/cable supports and plastic pipes/pipe closure devices)

### **RIGID WALLS $\geq 150$ MM, MINIMUM DENSITY 600 KG/M<sup>3</sup>**

Rigid walls comprised of concrete, blockwork or masonry with a minimum thickness of 150 mm and minimum density of 600 kg/m<sup>3</sup>.

Maximum seal size (width x height): 1200 x 1200 mm.

Maximum distance for first service support: 275 mm.

Minimum distances in mm:<sup>3</sup>

$s_1 = 0$  (distance between cables/cable supports and seal edge)

$s_2 = 0$  (distance between cable supports)

$s_3 = 45$  (distance between cables and upper seal edge)

$s_4 = 0$  (distance between cable supports and bottom seal edge)

$s_5 = 50$  (distance between cables and cable support above)

$s_6 = 30$  (distance between metal pipes and seal edge)

$s_7 = 3$  (distance between metal pipes and upper seal edge)

$s_8 = 0$  (distance between metal pipes)

$s_9 = 55$  (distance between plastic pipes/pipe closure devices and seal edge)

$s_{10} = 17$  (distance between plastic pipes/pipe closure devices and upper seal edge)

$s_{11} = 0$  (distance between plastic pipes/pipe closure devices)

$s_{12} = 68$  (distance between metal pipes and plastic pipes/pipe closure devices)

$s_{13} = 76$  (distance between cables/cable supports and metal pipes)

$s_{14} = 45$  (distance between cables/cable supports and plastic pipes/pipe closure devices)

### **RIGID WALLS $\geq 150$ MM, MINIMUM DENSITY 760 KG/M<sup>3</sup>**

Rigid walls comprised of concrete, blockwork or masonry with a minimum thickness of 150 mm and minimum density of 760 kg/m<sup>3</sup>.

Maximum seal size (width x height): 1200 x 1200 mm.

Maximum distance for first service support: 250 mm.

Minimum distances in mm:

$s_6 = 0$  (distance between metal pipes and lateral seal edge)

$s_7 = 45$  (distance between metal pipes and upper seal edge)

$s_8 = 30$  (distance between metal pipes)

<sup>4</sup> See flexible walls  $\geq 100$  mm for details about wall construction

<sup>3</sup> Composite pipes follow the same minimum distance requirements as plastic pipes

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM BLANK SEAL (NO SERVICES)

If services are added later, only services from the following tables may be added that fulfill the required classification.

| Maximum size (width x height) | Classification<br>E = Integrity<br>I = Insulation |
|-------------------------------|---------------------------------------------------|
| 1200 mm x 1200 mm             | EI 120                                            |
| 4000 mm x 800 mm              | EI 90                                             |



## RIGID WALLS $\geq 250$ MM BLANK SEAL (NO SERVICES)

If services are added later, only services from the following tables may be added that fulfill the required classification.

| Maximum size (width x height) | Classification<br>E = Integrity<br>I = Insulation |
|-------------------------------|---------------------------------------------------|
| 1200 mm x 2000 mm             | EI 90                                             |

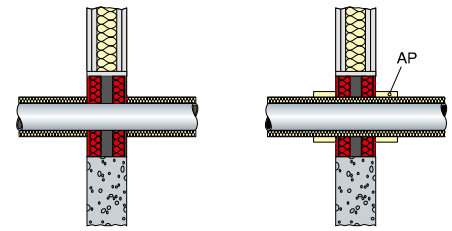
## FLEXIBLE AND RIGID WALLS $\geq 100$ MM METAL PIPES WITH MINERAL WOOL INSULATION

Minimum distance between metal pipes: 0 mm.

### Additional protection:

Depending on the required fire resistance, additional protection (AP) may be necessary.

AP<sub>8</sub>: Mineral wool mat wrapped around the pipe insulation on both sides of seal and fixed with wire, length along the pipe 250 mm on each side, thickness 40 mm.



### Copper pipes - Pipe end configuration U/C

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation |                 | Insulation configuration                                            |
|---------------|---------------------|----------------------|-------------------------------------------------|-----------------|---------------------------------------------------------------------|
|               |                     |                      | Without additional protection                   | AP <sub>8</sub> |                                                                     |
| 10 mm         | 1.0 – 14.2 mm       | 20 – 30 mm           | EI 120-U/C                                      | -               | Local sustained or interrupted, length on both sides $\geq 500$ mm  |
| 10 – 40 mm    | 1.0/1.5 – 14.2      | $\geq 20$ mm         | EI 120-U/C                                      | -               | Continued sustained or interrupted                                  |
|               |                     | 20 mm                | EI 120-U/C                                      | -               | Local sustained or interrupted, length on both sides $\geq 500$ mm  |
| 40 – 88.9 mm  | 1.5/2.0 – 14.2 mm   | $\geq 40$ mm         | EI 90-U/C                                       | EI 120-U/C      | Continued sustained                                                 |
|               |                     |                      | EI 120-U/C                                      | -               | Continued interrupted                                               |
|               |                     | 40 mm                | EI 90-U/C                                       | -               | Local sustained or interrupted, length on both sides $\geq 1000$ mm |

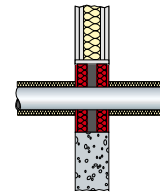
### Steel pipes - Pipe end configuration U/C

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys)

| Pipe diameter  | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation |                 | Insulation configuration                                            |
|----------------|---------------------|----------------------|-------------------------------------------------|-----------------|---------------------------------------------------------------------|
|                |                     |                      | Without additional protection                   | AP <sub>8</sub> |                                                                     |
| 114.3 mm       | 2.0 – 14.2 mm       | $\geq 30$ mm         | EI 60-U/C                                       | -               | Continued sustained                                                 |
|                |                     | $\geq 40$ mm         | EI 120-U/C                                      | -               |                                                                     |
|                |                     | $\geq 30$ mm         | EI 120-U/C                                      | -               | Continued interrupted                                               |
|                |                     | 30 – 40 mm           | EI 60-U/C                                       | -               | Local sustained or interrupted, length on both sides $\geq 500$ mm  |
|                |                     | 40 mm                | EI 120-U/C                                      | -               | Local sustained or interrupted, length on both sides $\geq 1000$ mm |
| 114.3 – 159 mm | 2.0/2.6 – 14.2 mm   | $\geq 40$ mm         | EI 60-U/C                                       | -               | Continued sustained                                                 |
|                |                     |                      | EI 120-U/C                                      | -               | Continued interrupted                                               |
|                |                     | 40 mm                | EI 45-U/C                                       | -               | Local sustained or interrupted, length on both sides $\geq 500$ mm  |
|                |                     |                      | EI 60-U/C                                       | -               | Local sustained, length on both sides $\geq 1000$ mm                |
|                |                     |                      | EI 90-U/C                                       | -               | Local interrupted, length on both sides $\geq 1000$ mm              |
| 159 mm         | 2.6 – 14.2 mm       | $\geq 40$ mm         | EI 60-U/C                                       | EI 120-U/C      | Continued sustained                                                 |
|                |                     | 40 mm                | EI 60-U/C                                       | EI 90-U/C       | Local sustained, length on both sides $\geq 1000$ mm                |
| 159 – 323.9 mm | 2.6/4.0 – 14.2      | $\geq 40$ mm         | EI 60-U/C                                       | EI 90-U/C       | Continued sustained                                                 |
|                |                     |                      | EI 60-U/C                                       | -               | Continued interrupted                                               |
|                |                     | 40 mm                | EI 30-U/C                                       | -               | Local sustained or interrupted, length on both sides $\geq 1000$ mm |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM METAL PIPES WITH MINERAL WOOL INSULATION

Minimum distance between metal pipes: 0 mm.  
No additional protection (AP) necessary.



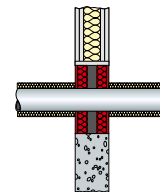
### Steel pipes – Pipe end configuration C/U

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                              |
|---------------|---------------------|----------------------|-------------------------------------------------|-------------------------------------------------------|
| 26.9 mm       | 1.4 – 14.2 mm       | $\geq 40$ mm         | EI 120-C/U                                      | Continued interrupted                                 |
|               |                     | 40 mm                | EI 120-C/U                                      | Local interrupted, length on both sides $\geq 500$ mm |
| 34 – 48.3 mm  | 4.0 – 14.2 mm       | $\geq 20$ mm         | EI 120-C/U                                      | Continued interrupted                                 |
|               |                     | 20 mm                | EI 120-C/U                                      | Local interrupted, length on both sides $\geq 500$ mm |
| 34 – 114.3 mm | 3.6 – 14.2 mm       | $\geq 30$ mm         | EI 120-C/U                                      | Continued interrupted                                 |
| 48.3 mm       | 1.6 – 14.2 mm       | $\geq 20$ mm         | EI 90-C/U                                       | Continued sustained                                   |
|               |                     |                      | EI 120-C/U                                      | Continued interrupted                                 |
|               |                     | 20 mm                | EI 90-C/U                                       | Local sustained, length on both sides $\geq 450$ mm   |
|               |                     |                      | EI 120-C/U                                      | Local interrupted, length on both sides $\geq 500$ mm |
| 114.3 mm      | 3.6 – 14.2 mm       | 30 mm                | EI 120-C/U                                      | Local interrupted, length on both sides $\geq 500$ mm |

## FLEXIBLE AND RIGID WALLS $\geq 135$ MM METAL PIPES WITH MINERAL WOOL INSULATION

Minimum distance between metal pipes: 0 mm.  
No additional protection (AP) necessary.



### Copper pipes – Pipe end configuration C/U

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys) and Ni

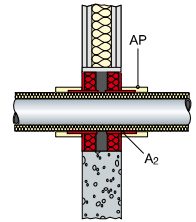
| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                            |
|---------------|---------------------|----------------------|-------------------------------------------------|-----------------------------------------------------|
| 88.9 mm       | 1.8 – 14.2 mm       | $\geq 40$ mm         | EI 120-C/U                                      | Continued sustained                                 |
|               |                     | 40 mm                | EI 120-C/U                                      | Local sustained, length on both sides $\geq 800$ mm |

### Steel pipes – Pipe end configuration C/U

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                               |
|---------------|---------------------|----------------------|-------------------------------------------------|--------------------------------------------------------|
| 32 mm         | 2.6 – 14.2 mm       | 30 mm                | EI 120-C/U                                      | Local interrupted, length on both sides $\geq 500$ mm  |
| 32 – 168.3 mm | 2.6/4.0 – 14.2 mm   | $\geq 30$ mm         | EI 120-C/U                                      | Continued interrupted                                  |
|               |                     | 30 mm                | EI 120-C/U                                      | Local interrupted, length on both sides $\geq 800$ mm  |
| 168.3 mm      | 4.0 – 14.2 mm       | 30 – 40 mm           | EI 120-C/U                                      | Local interrupted, length on both sides $\geq 1000$ mm |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM METAL PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP BANDAGE CFS-B



Minimum distance between metal pipes: 0 mm.

Two layers of Hilti firestop bandage CFS-B ( $A_2$ ) wrapped around the pipe insulation on both sides of the seal. Bandage positioned with half its width inside seal and fixed with wire outside seal. Additional protection ( $AP_6$ ) installed over bandage.

### Additional protection:

$AP_6$ : Armaflex AF pipe insulation wrapped around bandage/insulation on both sides of seal and fixed with wire, length along the pipe 250 mm on each side, thickness 32 mm.

### Copper pipes - Pipe end configuration U/C

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys) and Ni

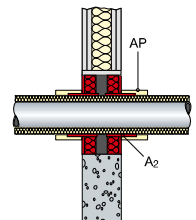
| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration |
|---------------|---------------------|----------------------|-------------------------------------------------|--------------------------|
| 10 mm         | 1.0 – 14.2 mm       | 7.5 – 40.5 mm        | EI 120-U/C                                      | Continued sustained      |
| 10 – 40 mm    | 1.0/1.5 – 14.2 mm   | 7.5 – 9 mm           | EI 90-U/C                                       |                          |
| 40 – 88.9 mm  | 1.5/2.0 – 14.2 mm   | 9 – 9.5 mm           | EI 45-U/C                                       |                          |
|               |                     | 45.5 – 47.5 mm       | EI 120-U/C                                      |                          |
| 88.9 mm       | 2.0 – 14.2 mm       | 9.5 – 47.5 mm        | EI 45-U/C                                       |                          |
|               |                     | 15 – 47.5 mm         | EI 60-U/C                                       |                          |

### Steel pipes - Pipe end configuration U/C

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

| Pipe diameter  | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration |
|----------------|---------------------|----------------------|-------------------------------------------------|--------------------------|
| 1.058 mm       | 2.0 – 14.2 mm       | 9 – 20 mm            | EI 90-U/C                                       | Continued sustained      |
| 114.3 – 159 mm | 2.0/2.6 – 14.2 mm   | 9 – 10 mm            | EI 60-U/C                                       |                          |
| 159 mm         | 2.6 – 14.2 mm       | 10 – 45 mm           |                                                 |                          |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM METAL PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP BANDAGE CFS-B



Minimum distance between metal pipes: 0 mm.

Two layers of Hilti firestop bandage CFS-B ( $A_2$ ) wrapped around the pipe insulation on both sides of the seal. Bandage positioned with half its width inside seal and fixed with wire outside seal. Additional protection ( $AP_6$ ) installed over bandage.

### Additional protection:

$AP_6$ : Armaflex AF pipe insulation wrapped around bandage/insulation on both sides of seal and fixed with wire, length along the pipe 300 mm on each side, thickness 19 mm.

### Copper pipes – Pipe end configuration C/U

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys) and Ni

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|---------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 28 mm         | 1.0 – 14.2 mm       | 19 – 35 mm           | EI 120-C/U                                      | Continued sustained or local sustained, length on both sides $\geq 500$ mm |

### Steel pipes – Pipe end configuration C/U

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

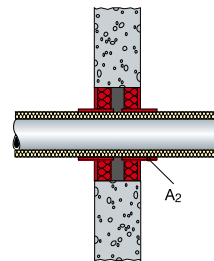
| Pipe diameter   | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|-----------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 60.3 mm         | 3.6 – 14.2 mm       | 21.5 – 39 mm         | EI 90-C/U                                       | Continued sustained or local sustained, length on both sides $\geq 500$ mm |
| 60.3 – 114.3 mm |                     | 21.5 – 39 mm         | EI 60-C/U                                       |                                                                            |
| 114.3 mm        |                     | 43 mm                | EI 90-C/U                                       |                                                                            |

### Stainless steel pipes – Pipe end configuration C/U

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|---------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 60.3 mm       | 2.0 – 14.2 mm       | 21.5 – 39 mm         | EI 120-C/U                                      | Continued sustained or local sustained, length on both sides $\geq 500$ mm |

## RIGID WALLS $\geq 150$ , MINIMUM DENSITY 760 KG/M<sup>3</sup> METAL PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP BANDAGE CFS-B

Two layers of Hilti firestop bandage CFS-B (A<sub>2</sub>) wrapped around the pipe insulation on both sides of the seal. Bandage positioned with half its width inside seal and fixed with wire outside seal.



No additional protection (A<sub>p</sub>) necessary.

### Copper pipes – Pipe end configuration C/U

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys) and Ni

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|---------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 28 mm         | 1.0 – 14.2 mm       | 19 – 35 mm           | EI 60-C/U                                       | Continued sustained or local sustained, length on both sides $\geq 500$ mm |
|               |                     | 35 mm                | EI 120-C/U                                      |                                                                            |

### Steel pipes – Pipe end configuration C/U

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

| Pipe diameter   | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|-----------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 60.3 mm         | 3.6 – 14.2 mm       | 21.5 – 39 mm         | EI 90-C/U                                       | Continued sustained or local sustained, length on both sides $\geq 500$ mm |
|                 |                     | 39 mm                | EI 120-C/U                                      |                                                                            |
| 60.3 – 114.3 mm | 3.6 – 14.2 mm       | 21.5 – 39 mm         | EI 60-C/U                                       |                                                                            |
| 114.3 mm        | 3.6 – 14.2 mm       | 43 mm                | EI 90-C/U                                       |                                                                            |

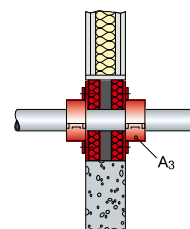
### Stainless steel pipes – Pipe end configuration C/U

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|---------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 60.3 mm       | 2.0 – 14.2 mm       | 21.5 – 39 mm         | EI 90-C/U                                       | Continued sustained or local sustained, length on both sides $\geq 500$ mm |
|               |                     | 39 mm                | EI 120-C/U                                      |                                                                            |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti Firestop collar CFS-C P (A<sub>3</sub>) installed on both sides of the seal and fixed together with M8 threaded rods, washers and nuts.



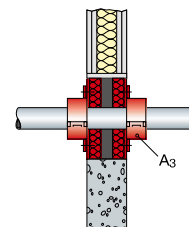
### Normed pipes – Pipe end configuration U/U

| Pipe material | Pipe norm                                                                 | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
|---------------|---------------------------------------------------------------------------|---------------|---------------------|-----------------|-------------------------------------------------|
| PVC-U         | EN ISO 1452-2,<br>EN ISO 15493,<br>DIN 8061/2,<br>EN 1329-1,<br>EN 1453-1 | 50 mm         | 2.4 – 5.6 mm        | CFS-C P 50/1.5" | EI 90-U/U                                       |
|               |                                                                           |               | 5.6 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
|               |                                                                           | 63 mm         | 3.0 – 4.7 mm        | CFS-C P 63/2"   | EI 90-U/U                                       |
|               |                                                                           | 75 mm         | 2.2 – 3.6 mm        | CFS-C P 75/2.5" | EI 90-U/U                                       |
|               |                                                                           |               | 2.2 mm              | CFS-C P 75/2.5" | EI 120-U/U                                      |
|               |                                                                           | 90 mm         | 2.7 – 4.3 mm        | CFS-C P 90/3"   | EI 90-U/U                                       |
|               |                                                                           | 110 mm        | 2.2 – 8.1 mm        | CFS-C P 110/4"  | EI 90-U/U                                       |
|               |                                                                           |               | 8.1 mm              | CFS-C P 110/4"  | EI 120-U/U                                      |
|               |                                                                           | 110 – 125 mm  | 3.7 – 6.0 mm        | CFS-C P 125/5"  | EI 120-U/U                                      |
|               |                                                                           | >125 – 160 mm | 2.5 – 11.8 mm       | CFS-C P 160/6"  | EI 120-U/U                                      |
| PE            | EN 1519,<br>EN 12201-2,<br>EN 12666-1                                     | 50 mm         | 3.0 mm              | CFS-C P 50/1.5" | EI 90-U/U                                       |
|               |                                                                           | 63 mm         | 3.0 mm              | CFS-C P 63/2"   |                                                 |
|               |                                                                           | 75 mm         | 3.0 mm              | CFS-C P 75/2.5" |                                                 |
|               |                                                                           | 90 mm         | 3.5 mm              | CFS-C P 90/3"   |                                                 |
|               |                                                                           | 110 mm        | 4.2 mm              | CFS-C P 110/4"  |                                                 |
|               |                                                                           | 110 - 125 mm  | 4.8 mm              | CFS-C P 125/5"  | EI 120-U/U                                      |
|               |                                                                           | >125 – 160 mm | 6.2 mm              | CFS-C P 160/6"  |                                                 |
| PE            | EN ISO 15494,<br>DIN 8074/5                                               | 50 mm         | 2.9 – 4.6 mm        | CFS-C P 50/1.5" |                                                 |
|               |                                                                           | 63 mm         | 1.8 – 5.8 mm        | CFS-C P 63/2"   |                                                 |
|               |                                                                           | 75 mm         | 1.9 – 6.8 mm        | CFS-C P 75/2.5" |                                                 |
|               |                                                                           | 90 mm         | 2.2 – 8.2 mm        | CFS-C P 90/3"   |                                                 |
|               |                                                                           | 110 mm        | 2.7 – 10.0 mm       | CFS-C P 110/4"  |                                                 |
|               |                                                                           | 110 – 125 mm  | 3.1 – 7.1 mm        | CFS-C P 125/5"  | EI 120-U/U                                      |
|               |                                                                           | >125 – 160 mm | 4.0 – 9.1 mm        | CFS-C P 160/6"  |                                                 |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti Firestop Collar CFS-C P (A<sub>3</sub>) installed on each side of the seal and fixed together with M8 threaded rods, washers and nuts.



### Branded pipes - Pipe end configuration U/U resp. C/U

| Pipe designation                   | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
|------------------------------------|-------------------|---------------|---------------------|-----------------|-------------------------------------------------|
| Dekaprop Industry pipes (PP-H 100) | Georg Fischer     | 50 mm         | 1.8 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
|                                    |                   | 110 mm        | 2.7 mm              | CFS-C P 110/4"  | EI 90-U/U                                       |
| Geberit Silent-db20 (PE-S2)        | Geberit           | 75 mm         | 3.6 mm              | CFS-C P 75/2.5" | EI 90-U/U                                       |
|                                    |                   | 90 mm         | 5.5 mm              | CFS-C P 90/3"   |                                                 |
|                                    |                   | 110 mm        | 6.0 mm              | CFS-C P 110/4"  |                                                 |
|                                    |                   | 135 mm        | 6.0 mm              | CFS-C P 160/6"  | EI 120-C/U                                      |
|                                    |                   | 160 mm        | 7.0 mm              | CFS-C P 160/6"  |                                                 |
| PROGEF standard pipe (PP-H)        | Georg Fischer     | 50 mm         | 2.9 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
|                                    |                   | 75 mm         | 6.8 mm              | CFS-C P 75/2.5" | EI 90-U/U                                       |
| Wavin TS (PE-HD 100 RC)            | Wavin             | 50 mm         | 4.6 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
|                                    |                   | 75 mm         | 6.8 mm              | CFS-C P 75/2.5" | EI 90-U/U                                       |
|                                    |                   | 90 mm         | 8.2 mm              | CFS-C P 90/3"   |                                                 |
|                                    |                   | 110 mm        | 10.0 mm             | CFS-C P 110/4"  |                                                 |

### Normed pipes - Pipe end configuration U/U resp. C/U

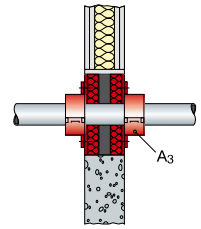
| Pipe designation | Pipe norm  | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
|------------------|------------|---------------|---------------------|-----------------|-------------------------------------------------|
| PP               | EN 1451-1* | 32            | 1.8                 | CFS-C P 50/1.5" | EI 90-U/U                                       |
|                  |            | 50            | 1.8 – 2.0           | CFS-C P 50/1.5" |                                                 |
|                  |            | 58            | 4.0                 | CFS-C P 63/2"   |                                                 |
|                  |            | 70            | 4.5                 | CFS-C P 75/2.5" |                                                 |
|                  |            | 75            | 1.9 – 2.3           | CFS-C P 75/2.5" |                                                 |
|                  |            | 90            | 2.8 – 4.5           | CFS-C P 90/3"   |                                                 |
|                  |            | 110           | 2.7 – 5.3           | CFS-C P 110/4"  |                                                 |
| PP               | EN 1451-1* | 125           | 3.1 – 5.3           | CFS-C P 125/5"  | EI 120-C/U                                      |
|                  |            | 135           | 5.3 – 5.8           | CFS-C P 160/6"  |                                                 |
|                  |            | 160           | 3.9 – 7.5           | CFS-C P 160/6"  |                                                 |

\*e.g. Rehau AG "Raupiano Plus", Magnaplast GmbH „Skolan-dB“, Wavin Ireland Ltd or KeKelit "Wavin AS" or "Phonex AS", Wavin Ireland Ltd "Wavin SiTech", Poloplast "Polokal NG", Poloplast "Polokal 3S", Geberit "Silent PP", Coes "Blue Power", Coes "PhoNoFire", Valsir "Triplus", Valsir "Silere", Pipelife "Master 3"

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on both sides of the seal and fixed together with M8 threaded rods, washers and nuts.



### Pre-insulated pipes – Pipe end configuration U/C

| Pipe designation        | Pipe manufacturer | Pipe diameter | Inner pipe diameter | Collar size    | Classification<br>E = integrity, I = insulation |
|-------------------------|-------------------|---------------|---------------------|----------------|-------------------------------------------------|
| Coolfit (ABS/PUR/PE-HD) | Georg Fischer     | 90 mm         | 32 mm               | CFS-C P 90/3"  | EI 90-U/C                                       |
|                         |                   | 110 mm        | 40 – 50 mm          | CFS-C P 110/4" |                                                 |

### Normed pipes – Pipe end configuration U/C

| Pipe material | Pipe norm    | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
|---------------|--------------|---------------|---------------------|-----------------|-------------------------------------------------|
| PP            | EN 1451-1    | 78 mm         | 45 mm               | CFS-P75/2.5"    | EI 90-U/C                                       |
| PP-R          | EN ISO 15874 | 50 mm         | 8.3 mm              | CFS-C P 50/1.5" | EI 120-U/C                                      |
|               |              | 63 mm         | 10.5 mm             | CFS-C P 63/2"   |                                                 |
|               |              | 75 mm         | 12.5 mm             | CFS-C P 75/2.5" | EI 90-U/C                                       |
|               |              | 90 mm         | 15 mm               | CFS-C P 90/3"   |                                                 |

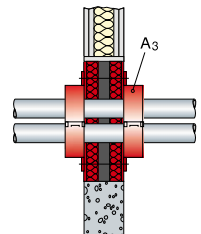
### Branded pipes – Pipe end configuration U/C

| Pipe designation            | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
|-----------------------------|-------------------|---------------|---------------------|-----------------|-------------------------------------------------|
| PROGEF standard pipe (PP-H) | Georg Fischer     | 50 mm         | 4.6 mm              | CFS-C P 50/1.5" | EI 120-U/C                                      |
|                             |                   | 90 mm         | 8.2 mm              | CFS-C P 90/3"   | EI 90-U/C                                       |
| Skolan-dB (PP)              | Magnaplast        | 78 mm         | 4.5 mm              | CFS-C P 75/2.5" | EI 90-U/C                                       |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM MULTIPLE PLASTIC PIPES IN SINGLE HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on both sides of the seal and fixed together with M8 threaded rods, washers and nuts.



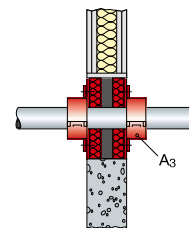
### Normed pipes - Pipe end configuration U/U

| Pipe material | Pipe norm                   | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
|---------------|-----------------------------|---------------|---------------------|-----------------|-------------------------------------------------|
| PVC-U         | EN ISO 15493,<br>DIN 8061/2 | 20 mm         | 1.5/2.2 mm          | CFS-C P 50/1.5" | EI 120-U/U                                      |
| PE            | EN ISO 15494,<br>DIN 8074/5 | 20 mm         | 1.9/2.8 mm          |                 |                                                 |
| PP-R          | EN ISO 15874,<br>DIN 8077/8 | 20 mm         | 3.4 mm              |                 |                                                 |
| PP-H          | EN ISO 15874,<br>DIN 8077/8 | 20 mm         | 1.9 mm              |                 |                                                 |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C (A<sub>3</sub>) installed on both sides of the seal and fixed together with M8 threaded rods, washers and nuts.



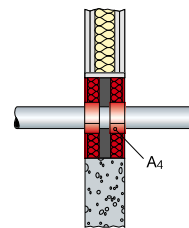
### Normed pipes - Pipe end configuration U/C

| Pipe material | Pipe norm                                                                 | Pipe diameter | Pipe wall thickness | Collar size   | Classification<br>E = integrity, I = insulation |
|---------------|---------------------------------------------------------------------------|---------------|---------------------|---------------|-------------------------------------------------|
| PVC-U         | EN ISO 1452-2,<br>EN ISO 15493,<br>DIN 8061/2,<br>EN 1329-1,<br>EN 1453-1 | 50 mm         | 2.4 – 5.6 mm        | CFS-C 50/1.5" | EI 120-U/C                                      |
|               |                                                                           | 63 mm         | 3.0 – 4.7 mm        | CFS-C 63/2"   |                                                 |
|               |                                                                           | 75 mm         | 2.2 – 3.6 mm        | CFS-C 75/2.5" |                                                 |
|               |                                                                           | 90 mm         | 2.7 – 4.3 mm        | CFS-C 90/3"   |                                                 |
|               |                                                                           | 110 mm        | 1.8 – 8.1 mm        | CFS-C 110/4"  |                                                 |
|               |                                                                           | 125 mm        | 3.7 – 6.0 mm        | CFS-C 125/5"  |                                                 |
|               |                                                                           | 160 mm        | 2.5 – 11.8 mm       | CFS-C 160/6"  |                                                 |
| PE            | EN 1519,<br>EN 12201-2,<br>EN 12666-1                                     | 50 mm         | 3.0 mm              | CFS-C 50/1.5" |                                                 |
|               |                                                                           | 63 mm         | 3.0 mm              | CFS-C 63/2"   |                                                 |
|               |                                                                           | 75 mm         | 3.0 mm              | CFS-C 75/2.5" |                                                 |
|               |                                                                           | 90 mm         | 3.5 mm              | CFS-C 90/3"   |                                                 |
|               |                                                                           | 110 mm        | 4.2 mm              | CFS-C 110/4"  |                                                 |
|               |                                                                           | 125 mm        | 4.8 mm              | CFS-C 125/5"  |                                                 |
|               |                                                                           | 160 mm        | 6.2 mm              | CFS-C 160/6"  |                                                 |
| PE            | EN ISO 15494,<br>DIN 8074/5                                               | 50 mm         | 2.9 – 4.6 mm        | CFS-C 50/1.5" |                                                 |
|               |                                                                           | 63 mm         | 1.8 – 5.8 mm        | CFS-C 63/2"   |                                                 |
|               |                                                                           | 75 mm         | 1.9 – 6.8 mm        | CFS-C 75/2.5" |                                                 |
|               |                                                                           | 90 mm         | 2.2 – 8.2 mm        | CFS-C 90/3"   |                                                 |
|               |                                                                           | 110 mm        | 2.7 – 10.0 mm       | CFS-C 110/4"  |                                                 |
|               |                                                                           | 125 mm        | 3.1 – 7.1 mm        | CFS-C 125/5"  |                                                 |
|               |                                                                           | 160 mm        | 4.0 – 9.1 mm        | CFS-C 160/6"  |                                                 |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM PLASTIC PIPES WITH HILTI FIRESTOP WRAP CFS-W

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop wrap CFS-W (A<sub>4</sub>) wrapped around pipe on both sides of the seal and positioned within the annular space so that the outer edge of the wrap is flush with the surface of the wall.



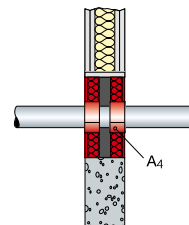
### Branded pipes – Pipe end configuration C/U

| Pipe designation            | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Wrap size/ number of layers | Classification<br>E = integrity<br>I = insulation |
|-----------------------------|-------------------|---------------|---------------------|-----------------------------|---------------------------------------------------|
| Geberit Silent-db20 (PE-S2) | Geberit           | $\leq 75$ mm  | 3,6 mm              | CFS-W EL 1 layer            | EI 120-C/U                                        |
| phonEX (PP)                 | Ke Kelit          | $\leq 78$ mm  | 4,5 mm              |                             |                                                   |
| Raupiano Plus (PP)          | Rehau             | $\leq 75$ mm  | 1,9 mm              |                             |                                                   |
| Wavin AS (PP)               | Wavin             | $\leq 78$ mm  | 4,5 mm              |                             |                                                   |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM PLASTIC PIPES WITH HILTI FIRESTOP WRAP CFS-W

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop wrap CFS-W (A<sub>4</sub>) wrapped around pipe on both sides of the seal and positioned within the annular space so that the outer edge of the wrap is flush with the surface of the wall.



### Normed pipes - Pipe end configuration U/C

| Pipe material | Pipe norm                                                                 | Pipe diameter      | Pipe wall thickness | Wrap size/ number of layers | Classification<br>E = integrity<br>I = insulation |
|---------------|---------------------------------------------------------------------------|--------------------|---------------------|-----------------------------|---------------------------------------------------|
| PVC-U         | EN ISO 1452-2,<br>EN ISO 15493,<br>DIN 8061/2,<br>EN 1329-1,<br>EN 1453-1 | 50 mm              | 2,2 – 3,6 mm        | CFS-W SG 50/1,5"            | EI 90-U/C                                         |
|               |                                                                           | 63 mm              | 2,2 – 3,6 mm        | CFS-W SG 63/2"              |                                                   |
|               |                                                                           | 75 mm              | 2,2 – 3,6 mm        | CFS-W SG 75/2,5"            |                                                   |
|               |                                                                           | 90 mm              | 3,7 – 6,0 mm        | CFS-W SG 90/3"              |                                                   |
|               |                                                                           | 110 mm             | 3,7 – 6,0 mm        | CFS-W SG 110/4"             |                                                   |
|               |                                                                           | 125 mm             | 3,7 – 6,0 mm        | CFS-W SG 125/5"             |                                                   |
|               |                                                                           | $\leq 75$ mm       | 2,2 – 3,6 mm        | CFS-W EL 1 layer            |                                                   |
|               |                                                                           | $> 75 \leq 125$ mm | 3,7 – 6,0 mm        | CFS-W EL 2 layers           |                                                   |
| PE            | EN 1519,<br>EN 12201-2,<br>EN 12666-1                                     | 50 mm              | 3,0 mm              | CFS-W SG 50/1,5"            |                                                   |
|               |                                                                           | 63 mm              | 3,0 mm              | CFS-W SG 63/2"              |                                                   |
|               |                                                                           | 75 mm              | 3,0 mm              | CFS-W SG 75/2,5"            |                                                   |
|               |                                                                           | 90 mm              | 4,8 mm              | CFS-W SG 90/3"              |                                                   |
|               |                                                                           | 110 mm             | 4,8 mm              | CFS-W SG 110/4"             |                                                   |
|               |                                                                           | 125 mm             | 4,8 mm              | CFS-W SG 125/5"             |                                                   |
|               |                                                                           | $\leq 75$ mm       | 3,0 mm              | CFS-W EL 1 layer            |                                                   |
|               |                                                                           | $> 75 \leq 125$ mm | 4,8 mm              | CFS-W EL 2 layers           |                                                   |
| PE            | EN ISO 15494,<br>DIN 8074/5                                               | 50 mm              | 1,9 – 6,8 mm        | CFS-W SG 50/1,5"            |                                                   |
|               |                                                                           | 63 mm              | 1,9 – 6,8 mm        | CFS-W SG 63/2"              |                                                   |
|               |                                                                           | 75 mm              | 1,9 – 6,8 mm        | CFS-W SG 75/2,5"            |                                                   |
|               |                                                                           | 90 mm              | 3,2 – 7,1 mm        | CFS-W SG 90/3"              |                                                   |
|               |                                                                           | 110 mm             | 3,2 – 7,1 mm        | CFS-W SG 110/4"             |                                                   |
|               |                                                                           | 125 mm             | 3,2 – 7,1 mm        | CFS-W SG 125/5"             |                                                   |
|               |                                                                           | $\leq 75$ mm       | 1,9 – 6,8 mm        | CFS-W EL 1 layer            |                                                   |
|               |                                                                           | $> 75 \leq 125$ mm | 3,2 – 7,1 mm        | CFS-W EL 2 layers           |                                                   |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR ENDLESS CFS-C EL

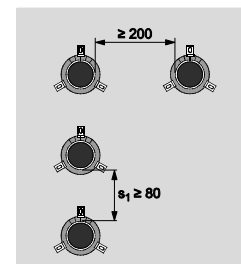
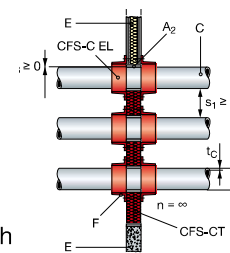
The pipes penetrating the board have to be grouped in line only and the minimum distance between them is  $s_1 \geq 80$  mm, however, the distance to the building element is zero ( $s_3 \geq 0$  mm). Minimum distances between two lines of pipes:  $\geq 200$  mm.

The gap filler is CFS-S ACR- Hilti firestop collar endless CFS-C EL installed on both sides and fixed with threaded rods M6 with disc and nut.

If the wall thickness is bigger than 100 mm the free space between both boards has to be closed around penetrating plastic pipes with mineral wool, at least 100 mm around the plastic pipes.

Pipes could be covered with a sound decoupling insulation, penetrating the wall and all installed jackets CFS-C EL in local sustained and continuous sustained situation.

Sound decoupling insulation comprises a max. 9 mm polyethylene based insulation or a max. 4 mm Polyester insulation (Thermaflex, ThermoVlies B2).



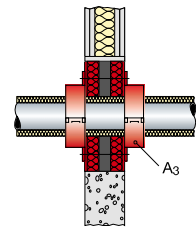
| Pipe designation | Pipe norm                               | Approved range | Classification<br>E = integrity<br>I = insulation |
|------------------|-----------------------------------------|----------------|---------------------------------------------------|
| Plastic pipes    | EN 1519-1,<br>EN 12666-1,<br>EN 12201-2 |                | EI 90-U/U                                         |
| ABS              | EN 1455-1                               |                |                                                   |
| SAN+PVC          | EN 1565-1                               |                |                                                   |
| ABS              | EN 1455,<br>EN 15493                    |                |                                                   |
| SAN+PVC          | EN 1565-1                               |                |                                                   |
| PE               | EN15494,<br>EN12201-2,<br>DIN 8074/75   |                |                                                   |

| PVC                     | EN 1452-1,<br>EN 1329-1,<br>EN 1453-1,<br>EN 1566-1,<br>EN ISO 15493,<br>DIN 8061/62                                                                                                                                                                                                                      | <table><thead><tr><th><math>d_C</math> (mm)</th><th><math>t_C</math> (mm)</th></tr></thead><tbody><tr><td>32</td><td>1.9</td></tr><tr><td>32</td><td>12.3</td></tr><tr><td>110</td><td>12.3</td></tr><tr><td>110</td><td>2.2</td></tr></tbody></table> | $d_C$ (mm) | $t_C$ (mm) | 32 | 1.9 | 32 | 12.3 | 110 | 12.3 | 110 | 2.2 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|----|-----|----|------|-----|------|-----|-----|
| $d_C$ (mm)              | $t_C$ (mm)                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 32                      | 1.9                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 32                      | 12.3                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 12.3                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 2.2                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| PP pipes, non-regulated | Coes Blue Power<br>Coes PhoNo Fire,<br>Geberit Silent PP<br>Marley Silent<br>Ostendorf Skolan db<br>Pipelife Master 3<br>Poloplast Polokal NG<br>Poloplast Polokal 3S<br>Poloplast Polokal XS<br>Rehau Raupiano Plus<br>KE KELIT PhonEx AS<br>Valsir Triplus<br>Valsir Silere<br>Wavin SiTech<br>Wavin AS | <table><thead><tr><th><math>d_C</math> (mm)</th><th><math>t_C</math> (mm)</th></tr></thead><tbody><tr><td>32</td><td>1.8</td></tr><tr><td>32</td><td>5.3</td></tr><tr><td>110</td><td>5.3</td></tr><tr><td>110</td><td>2.7</td></tr></tbody></table>   | $d_C$ (mm) | $t_C$ (mm) | 32 | 1.8 | 32 | 5.3  | 110 | 5.3  | 110 | 2.7 |
| $d_C$ (mm)              | $t_C$ (mm)                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 32                      | 1.8                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 32                      | 5.3                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 5.3                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 2.7                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| PP                      | EN1451-1,<br>DIN 8077/78                                                                                                                                                                                                                                                                                  | <table><thead><tr><th><math>d_C</math> (mm)</th><th><math>t_C</math> (mm)</th></tr></thead><tbody><tr><td>32</td><td>1.8</td></tr><tr><td>32</td><td>2.7</td></tr><tr><td>110</td><td>2.7</td></tr><tr><td>110</td><td>1.9</td></tr></tbody></table>   | $d_C$ (mm) | $t_C$ (mm) | 32 | 1.8 | 32 | 2.7  | 110 | 2.7  | 110 | 1.9 |
| $d_C$ (mm)              | $t_C$ (mm)                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 32                      | 1.8                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 32                      | 2.7                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 2.7                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 1.9                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| PE pipes, non-regulated | Geberit Silent dB20                                                                                                                                                                                                                                                                                       | <table><thead><tr><th><math>d_C</math> (mm)</th><th><math>t_C</math> (mm)</th></tr></thead><tbody><tr><td>56</td><td>3.2</td></tr><tr><td>56</td><td>6</td></tr><tr><td>110</td><td>6</td></tr><tr><td>110</td><td>3.6</td></tr></tbody></table>       | $d_C$ (mm) | $t_C$ (mm) | 56 | 3.2 | 56 | 6    | 110 | 6    | 110 | 3.6 |
| $d_C$ (mm)              | $t_C$ (mm)                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 56                      | 3.2                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 56                      | 6                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 6                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |
| 110                     | 3.6                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                        |            |            |    |     |    |      |     |      |     |     |

# **FLEXIBLE AND RIGID WALLS $\geq 100$ MM** **PLASTIC PIPES WITH FOAMED ELASTOMERIC** **INSULATION AND HILTI FIRESTOP COLLAR CFS-C P**

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on both sides of the seal and fixed together with M8 threaded rods, washers and nuts.



## **Normed pipes – Pipe end configuration U/U**

| Pipe material | Pipe norm                          | Pipe diameter | Pipe wall thickness | Insulation thickness | Collar size    | Classification<br>E = integrity<br>I = insulation | Insulation configuration |
|---------------|------------------------------------|---------------|---------------------|----------------------|----------------|---------------------------------------------------|--------------------------|
| PE            | EN 1519,<br>EN 12201-2, EN 12666-1 | 110 mm        | 4.2 mm              | 25 mm                | CFS-C P 160/6" | EI 90-U/U                                         | Continued sustained      |
|               |                                    |               |                     | 10 mm                | CFS-C P 160/6" | EI 90-U/U                                         | Continued interrupted    |

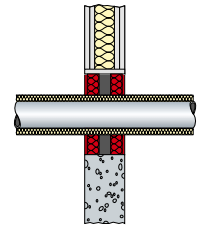
## **Normed pipes - Pipe end configuration U/C**

| Pipe material                          | Pipe norm    | Pipe diameter | Pipe wall thickness | Insulation thickness | Collar size     | Classification<br>E = integrity<br>I = insulation | Insulation configuration                                                   |
|----------------------------------------|--------------|---------------|---------------------|----------------------|-----------------|---------------------------------------------------|----------------------------------------------------------------------------|
| PE-X<br>(i.e. Rehau:<br>Rautitan flex) | EN ISO 15875 | 40 mm         | 5.5 mm              | 9 mm                 | CFS-C P 50/1.5" | EI 90-U/C                                         | Continued sustained or local sustained, length on both sides $\geq 250$ mm |
|                                        |              | 50 mm         | 6.9 mm              | 9 mm                 | CFS-C P 63/2"   |                                                   |                                                                            |
|                                        |              | 63 mm         | 8.6 mm              | 10 mm                | CFS-C P 75/2.5" |                                                   |                                                                            |

## **Branded pipes - Pipe end configuration U/C**

| Pipe designation                    | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Collar size     | Classification<br>E = integrity<br>I = insulation | Insulation configuration                                                   |
|-------------------------------------|-------------------|---------------|---------------------|----------------------|-----------------|---------------------------------------------------|----------------------------------------------------------------------------|
| Friatherm starr (PVC-C)             | Friatec           | 32 mm         | 3.6 mm              | 9 mm                 | CFS-C P 50/1.5" | EI 120-U/C                                        | Continued sustained or local sustained, length on both sides $\geq 200$ mm |
|                                     |                   | 40 mm         | 4.5 mm              | 9 mm                 | CFS-C P 63/2"   |                                                   |                                                                            |
|                                     |                   | 50 mm         | 5.6 mm              | 9 mm                 | CFS-C P 63/2"   |                                                   |                                                                            |
|                                     |                   | 63 mm         | 7.1 mm              | 10 mm                | CFS-C P 75/2.5" |                                                   |                                                                            |
| Fusiotherm Faser SDR 7.4/S3.2" (PP) | Aquatherm         | 40 mm         | 5.5 mm              | 9 mm                 | CFS-C P 50/1.5" |                                                   |                                                                            |
|                                     |                   | 50 mm         | 6.9 mm              | 9 mm                 | CFS-C P 63/2"   |                                                   |                                                                            |
|                                     |                   | 75 mm         | 10.3 mm             | 10 mm                | CFS-C P 90/3"   |                                                   |                                                                            |
|                                     |                   | 110 mm        | 15.1 mm             | 10 mm                | CFS-C P 125/5"  |                                                   |                                                                            |
| Fusiotherm SDR 11 (PP)              | Aquatherm         | 40 mm         | 3.7 mm              | 9 mm                 | CFS-C P 50/1.5" |                                                   |                                                                            |
|                                     |                   | 50 mm         | 4.6 mm              | 9 mm                 | CFS-C P 63/2"   |                                                   |                                                                            |
|                                     |                   | 75 mm         | 6.8 mm              | 10 mm                | CFS-C P 90/3"   |                                                   |                                                                            |
|                                     |                   | 110 mm        | 10.0 mm             | 10 mm                | CFS-C P 125/5"  |                                                   |                                                                            |
| Wavin TS (PE-100RC)                 | Wavin             | 50 mm         | 4.6 mm              | 9 mm                 | CFS-C P 63/2"   |                                                   |                                                                            |
|                                     |                   | 63 mm         | 5.8 mm              | 10 mm                | CFS-C P 75/2.5" |                                                   |                                                                            |
|                                     |                   | 75 mm         | 6.8 mm              | 10 mm                | CFS-C P 90/3"   |                                                   |                                                                            |
|                                     |                   | 90 mm         | 8.2 mm              | 10 mm                | CFS-C P 110/4"  |                                                   |                                                                            |
|                                     |                   | 110 mm        | 10.0 mm             | 10 mm                | CFS-C P 125/5"  |                                                   |                                                                            |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM COMPOSITE PIPES WITH MINERAL WOOL INSULATION

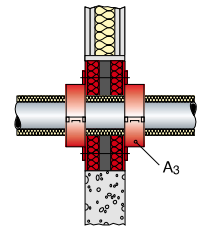


Minimum distance between pipes: 0 mm.  
No additional protection necessary.

### Branded pipes – Pipe end configuration U/C

| Pipe designation                    | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                            |
|-------------------------------------|-------------------|---------------|---------------------|----------------------|-------------------------------------------------|-----------------------------------------------------|
| Geberit Mepla<br>(PE-Xb/Al/PE-HD)   | Geberit           | 16 – 32 mm    | 2.0 – 3.0 mm        | $\geq 20$ mm         | EI 120-U/C                                      | Continued sustained                                 |
|                                     |                   |               |                     | 20 mm                | EI 120-U/C                                      | Local sustained, length on both sides $\geq 250$ mm |
| KELOX KM 110<br>(PE-X/Al/PE)        | Ke Kelit          | 16 – 32 mm    | 2.0 – 3.0 mm        | $\geq 20$ mm         | EI 120-U/C                                      | Continued sustained                                 |
|                                     |                   |               |                     | 20 mm                | EI 120-U/C                                      | Local sustained, length on both sides $\geq 250$ mm |
| Rautitan stabil<br>(PE-Xa/Al/PE-HD) | Rehau             | 16.2 – 32 mm  | 2.6 – 4.7 mm        | $\geq 20$ mm         | EI 120-U/C                                      | Continued sustained                                 |
|                                     |                   |               |                     | 20 mm                | EI 120-U/C                                      | Local sustained, length on both sides $\geq 250$ mm |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM COMPOSITE PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP COLLAR CFS-C P



Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on both sides of the seal and fixed together with M8 threaded rods, washers and nuts

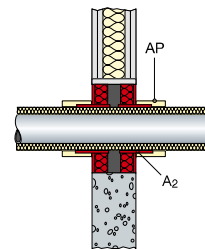
### Branded pipes – Pipe end configuration U/C

| Pipe designation                    | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Collar size     | Classification<br>E = integrity<br>I = insulation | Insulation configuration |
|-------------------------------------|-------------------|---------------|---------------------|----------------------|-----------------|---------------------------------------------------|--------------------------|
| Geberit Mepla<br>(PE-Xb/Al/PE-HD)   | Geberit           | 40 mm         | 3.5 mm              | 9 mm                 | CFS-C P 50/1.5" | EI 60-U/C                                         | Continued sustained      |
|                                     |                   | 50 mm         | 4.0 mm              | 9 mm                 | CFS-C P 63/2"   |                                                   |                          |
| KELOX KM 110<br>(PE-X/Al/PE)        | Ke Kelit          | 50 mm         | 4.5 mm              | 9 mm                 | CFS-C P 50/1.5" |                                                   |                          |
|                                     |                   | 63 mm         | 6.0 mm              | 9 mm                 | CFS-C P 75/2.5" |                                                   |                          |
| Rautitan stabil<br>(PE-Xa/Al/PE-HD) | Rehau             | 40 mm         | 6.0 mm              | 9 mm                 | CFS-C P 50/1.5" |                                                   |                          |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM COMPOSITE PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP BANDAGE CFS-B

Minimum distance between pipe closure devices: 0 mm.

Two layers of Hilti firestop bandage CFS-B (A<sub>2</sub>) wrapped around the pipe insulation on both sides of the seal. Bandage positioned with half its width inside seal and fixed with wire outside seal. Install additional protection (AP<sub>6</sub> or AP<sub>7</sub>) over bandage to achieve desired rating.



### Additional protection:

Depending on the required fire resistance, differing additional protection (AP) is necessary.

AP<sub>6</sub>: Armaflex AF pipe insulation wrapped around bandage/insulation on both sides of seal and fixed with wire, length along the pipe 300 mm on each side, thickness 19 mm.

AP<sub>7</sub>: Mineral wool mat wrapped around the bandage/pipe insulation on both sides of seal and fixed with wire, length along the pipe 300 mm on each side, thickness 20 mm.

### Branded pipes - Pipe end configuration U/C

| Pipe designation and material     | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity<br>I = insulation |                 | Insulation configuration                                                   |
|-----------------------------------|-------------------|---------------|---------------------|----------------------|---------------------------------------------------|-----------------|----------------------------------------------------------------------------|
|                                   |                   |               |                     |                      | AP <sub>6</sub>                                   | AP <sub>7</sub> |                                                                            |
| Geberit Mepla<br>(PE-Xb/Al/PE-HD) | Geberit           | 16 mm         | 2.25 mm             | 10 – 32 mm           | EI 120-U/C                                        | EI 90-U/C       | Continued sustained or local sustained, length on both sides $\geq 450$ mm |
|                                   |                   | 26 – 63 mm    | 3.0 – 4.5 mm        | 10 – 32 mm           | EI 120-U/C                                        | -               |                                                                            |
|                                   |                   | 32 mm         | 3.0 mm              | 10 – 32 mm           | -                                                 | EI 90-U/C       |                                                                            |
|                                   |                   |               |                     | 32 mm                | -                                                 | EI 120-U/C      |                                                                            |
|                                   |                   | 40 – 63 mm    | 3.5 – 4.5 mm        | 10 – 32 mm           | -                                                 | EI 120-U/C      |                                                                            |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM CABLES, CABLE BUNDLES, CABLE TRAYS, CONDUITS

All classifications with or without cable supports.

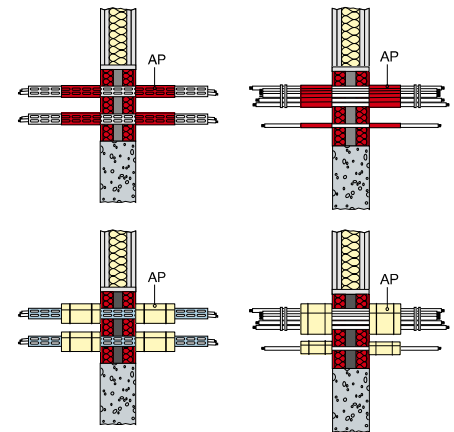
### Additional protection:

Depending on the required fire resistance, differing additional protection (AP) is necessary.

AP<sub>3</sub>: cables/small conduits coated with Hilti firestop coating CFS-CT over a length of 200 mm on both sides of the seal, thickness 2 mm.

AP<sub>4</sub>: mineral wool mat, Al-facing outside, wrapped around the cables/cable supports on both sides of seal and fixed with wire, width (length along the cables/small conduits) 200 mm on each side of the seal, thickness 20 mm.

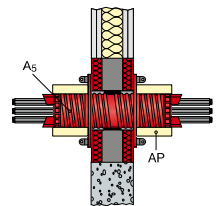
AP<sub>5</sub>: mineral wool mat, Al-facing outside, wrapped around the cables/cable supports on both sides of seal and fixed with wire, width (length along the cables/small conduits) 200 mm on each side of the seal, thickness 30 mm.



| Services                                                                           | Classification<br>E = integrity, I = insulation |                 |                 |
|------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|-----------------|
|                                                                                    | AP <sub>3</sub>                                 | AP <sub>4</sub> | AP <sub>5</sub> |
| All sheathed cables up to 21 mm diameter                                           | EI 90                                           | EI 120          | EI 120          |
| All sheathed cables up to 80 mm diameter                                           | EI 90                                           | EI 90           | EI 120          |
| Non-sheathed cables up to 24 mm diameter                                           | EI 60                                           | EI 120          | EI 120          |
| Tied cable bundle up to 100 mm diameter,<br>max. diameter of single cable 21 mm    | EI 90                                           | EI 120          | EI 120          |
| Plastic conduits and tubes up to 16 mm<br>with or without cables or cable supports | EI 120-U/C                                      | EI 120-U/C      | EI 120-U/U      |
| Steel conduits and tubes up to 16 mm<br>with or without cables or cable supports   | EI 90-C/U                                       | EI 120-C/U      | EI 120-U/U      |

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM CABLES WITH HILTI FIRESTOP SLEEVE CFS-SL M

Hilti firestop sleeve CFS-SL M (A5) centered in the wall and fixed by means of two flanges delivered together with the sleeve.



### Additional protection:

AP<sub>10</sub>: mineral wool mat, installed around Hilti firestop sleeve CFS-SL M on both sides of the seal over the total visible length of the sleeve, thickness 30 mm.

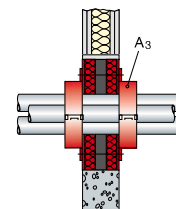
| Services                                 | Classification<br>E = integrity, I = insulation |
|------------------------------------------|-------------------------------------------------|
| All sheathed cables up to 21 mm diameter | EI 120                                          |

<sup>9</sup> EI 120 in rigid walls  $\geq 150$  mm with minimum density of 760 kg/m<sup>3</sup>

## FLEXIBLE AND RIGID WALLS $\geq 100$ MM MULTIPLE PLASTIC CONDUITS IN SINGLE HILTI FIRESTOP COLLAR CFS-C P

With or without cables.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on both sides of the seal and fixed together with M8 threaded rods, washers and nuts.



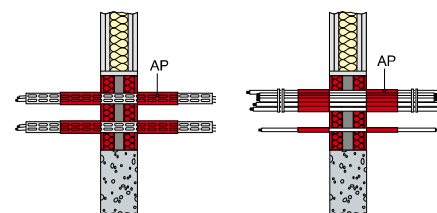
| Pipe material | Pipe diameter | Pipe wall thickness | Collar size   | Classification<br>E = integrity<br>I = insulation |
|---------------|---------------|---------------------|---------------|---------------------------------------------------|
| PVC           | 16 mm         | 1.0 mm              | CFS-C P 63/2" | EI 120-U/C                                        |
|               | 25 mm         | 1.5 mm              |               |                                                   |
| Polyolefin    | 32 mm         | 2.0 mm              |               |                                                   |

## RIGID WALLS $\geq 150$ MM, MINIMUM DENSITY 600 KG/M<sup>3</sup> CABLES, CABLE BUNDLES, CABLE TRAYS, CONDUITS

All classifications with or without cable supports.

### Additional protection:

AP1: cables/small conduits coated with Hilti firestop coating CFS-CT over a length of 150 mm on both sides of the seal, thickness 0.7 mm.



| Services                                                                           | Classification<br>E = integrity, I = insulation |
|------------------------------------------------------------------------------------|-------------------------------------------------|
| All sheathed cables up to 80 mm diameter                                           | EI 60                                           |
| Non-sheathed cables up to 17 mm diameter                                           | EI 90                                           |
| Tied cable bundle up to 100 mm diameter,<br>max. diameter of single cable 21 mm    | EI 60                                           |
| Plastic conduits and tubes up to 16 mm with or without cables<br>or cable supports | EI 120-U/C                                      |
| Steel conduits and tubes up to 16 mm with or without cables<br>or cable supports   | EI 120-C/U                                      |

## RIGID FLOORS INSTALLATION REQUIREMENTS

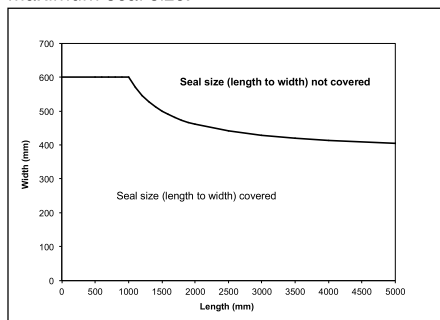
Penetration seal: Two 50 mm Hilti firestop boards CFS-CT B 1S<sup>1</sup> or suitable mineral wool boards<sup>2</sup> positioned flush to the surface of the building element on each side of the floor and coated with Hilti firestop coating CFS-CT to a dry film thickness of 0.7 mm on the outer face. All cut edges sealed with Hilti firestop acrylic sealant CFS-S ACR. Remaining gaps around cables/cable supports (i.e. trays, ladders) and other services filled with Hilti firestop acrylic sealant CFS-S ACR.

All penetrating items (cables, cable trays, conduits, metal, plastic and composite pipes) may be installed in a single, multiple or mixed configuration.

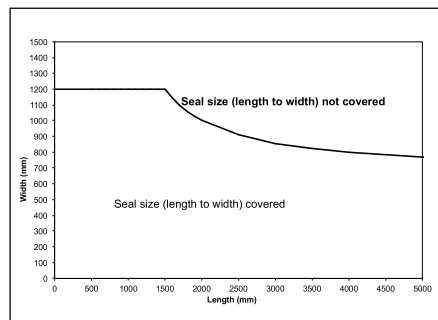
Installations must be fixed to the adjacent building elements (not to the seal) in accordance with the relevant regulations in such a way that no additional mechanical load is imposed on the seal.

Rigid floors comprised of aerated concrete or concrete with a minimum thickness of 150 mm and minimum density of 670 kg/m<sup>3</sup>.

Maximum seal size:



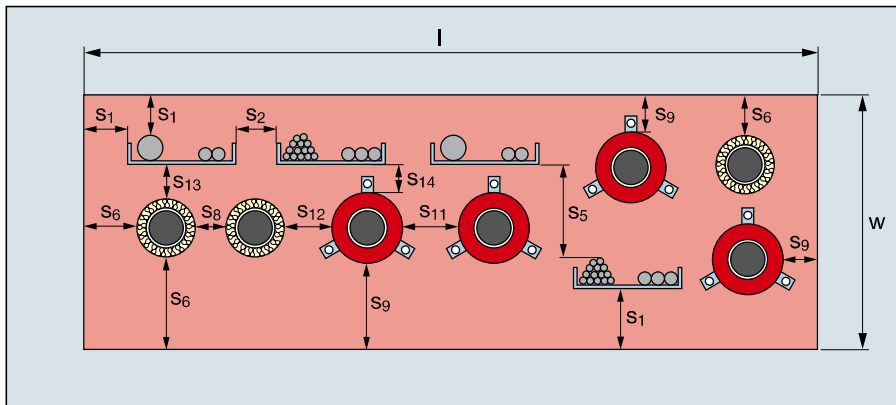
Unreinforced



Reinforced

Maximum distance for first service support: 100 mm.

Minimum distances in mm:<sup>3</sup>



$s_1 = 0$  (distance between cables/cable supports and seal edge)

$s_2 = 0$  (distance between cable supports)

$s_5 = 50$  (distance between cables and cable support above)

$s_6 = 10$  (distance between metal pipes and seal edge)

$s_8 = 20$  (distance between metal pipes)

$s_9 = 0$  (distance between plastic pipes/pipe closure devices and seal edge)

$s_{11} = 0$  (distance between plastic pipes/pipe closure devices)

$s_{12} = 30$  (distance between metal pipes and plastic pipes/pipe closure devices)

$s_{13} = 30$  (distance between cables/cable supports and metal pipes)

$s_{14} = 32$  (distance between cables/cable supports and plastic pipes/pipe closure devices)

<sup>1</sup> Hilti firestop board CFS-CT B 2S (coated on both faces) may also be used

<sup>2</sup> See specification on page 43

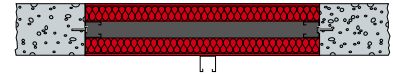
<sup>3</sup> Composite pipes follow the same minimum distance requirements as plastic pipes

## RIGID FLOORS $\geq 150$ MM BLANK SEAL (NO SERVICES)



If services are added later, only services listed in the following tables may be added that fulfill the required classification.

| Maximum size (width x length) | Classification<br>E = integrity, I = insulation |
|-------------------------------|-------------------------------------------------|
| 600 x 1000 mm                 | EI 180                                          |



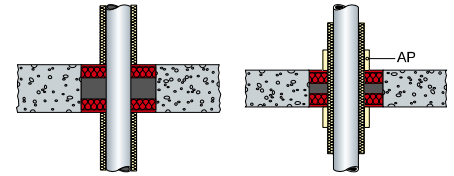
## RIGID FLOORS $\geq 150$ MM REINFORCED BLANK SEAL (NO SERVICES)

Additional supporting construction: a steel Hilti MQ-41/3 profile centered underneath the lower board layer along the length of the opening and affixed at each end with anchor bolts (diameter 6 mm, length 60 mm). Steel Hilti MQ-41/3 profiles installed between the two board layers and affixed to both slab edges along length of opening every 450 mm with anchor bolts (diameter 6 mm, length 60 mm).

If services are added later, only services listed in the following pages may be added that fulfill the required classification.

| Maximum size (width x length) | Classification<br>E = integrity, I = insulation |
|-------------------------------|-------------------------------------------------|
| 1200 x 1500 mm                | EI 90                                           |

## RIGID FLOORS $\geq 150$ MM METAL PIPES WITH MINERAL WOOL INSULATION



### Additional protection:

Depending on the required fire resistance, additional protection (AP) may be necessary.

AP<sub>8</sub>: Mineral wool mat wrapped around the pipe insulation on both sides of seal and fixed with wire, length along the pipe 250 mm on each side, thickness 40 mm.

### Copper pipes – Pipe end configuration U/C

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys) and Ni

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation |                 | Insulation configuration                                            |
|---------------|---------------------|----------------------|-------------------------------------------------|-----------------|---------------------------------------------------------------------|
|               |                     |                      | Without additional protection                   | AP <sub>8</sub> |                                                                     |
| 10 – 40 mm    | 1.0/1.5 – 14.2      | $\geq 20$ mm         | EI 120-U/C                                      | -               | Continued sustained or interrupted                                  |
|               |                     | 20 mm                | EI 120-U/C                                      | -               | Local sustained or interrupted, length on both sides $\geq 500$ mm  |
| 40 mm         | 1.5 – 14.2 mm       | 40 mm                | EI 120-U/C                                      | -               | Local sustained or interrupted, length on both sides $\geq 1000$ mm |
| 40 – 88.9 mm  | 1.5/2.0 – 14.2 mm   | $\geq 40$ mm         | EI 90-U/C                                       | -               | Continued sustained                                                 |
|               |                     |                      | EI 120-U/C                                      | -               | Continued interrupted                                               |
|               |                     | 40 mm                | EI 60-U/C                                       | EI 90-U/C       | Local sustained, length on both sides $\geq 1000$ mm                |
|               |                     |                      | EI 90-U/C                                       | -               | Local interrupted, length on both sides $\geq 1000$ mm              |

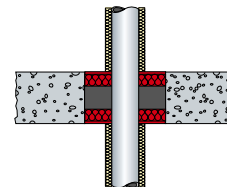
### Steel pipes – Pipe end configuration U/C

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMo alloys)

| Pipe diameter  | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation |                 | Insulation configuration                                            |
|----------------|---------------------|----------------------|-------------------------------------------------|-----------------|---------------------------------------------------------------------|
|                |                     |                      | Without additional protection                   | AP <sub>8</sub> |                                                                     |
| 114.3 mm       | 2.0 – 14.2 mm       | $\geq 30$ mm         | EI 120-U/C                                      | -               | Continued sustained or interrupted                                  |
|                |                     | 30 – 40 mm           | EI 120-U/C                                      | -               | Local sustained or interrupted, length on both sides $\geq 500$ mm  |
| 114.3 – 159 mm | 2.0/2.6 – 14.2 mm   | $\geq 40$ mm         | EI 120-U/C                                      | -               | Continued sustained or interrupted                                  |
|                |                     | 40 mm                | EI 90-U/C                                       | -               | Local sustained or interrupted, length on both sides $\geq 500$ mm  |
|                |                     |                      | EI 120-U/C                                      | -               | Local sustained or interrupted, length on both sides $\geq 1000$ mm |
| 159 – 323.9 mm | 2.6/4.0 – 14.2      | $\geq 40$ mm         | EI 90-U/C                                       | EI 120-U/C      | Continued sustained or interrupted                                  |
|                |                     | 40 mm                | EI 60-U/C                                       | EI 90-U/C       | Local sustained or interrupted, length on both sides $\geq 1000$ mm |

## RIGID FLOORS $\geq 150$ MM METAL PIPES WITH MINERAL WOOL INSULATION

No additional protection (AP) necessary.



### Copper pipes – Pipe end configuration C/U

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys) and Ni

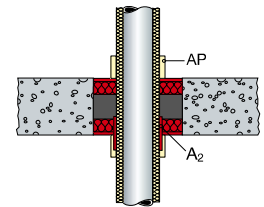
| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity,<br>I = insulation | Insulation configuration                                           |
|---------------|---------------------|----------------------|----------------------------------------------------|--------------------------------------------------------------------|
| 42 mm         | 1.5 – 14.2 mm       | $\geq 20$ mm         | EI 120-C/U                                         | Continued sustained or interrupted                                 |
|               |                     | 20 mm                | EI 120-C/U                                         | Local sustained or interrupted, length on both sides $\geq 500$ mm |
|               |                     | 20 – 40 mm           | EI 120-C/U                                         | Local sustained, length on both sides $\geq 800$ mm                |
|               |                     | 40 mm                | EI 120-C/U                                         | Local interrupted, length on both sides $\geq 800$ mm              |
| 88.9 mm       | 1.8 – 14.2 mm       | $\geq 40$ mm         | EI 120-C/U                                         | Continued sustained                                                |
|               |                     | 40 mm                | EI 120-C/U                                         | Local sustained, length on both sides $\geq 800$ mm                |

### Steel pipes – Pipe end configuration C/U

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

| Pipe diameter    | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity,<br>I = insulation | Insulation configuration                               |
|------------------|---------------------|----------------------|----------------------------------------------------|--------------------------------------------------------|
| 26.9 mm          | 1.4 – 14.2 mm       | $\geq 40$ mm         | EI 180-C/U                                         | Continued interrupted                                  |
|                  |                     | 40 mm                | EI 180-C/U                                         | Local interrupted, length on both sides $\geq 500$ mm  |
| 32 mm            | 4.0 – 14.2 mm       | $\geq 20$ mm         | EI 120-C/U                                         | Continued interrupted                                  |
|                  |                     | 20 mm                | EI 120-C/U                                         | Local interrupted, length on both sides $\geq 500$ mm  |
| 32 mm – 114.3 mm | 2.6 – 14.2 mm       | 30 mm                | EI 120-C/U                                         | Local interrupted, length on both sides $\geq 500$ mm  |
| 32 mm – 168.3 mm | 2.6 – 14.2 mm       | 30 mm                | EI 120-C/U                                         | Local interrupted, length on both sides $\geq 800$ mm  |
| 34 mm – 168.3 mm | 2.6 – 14.2 mm       | $\geq 30$ mm         | EI 120-C/U                                         | Continued interrupted                                  |
| 48.3 mm          | 1.6 – 14.2 mm       | $\geq 20$ mm         | EI 180-C/U                                         | Continued sustained or interrupted                     |
|                  |                     | 20 mm                | EI 180-C/U                                         | Local sustained, length on both sides $\geq 450$ mm    |
|                  |                     |                      | EI 180-C/U                                         | Local interrupted, length on both sides $\geq 500$ mm  |
| 114.3 mm         | 3.6 mm              | $\geq 40$ mm         | EI 120-C/U                                         | Continued sustained                                    |
|                  |                     | 40 mm                | EI 120-C/U                                         | Local sustained, length on both sides $\geq 500$ mm    |
| 168.3 mm         | 4.0 – 14.2 mm       | 30 – 40 mm           | EI 120-C/U                                         | Local interrupted, length on both sides $\geq 1000$ mm |

## RIGID FLOORS $\geq 150$ MM METAL PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP BANDAGE CFS-B



Two layers of Hilti firestop bandage CFS-B ( $A_2$ ) wrapped around the pipe insulation on bottom side of the seal. Bandage positioned with half its width inside seal and fixed with wire outside seal. Additional protection ( $AP_6$ ) installed over bandage.

### Additional protection:

$AP_6$ : Armaflex AF pipe insulation wrapped around bandage/insulation on both sides of seal and fixed with wire, length along the pipe 250 mm on each side, thickness 32 mm.

### Copper pipes – Pipe end configuration U/C

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys) and Ni

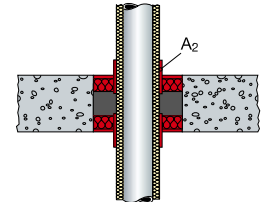
| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration |
|---------------|---------------------|----------------------|-------------------------------------------------|--------------------------|
| 10 mm         | 1.0 – 14.2 mm       | 7.5 – 40.5 mm        | EI 120-U/C                                      | Continued sustained      |
| 10 – 40 mm    | 1.0/1.5 – 14.2 mm   | 45.5 – 47.5 mm       | EI 90-U/C                                       |                          |
| 40 – 88.9 mm  | 1.5/2.0 – 14.2 mm   | 7.5 – 9.0 mm         | EI 120-U/C                                      |                          |

### Steel pipes – Pipe end configuration U/C

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration |
|---------------|---------------------|----------------------|-------------------------------------------------|--------------------------|
| 114.3 mm      | 2.0 – 14.2 mm       | 9 – 42 mm            | EI 90-U/C                                       | Continued sustained      |
| 159 mm        | 2.6 – 14.2 mm       | 10 mm                |                                                 |                          |

## RIGID FLOORS $\geq 150$ MM METAL PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP BANDAGE CFS-B



Two layers of Hilti firestop bandage CFS-B ( $A_2$ ) wrapped around the pipe insulation on both sides of the seal. Bandage positioned with half its width inside seal and fixed with wire outside seal.

No additional protection ( $AP$ ) necessary.

### Copper pipes – Pipe end configuration C/U

Also valid for steel, cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys) and Ni

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|---------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 28 mm         | 1.0 – 14.2 mm       | 19 – 35 mm           | EI 60-C/U                                       | Continued sustained or local sustained, length on both sides $\geq 500$ mm |
|               |                     | 35 mm                | EI 90-C/U                                       |                                                                            |

### Steel pipes – Pipe end configuration C/U

Also valid for cast iron, stainless steel, Ni alloys (NiCu, NiCr, NiMO alloys)

| Pipe diameter   | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|-----------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 60.3 mm         | 3.6 – 14.2 mm       | 21.5 – 39 mm         | EI 90-C/U                                       | Continued sustained or local sustained, length on both sides $\geq 500$ mm |
| 60.3 – 114.3 mm |                     |                      |                                                 |                                                                            |

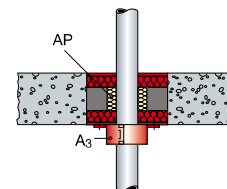
### Stainless steel pipes – Pipe end configuration C/U

| Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity, I = insulation | Insulation configuration                                                   |
|---------------|---------------------|----------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| 60.3 mm       | 2.0 – 14.2 mm       | 21.5 – 39 mm         | EI 90-C/U                                       | Continued sustained or local sustained, length on both sides $\geq 500$ mm |
|               |                     | 39 mm                | EI 120-C/U                                      |                                                                            |

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on bottom side of seal and fixed with M8 threaded rods, washers and nuts.

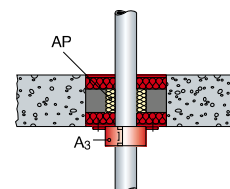


### Additional protection:

AP9: Mineral wool board installed around the pipe in the air gap between the two layers of the Hilti firestop double board seal, distance on all sides of pipe 100 mm, depth 50 mm (height of air gap).

| Normed pipes – Pipe end configuration U/U resp. C/U |                                                                           |               |                     |                 |                                                                      |
|-----------------------------------------------------|---------------------------------------------------------------------------|---------------|---------------------|-----------------|----------------------------------------------------------------------|
| Pipe material                                       | Pipe norm                                                                 | Pipe diameter | Pipe wall thickness | Collar size     | Classification (single or multiple)<br>E = integrity, I = insulation |
| PVC-U                                               | EN ISO 1452-2,<br>EN ISO 15493,<br>DIN 8061/2,<br>EN 1329-1,<br>EN 1453-1 | 20 mm         | 1.5 – 2.2 mm        | CFS-C P 50/1,5" | EI 120-U/U                                                           |
|                                                     |                                                                           | 50 mm         | 2.4 – 5.6 mm        |                 |                                                                      |
|                                                     |                                                                           | 63 mm         | 3.0 – 4.7 mm        | CFS-C P 63/2"   |                                                                      |
|                                                     |                                                                           | 75 mm         | 2.2 – 3.6 mm        | CFS-C P 75/2,5" |                                                                      |
|                                                     |                                                                           | 90 mm         | 2.7 – 4.3 mm        | CFS-C P 90/3"   |                                                                      |
|                                                     |                                                                           | 110 mm        | 1.8 – 8.1 mm        | CFS-C P 110/4"  |                                                                      |
|                                                     |                                                                           | 125 mm        | 3.7 – 6.0 mm        | CFS-C P 125/5"  | EI 120-C/U                                                           |
|                                                     |                                                                           | 125 mm        | 3.7 mm              | CFS-C P 125/5"  | EI 180-C/U                                                           |
|                                                     |                                                                           | 160 mm        | 2.5 – 11.8 mm       | CFS-C P 160/6"  | EI 120-C/U                                                           |
| PE                                                  | EN ISO 15494,<br>DIN 8074/5                                               | 50 mm         | 2.9 – 4.6 mm        | CFS-C P 50/1,5" | EI 120-U/U                                                           |
|                                                     |                                                                           | 63 mm         | 1.8 – 5.8 mm        | CFS-C P 63/2"   |                                                                      |
|                                                     |                                                                           | 75 mm         | 1.9 – 6.8 mm        | CFS-C P 75/2,5" |                                                                      |
|                                                     |                                                                           | 90 mm         | 2.2 – 8.2 mm        | CFS-C P 90/3"   |                                                                      |
|                                                     |                                                                           | 110 mm        | 2.7 – 10.0 mm       | CFS-C P 110/4"  |                                                                      |
|                                                     |                                                                           | 125 mm        | 3.1 – 7.1 mm        | CFS-C P 125/5"  |                                                                      |
|                                                     |                                                                           | 160 mm        | 14.6 mm             | CFS-C P 160/6"  | EI 180-C/U                                                           |
| PE                                                  | EN 1519,<br>EN 12201-2,<br>EN 12666-1                                     | 50 mm         | 3.0 mm              | CFS-C P 50/1,5" | EI 120-U/U                                                           |
|                                                     |                                                                           | 63 mm         | 3.0 mm              | CFS-C P 63/2"   |                                                                      |
|                                                     |                                                                           | 75 mm         | 3.0 mm              | CFS-C P 75/2,5" |                                                                      |
|                                                     |                                                                           | 90 mm         | 3.5 mm              | CFS-C P 90/3"   |                                                                      |
|                                                     |                                                                           | 110 mm        | 4.2 mm              | CFS-C P 110/4"  |                                                                      |
|                                                     |                                                                           | 125 mm        | 4.8 mm              | CFS-C P 125/5"  |                                                                      |
|                                                     |                                                                           | 160 mm        | 6.2 mm              | CFS-C P 160/6"  | EI 180-C/U                                                           |

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C P



Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on bottom side of seal and fixed with M8 threaded rods, washers and nuts.

### Additional protection:

AP<sub>9</sub>: Mineral wool board installed around the pipe in the air gap between the two layers of the Hilti firestop double board seal, distance on all sides of pipe 100 mm, depth 50 mm (height of air gap).

| Branded pipes – Pipe end configuration U/U resp. C/U |                   |               |                     |                 |                                                 |
|------------------------------------------------------|-------------------|---------------|---------------------|-----------------|-------------------------------------------------|
| Pipe designation                                     | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
| Dekaprop Industry pipe (PP-H 100)                    | Georg Fischer     | 50 mm         | 1.8 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
|                                                      |                   | 63 mm         | 1.8 mm              | CFS-C P 63/2"   |                                                 |
|                                                      |                   | 75 mm         | 1.9 mm              | CFS-C P 75/2.5" |                                                 |
|                                                      |                   | 90 mm         | 2.2 mm              | CFS-C P 90/3"   |                                                 |
|                                                      |                   | 110 mm        | 2.7 mm              | CFS-C P 110/4"  |                                                 |
| Fusiotherm SDR6 (PP-R)                               | Aquatherm         | 20 mm         | 3.4 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
| Geberit Silent-db20 (PE-S2)                          | Geberit           | 75 mm         | 3.6 mm              | CFS-C P 75/2.5" | EI 120-U/U                                      |
|                                                      |                   | 90 mm         | 5.5 mm              | CFS-C P 90/3"   | EI 120-C/U                                      |
|                                                      |                   | 110 mm        | 6.0 mm              | CFS-C P 110/4"  |                                                 |
|                                                      |                   | 135 mm        | 6.0 mm              | CFS-C P 160/6"  |                                                 |
|                                                      |                   | 160 mm        | 7.0 mm              | CFS-C P 160/6"  |                                                 |
| phonEX (PP)                                          | Ke Kelit          | 70 mm         | 4.5 mm              | CFS-C P 75/2.5" | EI 120-U/U                                      |
|                                                      |                   | 90 mm         | 4.5 mm              | CFS-C P 90/3"   | EI 120-C/U                                      |
|                                                      |                   | 110 mm        | 5.3 mm              | CFS-C P 110/4"  |                                                 |
| PROGEF standard pipe (PP-H)                          | Georg Fischer     | 20 mm         | 1.9 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
|                                                      |                   | 50 mm         | 2.9 mm              |                 |                                                 |
|                                                      |                   | 63 mm         | 5.8 mm              | CFS-C P 63/2"   |                                                 |
|                                                      |                   | 75 mm         | 6.8 mm              | CFS-C P 75/2.5" |                                                 |
|                                                      |                   | 90 mm         | 8.2 mm              | CFS-C P 90/3"   |                                                 |
| Raupiano Plus (PP)                                   | Rehau             | 50 mm         | 1.8 mm              | CFS-C P 50/1.5" | EI 120-U/U                                      |
|                                                      |                   | 75 mm         | 1.9 mm              | CFS-C P 75/2.5" |                                                 |
|                                                      |                   | 110 mm        | 2.7 mm              | CFS-C P 110/4"  |                                                 |
| Skolan-dB (PP)                                       | Magnaplast        | 58 mm         | 4.0 mm              | CFS-C P 63/2"   | EI 120-U/U                                      |
|                                                      |                   | 78 mm         | 4.5 mm              | CFS-C P 75/2.5" |                                                 |
|                                                      |                   | 90 mm         | 4.5 mm              | CFS-C P 90/3"   |                                                 |
|                                                      |                   | 110 mm        | 5.3 mm              | CFS-C P 110/4"  |                                                 |
| Wavin AS (PP)                                        | Wavin             | 70 mm         | 4.5 mm              | CFS-C P 75/2.5" | EI 120-U/U                                      |
|                                                      |                   | 90 mm         | 4.5 mm              | CFS-C P 90/3"   | EI 120-C/U                                      |
|                                                      |                   | 110 mm        | 5.3 mm              | CFS-C P 110/4"  |                                                 |
| Wavin SiTech (PP)                                    | Wavin             | 75 mm         | 2.3 mm              | CFS-C P 75/2.5" | EI 120-U/U                                      |
|                                                      |                   | 90 mm         | 2.8 mm              | CFS-C P 90/3"   |                                                 |

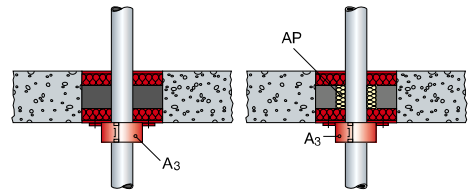
| Normed pipes – Pipe end configuration U/U resp. C/U |            |               |                     |                 |                                                 |
|-----------------------------------------------------|------------|---------------|---------------------|-----------------|-------------------------------------------------|
| Pipe designation                                    | Pipe norm  | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |
| PP                                                  | EN 1451-1* | 50            | 1.8 – 2.0           | CFS-C P 50/1.5" | EI 90-U/U                                       |
|                                                     |            | 58            | 4.0                 | CFS-C P 63/2"   |                                                 |
|                                                     |            | 70            | 4.5                 | CFS-C P 75/2.5" |                                                 |
|                                                     |            | 75            | 1.9 – 3.8           | CFS-C P 75/2.5" |                                                 |
|                                                     |            | 78            | 4.5                 | CFS-C P 75/2.5" |                                                 |
|                                                     |            | 90            | 2.8 – 4.5           | CFS-C P 90/3"   |                                                 |
|                                                     |            | 110           | 2.7 – 5.3           | CFS-C P 110/4"  |                                                 |
| PP                                                  | EN 1451-1* | 110           | 5.3                 | CFS-C P 110/4"  | EI 120-C/U                                      |
|                                                     |            | 125           | 3.1 – 5.3           | CFS-C P 125/5"  | EI 180-C/U                                      |
|                                                     |            | 135           | 5.3 – 5.8           | CFS-C P 160/6"  |                                                 |
|                                                     |            | 160           | 3.9 – 7.5           | CFS-C P 160/6"  |                                                 |

\*e.g. Rehau AG "Raupiano Plus", Magnaplast GmbH "Skolan-dB", Wavin Ireland Ltd or KeKelit "Wavin AS" or "Phonex AS", Wavin Ireland Ltd "Wavin SiTech", Poloplast "Polokal NG", Poloplast "Polokal 3S", Geberit "Silent PP", Coes "Blue Power", Coes "PhoNoFire", Valsir "Triplus", Valsir "Silere", Pipelife "Master 3"

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on bottom side of seal and fixed with M8 threaded rods, washers and nuts.



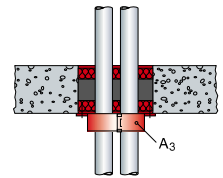
### Additional protection:

Depending on the required fire resistance, additional protection (AP) may be necessary.

AP9: Mineral wool board installed around the pipe in the air gap between the two layers of the Hilti firestop double board seal, distance on all sides of pipe 100 mm, depth 50 mm (height of air gap).

| Pre-insulated pipes – Pipe end configuration U/C |                                                               |               |                     |                 |                                                 |                 |
|--------------------------------------------------|---------------------------------------------------------------|---------------|---------------------|-----------------|-------------------------------------------------|-----------------|
| Pipe designation                                 | Pipe manufacturer                                             | Pipe diameter | Inner pipe diameter | Collar size     | Classification<br>E = integrity, I = insulation |                 |
|                                                  |                                                               |               |                     |                 | without additional protection                   | AP <sub>9</sub> |
| Coolfit (ABS/PUR/PE-HD)                          | Georg Fischer                                                 | 90 mm         | 32 mm               | CFS-C P 90/3"   | -                                               | EI 90-U/C       |
|                                                  |                                                               | 110 mm        | 40 – 50 mm          | CFS-C P 110/4"  | -                                               | EI 120-U/C      |
| Normed pipes – Pipe end configuration U/C        |                                                               |               |                     |                 |                                                 |                 |
| Pipe material                                    | Pipe norm                                                     | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |                 |
|                                                  |                                                               |               |                     |                 | without additional protection                   | AP <sub>9</sub> |
| PVC-U                                            | EN ISO 1452-2, EN ISO 15493, DIN 8061/2, EN 1329-1, EN 1453-1 | 50 mm         | 1.8 mm              | CFS-C P 50/1.5" | EI 120-U/C                                      | -               |
|                                                  |                                                               | 160 mm        | 1.8 – 11.9 mm       | CFS-C P 160/6"  |                                                 |                 |
| PE                                               | EN ISO 15494, DIN 8074/5                                      | 160 mm        | 14.6 mm             | CFS-C P 160/6"  |                                                 |                 |
| Branded pipes – Pipe end configuration U/C       |                                                               |               |                     |                 |                                                 |                 |
| Pipe designation                                 | Pipe manufacturer                                             | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity, I = insulation |                 |
|                                                  |                                                               |               |                     |                 | without additional protection                   | AP <sub>9</sub> |
| Aquatherm Firestop (PP-R)                        | Aquatherm                                                     | 90 mm         | 12.3 mm             | CFS-C P 90/3"   | -                                               | EI 120-U/C      |
| Fusiotherm SDR6 (PP-R)                           | Aquatherm                                                     | 63 mm         | 10.5 mm             | CFS-C P 63/2"   |                                                 |                 |
|                                                  |                                                               | 75 mm         | 12.5 mm             | CFS-C P 75/2.5" |                                                 |                 |
|                                                  |                                                               | 90 mm         | 15.0 mm             | CFS-C P 90/3"   |                                                 |                 |
| Fusiotherm SDR7,4 (PP-R)                         | Aquatherm                                                     | 40 mm         | 5.5 mm              | CFS-C P 50/1.5" |                                                 |                 |
|                                                  |                                                               | 50 mm         | 6.9 mm              | CFS-C P 50/1.5" |                                                 |                 |
|                                                  |                                                               | 75 mm         | 10.3 mm             | CFS-C P 90/3"   |                                                 |                 |
|                                                  |                                                               | 110 mm        | 15.1 mm             | CFS-C P 110/4"  |                                                 |                 |
| Fusiotherm SDR11 (PP-R)                          | Aquatherm                                                     | 40 mm         | 3.7 mm              | CFS-C P 50/1.5" |                                                 |                 |
|                                                  |                                                               | 50 mm         | 4.6 mm              | CFS-C P 50/1.5" |                                                 |                 |
|                                                  |                                                               | 75 mm         | 6.8 mm              | CFS-C P 75/2.5" |                                                 |                 |
|                                                  |                                                               | 110 mm        | 10.0 mm             | CFS-C P 110/4"  |                                                 |                 |
| Wavin TS (PE-HD 100 RC)                          | Wavin                                                         | 50 mm         | 4.6 mm              | CFS-C P 50/1.5" | -                                               | EI 90-U/C       |
|                                                  |                                                               | 63 mm         | 5.8 mm              | CFS-C P 63/2"   | -                                               | EI 120-U/C      |
|                                                  |                                                               | 75 mm         | 6.8 mm              | CFS-C P 75/2.5" |                                                 |                 |
|                                                  |                                                               | 90 mm         | 8.2 mm              | CFS-C P 90/3"   |                                                 |                 |
|                                                  |                                                               | 110 mm        | 10.0 mm             | CFS-C P 110/4"  |                                                 |                 |

## RIGID FLOORS $\geq 150$ MM MULTIPLE PLASTIC PIPES IN SINGLE HILTI FIRESTOP COLLAR CFS-C P



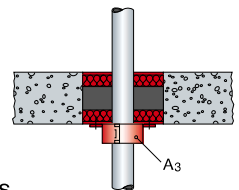
Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on bottom side of the seal and fixed together with M8 threaded rods, washers and nuts.

### Normed pipes – Pipe end configuration U/U

| Pipe material | Pipe norm                   | Pipe diameter | Pipe wall thickness | Collar size     | Classification<br>E = integrity,<br>I = insulation |
|---------------|-----------------------------|---------------|---------------------|-----------------|----------------------------------------------------|
| PVC-U         | EN ISO 15493,<br>DIN 8061/2 | 20 mm         | 1.5 / 2.2 mm        | CFS-C P 50/1.5" | EI 90-U/U                                          |
| PE            | EN ISO 15494,<br>DIN 8074/5 | 20 mm         | 1.9 / 2.8 mm        |                 |                                                    |
| PP-R          | EN ISO 15874,<br>DIN 8077/8 | 20 mm         | 3.4 mm              |                 |                                                    |
| PP-H          | EN ISO 15874,<br>DIN 8077/8 | 20 mm         | 1.9 mm              |                 |                                                    |

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR CFS-C



Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C (A<sub>3</sub>) installed on bottom side of seal and fixed with M8 threaded rods, washers and nuts.

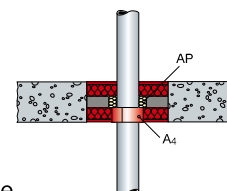
### Normed pipes – Pipe end configuration U/C

| Pipe material | Pipe norm                                                                 | Pipe diameter | Pipe wall thickness | Collar size   | Classification<br>E = integrity,<br>I = insulation |
|---------------|---------------------------------------------------------------------------|---------------|---------------------|---------------|----------------------------------------------------|
| PVC-U         | EN ISO 1452-2,<br>EN ISO 15493,<br>DIN 8061/2,<br>EN 1329-1,<br>EN 1453-1 | 32 mm         | 1.9 mm              | CFS-C 50/1.5" | EI 120-U/C                                         |
|               |                                                                           | 110 mm        | 2.2 – 8.2 mm        | CFS-C 110/4"  |                                                    |
|               |                                                                           | 160 mm        | 4.7 mm              | CFS-C 160/6"  | EI 90-U/C                                          |
| PE            | EN ISO 15494,<br>DIN 8074/5                                               | 50 mm         | 3.0 mm              | CFS-C 50/1.5" |                                                    |
|               |                                                                           | 63 mm         | 2.0 mm              | CFS-C 63/2"   |                                                    |

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH HILTI FIRESTOP WRAP CFS-W

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop wrap CFS-W ( $A_4$ ) wrapped around pipe on bottom side of the seal and positioned within the annular space so that the outer edge of the wrap is flush with the surface of the floor.



### Additional protection:

$AP_9$ : Mineral wool board installed around the pipe in the air gap between the two layers of the Hilti firestop double board seal, distance on all sides of pipe 100 mm, depth 50 mm (height of air gap).

| Normed pipes – Pipe end configuration C/U resp. U/U |                                                                        |                    |                     |                             |                                                   |
|-----------------------------------------------------|------------------------------------------------------------------------|--------------------|---------------------|-----------------------------|---------------------------------------------------|
| Pipe material                                       | Pipe norm                                                              | Pipe diameter      | Pipe wall thickness | Wrap size/ number of layers | Classification<br>E = integrity<br>I = insulation |
| PVC-U                                               | EN ISO 1452-2,<br>EN ISO 15493,<br>DIN 8061/2, EN 1329-1,<br>EN 1453-1 | $\leq 75$ mm       | 2,2 – 5,6 mm        | CFS-W EL 2 layers           | EI 60-C/U                                         |
|                                                     |                                                                        |                    | 5,6 mm              | CFS-W EL 2 layers           | EI 90-C/U                                         |
|                                                     |                                                                        | $> 75 \leq 110$ mm | 2,2 – 8,1 mm        | CFS-W EL 2 layers           | EI 60-C/U                                         |
| PE                                                  | EN ISO 15494,<br>DIN 8074/5                                            | $\leq 75$ mm       | 4,3 mm              | CFS-W EL 2 layers           | EI 60-C/U                                         |
|                                                     |                                                                        | $\leq 125$ mm      | 3,1 mm              | CFS-W EL 2 layers           | EI 60-U/U                                         |
| PE                                                  | EN 1519, EN 12201-2,<br>EN 12666-1                                     | $\leq 75$ mm       | 3,0 mm              | CFS-W EL 2 layers           | EI 60-C/U                                         |

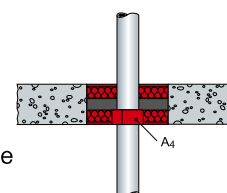
  

| Branded pipes – Pipe end configuration C/U |                   |                    |                     |                             |                                                   |
|--------------------------------------------|-------------------|--------------------|---------------------|-----------------------------|---------------------------------------------------|
| Pipe designation                           | Pipe manufacturer | Pipe diameter      | Pipe wall thickness | Wrap size/ number of layers | Classification<br>E = integrity<br>I = insulation |
| Geberit<br>Silent-db20 (PE-S2)             | Geberit           | $\leq 75$ mm       | 3,6 mm              | CFS-W EL 2 layers           | EI 120-C/U                                        |
| phonEX AS (PP)                             | Ke Kelit          | $\leq 70$ mm       | 4,5 mm              |                             |                                                   |
| Polokal 3S (PP/<br>Porolen/<br>PP)         | Poloplast         | $\leq 75$ mm       | 3,8 mm              |                             |                                                   |
|                                            |                   | $> 75 \leq 110$ mm | 4,8 mm              |                             |                                                   |
| Polokal NG (PP/<br>PP-MV/PP)               | Poloplast         | $\leq 75$ mm       | 2,6 mm              |                             |                                                   |
| Wavin AS (PP)                              | Wavin             | $\leq 70$ mm       | 4,5 mm              |                             |                                                   |

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH HILTI FIRESTOP WRAP CFS-W

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop wrap CFS-W ( $A_4$ ) wrapped around pipe on bottom side of the seal and positioned within the annular space so that the outer edge of the wrap is flush with the surface of the floor.



| Normed pipes – Pipe end configuration U/C |                                                               |               |                     |                             |                                                   |
|-------------------------------------------|---------------------------------------------------------------|---------------|---------------------|-----------------------------|---------------------------------------------------|
| Pipe material                             | Pipe norm                                                     | Pipe diameter | Pipe wall thickness | Wrap size/ number of layers | Classification<br>E = integrity<br>I = insulation |
| PVC-U                                     | EN ISO 1452-2, EN ISO 15493, DIN 8061/2, EN 1329-1, EN 1453-1 | 75 mm         | 3,6 mm              | CFS-W SG 75/2,5"            | EI 90-U/C                                         |
|                                           |                                                               | 125 mm        | 6,0 mm              | CFS-W SG 125/5"             |                                                   |
| PE                                        | EN 1519, EN 12201-2,<br>EN 12666-1                            | 75 mm         | 3,0 mm              | CFS-W SG 75/2,5"            |                                                   |
| PE                                        | EN ISO 15494,<br>DIN 8074/5                                   | 75 mm         | 1,9 mm              | CFS-W SG 75/2,5"            |                                                   |
|                                           |                                                               | 110 mm        | 2,7 mm              | CFS-W SG 110/4"             |                                                   |
|                                           |                                                               | 125 mm        | 7,1 mm              | CFS-W SG 125/5"             |                                                   |

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH HILTI FIRESTOP COLLAR ENDLESS CFS-C EL

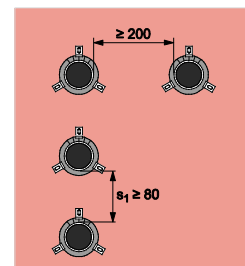
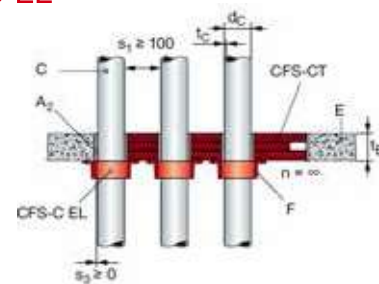
The pipes penetrating the board have to be grouped in line only and the minimum distance between them is  $s_1 \geq 100$  mm, however, the distance to the building element is zero ( $s_3 \geq 0$  mm). Minimum distances between two lines of pipes:  $\geq 200$  mm.

The gap filler is CFS-S ACR- Hilti firestop collar endless CFS-C EL installed on the underside of the floor only and fixed with threaded rods M6 with disc and nut.

If the wall thickness is bigger than 100 mm the free space between both boards has to be closed around penetrating plastic pipes with mineral wool, at least 100 mm around the plastic pipes.

Pipes could be covered with a sound decoupling insulation, penetrating the wall and all installed jackets CFS-C EL in local sustained and continuous sustained situation.

Sound decoupling insulation comprises a max. 9 mm polyethylene based insulation or a max. 4 mm Polyester insulation (Thermaflex, ThermoVließ B2).



### Normed pipes – Pipe end configuration U/C

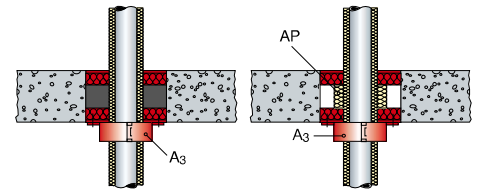
| Pipe designation | Pipe norm                               | Approved range | Classification<br>E = integrity,<br>I = insulation |
|------------------|-----------------------------------------|----------------|----------------------------------------------------|
| PE               | EN 1519-1,<br>EN 12666-1,<br>EN 12201-2 |                | EI 90-U/U                                          |
| ABS              | EN 1455-1                               |                |                                                    |
| SAN+PVC          | EN 1565-1                               |                |                                                    |
| ABS              | EN 1455,<br>EN 15493                    |                |                                                    |
| SAN+PVC          | EN 1565-1                               |                |                                                    |
| PE               | EN15494,<br>EN12201-2,<br>DIN 8074/75   |                |                                                    |

|                             |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                         |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PVC                         | EN 1452-1,<br>EN 1329-1,<br>EN 1453-1,<br>EN 1566-1,<br>EN ISO 15493,<br>DIN 8061/62                                                                                                                                                                                                                      | <p>Graph showing <math>t_C</math> (mm) vs <math>d_C</math> (mm) for PVC. The shaded area represents the range of values. Data points: (32, 12.3), (110, 12.3), (32, 1.9), (50, 1.8), (110, 2.2).</p>    |
| PP pipes,<br>non-regulated  | Coes Blue Power<br>Coes PhoNo Fire,<br>Geberit Silent PP<br>Marley Silent<br>Ostendorf Skolan db<br>Pipelife Master 3<br>Poloplast Polokal NG<br>Poloplast Polokal 3S<br>Poloplast Polokal XS<br>Rehau Raupiano Plus<br>KE KELIT PhonEx AS<br>Valsir Triplus<br>Valsir Silere<br>Wavin SiTech<br>Wavin AS | <p>Graph showing <math>t_C</math> (mm) vs <math>d_C</math> (mm) for PP pipes. The shaded area represents the range of values. Data points: (32, 5.3), (110, 5.3), (32, 1.8), (75, 1.9), (110, 2.7).</p> |
| PP                          | EN1451-1,<br>DIN 8077/78                                                                                                                                                                                                                                                                                  | <p>Graph showing <math>t_C</math> (mm) vs <math>d_C</math> (mm) for PP. The shaded area represents the range of values. Data points: (32, 6.3), (110, 6.3), (32, 1.8), (75, 1.9), (110, 2.7).</p>       |
| PE pipes,<br>non-regulated  | Geberit Silent dB20                                                                                                                                                                                                                                                                                       | <p>Graph showing <math>t_C</math> (mm) vs <math>d_C</math> (mm) for PE pipes. The shaded area represents the range of values. Data points: (32, 6.3), (110, 6.3), (32, 1.8), (75, 1.9), (110, 2.7).</p> |
| PVC-pipes,<br>non-regulated | Friatec Friaphon                                                                                                                                                                                                                                                                                          | <p>Graph showing <math>t_C</math> (mm) vs <math>d_C</math> (mm) for PVC-pipes. The shaded area represents the range of values. Data points: (52, 5.3), (110, 5.3), (52, 2.8), (78, 4.9), (90, 5.1).</p> |

## RIGID FLOORS $\geq 150$ MM PLASTIC PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on bottom side of seal and fixed with M8 threaded rods, washers and nuts.



### Additional protection:

Depending on the required fire resistance, additional protection (AP) may be necessary.

AP<sub>9</sub>: Mineral wool board installed around the pipe in the air gap between the two layers of the Hilti firestop double board seal, distance on all sides of pipe 100 mm, depth 50 mm (height of air gap).

### Normed pipes – Pipe end configuration U/C

| Pipe material                | Pipe norm    | Pipe diameter | Pipe wall thickness | Insulation thickness | Collar size     | Classification<br>E = integrity I = insulation |                 | Insulation configuration                                                   |
|------------------------------|--------------|---------------|---------------------|----------------------|-----------------|------------------------------------------------|-----------------|----------------------------------------------------------------------------|
|                              |              |               |                     |                      |                 | Without additional protection                  | AP <sub>9</sub> |                                                                            |
| PE-X<br>(i.e. Rautitan flex) | EN ISO 15875 | 16 mm         | 2.2 mm              | 8 mm                 | CFS-C P 50/1,5" | -                                              | EI 120-U/C      | Continued sustained or local sustained, length on both sides $\geq 250$ mm |
|                              |              |               |                     | 32 mm                | CFS-C P 90/3"   |                                                |                 |                                                                            |
|                              |              | 16 mm         | 4.4 mm              | 9 mm                 | CFS-C P 50/1,5" |                                                |                 |                                                                            |
|                              |              |               |                     | 35 mm                | CFS-C P 110/4"  |                                                |                 |                                                                            |
|                              |              | 40 mm         | 5.5 mm              | 9 mm                 | CFS-C P 63/2"   |                                                |                 |                                                                            |
|                              |              |               |                     | 20.5 mm              | CFS-C P 75/2.5" |                                                |                 |                                                                            |
|                              |              | 50 mm         | 6.9 mm              | 9 mm                 | CFS-C P 75/2.5" |                                                |                 |                                                                            |
|                              |              |               |                     | 21 mm                | CFS-C P 90/3"   |                                                |                 |                                                                            |
|                              |              | 63 mm         | 8.6 mm              | 9 mm                 | CFS-C P 90/3"   |                                                |                 |                                                                            |
|                              |              |               |                     | 21.5 mm              | CFS-C P 110/4"  |                                                |                 |                                                                            |

### Branded pipes – Pipe end configuration U/C

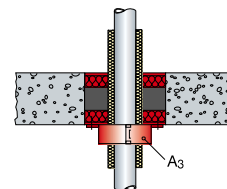
| Pipe designation                     | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Collar size     | Classification<br>E = integrity I = insulation |                         | Insulation configuration                                              |            |
|--------------------------------------|-------------------|---------------|---------------------|----------------------|-----------------|------------------------------------------------|-------------------------|-----------------------------------------------------------------------|------------|
|                                      |                   |               |                     |                      |                 | Without additional protection                  | AP <sub>9</sub>         |                                                                       |            |
| Aquatherm Firestop (PP-R)            | Aquatherm         | 110 mm        | 15.1 mm             | 10 mm                | CFS-C P 125/5"  | -                                              | EI 120-U/C              | Continued sustained or local sustained, length on both sides ≥ 200 mm |            |
| Climatherm Faser (PP-R)              | Aquatherm         | 75 mm         | 6.8 mm              | 10 mm                | CFS-C P 90/3"   | -                                              | EI 120-U/C              |                                                                       |            |
|                                      |                   | 90 mm         | 12.3 mm             | 22.5 mm              | CFS-C P 160/6"  | -                                              | EI 120-U/C <sup>6</sup> |                                                                       |            |
| Friatherm starr (PVC-C)              | Friatec           | 32 mm         | 3.6 mm              | 9 mm                 | CFS-C P 50/1.5" | -                                              | EI 120-U/C              |                                                                       |            |
|                                      |                   | 40 mm         | 4.5 mm              | 9 mm                 |                 |                                                |                         |                                                                       |            |
|                                      |                   | 50 mm         | 5.6 mm              | 9 mm                 | CFS-C P 75/2.5" |                                                |                         |                                                                       |            |
|                                      |                   | 63 mm         | 7.1 mm              | 9 mm                 | CFS-C P 110/4"  |                                                |                         |                                                                       |            |
| Fusiotherm Faser SDR 7.4/ S3.2" (PP) | Aquatherm         | 40 mm         | 5.5 mm              | 9 mm                 | CFS-C P 63/2"   | -                                              | EI 120-U/C              |                                                                       |            |
|                                      |                   | 50 mm         | 6.9 mm              | 9 mm                 | CFS-C P 63/2"   | EI 90-U/C <sup>6</sup>                         | -                       |                                                                       |            |
|                                      |                   |               |                     |                      | CFS-C P 75/2.5" | -                                              | EI 120-U/C              |                                                                       |            |
|                                      |                   |               |                     |                      |                 |                                                |                         |                                                                       |            |
|                                      |                   | 75 mm         | 10.3 mm             | 10 mm                | CFS-C P 90/3"   |                                                | EI 120-U/C              |                                                                       |            |
|                                      |                   | 110 mm        | 15.1 mm             | 10 mm                | CFS-C P 125/5"  |                                                |                         |                                                                       |            |
| Fusiotherm SDR 11 (PP)               | Aquatherm         | 40 mm         | 3.7 mm              | 9 mm                 | CFS-C P 63/2"   | -                                              | EI 120-U/C              |                                                                       |            |
|                                      |                   | 50 mm         | 4.6 mm              | 9 mm                 | CFS-C P 75/2.5" |                                                |                         |                                                                       |            |
|                                      |                   | 75 mm         | 6.8 mm              | 10 mm                | CFS-C P 90/3"   |                                                |                         |                                                                       |            |
|                                      |                   |               |                     | 110 mm               | 10.0 mm         | 10 mm                                          | CFS-C P 125/5"          | EI 90-U/C <sup>6</sup>                                                | EI 120-U/C |
| Wavin TS (PE-100RC)                  | Wavin             | 50 mm         | 4.6 mm              | 9 mm                 | CFS-C P 63/2"   | -                                              | EI 120-U/C              |                                                                       |            |
|                                      |                   | 63 mm         | 5.8 mm              | 10 mm                | CFS-C P 75/2.5" |                                                |                         |                                                                       |            |
|                                      |                   | 75 mm         | 6.8 mm              | 10 mm                | CFS-C P 90/3"   |                                                |                         |                                                                       |            |
|                                      |                   |               |                     | 90 mm                | 8.2 mm          | 10 mm                                          | CFS-C P 110/4"          | EI 90-U/C <sup>6</sup>                                                | EI 120-U/C |
|                                      |                   |               |                     | 110 mm               | 10.0 mm         | 10 mm                                          | CFS-C P 125/5"          | -                                                                     | EI 120-U/C |

<sup>6</sup> Local sustained: length on both sides  $\geq 250$  mm

## RIGID FLOORS $\geq 150$ MM COMPOSITE PIPES WITH FOAMED ELASTOMERIC INSULATION AND HILTI FIRESTOP COLLAR CFS-C P

Minimum distance between pipe closure devices: 0 mm.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on bottom side of seal and fixed with M8 threaded rods, washers and nuts.

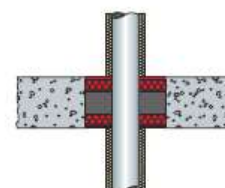


| Branded pipes – Pipe end configuration U/C |                   |               |                     |                      |                 |                                                   |                                                     |
|--------------------------------------------|-------------------|---------------|---------------------|----------------------|-----------------|---------------------------------------------------|-----------------------------------------------------|
| Pipe designation                           | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Collar size     | Classification<br>E = integrity<br>I = insulation | Insulation configuration                            |
| Geberit Mepla (PE-Xb/Al/PE-HD)             | Geberit           | 16 mm         | 2.3 mm              | 8 mm                 | CFS-C P 50/1.5" | EI 120-U/C                                        | continued sustained                                 |
|                                            |                   |               |                     | 32 mm                | CFS-C P 90/3"   |                                                   |                                                     |
|                                            |                   | 32 mm         | 3.0 mm              | 9 mm                 | CFS-C P 50/1.5" |                                                   |                                                     |
|                                            |                   |               |                     | 35 mm                | CFS-C P 50/1.5" |                                                   |                                                     |
|                                            |                   | 40 mm         | 3.5 mm              | 9 mm                 | CFS-C P 63/2"   | EI 90-U/C                                         | Local sustained, length on both sides $\geq 250$ mm |
|                                            |                   | 63 mm         | 4.5 mm              | 9 mm                 | CFS-C P 75/2.5" |                                                   |                                                     |
| KELOX KM 110 (PE-X/Al/PE)                  | Ke Kelit          | 16 mm         | 2.3 mm              | 8 mm                 | CFS-C P 50/1.5" | EI 120-U/C                                        | continued sustained                                 |
|                                            |                   |               |                     | 32 mm                | CFS-C P 90/3"   |                                                   |                                                     |
|                                            |                   | 32 mm         | 3.0 mm              | 9 mm                 | CFS-C P 50/1.5" |                                                   |                                                     |
|                                            |                   |               |                     | 35 mm                | CFS-C P 110/4"  |                                                   |                                                     |
|                                            |                   | 40 mm         | 4.0 mm              | 9 mm                 | CFS-C P 50/1.5" | EI 120-U/C                                        | Local sustained, length on both sides $\geq 250$ mm |
|                                            |                   | 63 mm         | 6.0 mm              | 9 mm                 | CFS-C P 75/2.5" |                                                   |                                                     |

## RIGID FLOORS $\geq 150$ MM COMPOSITE PIPES WITH MINERAL WOOL INSULATION

Minimum distance between pipes: 0 mm

No additional protection necessary.



| Pipe designation               | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity<br>I = insulation | Insulation configuration |
|--------------------------------|-------------------|---------------|---------------------|----------------------|---------------------------------------------------|--------------------------|
| Geberit Mepla (PE-Xb/Al/PE-HD) | Geberit           | 16 mm         | 2.3 mm              | $\geq 20$ mm         | EI 180-U/C                                        | continued sustained      |
|                                |                   | 32 mm         | 3.2 mm              |                      |                                                   |                          |
|                                |                   | 75 mm         | 4.7 mm              |                      |                                                   |                          |
| KELOX KM 110 (PE-X/Al/VPE)     | Ke Kelit          | 16 mm         | 2.0 mm              | $\geq 20$ mm         | EI 180-U/C                                        | continued sustained      |
|                                |                   | 32 mm         | 3.0 mm              |                      |                                                   |                          |
|                                |                   | 75 mm         | 3.0 mm              |                      |                                                   |                          |

## RIGID FLOORS $\geq 150$ MM PE PIPES WITH MINERAL WOOL INSULATION

Minimum distance between pipes: 0 mm

No additional protection necessary.

| Pipe designation      | Pipe manufacturer | Pipe diameter | Pipe wall thickness | Insulation thickness | Classification<br>E = integrity<br>I = insulation | Insulation configuration |
|-----------------------|-------------------|---------------|---------------------|----------------------|---------------------------------------------------|--------------------------|
| Rautitan flex (PE-Xa) | Rehau             | 16 mm         | 2.2 mm              | $\geq 20$ mm         | EI 180-U/C                                        | continued sustained      |
|                       |                   | 32 mm         | 4.4 mm              |                      |                                                   |                          |
|                       |                   | 63 mm         | 8.6 mm              |                      |                                                   |                          |

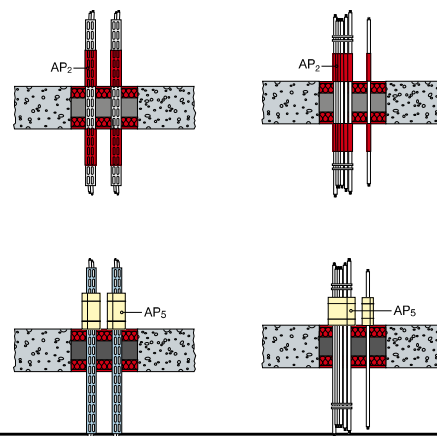
## RIGID FLOORS ≥ 150 MM CABLES, CABLE BUNDLES, CABLE TRAYS, CONDUITS

### Additional protection:

Depending on the required fire resistance, differing additional protection (AP) is necessary.

AP<sub>2</sub>: cables/small conduits coated with Hilti firestop coating CFS-CT over a length of 200 mm on both sides of the seal, thickness 1 mm.

AP<sub>5</sub>: mineral wool mat, Al-facing outside, wrapped around the cables/cable supports and fixed with wire, width (length along the cables/small conduits) 200 mm on top side of the seal, thickness 30 mm.

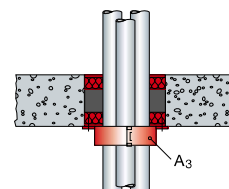


| Services                                                                     | Classification<br>E = integrity<br>I = insulation |                       |                               |
|------------------------------------------------------------------------------|---------------------------------------------------|-----------------------|-------------------------------|
|                                                                              | AP <sub>2</sub>                                   |                       | AP <sub>5</sub>               |
|                                                                              | with cable support                                | without cable support | with or without cable support |
| All sheathed cables up to 21 mm diameter                                     | EI 90                                             | EI 120                | EI 120                        |
| All sheathed cables up to 80 mm diameter                                     | EI 60                                             | EI 60                 | EI 120                        |
| Non-sheathed cables up to 24 mm diameter                                     | EI 60                                             | EI 60                 | -                             |
| Tied cable bundle up to 100 mm diameter, max. diameter of single cable 21 mm | EI 90                                             | EI 120                | EI 120                        |
| Plastic conduits and tubes up to 16 mm with or without cables                | EI 90-U/C                                         | EI 120-U/C            | EI 90-U/C                     |
| Steel conduits and tubes up to 16 mm with or without cables                  | EI 90-C/U                                         | EI 120-C/U            | EI 90-C/U                     |

## RIGID FLOORS ≥ 150 MM MULTIPLE PLASTIC CONDUITS IN SINGLE HILTI FIRESTOP COLLAR CFS-C P

With or without cables.

Hilti firestop collar CFS-C P (A<sub>3</sub>) installed on bottom side of the seal and fixed together with M8 threaded rods, washers and nuts.



| Pipe material | Pipe diameter | Pipe wall thickness | Collar size   | Classification<br>E = integrity<br>I = insulation |
|---------------|---------------|---------------------|---------------|---------------------------------------------------|
| PVC           | 16 mm         | 1.0 mm              | CFS-C P 63/2" | EI 90-U/C                                         |
|               | 25 mm         | 1.5 mm              |               |                                                   |
| Polyolefin    | 35 mm         | 2.0 mm              |               |                                                   |

## MINERAL WOOL BOARDS SUITABLE FOR HILTI FIRESTOP COATINGS CFS-CT

- Flumroc Flumroc 341
- Isover Fireprotect 150, Orsil Pyro, Orsil S, Orsil T, Protect BSP 150, Stropoterm
- Knauf Heralan BS-15, Heralan DDP-S, Heralan DP-15
- Paroc FPS 14, FPS 17, Pyrotech Slab 140, Pyrotech Slab 160
- Rockwool Hardrock II, Hardrock 040, RP-XV, RPB-15, ProRox SL 980

## MINERAL WOOL PRODUCTS SUITABLE AS ADDITIONAL PROTECTION FOR CABLE SUPPORT AND METAL PIPES

- Stone wool according to EN 14303, reaction to fire class acc. to EN 13501-1 A1 or A2, thermal conductivity at 20°C  $\leq 0.040$  W/(mK), density 35-45 kg/m<sup>3</sup>, surface Al-foil faced on one side.
- Suitable products e.g. Isover Ultimate U TFA 34, Knauf Lamella Forte LLMF AluR, Paroc Lamella Mat 35 Alu Coat, Rockwool Klimafix, Klimarock or 133 (Lamella mat).

## MINERAL WOOL PRODUCTS SUITABLE FOR PIPE INSULATION

- Interrupted insulation: Stone wool acc. to EN 14303, class A2 or A1 acc. to EN13501-2, Al-faced.
- Sustained insulation: Isover Coquilla AT-LR, Protect BSR 90 alu, Paroc Section AluCoat T, Rockwool Conlit Pipe sections, Klimarock, RS 800 pipe sections, TP Thermoprodukt TP-Protect RS 1, TP-Protect RS 105, TP-Protect RS 120, TP-Protect RS 150.

## SPECIFICATION OF FLEXIBLE ELASTOMERIC FOAM PRODUCTS SUITABLE FOR PIPE INSULATION

- Armacell International GmbH: Armaflex AF (CE marked according to EN 14304), Armaflex SH, Armaflex Ultima, Armaflex HAT
- 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

## CHARACTERISTICS OF CFS-CT

### Additional Attributes

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



| Characteristics                                                                                 | Assessment of Characteristics                                                                                                                                                                                                                                                                                                                                                                                                   | Norm, standard, test                            |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Health and the environment</b><br>Air permeability (gas tightness)<br><br>Water permeability | Tested for gas permeability regarding the gases air, nitrogen (N <sub>2</sub> ), carbon dioxide (CO <sub>2</sub> ) and CH <sub>4</sub> (methane). See ETA 11/0429 for detailed results.<br>Water tight to 1000 mm head of water or 9806 Pa. for 0.7 mm dry film thickness.                                                                                                                                                      | EN 1026<br><br>ETAG 026-2                       |
| Dangerous substances                                                                            | Below any respective occupational exposure limits as far as such limits exist (compared with the list of dangerous substances of the European Commission)                                                                                                                                                                                                                                                                       | Material safety datasheet                       |
| Protection against noise (air borne sound insulation)                                           | Detailed test results, see ETA 11/0429.                                                                                                                                                                                                                                                                                                                                                                                         | EN ISO 140-3<br>EN ISO 20140-10<br>EN ISO 717-1 |
| <b>Safety in use</b><br>Mechanical resistance and stability<br>Resistance to impact/movement    | Highest risk zone type has been fulfilled (Type IV)<br><b>Safety in use:</b> Soft body impact: Energy 500 Nm.<br>Hard body Impact: Energy 10 Nm<br><b>Serviceability:</b> Soft body impact: Energy 120 Nm.<br>Hard body Impact: Energy 6 Nm.<br>Maximum dimension of the penetration seal is 1.0×1.5 m. In case of horizontal penetrations precautions have to be taken to prevent a person stepping onto the penetration seal. | EOTA Technical Report TR001: A1                 |
| Adhesion                                                                                        | It is assumed that verification of adequate adhesion is covered by the impact test (see above).                                                                                                                                                                                                                                                                                                                                 |                                                 |
| Thermal properties                                                                              | CFS-CT B 1S: $\lambda_{10} = 0.039$ W/mK.<br>Insulation performance of mineral wool slab slightly reduced by the coating.                                                                                                                                                                                                                                                                                                       | EN 12667                                        |
| Durability and serviceability                                                                   | Category Y <sub>2</sub> (suitable for penetration seals intended for use at internal dry conditions with temperatures between -20°C and +70°C with no exposure to rain nor UV. Y <sub>2</sub> ,(-20/+70)°C.                                                                                                                                                                                                                     | EOTA Technical Report TR 024<br>ETAG 026-2      |
| Reaction to Fire                                                                                | Coating: Class D-s2 d0<br>Precoated Board: Class A1                                                                                                                                                                                                                                                                                                                                                                             | 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).

## FIRESTOP ACRYLIC SEALANT CFS-S ACR

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



### Applications

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

### Advantages

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

### Technical data

|                                                       | CFS-S ACR                      |
|-------------------------------------------------------|--------------------------------|
| Chemical basis                                        | Water-based acrylic dispersion |
| Volume shrinkage                                      | < 20 %                         |
| Movement                                              | 12,5 % (ISO 11600)             |
| Cure Time (at 23° C/50 % r.H.)                        | ~ 3 mm/72 h                    |
| Application temperature range                         | 5° C – 40° C                   |
| Storage and transportation temperature - range        | 5° C – 25° C                   |
| Shelf life (@73° F /23° C and 50 % relative humidity) | 24 month(s)                    |
| Reaction to fire class                                | D-s1d0 (EN13501-1)             |
| Approvals*                                            | ETA 10 / 0292, ETA 10 / 0389   |



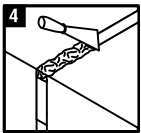
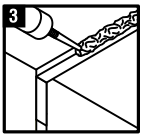
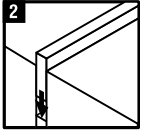
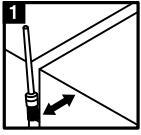
\* The European Technical Approval (ETA) can be obtained via your local Hilti contact or [www.hilti.com](http://www.hilti.com)



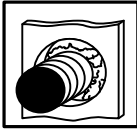
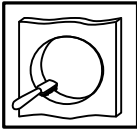
| Package   | Volume | Color | Order designation                  | Sales Quantity | Item Number |
|-----------|--------|-------|------------------------------------|----------------|-------------|
| Cartridge | 310 ml | white | Firestop acrylic sealant CFS-S ACR | 1 pc           | 435859      |
| Cartridge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

## INSTALLATION INSTRUCTIONS

### Joint



### Penetration



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

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

Apply CFS-S ACR using a dispenser.

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

Smooth joint with water using a narrow spatula or finger.

### Notes on Cleaning:

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

## HILTI FIRESTOP COLLAR CFS-C P

Firestopping for flammable pipes up to 250 mm in diameter with European Technical Approval.



### Applications

- Sealing flammable pipes from 50 mm to 250 mm in diameter in penetrations through fire compartment walls and floors
- Pipe materials: PVC, PVC-U, PE, PE-HD, PE-X, PP, ABS, Al-composite
- Suitable for use in openings in concrete, aerated concrete, masonry, drywall, shaft wall and coated board.
- Different backfilling and sealing materials are covered

### Advantages

- Quick and easy closure without use of a tool
- Adjustable position tabs for simple fastening
- Sound decoupling strip based on PE (foam) can be used
- Low profile for tight installations

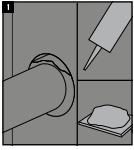
### Technical data

|                                                | CFS-C P                                                                       |
|------------------------------------------------|-------------------------------------------------------------------------------|
| Minimal wall thickness                         | 100mm                                                                         |
| Minimal ceiling thickness                      | 150mm                                                                         |
| Storage and transportation temperature - range | -5 °C – 50 °C                                                                 |
| Close aperture with                            | Gypsum plaster, cementitious mortar, Hilti Firestop Acrylic Sealant CFS-S ACR |
| Expansion temperature                          | 180 °C                                                                        |

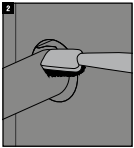


| Nominal pipe diameter | Number of hooks and fasteners | Order designation               | Sales Quantity | Item Number |
|-----------------------|-------------------------------|---------------------------------|----------------|-------------|
| 50 mm                 | 2                             | Firestop collar CFS-C P 50/1.5" | 1 pc           | 00435406    |
| 63 mm                 | 2                             | Firestop collar CFS-C P 63/2"   | 1 pc           | 00435407    |
| 75 mm                 | 3                             | Firestop collar CFS-C P 75/2.5" | 1 pc           | 00435408    |
| 90 mm                 | 3                             | Firestop collar CFS-C P 90/3"   | 1 pc           | 00435409    |
| 110 mm                | 4                             | Firestop collar CFS-C P 110/4"  | 1 pc           | 00435410    |
| 125 mm                | 4                             | Firestop collar CFS-C P 125/5"  | 1 pc           | 00435411    |
| 160 mm                | 6                             | Firestop collar CFS-C P 160/6"  | 1 pc           | 00435412    |
| 180 mm                | 8                             | Firestop collar CFS-C P 180/7"  | 1 pc           | 00435413    |
| 200 mm                | 8                             | Firestop collar CFS-C P 200/8"  | 1 pc           | 00435414    |
| 225 mm                | 10                            | Firestop collar CFS-C P 225/9"  | 1 pc           | 00435415    |
| 250 mm                | 12                            | Firestop collar CFS-C P 250/10" | 1 pc           | 00435416    |

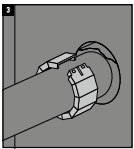
## INSTALLATION INSTRUCTIONS



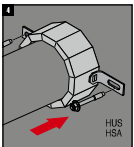
**Seal the opening:** The aperture around the pipe is filled with gypsum plaster (flexible walls) or cementitious mortar (concrete walls/floors) over the full thickness of the wall/floor or alternatively sealed with minimum 25 mm thick Hilti Firestop Acrylic Sealant CFS-S ACR on both sides. Backfilling with stone wool may be omitted in case of small annular gaps and classifications  $\leq$  EI 120. In case of missing sound decoupling means around the pipe it is recommended to use Hilti Firestop Acrylic Sealant CFS-S ACR as annular gap seal. If gypsum plaster or cementitious mortar is intended to be used it is recommended to install a PE foam strip around the pipe over the entire wall or floor thickness for sound decoupling of the pipe.



**Clean the plastic pipe.** Remove all plaster/mortar or dust from the pipe in the area where the Firestop collar is to be installed.

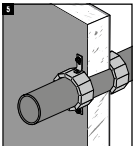


**Close the Hilti Firestop Collar:** Place the Hilti Firestop Collar around the plastic pipe and apply firm pressure by hand until it latches with a "click" sound. No tools, pins or screws are necessary. The Hilti Firestop Collar can be re-opened by pushing down the engaged "tongue" with a screwdriver while pulling the Hilti Firestop Collar apart.

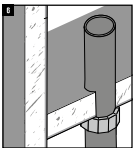


**Attach fastening hooks/tabs:** The fastening hooks can be attached to various points of the metal housing. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated below and on the packaging.

Fasten the Hilti Firestop Collar:

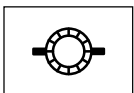


- Attach fastening hooks/tabs on the metal housing.
- Mark the fastening points on the wall/floor.
- Fasten the Hilti Firestop Collar, using recommended metal anchors/fasteners, e.g. Hilti DBZ, Hilti HUS, Hilti HSA for rigid walls and floors or threaded rod, nuts, washers in flexible walls. These are defined in the respective test reports and approvals.
- If required by national prescriptions mark the penetration seal with an identification plate containing the required information. In such a case fasten the identification plate in a visible position next to the seal.

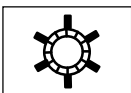


**For wall applications:** Repeat installation on the other side of the wall.

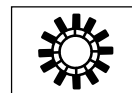
## COLLAR SIZES AND NUMBER OF HOOKS FOR SUITABLE PIPE DIAMETERS



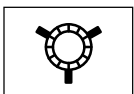
FS Collar P 50/1,5" – 2  
FS Collar P 63/2" – 2



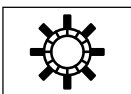
FS Collar P 160/6" – 6



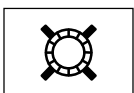
FS Collar P 250/10" – 12



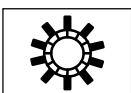
FS Collar P 75/2,5" – 3  
FS Collar P 90/3" – 3



FS Collar P 180/7" – 8  
FS Collar P 200/8" – 8



FS Collar P 110/4" – 4  
FS Collar P 125/5" – 4



FS Collar P 225/9" – 10

## FIRESTOP COLLAR CFS-C

Firestopping for plastic pipes with European Technical Approval.



### Applications

- Sealing flammable pipes from 50 mm to 160 mm in diameter in penetrations through fire compartment walls and floors
- Pipe materials: PE, PE-HD, PVC, PVC-U
- Suitable for use in openings in concrete, aerated concrete, masonry and drywall
- Different backfilling and sealing materials are covered

### Advantages

- Quick and easy closure without the use of a tool
- Adjustable position tabs for simple fastening
- Low profile for tight installations
- Sound decoupling strip based on PE (foam) can be used
- Collar stays in place whilst fixing (foam insert grips pipe)
- Reduces noise transmission from pipes to structure (foam insert)

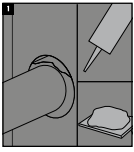
### Technical data

| CFS-C                                          |                                                                               |
|------------------------------------------------|-------------------------------------------------------------------------------|
| Minimal wall thickness                         | 100mm                                                                         |
| Minimal ceiling thickness                      | 150mm                                                                         |
| Storage and transportation temperature - range | -5 °C – 50 °C                                                                 |
| Close aperture with                            | Gypsum plaster, cementitious mortar, Hilti Firestop Acrylic Sealant CFS-S ACR |
| Expansion temperature                          | 180 °C                                                                        |
| Expansion ratio                                | 1:15 load expansion, load = 5g/cm <sup>3</sup>                                |



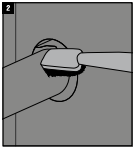
| Nominal pipe diameter | Number of hooks and fasteners | Order designation             | Sales Quantity | Item Number |
|-----------------------|-------------------------------|-------------------------------|----------------|-------------|
| 50 mm                 | 2                             | Firestop collar CFS-C 50/1.5" | 1              | 00435417    |
| 63 mm                 | 2                             | Firestop collar CFS-C 63/2"   | 1              | 00435418    |
| 75 mm                 | 3                             | Firestop collar CFS-C 75/2.5" | 1              | 00435419    |
| 90 mm                 | 3                             | Firestop collar CFS-C 90/3"   | 1              | 00435420    |
| 110 mm                | 4                             | Firestop collar CFS-C 110/4"  | 1              | 00435421    |
| 125 mm                | 4                             | Firestop collar CFS-C 125/5"  | 1              | 00435422    |
| 160 mm                | 4                             | Firestop collar CFS-C 160/6"  | 1              | 00435423    |

## INSTALLATION INSTRUCTIONS

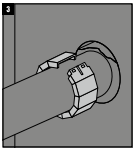


**Seal the opening:** The aperture around the pipe is filled with gypsum plaster (flexible walls) or cementitious mortar (concrete walls/floors) over the full thickness of the wall/floor or alternatively sealed with minimum 25 mm thick Hilti Firestop Acrylic Sealant CFS-S ACR on both sides. Backfilling with stone wool may be omitted in case of small annular gaps and classifications  $\leq$  EI 120.

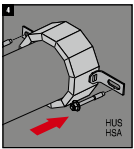
In case of missing sound decoupling means around the pipe it is recommended to use Hilti Firestop Acrylic Sealant CFS-S ACR as annular gap seal. If gypsum plaster or cementitious mortar is intended to be used it is recommended to install a PE foam strip around the pipe over the entire wall or floor thickness for sound decoupling of the pipe.



**Clean the plastic pipe.** Remove all plaster/mortar or dust from the pipe in the area where the Firestop collar is to be installed.

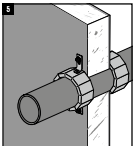


**Close the Hilti Firestop Collar:** Place the Hilti Firestop Collar around the plastic pipe and apply firm pressure by hand until it latches with a "click" sound. No tools, pins or screws are necessary. The Hilti Firestop Collar can be re-opened by pushing down the engaged "tongue" with a screwdriver while pulling the Hilti Firestop Collar apart.

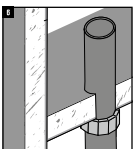


**Attach fastening hooks/tabs:** The fastening hooks can be attached to various points of the metal housing. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated below and on the packaging.

Fasten the Hilti Firestop Collar:

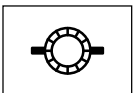


- Attach fastening hooks/tabs on the metal housing.
- Mark the fastening points on the wall/floor.
- Fasten the Hilti Firestop Collar, using recommended metal anchors/fasteners, e.g. Hilti DBZ, Hilti HUS, Hilti HSA for rigid walls and floors or threaded rod, nuts, washers in flexible walls. These are defined in the respective test reports and approvals.
- If required by national prescriptions mark the penetration seal with an identification plate containing the required information. In such a case fasten the identification plate in a visible position next to the seal.

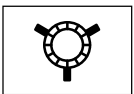


**For wall applications:** Repeat installation on the other side of the wall.

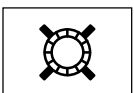
## COLLAR SIZES AND NUMBER OF HOOKS FOR SUITABLE PIPE DIAMETERS



FS Collar 50/1,5" – 2  
FS Collar 63/2" – 2



FS Collar 75/2,5" – 3  
FS Collar 90/3" – 3



FS Collar 110/4" – 4  
FS Collar 125/5" – 4  
FS Collar 160/6" – 4

# FIRESTOP BANDAGE CFS-B

Easy firestopping solution with European Technical Approval for insulated metal pipes



## Applications

- Firestopping around insulated (hot/cold) metal pipes
- Pipe materials: copper, steel and other metals with heat conductivity lower than that of copper (e.g. cast iron, stainless steel etc.) and melting point of minimum 1050°C
- Various insulation materials
- Suitable for use in openings in concrete, masonry block or drywall

## Advantages

- Highly versatile – one product for a variety of insulation materials, pipe materials and pipe diameters
- Quick and easy to install – no drilling or additional tools needed
- No need to interrupt the pipe insulation material within the wall/floor penetration
- Minimal thickness for easy installation in narrow gaps
- Good elasticity for optimum flexibility
- Very good acoustic insulation properties



## Technical data

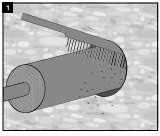
| CFS-B                                    |               |
|------------------------------------------|---------------|
| Color                                    | Grey          |
| Intumescent                              | Yes           |
| Length                                   | 10 m          |
| Width                                    | 125 mm        |
| Thickness                                | 2 mm          |
| Application temperature range            | -5°C – 50°C   |
| Temperature resistance temperature range | -20°C – 100°C |
| Expansion temperature                    | 180°C         |



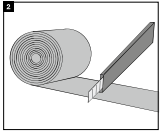
## Ordering

| Order designation      | Sales Quantity | Item Number |
|------------------------|----------------|-------------|
| Firestop bandage CFS-B | 1 pc           | 00429557    |

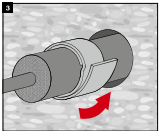
## INSTALLATION INSTRUCTIONS



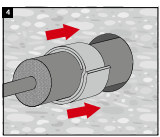
Clean the opening. The material around the opening must be dry, in sound condition and free from dust or grease.



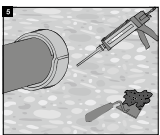
Cut Hilti Firestop Bandage CFS-B to fit the outside diameter of the insulation. Ensure 2 layers and an overlap.



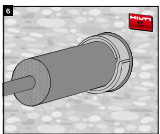
Wrap Hilti Firestop Bandage CFS-B around the insulation. Secure the bandage with steel bands or wire ( $\geq 0.7$  mm).



Install Hilti Firestop Bandage CFS-B on both sides of the opening to a depth of 62.5 mm (see marking on bandage).



Close the remaining gap with gypsum or Hilti Firestop Foam (see details from ETA 10/109 for CFS-F FX FS Foam).



If it is necessary, an additional insulation over the bandage has to be installed. Mount the installation identification plate beside the correctly sealed opening, if required.

## FIRESTOP WRAP STRIP CFS-W SG

Firestopping for flammable pipes from 50 mm up to 160 mm in diameter with pre-cut wraps strips with European Technical Approval.



### Applications

- Sealing flammable pipes from 50 mm to 160 mm in diameter in penetrations through fire compartment walls and floors
- Pipe materials: PE, PE-HD, PVC-U, PVC, PVC-C
- Suitable for use in openings in concrete, aerated concrete, masonry and drywall
- Different backfilling and sealing materials are covered

### Advantages

- Quick and easy closure without tools
- Ready-to-use pre-measured wrap strips for quick installation
- Sound decoupling strip based on PE (foam) can be used
- Ideal for very tight installations

### Technical data

|                                                | CFS-W SG                                          |
|------------------------------------------------|---------------------------------------------------|
| Storage and transportation temperature - range | -5 °C –50 °C                                      |
| Expansion temperature                          | > 180 °C                                          |
| Expansion ratio                                | 1:15 load expansion,<br>load = 5g/cm <sup>3</sup> |
| Compatibility other Hilti Firestop Products    | Hilti Firestop Acrylic Sealant CFS-ACR            |



| Dimensions (LxWxH) | Nominal pipe diameter | Recommended opening size | Order designation                    | Sales Quantity | Item Number |
|--------------------|-----------------------|--------------------------|--------------------------------------|----------------|-------------|
| 169 x 45 x 4,5 mm  | 50 mm                 | 67 mm                    | Firestop wrap strip CFS-W SG 50/1.5" | 2              | 00429549    |
| 210 x 45 x 4,5 mm  | 63 mm                 | 77 mm                    | Firestop wrap strip CFS-W SG 63/2"   | 2              | 00429550    |
| 249 x 45 x 4,5 mm  | 75 mm                 | 92 mm                    | Firestop wrap strip CFS-W SG 75/2.5" | 2              | 00429551    |
| 311 x 45 x 9 mm    | 90 mm                 | 112 mm                   | Firestop wrap strip CFS-W SG 90/3"   | 2              | 00429552    |
| 370 x 45 x 9 mm    | 110 mm                | 132 mm                   | Firestop wrap strip CFS-W SG 110/4"  | 2              | 00429553    |
| 421 x 45 x 9 mm    | 160 mm                | 152 mm                   | Firestop wrap strip CFS-W SG 125/5"  | 2              | 00429554    |
| 543 x 45 x 13,5 mm |                       | 202 mm                   | Firestop wrap strip CFS-W SG 160/6"  | 2              | 00429555    |

## FIRESTOP WRAP STRIP CFS-W EL

Firestopping for flammable pipes from 50 mm up to 160 mm with endless wraps strip providing an European Technical Approval.



### Applications

- Sealing flammable pipes from 50 mm to 160 mm in diameter in penetrations through fire compartment walls and floors
- Pipe materials: PE, PE-HD, PVC-U, PVC, PVC-C
- Suitable for use in openings in concrete, aerated concrete, masonry and drywall
- Different backfilling and sealing materials are covered

### Advantages

- Quick and easy closure without tools
- Highest flexibility – one product for pipe diameters from 50 mm to 160 mm
- Sound decoupling strip based on PE (foam) can be used
- Ideal for very tight installations

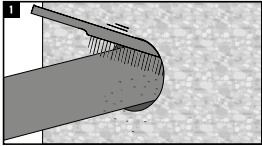
### Technical data

| CFS-W EL                                       |                                                   |
|------------------------------------------------|---------------------------------------------------|
| Storage and transportation temperature – range | –5 °C – 50 °C                                     |
| Expansion temperature                          | > 180 °C                                          |
| Expansion ratio                                | 1:15 load expansion,<br>load = 5g/cm <sup>3</sup> |
| Compatibility other Hilti Firestop Products    | Hilti Firestop Acrylic Sealant CFS-ACR            |

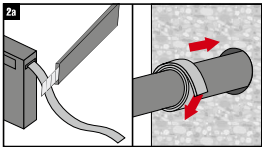


| Dimensions (LxWxH)  | Pipe diameter - range | Order designation                     | Sales Quantity | Item Number |
|---------------------|-----------------------|---------------------------------------|----------------|-------------|
| 10000 x 45 x 4.5 mm | 50 – 160mm            | Firestop wrap strip CFS-W EL W45/1.8" | 1              | 00429556    |

## INSTALLATION INSTRUCTIONS



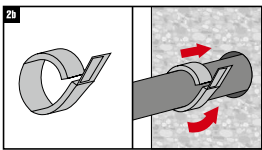
Clean the plastic pipe in the area where the Hilti Firestop Wrap CFS-W is to be installed.



### Installation of the wrap

#### a) Hilti Firestop Wrap CFS-W SG:

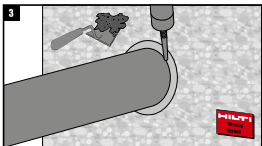
Use the Hilti Firestop Wrap CFS-W SG corresponding to the diameter of the pipe. Wrap the Hilti Firestop Wrap CFS-W SG around the pipe and fasten its end to each other tightly using the integrated adhesive strip. Push the Hilti Firestop Wrap CFS-W into the annular gap until its outer edge is flush with the surface of the wall or floor.



#### b) Hilti Firestop Wrap CFS-W EL:

Cut the Hilti Firestop Wrap CFS-W EL to length according to the outer diameter of the pipe, taking the required number of layers into consideration. If sound decoupling means are installed around the pipe this has to be considered when cutting the wrap to length. Wrap the Hilti Firestop Wrap CFS-W EL around the pipe and secure it with a short strip of adhesive tape. Push the Hilti Firestop Wrap CFS-W into the annular gap until its outer edge is flush with the surface of the wall or floor.

Do not install Hilti Firestop Wrap CFS-W in the centre of the wall/floor or using single layers of CFS-W EL one behind the other.



Seal the remaining gap with Hilti Firestop Acrylic Sealant CFS-S ACR or a cementitious mortar. Use minimum 25mm Hilti Firestop Acrylic Sealant CFS-S ACR in case of flexible wall constructions, minimum 15 mm in rigid wall constructions and minimum 10 mm, backfilled with mineral wool, in case of rigid floor constructions. In case of use of mortar the gap is to be filled completely over the entire thickness of the wall or floor.

## 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                      |                |
|-------------------------------|----------------|
| Pipe diameter range           | 16 – 160 mm    |
| Intumescent                   | Yes            |
| Length                        | 2580 mm        |
| Width                         | 52 mm          |
| Thickness                     | 17 mm          |
| Expansion temperature         | 210° C         |
| Application temperature range | –5° C – 50° C  |
| Temperature resistance        | –30° C – 80° C |



### Ordering

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

# FIRESTOP SLEEVE CFS-SL

Simplifies cable management where frequent re-penetration is required



## Applications

- Sealing penetrations for single cables and cable bundles
- Suitable for small to medium-sized circular openings in walls and ceilings
- For use on concrete, masonry and drywall

## Advantages

- Easy to install and to inspect
- Fully functional immediately after installation
- Robust
- Optimum smoke-proofing performance
- Easy subsequent installation of additional cables
- Fire resistance rating of up to 2 hours



|                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CE</b>                                                                                                                                   |
| <b>0843</b>                                                                                                                                 |
| <b>HILTI Corporation</b><br>Feldkirchstrasse 100<br>9494 Schaan<br>Liechtenstein                                                            |
| 11                                                                                                                                          |
| 0843-CPD-0105                                                                                                                               |
| ETA-11/0153                                                                                                                                 |
| ETAG N° 026, Part 2                                                                                                                         |
| Penetration Seal 'HilTI Firestop<br>Sleeve CFS-SL'<br>Use category: Z <sub>2</sub><br>See ETA-11/0153 for other<br>relevant characteristics |

|                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FM</b><br>APPROVED                                                                                                                                                   |
| <b>CLASSIFIED</b><br><b>UL</b><br>US                                                                                                                                    |
| FIRESTOP DEVICES<br>FOR USE IN THROUGH-PENETRATION<br>FIRESTOP SYSTEMS SEE UL DIRECTORY<br>OF PRODUCTS CERTIFIED FOR CANADA<br>AND UL FIRE RESISTANCE DIRECTORY<br>5N76 |



## Technical data

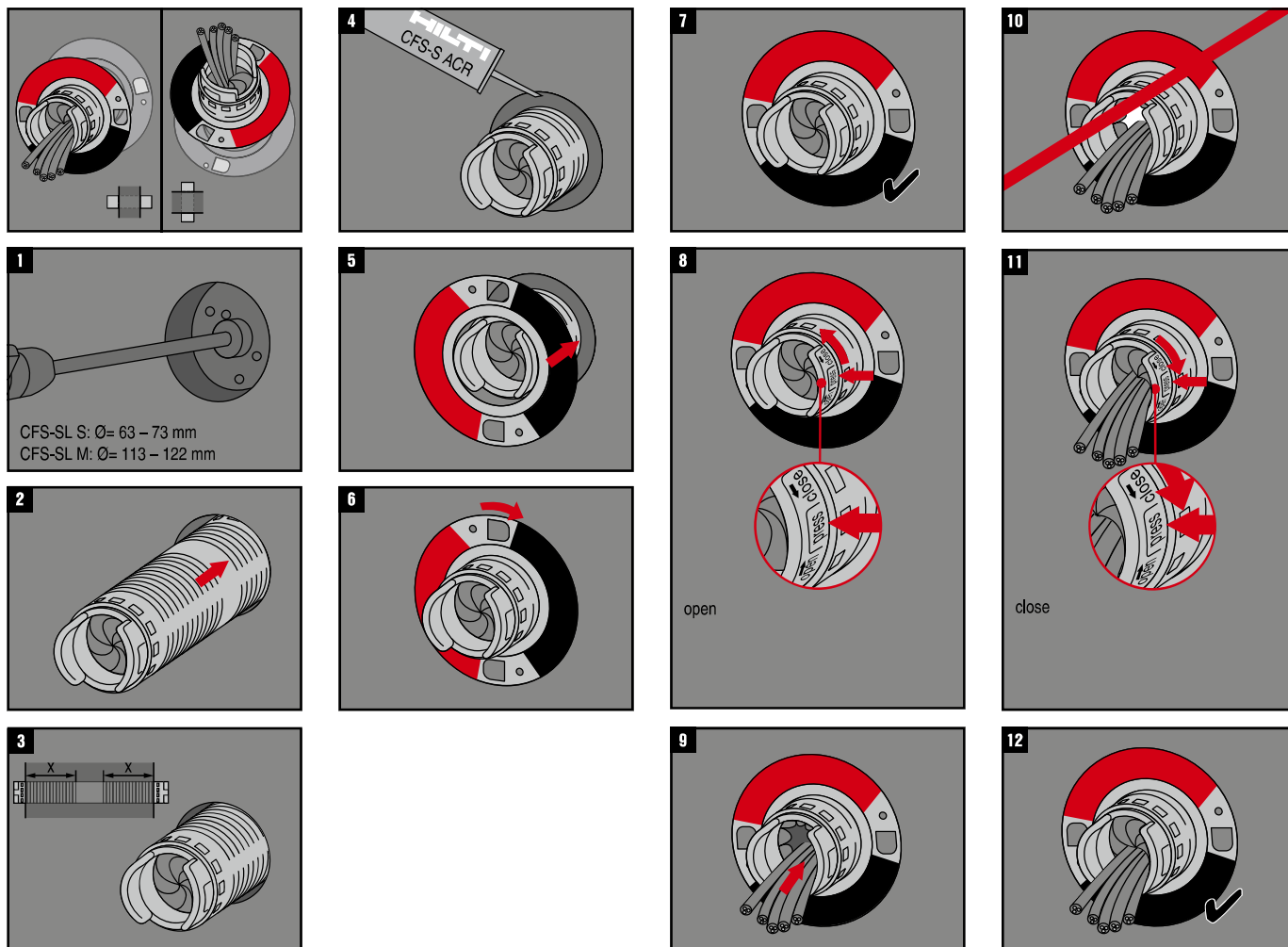
| CFS-SL                    |                                   |
|---------------------------|-----------------------------------|
| Intumescent               | Yes                               |
| Max. annular space        | 7 mm                              |
| Minimum wall thickness    | 100 mm                            |
| Minimum ceiling thickness | 150mm                             |
| 2nd component             | Firestop Acrylic Sealant CFS-SACR |
| Reaction to fire class    | E (according to EN 13501-1:2007)  |

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

## Ordering

| Order designation        | Recommended opening size | Item Number |
|--------------------------|--------------------------|-------------|
| Firestop sleeve CFS-SL S | Ø 63-73 mm               | 02019717    |
| Firestop sleeve CFS-SL M | Ø 113-122 mm             | 02019718    |

## INSTALLATION INSTRUCTIONS









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