

# ДЕКЛАРАЦИЯ ЗА ЕКСПЛОАТАЦИОННИ ПОКАЗАТЕЛИ

в съответствие с Приложение III на Регламент (ЕС) № 305/2011 (Регламент за строителните продукти)

## Пожарозащтен кабелен преход CFS-T на Hilti № Hilti CFS-T "1139-CPD-0499/13"

### 1. Уникален идентификационен код на типа продукт:

Пожарозащтен кабелен преход CFS-T на Hilti

### 2. Предвидена употреба/употреби:

Пожарозащтен и уплътняващ продукт за уплътнения на прониквания, вижте ETA-13/0516 (19.12.2019 г.)

|                                    |                                                            |
|------------------------------------|------------------------------------------------------------|
| Смесено уплътнение на проникването | Прониквания на кабели, метални тръби и смесени прониквания |
|------------------------------------|------------------------------------------------------------|

### 3. Производител:

Hilti Corporation, Feldkircherstrasse 100, 9494 Schaan, Княжество Лихтенщайн

### 4. Система/системи за оценяване и проверка на постоянството на експлоатационните показатели:

Система 1

### 5. Европейски документ за оценяване:

EAD 350454-00-1104 "Пожарозащтни и уплътняващи продукти – Уплътнения на прониквания"

#### Европейска техническа оценка:

ETA-13/0516 (19.12.2019)

#### Орган за техническа оценка:

Австрийски институт по строителни технологии (OIB)

#### Нотифициран орган/органи:

Magistratsabteilung 39 – Prüf-, Überwachungs- und Zertifizierungsstelle der Stadt Wien, No. 1139

### 6. Декларирани експлоатационни показатели:

| Съществена характеристика                       | Декларирани експлоатационни показатели / Хармонизирана техническа спецификация                                        |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Реакция на огън                                 | Стоманен корпус: клас A1 съгласно EN 13501-1<br>Облицовка: клас E съгласно EN 13501-1                                 |
| Огнеустойчивост                                 | Експлоатационни показатели за огнеустойчивост и област на приложение в съответствие с EN 13501-2.<br>Вижте Приложение |
| Устойчивост на механично въздействие / движение | Изпълнява изискванията за рискова зона IV съгласно EOTA TR 001                                                        |
| Дълготрайност и експлоатационна годност         | X в съответствие с EOTA Технически доклад - TR024.                                                                    |

Експлоатационните показатели на продукта, посочени по-горе, са в съответствие с декларираните експлоатационни показатели. Настоящата декларация за експлоатационни показатели се издава в съответствие с Регламент (ЕС) № 305/2011, като отговорността за нея се носи изцяло от посочения по-горе производител.

Подписано за и от името на производителя от:



Tatjana Tsalolikhina  
Product Manager  
Business Unit Fire Protection  
Hilti Aktiengesellschaft



Martin Althof  
Leiter Qualitätssicherung  
Business Unit Fire Protection  
Hilti Aktiengesellschaft

## **Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)**

### **Intended use**

“Hilti Firestop Cable Transit CFS-T” is intended to be used as a cable- and / or pipe penetration seal (mixed penetration seal) to temporarily or permanently reinstate the fire resistance performance of rigid wall constructions and rigid floor constructions where they have been provided with apertures which are penetrated by various cables, conduits, metal pipes, plastic pipes and multi-layer composite pipes. Other parts or service support constructions shall not penetrate the penetration seal. Further details are given in Annex C of the ETA.

The maximum opening size of the penetration seal in walls is 504 mm x 562 mm. For more details see Annex C of the ETA.

“Hilti Firestop Cable Transit CFS-T” can be installed only in the types of separating elements as specified in the following table.

| <b>Separating element</b> | <b>Construction</b>                                                                                                                                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rigid walls               | <ul style="list-style-type: none"><li>&gt; Concrete</li><li>&gt; Minimum density 2200 kg/m<sup>3</sup></li><li>&gt; Minimum thickness 150 mm</li><li>&gt; The rigid wall shall be classified in accordance with EN 13501-2 for the required fire resistance period</li></ul>  |
| Rigid floors              | <ul style="list-style-type: none"><li>&gt; Concrete</li><li>&gt; Minimum density 2200 kg/m<sup>3</sup></li><li>&gt; Minimum thickness 200 mm</li><li>&gt; The rigid floor shall be classified in accordance with EN 13501-2 for the required fire resistance period</li></ul> |

This European Technical Assessment does not cover sandwich panel constructions.

## Abbreviations used in drawings

| Abbreviation      | Description                                           |
|-------------------|-------------------------------------------------------|
| A <sub>1</sub>    | Hilti Firestop Cable Transit Frame (Sleeve)           |
| A <sub>2</sub>    | Hilti Firestop Cable Transit Modules                  |
| A <sub>2</sub> SM | Hilti Firestop Cable Transit Super Modules            |
| A <sub>3</sub>    | Hilti Firestop Cable Transit Wedge                    |
| A <sub>4</sub>    | Hilti Firestop Cable Transit Plug Seal                |
| A <sub>5</sub>    | Sealing with Hilti Firestop Acrylic Sealant CFS-S ACR |
| C <sub>1</sub>    | Cable                                                 |
| C <sub>2</sub>    | Pipe                                                  |
| d <sub>C2</sub>   | Pipe diameter (nominal outside diameter)              |
| AP <sub>1</sub>   | Cable Insulation                                      |
| AP <sub>2</sub>   | Pipe Insulation                                       |
| AP <sub>3</sub>   | Transit Frame Insulation                              |
| E                 | Building element (wall, floor)                        |
| F                 | Fixing of the frame (sleeve)                          |
| S <sub>1</sub>    | Minimum distance between single penetration seals     |
| t <sub>C2</sub>   | Pipe wall thickness                                   |
| t <sub>AP1</sub>  | Insulation thickness / cable                          |
| t <sub>AP2</sub>  | Insulation thickness / pipe                           |
| t <sub>AP3</sub>  | Insulation thickness / transit frame                  |
| t <sub>E</sub>    | Thickness of the building element                     |
| L <sub>AP1</sub>  | Length of Cable Insulation                            |
| L <sub>AP2</sub>  | Length of Pipe Insulation                             |

## C.2 Penetration seal system Hilti CFS-T SB and CFS-T SBO in rigid walls and floors according to Annex C.1.1 of the ETA

Maximum distance for 1<sup>st</sup> service support: 420 mm.

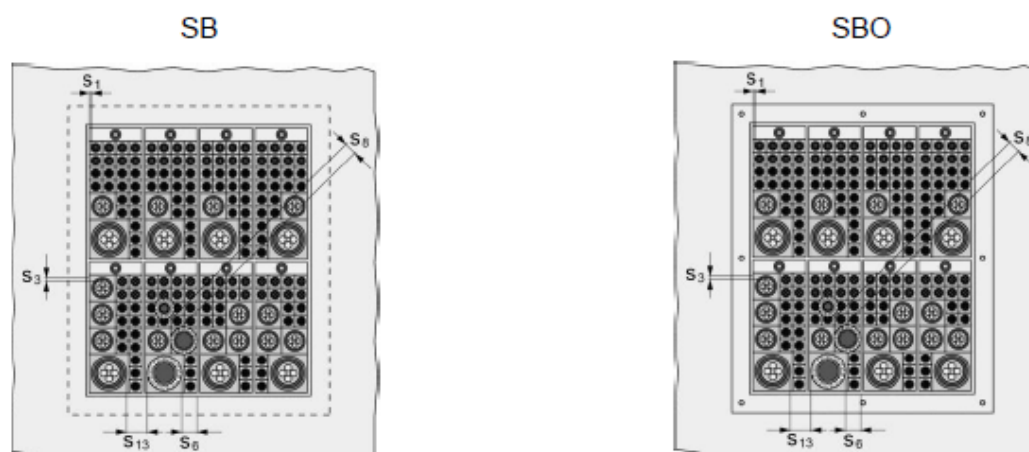
Maximum seal size: 504 x 562 mm (width x height).

Minimum distances in mm cable and metal pipe penetration seal:

|            |    |                                                                    |
|------------|----|--------------------------------------------------------------------|
| $s_1$ =    | 5  | (distance between cables and the side seal edge)                   |
| $s_3$ =    | 5  | (distance between cables and upper seal edge)                      |
| $s_6$ =    | 0  | (distance between the insulation of metal pipes and the seal edge) |
| $s_8$ =    | 0  | (distance between the insulation of metal pipes)                   |
| $s_{13}$ = | 90 | (distance between cables and metal pipes)                          |

The results are also valid for mixed penetration seals

Minimum distances in mm (see illustration of distances below):



### C.2.1 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 150 mm

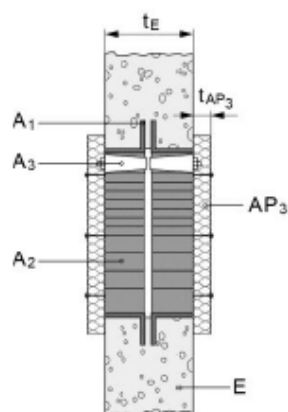
#### C.2.1.1 Blank seal (no services) - System: CFS-T SB

#### Classification

- Single frame

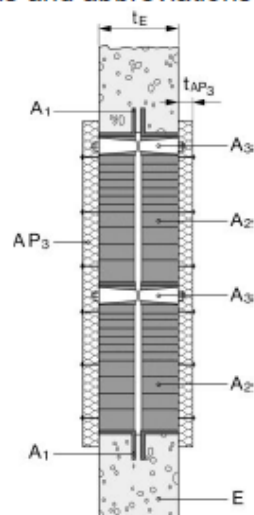
Maximum seal size: 277 mm x 120 mm (CFS-T SB 8x1),

Construction details (for symbols and abbreviations see Annex A of the ETA):



EI 180

- Multiple frame  
Maximum seal size: 504 mm x 562 mm (CFS-T SB 8+8x4),  
Construction details (for symbols and abbreviations see Annex A of the ETA):

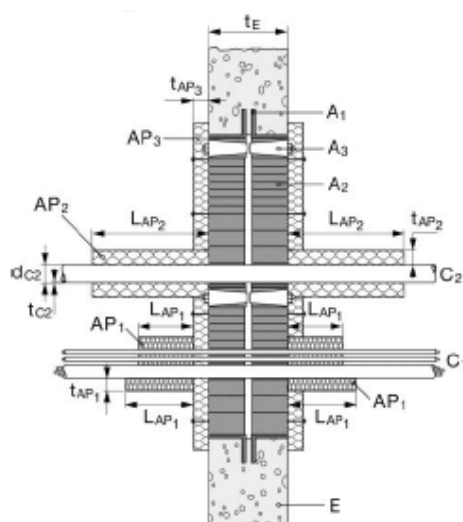


EI 180

#### C.2.1.2 Cable penetration - System: CFS-T SB

Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4)

Construction details (for symbols and abbreviations see Annex A):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                   | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation<br>length $L_{AP1}$ (mm) | Classification |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables) with a diameter of: |                                              |                                           |                |
| Small cable group max. Ø21mm                                                                                                                                                                                                   | 30                                           | 250                                       | EI 180         |
| Medium cable group max. Ø50mm                                                                                                                                                                                                  | 30                                           | 250                                       | EI 180         |
| Large cable group max. Ø80mm                                                                                                                                                                                                   | 30                                           | 250                                       | EI 120 / E 180 |

### C.2.1.3 Non-combustible pipe penetration - System: CFS-T SB

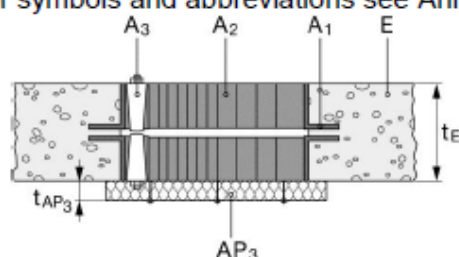
Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4)

| Pipe diameter<br>$d_{C2}$ (mm) | Pipe wall<br>thickness<br>$t_{C2}$ (mm) | Thickness of<br>pipe insulation<br>$t_{AP2}$ (mm) | Length of pipe<br>insulation<br>$L_{AP2}$ (mm) | Arrangement<br>pipe insulation | Classification           |
|--------------------------------|-----------------------------------------|---------------------------------------------------|------------------------------------------------|--------------------------------|--------------------------|
| 15                             | 1 – 14,2                                | $\geq 30$                                         | $\geq 500$                                     | LI                             | EI 180                   |
| 15 – 28                        | 1 – 14,2                                | $\geq 30$                                         | $\geq 500$                                     | LI                             | EI 120-C/U,<br>E 180-C/U |
| 28 – 54                        | 1/1,5 – 14,2                            | $\geq 30$                                         | $\geq 500$                                     | LI                             |                          |
| 15 – 28                        | 1 – 14,2                                | $\geq 30$                                         | -                                              | CI                             | EI 180                   |
| 28 – 54                        | 1/1,5 – 14,2                            | $\geq 30$                                         | -                                              | CI                             | EI 180                   |

## C.2.2 Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 200 mm

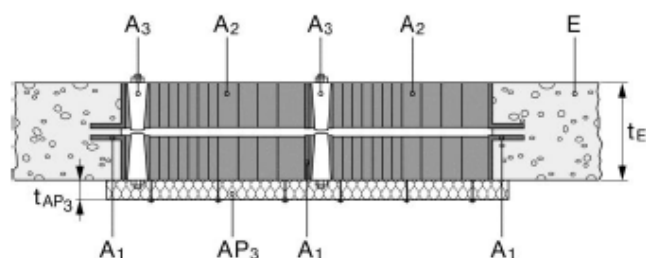
### C.2.2.1 Blank seal (no services) - System: CFS-T SB

- Single frame  
Maximum seal size: 277mm x 120mm (CFS-T SB 8x1),  
Construction details (for symbols and abbreviations see Annex A of the ETA):



EI 180

- Multiple frame  
Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4),  
Construction details (for symbols and abbreviations see Annex A of the ETA):

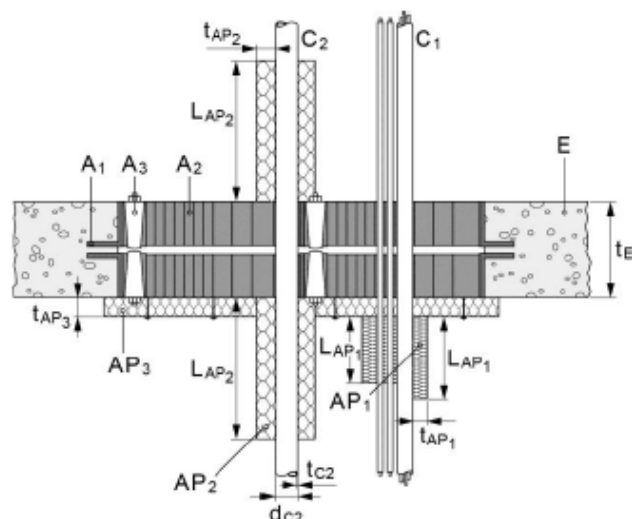


EI 180

### C.2.2.2 Cable penetration - System: CFS-T SB

Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4)

Construction details (for symbols and abbreviations see Annex A of the ETA):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>$\varnothing 21$ mm                                                                                                                                                                                 | 30                                           | 300                                       | EI 180         |
| Medium cable group max.<br>$\varnothing 50$ mm                                                                                                                                                                                | 30                                           | 300                                       | EI 180         |
| Large cable group max.<br>$\varnothing 80$ mm                                                                                                                                                                                 | 30                                           | 300                                       | EI 120 / E 180 |

### C.2.2.3 Non-combustible pipe penetration - System: CFS-T SB

Maximum seal size: 504 mm x 562 mm (CFS-T SB 8+8x4)

| Pipe diameter<br>$d_{C2}$ (mm) | Pipe wall<br>thickness<br>$t_{C2}$ (mm) | Thickness of<br>pipe insulation<br>$t_{AP2}$ (mm) | Length of pipe<br>insulation<br>$L_{AP2}$ (mm) | Arrangement<br>pipe insulation | Classification           |
|--------------------------------|-----------------------------------------|---------------------------------------------------|------------------------------------------------|--------------------------------|--------------------------|
| 15 - 28                        | 1 - 14,2                                | $\geq 30$                                         | $\geq 400$                                     | LI                             | EI 120-C/U,<br>E 180-C/U |
| 28 - 54                        | 1/1,5 - 14,2                            | $\geq 30$                                         | $\geq 500$                                     | LI                             |                          |
| 15 - 28                        | 1 - 14,2                                | $\geq 30$                                         | -                                              | CI                             | EI 180                   |
| 28 - 54                        | 1/1,5 - 14,2                            | $\geq 30$                                         | -                                              | CI                             | EI 180                   |

### C.2.3 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 150 mm

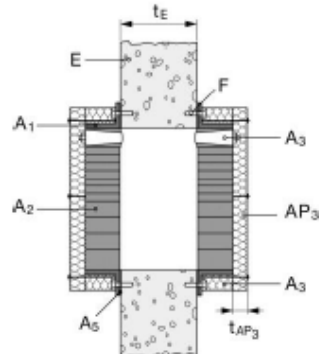
C.2.3.1 Blank seal (no services) - System: CFS-T SBO

## Classification

- Single frame

Maximum seal size: 120 mm x 277 mm (CFS-T SBO 8x1),

Construction details (for symbols and abbreviations see Annex A of the ETA):

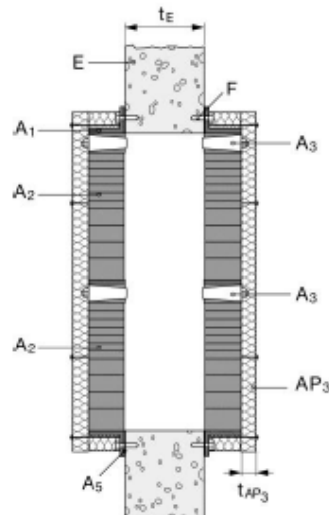


EI 180

- Multiple frame

Maximum seal size: 504 mm x 562 mm (CFS-T SBO 8+8x4),

Construction details (for symbols and abbreviations see Annex A of the ETA):

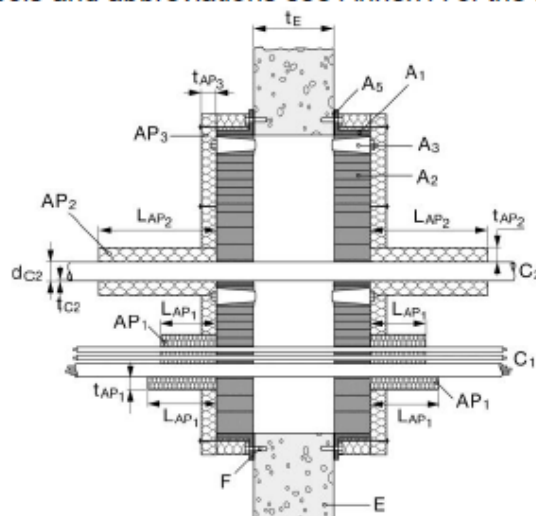


EI 180

#### C.2.3.2 Cable penetration - System: CFS-T SBO

Maximum seal size: 504 mm x 562 mm (CFS-T SBO 8+8x4)

Construction details (for symbols and abbreviations see Annex A of the ETA):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation<br>length $L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>$\varnothing 21$ mm                                                                                                                                                                                 | 30                                           | 150                                       | EI 180         |
| Medium cable group max.<br>$\varnothing 50$ mm                                                                                                                                                                                | 30                                           | 150                                       | EI 180         |
| Large cable group max.<br>$\varnothing 80$ mm                                                                                                                                                                                 | 30                                           | 150                                       | EI 120 / E 180 |

### C.2.3.3 Non-combustible pipe penetration - System: CFS-T SBO

Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4)

| Pipe diameter<br>$d_{C2}$ (mm) | Pipe wall<br>thickness<br>$t_{C2}$ (mm) | Thickness of<br>pipe insulation<br>$t_{AP2}$ (mm) | Length of pipe<br>insulation<br>$L_{AP2}$ (mm) | Arrangement<br>pipe insulation | Classification           |
|--------------------------------|-----------------------------------------|---------------------------------------------------|------------------------------------------------|--------------------------------|--------------------------|
| 15                             | 1 – 14,2                                | $\geq 30$                                         | $\geq 250$                                     | LI                             | EI 180                   |
| 15 – 28                        | 1 – 14,2                                | $\geq 30$                                         | $\geq 250$                                     | LI                             | EI 120-C/U,<br>E 180-C/U |
| 28 – 54                        | 1/1,5 – 14,2                            | $\geq 30$                                         | $\geq 500$                                     | LI                             |                          |
| 15 – 28                        | 1 – 14,2                                | $\geq 30$                                         | -                                              | CI                             | EI 180                   |
| 28 – 54                        | 1/1,5 – 14,2                            | $\geq 30$                                         | -                                              | CI                             | EI 180                   |

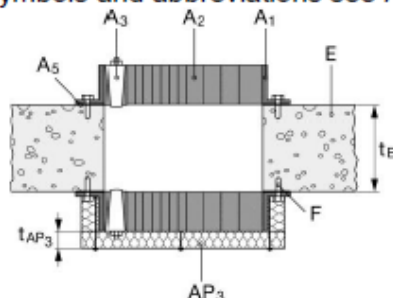
### C.2.4 Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 200 mm

#### C.2.4.1 Blank seal (no services) - System: CFS-T SBO

- Single frame

Maximum seal size: 277 mm x 120 mm (CFS-T SBO 8x1),

Construction details (for symbols and abbreviations see Annex A of the ETA):

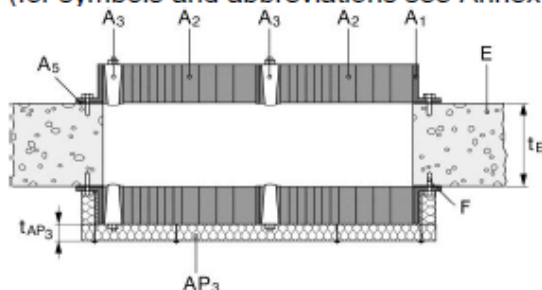


EI 180

- Multiple frame

Maximum seal size: 520 mm x 580 mm (CFS-T SBO 8+8x4),

Construction details (for symbols and abbreviations see Annex A of the ETA):

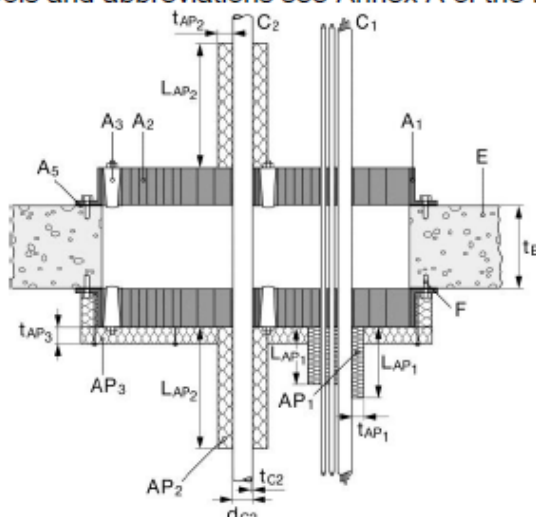


EI 180

#### C.2.4.2 Cable penetration - System: CFS-T SBO

Maximum seal size: 504mm x 562mm (CFS-T SBO 8+8x4)

Construction details (for symbols and abbreviations see Annex A of the ETA):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>$\varnothing$ 21 mm                                                                                                                                                                                 | 30                                           | 250                                       | EI 180         |
| Medium cable group max.<br>$\varnothing$ 50 mm                                                                                                                                                                                | 30                                           | 250                                       | EI 180         |
| Large cable group max.<br>$\varnothing$ 80 mm                                                                                                                                                                                 | 30                                           | 250                                       | EI 180         |

#### C.2.4.3 Non-combustible pipe penetration - System: CFS-T SBO

Maximum seal size: 520 mm x 580 mm (CFS-T SB 8+8x4)

| Pipe diameter<br>$d_{C2}$ (mm) | Pipe wall<br>thickness<br>$t_{C2}$ (mm) | Thickness of<br>pipe insulation<br>$t_{AP2}$ (mm) | Length of pipe<br>insulation<br>$L_{AP2}$ (mm) | Arrangement<br>pipe insulation | Classification           |
|--------------------------------|-----------------------------------------|---------------------------------------------------|------------------------------------------------|--------------------------------|--------------------------|
| 15 – 28                        | 1 – 14,2                                | $\geq 30$                                         | $\geq 300$                                     | LI                             | EI 120-C/U,<br>E 180-C/U |
| 28 – 54                        | 1/1,5 – 14,2                            | $\geq 30$                                         | $\geq 500$                                     | LI                             |                          |
| 15 – 28                        | 1 – 14,2                                | $\geq 30$                                         | -                                              | CI                             | EI 180                   |
| 28 – 54                        | 1/1,5 – 14,2                            | $\geq 30$                                         | -                                              | CI                             | EI 180                   |

### C.3 Penetration seal system Hilti CFS-T SBF in rigid walls and floors according to Annex C.1.1 of the ETA

Maximum distance for 1<sup>st</sup> service support: 420 mm.

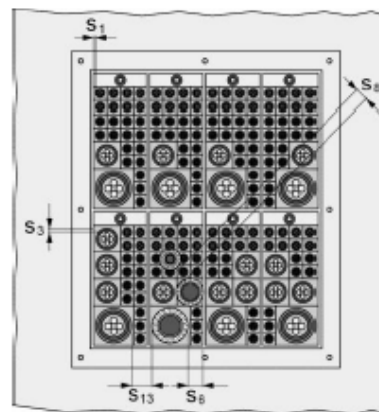
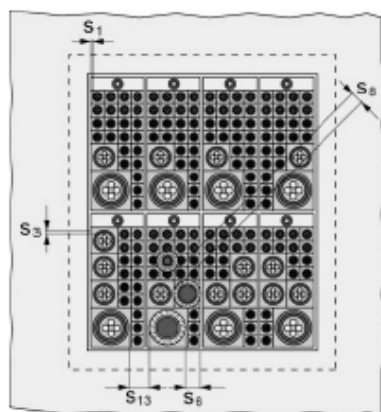
Maximum seal size: 504 x 562 mm (width x height).

Minimum distances in mm cable and metal pipe penetration seal:

|          |   |    |                                                                    |
|----------|---|----|--------------------------------------------------------------------|
| $s_1$    | = | 5  | (distance between cables and the side seal edge)                   |
| $s_3$    | = | 5  | (distance between cables and upper seal edge)                      |
| $s_6$    | = | 0  | (distance between the insulation of metal pipes and the seal edge) |
| $s_8$    | = | 0  | (distance between the insulation of metal pipes)                   |
| $s_{13}$ | = | 90 | (distance between cables and metal pipes)                          |

The results are also valid for mixed penetration seals

Minimum distances in mm (see illustration of distances below):



#### C.3.1 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 150 mm

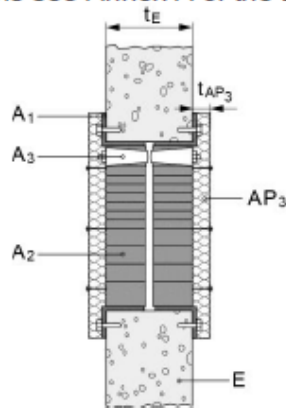
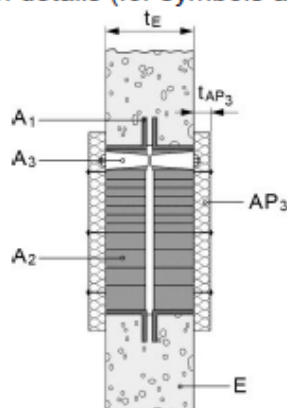
##### C.3.1.1 Blank seal (no services) - System: CFS-T SBF

##### Classification

- Single frame

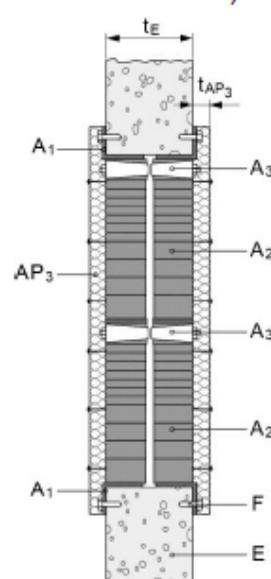
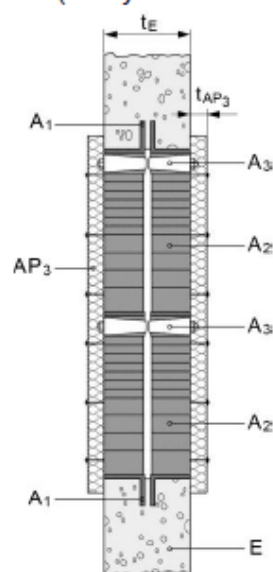
Maximum seal size: 277 mm x 120 mm (CFS-T SBF 8x1),

Construction details (for symbols and abbreviations see Annex A of the ETA):



EI 180

- Multiple frame  
Maximum seal size: 504 mm x 562 mm (CFS-T SBF 8+8x4),  
Construction details (for symbols and abbreviations see Annex A of the ETA):

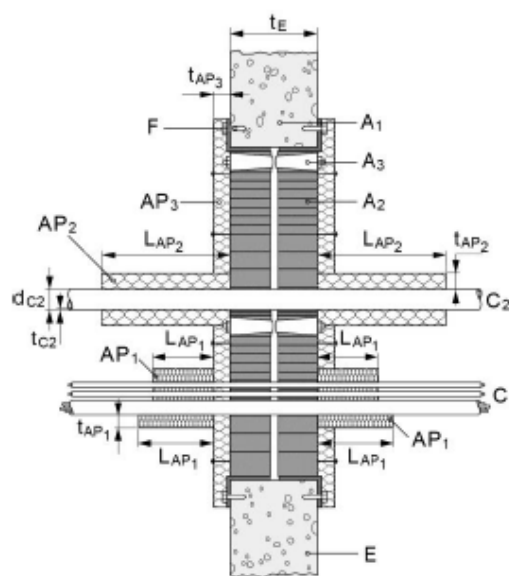
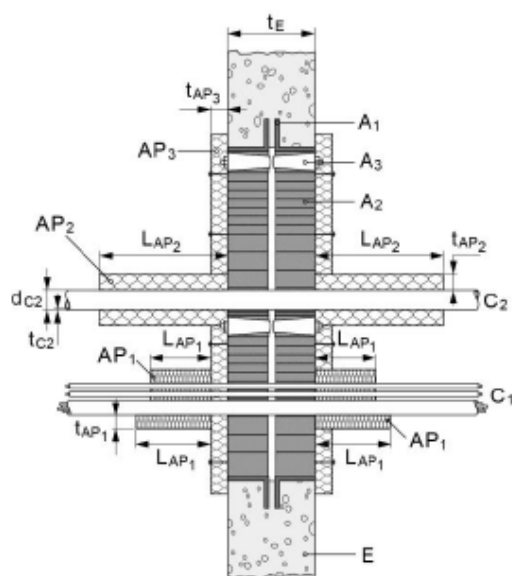


EI 180

### C.3.1.2 Cable penetration - System: CFS-T SBF

Maximum seal size: 504mm x 562mm (CFS-T SBF 8+8x4)

Construction details (for symbols and abbreviations see Annex A):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                   | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation<br>length $L_{AP1}$ (mm) | Classification |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables) with a diameter of: |                                              |                                           |                |
| Small cable group max. Ø21mm                                                                                                                                                                                                   | 30                                           | 250                                       | EI 180         |
| Medium cable group max. Ø50mm                                                                                                                                                                                                  | 30                                           | 250                                       | EI 180         |
| Large cable group max. Ø80mm                                                                                                                                                                                                   | 30                                           | 250                                       | EI 120 / E 180 |

### C.3.1.3 Non-combustible pipe penetration - System: CFS-T SBF

Maximum seal size: 504mm x 562mm (CFS-T SBF 8+8x4)

| Pipe diameter<br>$d_{c2}$ (mm) | Pipe wall thickness<br>$t_{c2}$ (mm) | Thickness of pipe insulation<br>$t_{AP2}$ (mm) | Length of pipe insulation<br>$L_{AP2}$ (mm) | Arrangement pipe insulation | Classification           |
|--------------------------------|--------------------------------------|------------------------------------------------|---------------------------------------------|-----------------------------|--------------------------|
| 15                             | 1 – 14,2                             | $\geq 30$                                      | $\geq 500$                                  | LI                          | EI 180                   |
| 15 – 28                        | 1 – 14,2                             | $\geq 30$                                      | $\geq 500$                                  | LI                          | EI 120-C/U,<br>E 180-C/U |
| 28 – 54                        | 1/1,5 – 14,2                         | $\geq 30$                                      | $\geq 500$                                  | LI                          |                          |
| 15 – 28                        | 1 – 14,2                             | $\geq 30$                                      | -                                           | CI                          | EI 180                   |
| 28 – 54                        | 1/1,5 – 14,2                         | $\geq 30$                                      | -                                           | CI                          | EI 180                   |

### C.3.2 Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 200 mm

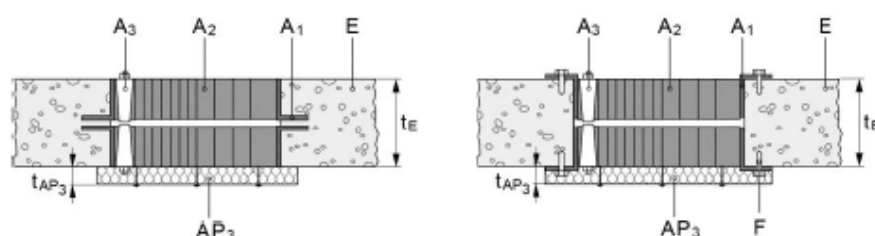
#### C.3.2.1 Blank seal (no services) - System: CFS-T SBF

#### Classification

##### - Single frame

Maximum seal size: 277mm x 120mm (CFS-T SBF 8x1),

Construction details (for symbols and abbreviations see Annex A of the ETA):

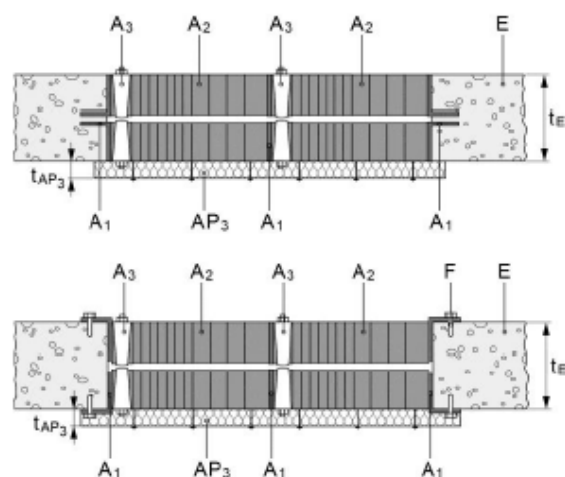


EI 180

##### - Multiple frame

Maximum seal size: 504mm x 562mm (CFS-T SBF 8+8x4),

Construction details (for symbols and abbreviations see Annex A of the ETA):

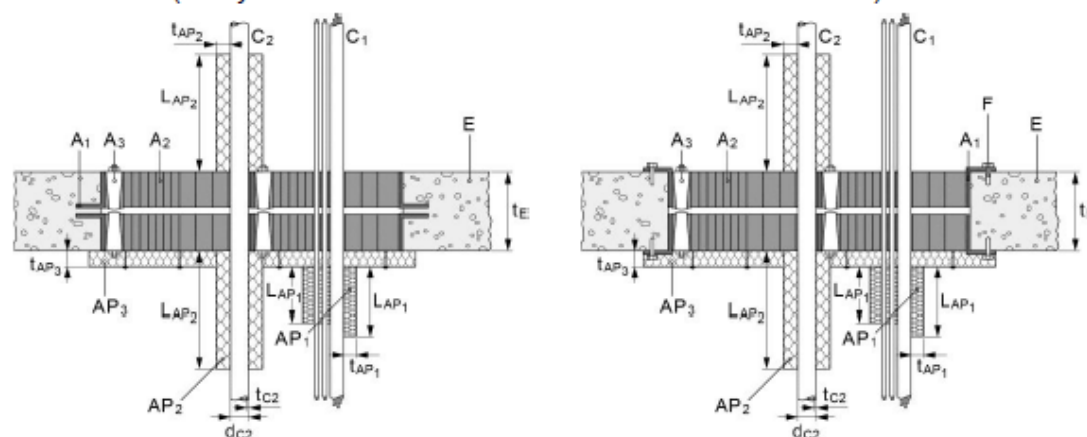


EI 180

### C.3.2.2 Cable penetration - System: CFS-T SBF

Maximum seal size: 504mm x 562mm (CFS-T SBF 8+8x4)

Construction details (for symbols and abbreviations see Annex A of the EAT):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>$\varnothing$ 21 mm                                                                                                                                                                                 | 30                                           | 300                                       | EI 180         |
| Medium cable group max.<br>$\varnothing$ 50 mm                                                                                                                                                                                | 30                                           | 300                                       | EI 180         |
| Large cable group max.<br>$\varnothing$ 80 mm                                                                                                                                                                                 | 30                                           | 300                                       | EI 120 / E 180 |

### C.3.2.3 Non-combustible pipe penetration - System: CFS-T SBF

Maximum seal size: 504 mm x 562 mm (CFS-T SBF 8+8x4)

| Pipe diameter<br>$d_{C2}$ (mm) | Pipe wall<br>thickness<br>$t_{C2}$ (mm) | Thickness of<br>pipe insulation<br>$t_{AP2}$ (mm) | Length of pipe<br>insulation<br>$L_{AP2}$ (mm) | Arrangement<br>pipe insulation | Classification           |
|--------------------------------|-----------------------------------------|---------------------------------------------------|------------------------------------------------|--------------------------------|--------------------------|
| 15 - 28                        | 1 - 14,2                                | $\geq 30$                                         | $\geq 400$                                     | LI                             | EI 120-C/U,<br>E 180-C/U |
| 28 - 54                        | 1/1,5 - 14,2                            | $\geq 30$                                         | $\geq 500$                                     | LI                             |                          |
| 15 - 28                        | 1 - 14,2                                | $\geq 30$                                         | -                                              | CI                             | EI 180                   |
| 28 - 54                        | 1/1,5 - 14,2                            | $\geq 30$                                         | -                                              | CI                             | EI 180                   |

## C.4 Penetration seal system Hilti CFS-T SBS and CFS-T SBSO in rigid walls and floors according to Annex C.1.1 of the ETA

Maximum distance for 1<sup>st</sup> service support: 420 mm.

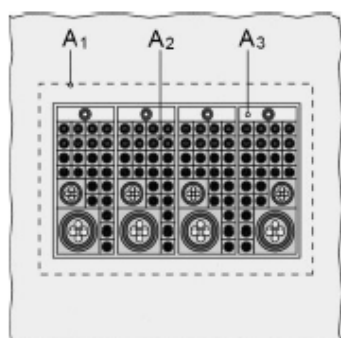
Maximum seal size: 595 x 347 mm (width x height).

Minimum distances in mm cable and metal pipe penetration seal:

|            |    |                                                                    |
|------------|----|--------------------------------------------------------------------|
| $s_1 =$    | 5  | (distance between cables and the side seal edge)                   |
| $s_3 =$    | 5  | (distance between cables and upper seal edge)                      |
| $s_6 =$    | 0  | (distance between the insulation of metal pipes and the seal edge) |
| $s_8 =$    | 0  | (distance between the insulation of metal pipes)                   |
| $s_{13} =$ | 90 | (distance between cables and metal pipes)                          |

The results are also valid for mixed penetration seals

Minimum distances in mm (see illustration of distances below):



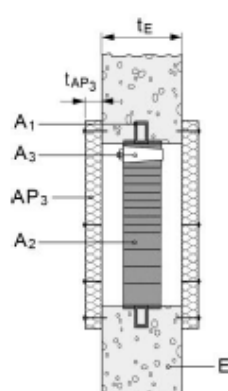
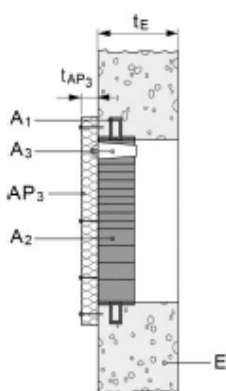
### C.4.1 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 200 mm

C.4.1.1 Blank seal (no services) - System: CFS-T SBS and CFS-T SBSO

Classification

- Single frame

Maximum seal size: 277 mm x 120 mm (CFS-T SBS and CFS-T SBSO 8x1),  
Construction details (for symbols and abbreviations see Annex A of the ETA):

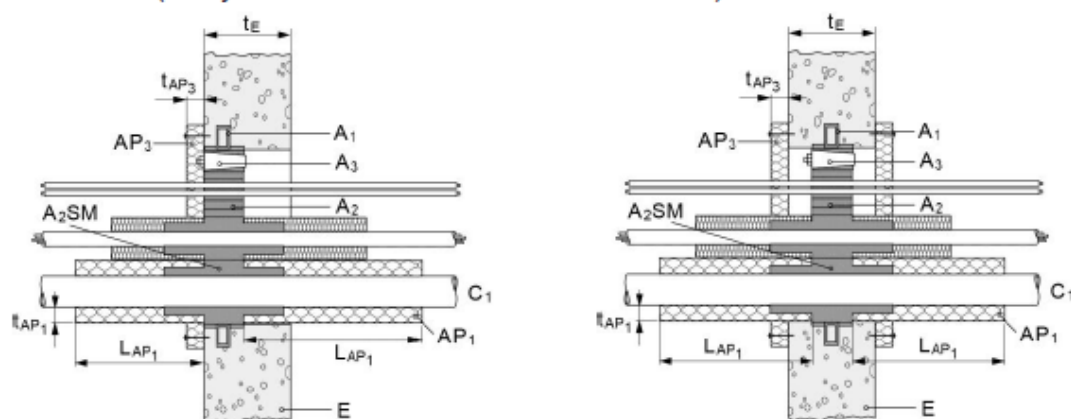


EI 120

#### C.4.1.2 Cable penetration - System: CFS-T SBS and CFS-T SBSO

Maximum seal size: 595 mm x 347 mm (CFS-T SBS and CFS-T SBSO 8x4)

Construction details (for symbols and abbreviations see Annex A):



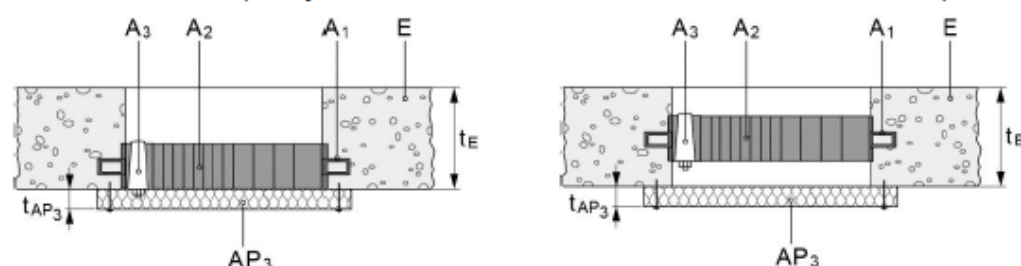
| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                   | Cable insulation<br>thickness $t_{AP1}$<br>(mm) | Cable insulation<br>length $L_{AP1}$ (mm) | Super module<br>(CFS-T SM)<br>$A_{2SM}$ | Classification |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------|-----------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables) with a diameter of: |                                                 |                                           |                                         |                |
| Small cable group max.<br>$\varnothing$ 13 mm                                                                                                                                                                                  | without                                         | without                                   | Without                                 | EI 120         |
| Small cable group max.<br>$\varnothing$ 21 mm                                                                                                                                                                                  | 30                                              | 300                                       | without                                 | EI 120         |
| Medium cable group<br>max. $\varnothing$ 50 mm                                                                                                                                                                                 | 30                                              | 300                                       | yes                                     | EI 120         |
| Large cable group max.<br>$\varnothing$ 80 mm                                                                                                                                                                                  | 30                                              | 300                                       | yes                                     | EI 120         |

## C.4.2 Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 150 mm

### C.4.2.1 Blank seal (no services) - System: CFS-T SBS and CFS-T SBSO

### Classification

Maximum seal size: 595 mm x 347 mm (CFS-T SBS and CFS-T SBSO 8x4),  
Construction details (for symbols and abbreviations see Annex A of the ETA):

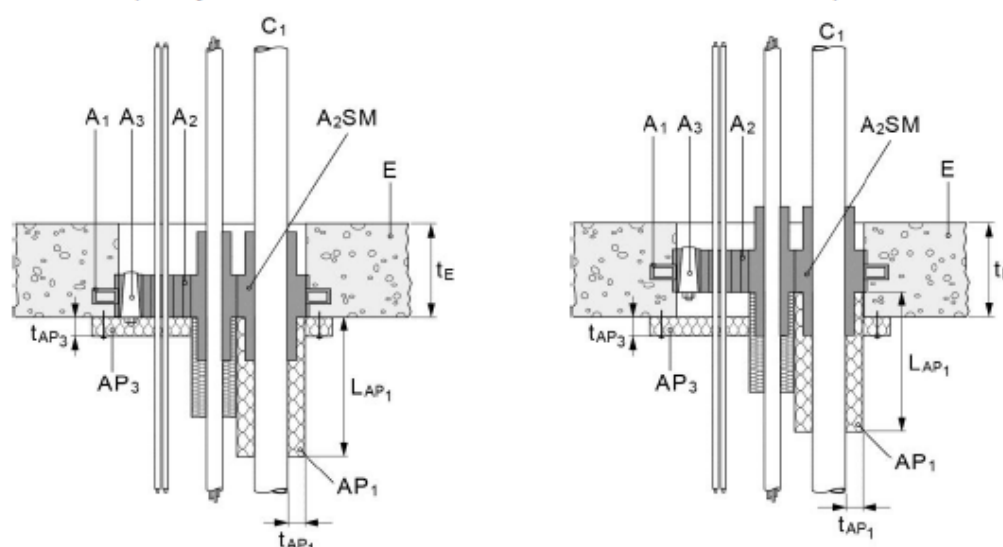


EI 120

### C.4.2.2 Cable penetration - System: CFS-T SBS and CFS-T SBSO

Maximum seal size: 595 mm x 347 mm (CFS-T SBS and CFS-T SBSO 8x4)

Construction details (for symbols and abbreviations see Annex A of the EAT):



Cable diameter  
 $C_1$  (mm)

Cable insulation  
thickness  $t_{AP1}$   
(mm)

Cable insulation  
length  $L_{AP1}$  (mm)

Super module  
(CFS-T SM)  
 $A_{2SM}$

### Classification

All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables) with a diameter of:

|                                    |         |         |         |        |
|------------------------------------|---------|---------|---------|--------|
| Small cable group max.<br>Ø 13 mm  | without | without | Without | EI 120 |
| Small cable group max.<br>Ø 21 mm  | 30      | 300     | without | EI 120 |
| Medium cable group<br>max. Ø 50 mm | 30      | 300     | yes     | EI 120 |
| Large cable group max.<br>Ø 80 mm  | 30      | 300     | yes     | EI 120 |

## C.5 Penetration seal system Hilti CFS-T RR and CFS-T RRS in rigid walls and floors according to Annex C.1.1 of the ETA

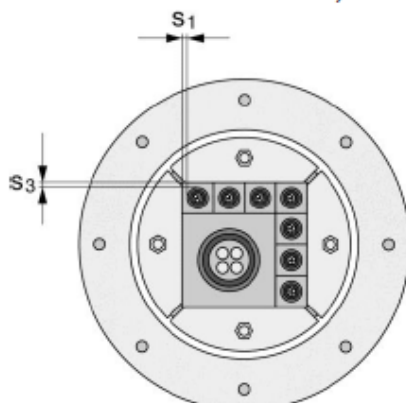
Maximum distance for 1<sup>st</sup> service support: 420 mm.

Maximum seal size: Ø 205mm (diameter).

Minimum distances in mm cable and metal pipe penetration seal:

|            |    |                                                                    |
|------------|----|--------------------------------------------------------------------|
| $s_1 =$    | 5  | (distance between cables and the side seal edge)                   |
| $s_3 =$    | 5  | (distance between cables and upper seal edge)                      |
| $s_6 =$    | 0  | (distance between the insulation of metal pipes and the seal edge) |
| $s_8 =$    | 0  | (distance between the insulation of metal pipes)                   |
| $s_{13} =$ | 90 | (distance between cables and metal pipes)                          |

Minimum distances in mm (see illustration of distances below):



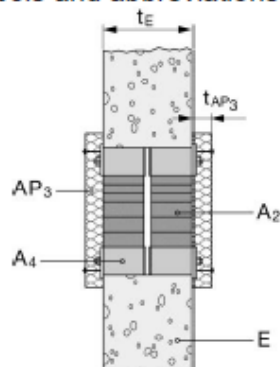
### C.5.1 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 150 mm

#### C.5.1.1 Blank seal (no services) - System: CFS-T RR

Maximum seal size: Ø 205 mm (CFS-T RR-200),

**Classification**

Construction details (for symbols and abbreviations see Annex A of the ETA):

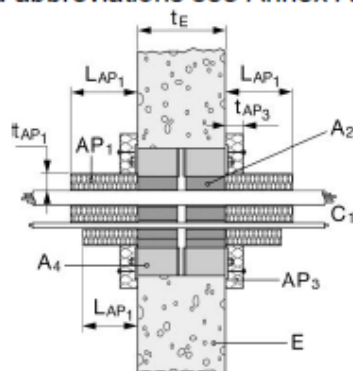


EI 180

### C.5.1.2 Cable penetration - System: CFS-T RR

Maximum seal size: Ø 205 mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex A of the ETA):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation<br>length $L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 250                                       | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 250                                       | EI 180         |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 250                                       | EI 120         |

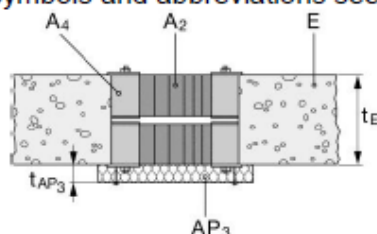
### C.5.2. Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 200 mm

#### C.5.2.1 Blank seal (no services) - System: CFS-T RR

Maximum seal size: Ø 205 mm (CFS-T RR-200),

Classification

Construction details (for symbols and abbreviations see Annex A of the ETA):

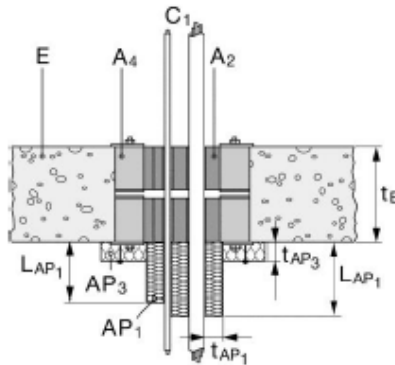


EI 180

### C.5.2.2 Cable penetration - System: CFS-T RR

Maximum seal size: Ø 205 mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex A of the ETA):



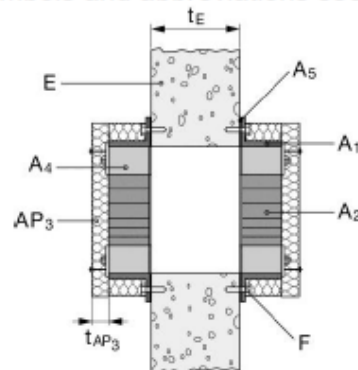
| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 300                                       | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 300                                       | EI 180         |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 300                                       | EI 180         |

### C.3.3 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 150 mm

C.3.3.1 Blank seal (no services) - System: CFS-T RR + CFS-T SLF

Maximum seal size: Ø 205 mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex A of the ETA):

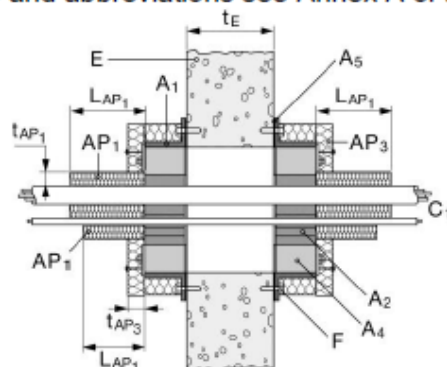


EI 180

### C.5.3.2 Cable penetration - System: CFS-T RR + CFS-T SLF

Maximum seal size: Ø 205 mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex A of the ETA):



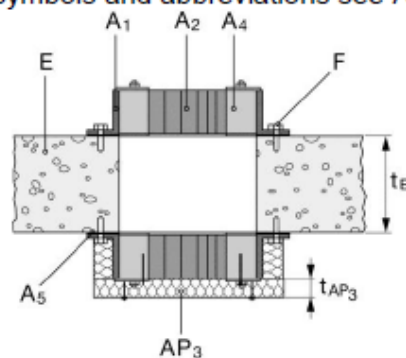
| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 150                                       | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 150                                       | EI 180         |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 150                                       | EI 180         |

### C.5.4 Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 200 mm

C.5.4.1 Blank seal (no services) - System: CFS-T RR + CFS-T SLF

Maximum seal size: Ø 205 mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex A of the ETA):

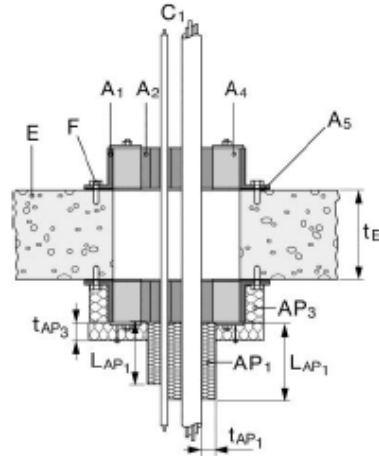


EI 180

#### C.5.4.2 Cable penetration - System: CFS-T RR + CFS-T SLF

Maximum seal size: Ø 205 mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex A of the ETA):



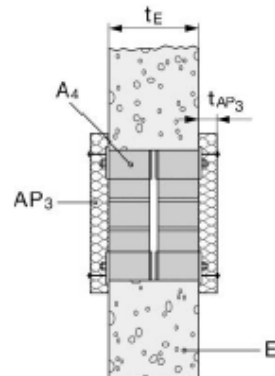
| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 250                                       | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 250                                       | EI 180         |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 250                                       | EI 180         |

#### C.5.5 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 150 mm

##### C.5.5.1 Blank seal (no services) - System: CFS-T RRS

Maximum seal size: Ø 103 mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):

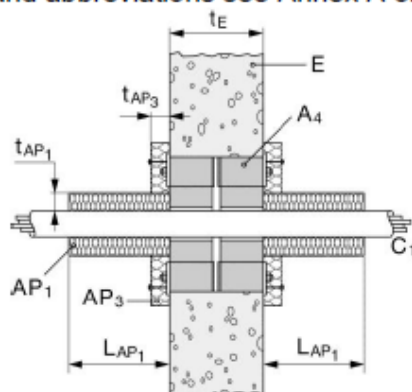


EI 180

### C.5.5.2 Cable penetration - System: CFS-T RRS

Maximum seal size: Ø 103 mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):



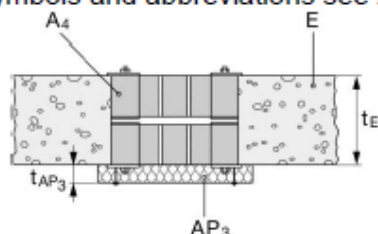
| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 250                                       | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 250                                       | EI 120 / E 180 |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 250                                       | EI 120 / E180  |

### C.5.6 Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 200 mm

C.5.6.1 Blank seal (no services) - System: CFS-T RRS

Maximum seal size: Ø103mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):

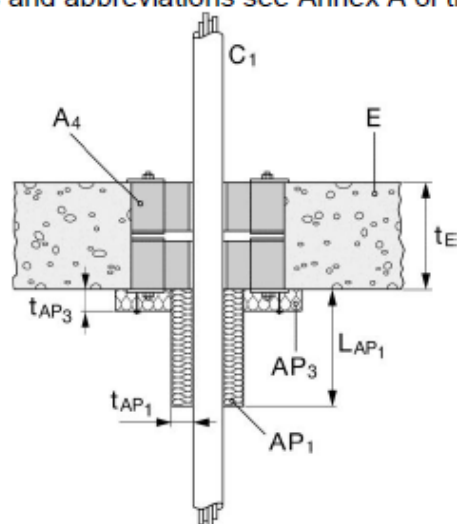


EI 180

### C.5.6.2 Cable penetration - System: CFS-T RRS

Maximum seal size: Ø 103 mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):



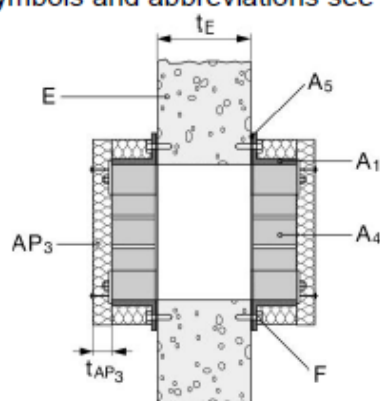
| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 300                                       | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 300                                       | EI 180         |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 300                                       | EI 180         |

### C.5.7 Rigid Walls according to Annex C.1.1 of the ETA – minimum wall thickness 150 mm

C.5.7.1 Blank seal (no services) - System: CFS-T RRS + CFS-T SLF

Maximum seal size: Ø103mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):

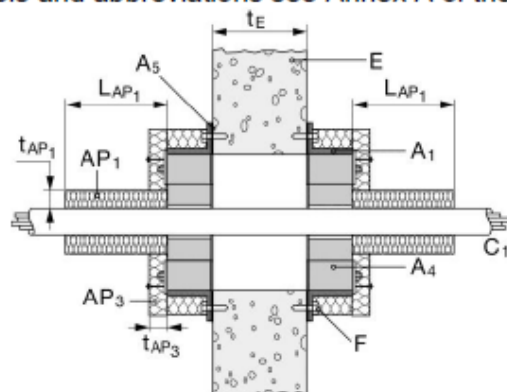


EI 180

### C.5.7.2 Cable penetration - System: CFS-T RRS + CFS-T SLF

Maximum seal size: Ø 103 mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):



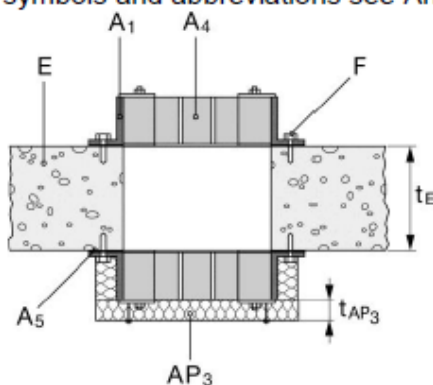
| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 150                                       | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 150                                       | EI 180         |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 150                                       | EI 180         |

### C.5.8 Rigid Floors according to Annex C.1.1 of the ETA – minimum floor thickness 200 mm

C.5.8.1 Blank seal (no services) - System: CFS-T RRS + CFS-T SLF

Maximum seal size: Ø 103 mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):

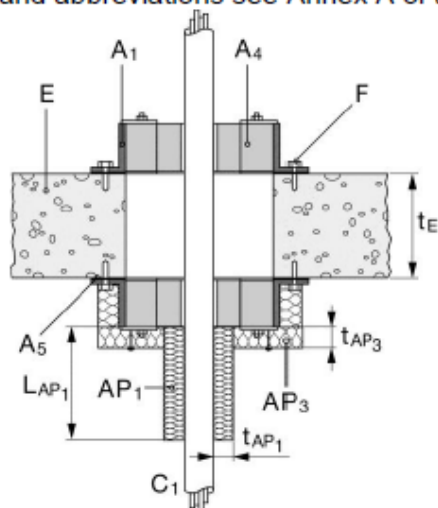


EI 180

### C.5.8.2 Cable penetration - System: CFS-T RRS + CFS-T SLF

Maximum seal size: Ø 103 mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex A of the ETA):



| Cable diameter<br>$C_1$ (mm)                                                                                                                                                                                                  | Cable insulation<br>thickness $t_{AP1}$ (mm) | Cable insulation length<br>$L_{AP1}$ (mm) | Classification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|----------------|
| All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of: |                                              |                                           |                |
| Small cable group max.<br>Ø 21 mm                                                                                                                                                                                             | 30                                           | 25                                        | EI 180         |
| Medium cable group max.<br>Ø 50 mm                                                                                                                                                                                            | 30                                           | 250                                       | EI 180         |
| Large cable group max.<br>Ø 80 mm                                                                                                                                                                                             | 30                                           | 250                                       | EI 180         |