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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA
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# European Technical Assessment

# ETA-14/0088
## of 14.03.2023

General part

| | |
|---|---|
| **Technical Assessment Body issuing the European Technical Assessment** | Österreichisches Institut für Bautechnik (OIB)<br>Austrian Institute of Construction Engineering |
| **Trade name of the construction product** | Hilti Firestop Module Box CFS-MB |
| **Product family to which the construction product belongs** | Fire Stopping and Fire Sealing Products: Penetration Seals |
| **Manufacturer** | Hilti AG<br>Feldkircherstrasse 100<br>9494 Schaan<br>LIECHTENSTEIN |
| **Manufacturing plant** | Hilti production plant 4a |
| **This European Technical Assessment contains** | 29 pages including Annexes A to D which form an integral part of this assessment. |
| **This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of** | European Assessment Document<br>EAD 350454-00-1104 “Fire stopping and fire sealing products - Penetration seals” |
| **This European Technical Assessment replaces** | European Technical Assessment ETA-14/0088 from 25.04.2014 |

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Content

Specific parts

## 1 Technical description of the product

"Hilti Firestop Module Box CFS-MB" is used as a cable penetration seal together with "Hilti Firestop Block CFS-BL P" and in some cases with "Hilti Firestop Foam CFS-F FX".

| Components | Characteristics |
|---|---|
| Hilti Firestop Module Box CFS-MB | A penetration seal made of two u-shaped halves, which form a box-shaped frame around penetrating services according Annex A 1 of the ETA. The frame is filled with the Hilti Firestop products mentioned below. |
| Hilti Firestop Block CFS-BL P | Brick-shaped block based on a pre-cured, pre-formed PU-based firestop material, see Annex A 2 of the ETA. |
| Hilti Firestop Foam CFS-F FX | Two-component, polyurethane based foam delivered in foil packs, see Annex A 3 of the ETA. |

| Additional Components | Characteristics |
|---|---|
| Hilti Firestop Filler CFS-FIL | Acrylic based firestop filler mastic, see Annex A 4 of the ETA |

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

### 2.1 Intended use

"Hilti Firestop Module Box CFS-MB" is intended to be used as a penetration seal to temporarily or permanently reinstate the fire resistance performance of flexible wall constructions, rigid wall constructions and rigid floor constructions as well as timber wall constructions ("Binderholz BBS XL") where they have been provided with apertures, which are penetrated by various cables, conduits, and plastic pipes. For more details see Annex B of this ETA.

The maximum opening size of the penetration seal in wall / floor constructions is 495 x 405 mm (cluster arrangement in walls / floors according to Annex B 1.1.a-c of the ETA) and 495 x 270 mm (cluster arrangement in timber walls according to Annex B 1.1.d of the ETA).

"Hilti Firestop Module Box CFS-MB" can only be used as penetration seal for cables, conduits and small pipes / tubes. Further details are given in Annex B 2 of the ETA. Other parts or service support constructions shall not penetrate the penetration seal.

"Hilti Firestop Module Box CFS-MB" can be installed only in types of separating elements as specified in Annex B table B 1.1.

### 2.2 Use conditions

"Hilti Firestop Module Box CFS-MB" is intended for use at temperatures below 0°C with exposure to UV, but with no exposure to rain and can therefore – according to EAD 350454-00-1104 clause 2.2.9.3.1 – be categorized as Type $Y_1$. Since the requirements for Type $Y_1$ are met, also the requirements for Type $Y_2$, $Z_1$ and $Z_2$ are fulfilled.

## 2.3 Working life

The provisions made in this European Technical Assessment are based on an assumed working life of "Hilti Firestop Module Box CFS-MB" of 25 years, provided the conditions laid down in the technical literature of the manufacturer relating to packaging, transport, storage, installation, use and repair are met.

The indications given on the intended working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body, but are to be regarded only as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

The real working life might be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for construction works.

## 2.4 General assumptions

It is assumed that

- damages to the penetration seal are repaired accordingly,
- the installation of the penetration seal does not affect the stability of the adjacent building element – even in case of fire,
- the lintel or floor above the penetration seal is designed structurally and in terms of fire protection such that no additional mechanical load (other than its own weight) is imposed on the penetration seal,
- the installations are fixed to the adjacent building element in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal,
- the support of the installations is maintained for the required period of fire resistance and
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

2.4.1 This European Technical Assessment does not address any risks associated with the emission of dangerous liquids or gases caused by failure of the pipe(s) in case of fire nor does it prove the prevention of the transmission of fire through heat transfer via the medium in the pipes.

2.4.2 This European Technical Assessment does not verify the prevention of destruction of adjacent building elements with fire separating function or of the pipes themselves due to distortion forces caused by extreme temperatures. These risks shall be accounted for by taking appropriate measures when designing or installing the works.

2.4.3 The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this European Technical Assessment (see EN 1366-3:2021, clause 1).

2.4.4 The durability assessment does not take into account the possible effect of the penetration seal of substances permeating through the pipe walls.

2.4.5 The assessment does not cover the avoidance of destruction of the penetration seal or the adjacent building element(s) by forces caused by temperature changes in case of fire. This has to be considered when designing the piping system.

## 2.5 Manufacturing

The European Technical Assessment is issued for the product on the basis of agreed data / information, deposited with the Österreichisches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data / information being incorrect, should be notified to the Österreichisches Institut für Bautechnik before the changes are introduced.

The Österreichisches Institut für Bautechnik will decide whether or not such changes affect the European Technical Assessment and consequently the validity of the CE marking on the basis of the European Technical Assessment and if so whether further assessment or alterations to the European Technical Assessment, shall be necessary.

## 3 Performance of the product and references to the methods used for its assessment

| Basic requirements for construction works | Essential characteristic | Method of verification | Performance |
|---|---|---|---|
| **BWR 2** | Reaction to fire | EN 13501-1: 2007+A1:2009 | Clause 3.1.1 of the ETA |
| | Resistance to fire | EN 13501-2:2016 | Clause 3.1.2 and Annex B 1 to B 4 of the ETA |
| **BWR 3** | Air permeability | No performance assessed | |
| | Water permeability | No performance assessed | |
| | Content, emission and/or release of dangerous substances | EN 16516:2020 | Clause 3.2.3 of the ETA |
| **BWR 4** | Mechanical resistance and stability | No performance assessed | |
| | Resistance to impact / movement | No performance assessed | |
| | Adhesion | No performance assessed | |
| | Durability | EAD 350454-00-1104 clause 2.2.9.3.1 | Clause 3.3.4 of the ETA |
| **BWR 5** | Airborne sound insulation | EN ISO 10140-1 and EN ISO 10140-2, EN ISO 717-1 | Clause 3.4.1 of the ETA |
| **BWR 6** | Thermal properties | No performance assessed | |
| | Water vapour permeability | No performance assessed | |

## 3.1 Safety in case of fire (BWR 2)

### 3.1.1 Reaction to fire

The components of “Hilti Firestop Module Box CFS-MB” were assessed according to EAD 350454-00-1104 clause 2.2.1 and classified according to EN 13501-1:2007+A1:2009.

| Component | Class according to EN 13501-1:2007+A1:2009 |
|---|---|
| Hilti Firestop Module Box CFS-MB | **E** |
| Hilti Firestop Block CFS-BL P | **E** |
| Hilti Firestop Foam CFS-F FX | **E** |
| Hilti Firestop Filler CFS-FIL | **E** |

### 3.1.2 Resistance to fire

“Hilti Firestop Module Box CFS-MB” was tested according to EAD 350454-00-1104 clause 2.2.2 and EN 1366-3:2009.

Based upon the gained test results and the field of application specified within EN 1366-3:2009 the penetration seal “Hilti Firestop Module Box CFS-MB” has been classified according to EN 13501-2:2016. The individual fire resistance classes are listed in Annex B 1 to B 4 of the ETA.

The maximum fire resistance class of the penetration seal in vertical or horizontal separating element depends on the fire resistance class of the penetrating elements. The fire resistance class of the penetration seal is reduced to the fire resistance class of the penetrating element with the lowest fire resistance classification.

## 3.2 Hygiene, health and the environment (BWR 3)

### 3.2.1 Air permeability

No performance assessed.

### 3.2.2 Water permeability

No performance assessed.

### 3.2.3 Content, emission and/or release of dangerous substances

The content of semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) in “Hilti Firestop Module Box CFS-MB” was assessed according to EN 16516. The loading factor for emission testing was 0,007 m²/m³ according to EAD 350454-00-1104.

The concentration of SVOC has been below 0,005 mg/m³ after 3 and after 28 days. The concentration of total emission of VOC after 3 days was 0,013 mg/m³, after 28 days the concentration was below 0,005 mg/m³.

## 3.3 Safety and accessibility in use (BWR 4)

### 3.3.1 Mechanical resistance and stability

No performance assessed.

3.3.2 Resistance to impact / movement

No performance assessed.

Provisions shall be taken to prevent a person from stepping onto a horizontal penetration seal or falling against a vertical penetration seal (e.g. by covering with a wire mesh).

3.3.3 Adhesion

No performance assessed.

3.3.4 Durability

All components of “Hilti Firestop Module Box CFS-MB” fulfil the requirements for the intended use condition.

“Hilti Firestop Module Box CFS-MB” is therefore appropriate for conditions at temperatures below 0°C with exposure to UV, but with no exposure to rain and can – according to EAD 350454-00-1104 clause 2.2.9.3.1 – be categorized as Type $Y_1$. Since the requirements for Type $Y_1$ are met, also the requirements for Type $Y_2$, $Z_1$ and $Z_2$ are fulfilled.

## 3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation

The airborne sound insulation of “Hilti Firestop Module Box CFS-MB” was tested according to EN ISO 10140-1 and EN ISO 10140-2. The rating of the sound insulation properties has been calculated in accordance with EN ISO 717-1.

The tested flexible wall element was a typical sound wall (double stud, double board, 2 x 12,5 mm each side, 155 mm thickness and filled with mineral wool insulation). “Hilti Firestop Module Box CFS-MB” (200 mm length) was tested as a blank seal and with cable penetration. It was filled with “Hilti Firestop Block CFS-BL P” and sealed with “Hilti Firestop Filler CFS-FIL”.
The resulting values for the airborne sound insulation in accordance with EN ISO 717-1:2013 are as follows:

| | **Rw (C; Ctr) [dB]** |
|---|---|
| Blank seal | 59 (-3;-5) |
| with cable penetration | 60 (-2;-6) |

## 3.5 Energy economy and heat retention (BWR 6)

3.5.1 Thermal properties

No performance assessed.

3.5.2 Water vapour permeability

No performance assessed.

## 4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to the Decision 1999/454/EC[1], amended by Decision 2001/596/EC[2] of the European Commission the system(s) of assessment and verification of constancy of performance (see Annex V of Regulation (EU) No 305/2011) is given in the following table.

| **Product(s)** | **Intended use(s)** | **Level(s) or class(es)** (resistance to fire) | **System** of assessment and verification of constancy of performance |
|---|---|---|---|
| Fire Stopping and Fire Sealing Products | for fire compartmentation and/or fire protection or fire performance | any | 1 |

In addition, according to the Decision 1999/454/EC, amended by Decision 2001/596/EC of the European Commission the system(s) of assessment and verification of constancy of performance, with regard to reaction to fire, is 3.

| **Product(s)** | **Intended use(s)** | **Level(s) or class(es)** (reaction to fire) | **System** of assessment and verification of constancy of performance |
|---|---|---|---|
| Fire Stopping and Fire Sealing Products | For uses subject to regulations on reaction to fire | A1*, A2*, B*, C* | 1 |
| | | A1**, A2**, B**, C**, D, E | 3 |
| | | (A1 to E)***, F | 4 |

* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)

** Products/materials not covered by footnote (*)

*** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of class A1 according to Commission Decision 96/603/EC, as amended)

[1] Official Journal of the European Communities no. L 178, 14.7.1999, p. 52
[2] Official Journal of the European Communities no. L 209, 2.8.2001, p. 33

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## 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

The notified product certification body shall visit the factory at least twice a year for surveillance of the manufacturer.

Issued in Vienna on 14.03.2023
by Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits
Managing Director

## ANNEX A - DESCRIPTION OF PRODUCT(S)

### A 1 Hilti Firestop Module Box CFS-MB

The half of a module box is moulded in U-shape. Two U-shapes fit together to build a box of approximately 130 mm in height, 160 mm in width and 200 mm in length. The “Hilti Firestop Module Box CFS-MB” half is used open (U shape) against a surface or as a box (2x U halves) free placed in dry walls or massive floors. Only in wood wall constructions the length was trimmed to wall thickness – details see Annex B.

### A 2 Hilti Firestop Block CFS-BL P

Blocks are made of polyurethane foam and are 200 x 130 x 50 mm in size.

### A 3 Hilti Firestop Foam CFS-F FX

Hilti Firestop Foam CFS-F FX is a flexible two component, polyurethane based foam delivered in foil pack of 330 ml. To applicate the foam typically the electrical dispenser HDE 500-A22 or the mechanical dispenser HDM 330 is used.

### A 4 Hilti Firestop Filler Mastic CFS-FIL

“Hilti Firestop Filler Mastic CFS-FIL” is available as a cartridge of 310 ml or as a foil pack of 580 ml or in a pail of 19 litres.
The Control Plan is defined in document "Control Plan relating to the European Technical Assessment ETA-21/0256 – Hilti Firestop Filler Mastic CFS-FIL", which is a non-public part of the ETA.
Suitable dispensers:
“Hilti CFS-DISP” (for 310 ml cartridge)
“Hilti CS 270-P1” (for 580 ml foil pack)
“Hilti CD 4-A22” (for 310 ml cartridge or 580 ml foil pack)

### A 5 Technical product literature

Technical data “Hilti Firestop Module Box CFS-MB” (including all ancillary products) see www.Hilti.group.

# ANNEX B - RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF HILTI FIRESTOP MODULE BOX CFS-MB

## B 1. General Information

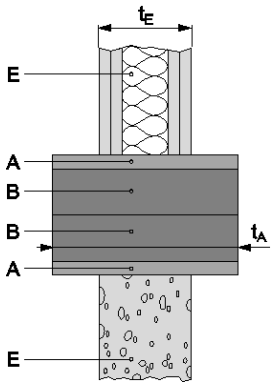
### B 1.1. Wall/floor constructions

| | Separating element | Construction | Maximum opening size of the penetration seal (width x height) |
|---|---|---|---|
| B 1.1. a | Flexible walls | > Steel studs or timber studs lined on both faces with minimum 2 layers of boards (minimum thickness 12,5 mm) according to EN 520 type F. Space between linings has not be filled with insulation but nevertheless has to be set-up according requirements<br>> For timber studs walls there must be a minimum distance of 100 mm of the penetration seal to any timber stud. The cavity between the penetration seal and stud has to be closed with minimum of 100 mm of insulation with classification A1 or A2 according to EN 13501-1<br>> Minimum thickness 100 mm | 495 x 405 mm |
| B 1.1. b | Rigid walls | > Aerated concrete, concrete, masonry<br>> Minimum density 550 kg/m³<br>> Minimum thickness 100 mm<br>> The rigid wall shall be classified in accordance with EN 13501-2 for the required fire resistance period | 495 x 405 mm |
| B 1.1. c | Rigid floors | > Aerated concrete, concrete<br>> Minimum density 550 kg/m³<br>> Minimum thickness 150 mm<br>> The rigid floor shall be classified in accordance with EN 13501-2 for the required fire resistance period | 495 x 405 mm |
| B 1.1. d | Timber walls | > “Binderholz BBS XL”<br>> Solid and engineered CLT or GluLam timber wall construction in accordance with EN 16351<br>> Minimum number of layers is 3<br>> The thickness of the first layer must be minimum 20 mm<br>> Minimum thickness of wall 80 mm / 100 mm<br>> The timber wall shall be classified in accordance with EN 13501-2 for the required fire resistance period<br>> For further details see Annex B 3 of the ETA | 505 x 265 mm / 340 x 400 mm |

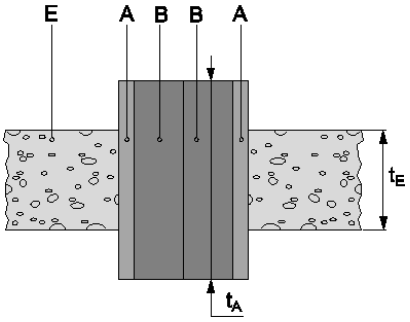
## B 1.2. Seal depths

The penetration seal depth in wall / floor constructions according to B 1.1 a), b) and c) is 200 mm ($t_A$).

Wall installation:



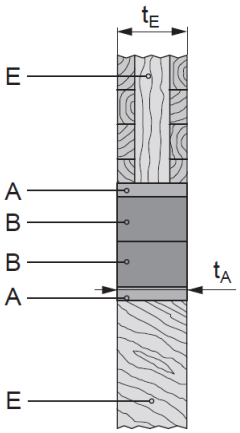

Floor installation:



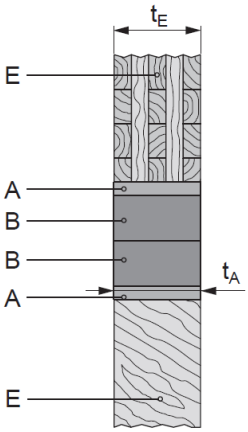

**Installation in timber wall constructions "Binderholz BBS XL":**

In timber wall constructions according to B 1.1 d) the module box ($t_A$) is trimmed to the respective wall thickness of ≥ 80 mm / ≥ 100 mm ($t_E$).

Timber wall 80:




Timber wall 100:




Front view:

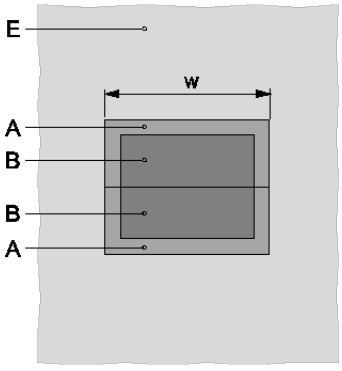



Figure 1: Position of the penetration seal in walls / floors, timber wall constructions

A – Hilti CFS-MB
B – Hilti Firestop product (CFS-F FX, CFS-BL P, CFS-FIL)
E – Building element (wall, floor construction)

$t_A$ – Thickness of seal
$t_E$ – Thickness of building element
w – Width of seal

## B 1.3. Maximum seal size

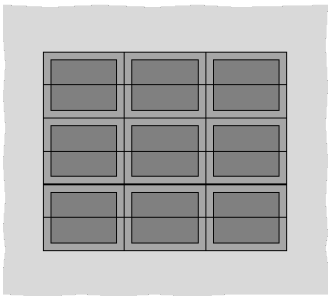
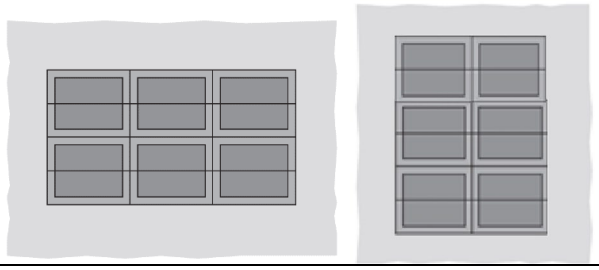
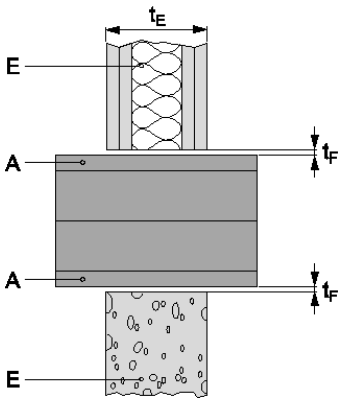
| Cluster arrangement | |
|---|---|
| For wall / floor constructions according to B 1.1 a), b) and c):<br>• Hilti Firestop Module Box can be used as half (1xA) or as box (two U halves; 2xA); boxes can be clustered, as shown in picture aside, halves should be clustered linear only.<br>• The maximum cluster is 3 x 3 boxes aside which cover an area of approximately 495 x 405 mm (width x height). |  |
| For timber wall constructions “Binderholz BBS XL” according to B 1.1 d):<br>• The maximum cluster is 6 boxes – 3 x 2 or 2 x 3 (505 x 265 or 340 x 400) |  |

Figure 2: Maximum seal size – cluster arrangements

## B 1.4. Installation of the Penetration seal

### B 1.4.1. Detailed installation

| | |
|---|---|
| For wall / floor constructions according to B 1.1 a), b) and c):<br>• Hilti Firestop Module Box CFS-MB (2xA) or its half (A) is put into a rectangular void of wall or floor; centred within wall/floor. In case only one half is used, the open side has to face a wall or floor.<br>• Box is installed in a way that the annular space ($t_F$) between wall / floor and box backside must not exceed 7,5 mm on each side (7,5 / 7,5). When the Box touches one side of the supporting construction, the opposite gap must not exceed 15 mm (0 / 15).<br>• Annular space is closed with Hilti Firestop Filler CFS-FIL or plaster. |  |

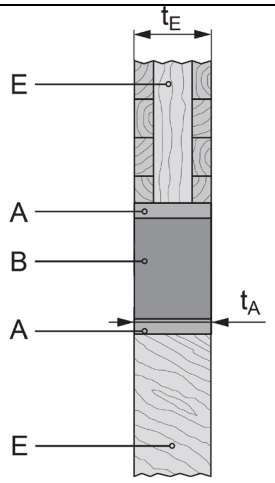
| | |
|---|---|
| For timber wall constructions “Binderholz BBS XL” according to B 1.1 d):<br><br>• Hilti Firestop Module Box CFS-MB (2xA) is put into a rectangular void of the wall; the box could be trimmed to wall thickness ( ≥ 80 mm)<br>• The annular space between wall and box ($t_F$) must not exceed 2 mm on each side (2 / 2). When the box touches one side of the wall construction, the opposite gap must not exceed 4 mm (0 / 4).<br>• Annular space is closed with Hilti Firestop Filler CFS-FIL or Hilti Firestop Foam CFS-F FX |  |

Figure 3: Annular space of the penetration seal

B 1.4.2. Sealing of services

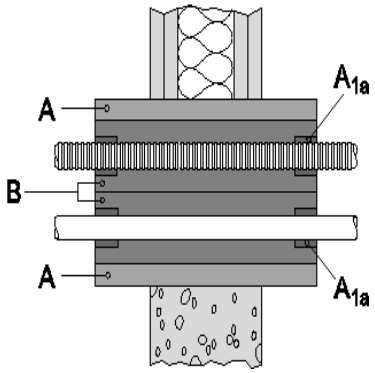
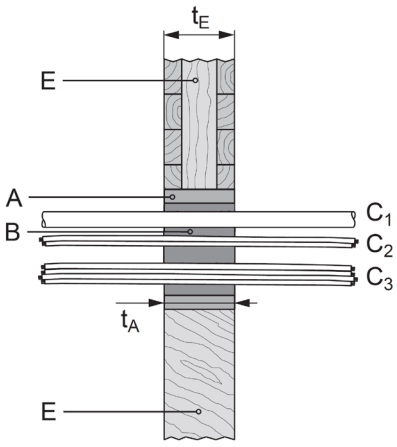
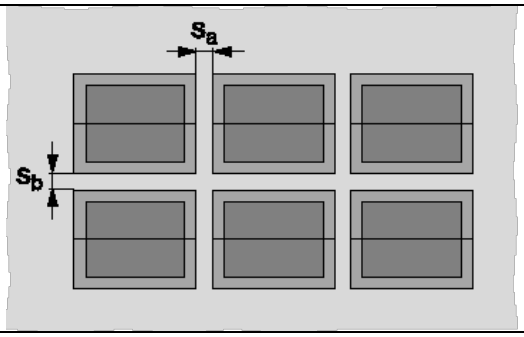
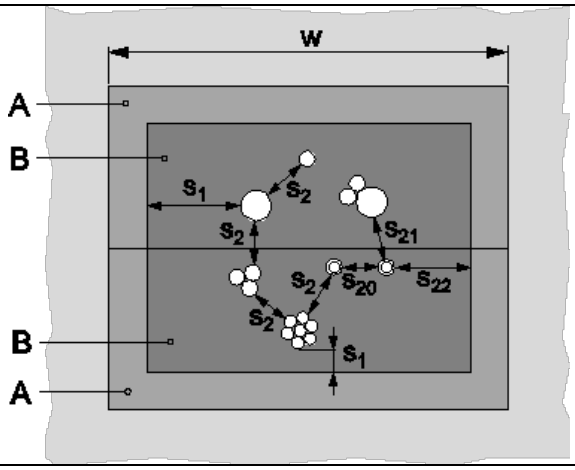
| | |
|---|---|
| For dry wall constructions according to B1.1 a):<br><br>• Gaps between services and Hilti Firestop Module Box CFS-MB (A) or blocks (B) are filled with Hilti Firestop Filler CFS-FIL ($A_{1a}$), depth 20 mm.<br>• In case Hilti Firestop Foam CFS-F FX is used instead of blocks to fill the module box cavity Hilti Firestop Filler CFS-FIL is not applied. |  |
| For timber wall constructions “Binderholz BBS XL” according to B 1.1 d):<br><br>• Hilti Firestop Foam CFS-F FX is used to fill the module box cavity fully or aside services.<br>• In cases where the box was completely filled with cable services Hilti Firestop Filler CFS-FIL can also be used to close voids/gaps from the ends. |  |

Figure 4: Sealing of services

B 1.4.3. Distance rules for cluster arrangement

| | |
|---|---|
| Minimum distances in mm (see illustration):<br><br>$S_a$ = 0 (distance between module boxes linear)<br>$S_b$ = 0 (distance between module boxes in cluster arrangement)<br><br>Valid for all supporting constructions |  |

B 1.4.4. Distance rules for installations in walls / floor constructions according to B 1.1 a), b), c)

| | |
|---|---|
| Minimum distances in mm (see illustration):<br><br>$s_1$ = 0 (distance between cables and box edge)<br>$s_2$ = 0 (distance between cables or bundles)<br>$s_{20,21,22}$ = 0 (conduits Ø ≤ 16 mm)<br>$s_{20}$ = 0 (conduits Ø > 16 mm; distance between conduits to each other)<br>$s_{22}$ = 10 (conduits Ø > 16 mm; distance between conduits to box edge)<br>$s_{21}$ = 20 (conduits Ø > 16 mm; distance of conduits to other services) |  |

B 1.4.5. Distance rules for installations in timber wall “Binderholz BBS XL” according to B 1.1 d

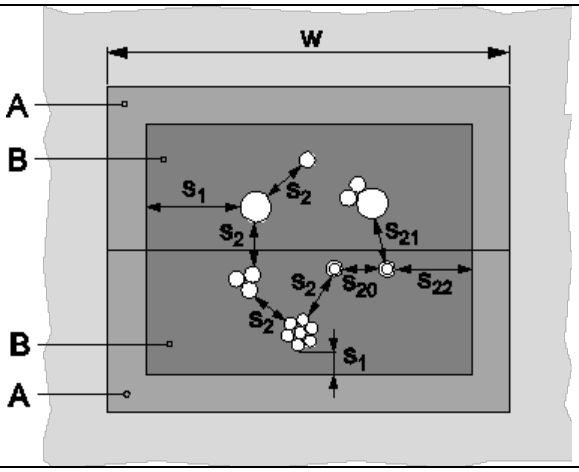
| | |
|---|---|
| Minimum distances in mm (see illustration):<br><br>$s_1$ = 0 (distance between cables and box edge)<br>$s_2$ = 0 (distance between cables or bundles)<br>$s_{20}$ = 0 (conduits / conduit – Ø ≤ 16 mm)<br>$s_{22}$ = 0 (conduits Ø ≤ 16 mm)<br>$s_{20}$ = 50 (conduits Ø > 16 mm; distance between conduits to each other)<br>$s_{22}$ = 0 (conduits Ø > 16 mm; distance to box edge) |  |

Figure 5: Distance rules

## B 2. Flexible or rigid walls according to Annex B 1.1 of the ETA - minimum wall thickness 100 mm

### B 2.1. Blank seal (no services) *

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

- Hilti Firestop Module Box (2xA full box or 1xA half box).
- Clustered up to 9 boxes in a rectangular manner (495 x 405 mm / width x height) – see B 1.3

- Hilti Firestop Module Box half (1xA), open side faced towards a surface (wall, floor); integration into wall/floor as for the complete box – see B 1.4.1

Size of the penetration seal:
- Box 160 x 130 mm (width x height)
- Half shell 160 x 70 mm (width x height)
- Linear clusters allowed

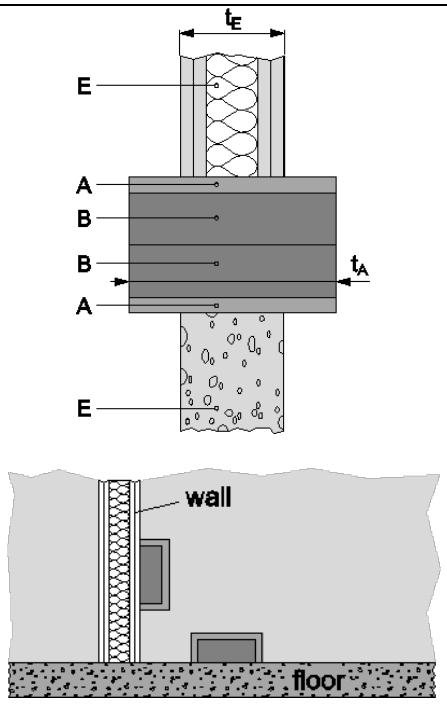



Figure 6: Blank seals in walls

**Classification:** EI 90

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

### B 2.2. Penetrating services in walls – 100 mm wall thickness

First support: Services shall be supported at maximum distance of 300 mm from both sides of wall

| Abbreviation | Description |
|---|---|
| A, $A_1$, $A_2$, ... | Firestop products:<br>A Hilti Firestop Module Box CFS-MB<br>$A_{1a}$ Hilti Firestop Filler CFS-FIL<br>B Hilti Firestop Block / Foam |
| $C_1$, $C_2$, $C_3$ | Penetrating services |
| E, $E_1$, $E_2$, … | Separating elements |
| $t_A$ | Thickness of penetration seal |
| $t_E$ | Thickness of supporting construction |

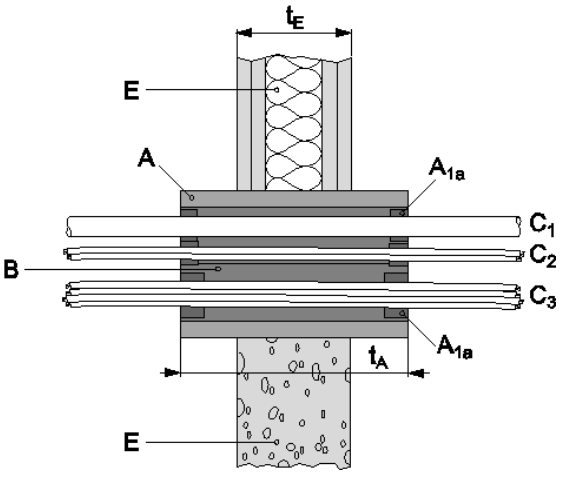



Figure 7: Penetrating services in walls

B 2.2.1. Cables

| Construction details:<br>• Hilti Firestop Module Box (2xA or 1xA), seal thickness $t_A$ = 200 mm<br>• Centered regarding to thickness of wall (E);<br>• Abbreviations see figure 7 ($C_2$, $C_3$)<br>• Filler: $A_{1a}$ | | |
|---|---|---|
| All types of cables currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, without cable supports) | | |
| All sheathed cable: | **Box Insert** | **Classification** |
| Ø ≤ 21 mm | CFS-BL P /<br>CFS-F FX | EI 90 / E 120 |
| 21 ≤ Ø ≤ 50 mm | CFS-BL P /<br>CFS-F FX | EI 90 / E 120 |
| Tied cable bundle ≤ Ø 100 mm;<br>Ø single cable ≤ 21 mm; | CFS-BL P /<br>CFS-F FX | EI 90 / E 120 |
| 100% filled penetration with<br>Ø single cables ≤ 21 mm | (only smoke tight with<br>CFS-FIL) | EI 90 / E 120 |
| Non-sheathed cables (wires) Ø ≤ 24 mm | CFS-BL P /<br>CFS-F FX | EI 30 / E 120 |

B 2.2.2. Small conduits and tubes

| Construction details:<br>• Illustration figure 7<br>• Services: $C_1$<br>• Filler: $A_{1a}$ | | |
|---|---|---|
| Ø ≤ 16 mm, wall thickness ≥ 1 mm, arranged linear or clustered, with or without cables, without cable supports, minimum distance to each other = 0 mm | | |
| | **Box Insert** | **Classification** |
| Plastic conduits / pipes and tubes | CFS-BL P /<br>CFS-F FX | EI 90 / E 120 U/U |
| Steel conduits / pipes and tubes | | EI 90 / E 120 C/U |

B 2.2.3. Conduits

| Construction details:<br>• Illustration figure 7<br>• Services: $C_1$<br>• Filler: $A_{1a}$<br>• Wall thickness of rigid conduits:<br>PO: 1,20 – 2,30 mm<br>PVC: 1,80 – 2,00 mm | | | | | |
|---|---|---|---|---|---|
| | | Diameter [mm] | | **Box Insert** | **Classification** |
| | | PO | PVC | | |
| Flexible Conduits | with and without cable | 16 – 32 | 16 – 32 | CFS-BL P /<br>CFS-F FX | EI 90 / E 120 U/U |
| Rigid Conduits | | 16 – 32 | 16 – 32 | | |
| Bundle of rigid or flexible conduits;<br>Ø of single conduits ≤ 32 mm | | ≤ 100 | | | |
| PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride | | | | | |

B 2.2.4. Waveguides (coaxial)

| Construction details:<br>• Illustration figure 7<br>• Services: $C_1$<br>• Filler: $A_{1a}$ | | |
|---|---|---|
| Waveguides (coaxial): 27,8 mm ≤ Ø ≤ 59,9 mm | **Box Insert** | **Classification** |
| RFS Cellflex LCF 78-50 JA Ø 27,8 mm<br>RFS Cellflex LCF 214-50 J Ø 59,9 mm<br>RFS Heliflex HCA 78-50 JFNA Ø 28,0 mm<br>RFS Heliflex HCA 158J Ø 59,9 mm<br>RFS Radialflex RLKW 78-50 Ø 28,5 mm<br>RFS Radialflex RLKU 158-50 JFLA Ø 48,2 mm | CFS-BL P /<br>CFS-F FX | EI 90 / E120 U/C |

B 2.2.5. Air conditioning – clima split application

| Module box two halves (2xA) or one half (1xA) | **Box Insert** | **Classification** |
|---|---|---|
| • Sangi twin copper pipe12/6 mm x 1,0 mm<br>• pre-insulated by PE insulation of 9mm thickness (Ø 30 or 24 mm)<br>• plastic condenser tube Ø 24 mm x 4,3mm (Rehau Rauflame-E, flex PVC)<br>• electrical lines: two lines, each 5 x 1,5 mm²<br>all services are bundled together with no distance in between | CFS-BL P | EI 90 / E120 |

## B 3. Timber walls “Binderholz BBS XL” according to Annex B 1.1. d

### B 3.1. Timber walls – 80 mm wall thickness

B 3.1.1. Blank seal (no services)*

Construction details:

- Hilti Firestop Module Box (2xA full box).
- Box insert: Hilti Firestop Foam CFS-F FX
- Clustered up to 2 x 3 or 3 x 2 boxes – see B 1.3

- For integration into wall – see B 1.4

for symbols and abbreviations see Annex D

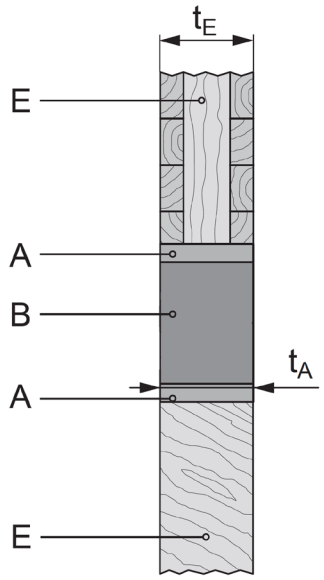



Figure 8: Blank seals in timber wall 80

**Classification:** EI 60 / E 60

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

B 3.1.2. Penetrating services in timber walls – ≥ 80 mm wall thickness

First support: Services shall be supported at maximum distance of 350 mm from both sides of wall

| Abbreviation | Description |
|---|---|
| A, $A_1$, $A_2$, ... | Firestop products:<br>A Hilti Firestop Module Box CFS-MB<br>B Hilti Firestop Foam CFS-F FX |
| $C_1$, $C_2$, $C_3$ | Penetrating services<br>$C_1$ Conduits (with / without cables)<br>$C_{2,3}$ cable; cable bundle |
| E, $E_1$, $E_2$, … | Separating elements |
| $t_A$ | Thickness of penetration seal |
| $t_E$ | Thickness of supporting construction |

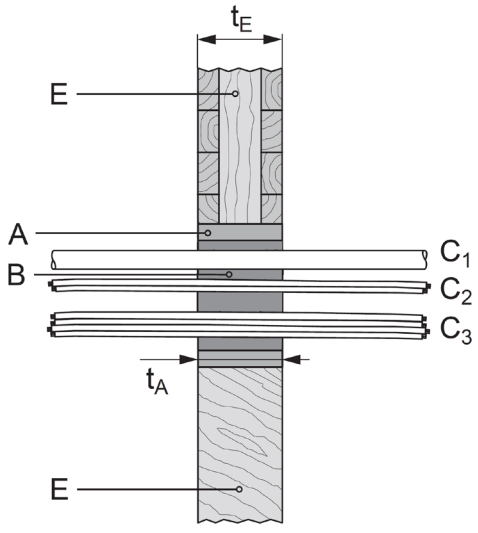



Figure 9: Penetrating services in timber wall 80

B 3.1.2.1. Conduit

| |
|---|
| Construction details:<br>• Hilti Firestop Module Box (2xA), seal thickness $t_A$ = 80 mm<br>• Flush to the wall (E);<br>• Abbreviations see figure 7 ($C_2$, $C_3$) |
| All types of cables currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, without cable supports) |

| All sheathed cable: | **Box Insert** | **Classification** |
|---|---|---|
| Tied cable bundle ≤ Ø 125 mm;<br>Ø single cable ≤ 21 mm; | CFS-FIL | EI 45 / E 60 |
| 100% filled penetration with<br>Ø single cables ≤ 21 mm | CFS-FIL | EI 45 / E 60 |

B 3.1.2.2. Small conduits and tubes

| |
|---|
| Construction details:<br>• Illustration figure 9<br>• Services: $C_1$<br>• Filler: $A_{1a}$ |
| Ø ≤ 16 mm, wall thickness ≥ 1 mm, arranged linear or clustered, with or without cables, without cable supports, minimum distance to each other = 0 mm |

| | **Box Insert** | **Classification** |
|---|---|---|
| Plastic conduits / pipes and tubes | CFS-F FX | EI 60 / E 60 U/C |

B 3.1.2.3. Conduits > 16 mm

Construction details:
- Illustration figure 9
- Services: $C_1$
- CFS-F FX: B

- Wall and wave thickness of flexible PO conduits:

S: wall thickness; $W_d$: Wave thickness;
PO: Polyolefin

| Ø | S | $W_d$ |
|---|---|---|
| 16 | 0,2 | 5,9 |
| 25 | 0,2 | 6,5 |
| 32 | 0,2 | 7,5 |
| 50 | 0,2 | 10,5 |

| | | PO Diameter [mm] | **Box Insert** | **Classification** |
|---|---|---|---|---|
| Flexible Conduits | with and without cable | 16 – 25 | CFS-F FX | EI 60 / E 60 U/C |
| Flexible Conduits | with and without cable | 16 – 50 | | |
| Bundle of flexible conduits; Ø of single conduits ≤ 25 mm | with and without cable | ≤ 100 | | |
| Bundle of flexible conduits; Ø of single conduits ≤ 50 mm | with and without cable | | | |

## B 3.2. Timber walls – 100 mm wall thickness

B 3.2.1. Blank seal (no services)*

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

- Hilti Firestop Module Box (2xA full box).
- Clustered up to 2 x 3 or 3 x 2 boxes – see B 1.3
- Box insert: Hilti Firestop Foam CFS-F FX

- For integration into wall – see B 1.4

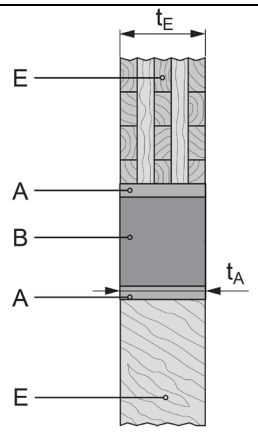



Figure 10: Blank seals in timber wall 100

**Classification:** EI 60 / EI 90

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

B 3.2.2. Penetrating services in timber walls – 100 mm wall thickness

First support: Services shall be supported at maximum distance of 350 mm from both sides of wall

| Abbreviation | Description |
|---|---|
| A, $A_1$, $A_2$, ... | Firestop products:<br>A Hilti Firestop Module Box CFS-MB<br>B Hilti Firestop Foam CFS-F FX |
| $C_1$, $C_2$, $C_3$ | Penetrating services<br>$C_1$ Conduits (with / without cables)<br>$C_{2,3}$ cable; cable bundle |
| E, $E_1$, $E_2$, … | Separating elements |
| $t_A$ | Thickness of penetration seal |
| $t_E$ | Thickness of supporting construction |

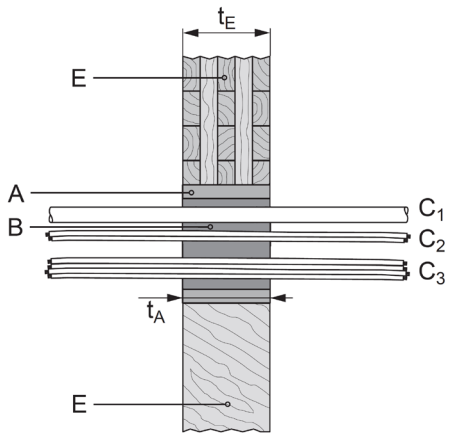



Figure 11: Penetrating services in timber wall 100

B 3.2.2.1. Cables

Construction details:
- Hilti Firestop Module Box (2xA), seal thickness $t_A$ = 100 mm
- Flush to the wall (E);
- Abbreviations see figure 7 ($C_2$, $C_3$)
- Filler: $A_{1a}$

All types of cables currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, without cable supports)

| All sheathed cable: | Box Insert | Classification |
|---|---|---|
| Ø ≤ 21 mm | CFS-F FX | EI 60 / E 90 |
| Tied cable bundle ≤ Ø 125 mm;<br>Ø single cable ≤ 21 mm; | CFS-F FX | EI 60 / E 90 |
| 100% filled penetration with<br>Ø single cables ≤ 21 mm | CFS-FIL | EI 60 / E 90 |

B 3.2.2.2. Small conduits and tubes

Construction details:
- Illustration figure 11
- Services: $C_1$
- Filler: $A_{1a}$

Ø ≤ 16 mm, wall thickness ≥ 1 mm, arranged linear or clustered, with or without cables, without cable supports, minimum distance to each other = 0 mm

| | Box Insert | Classification |
|---|---|---|
| Plastic conduits / pipes and tubes | CFS-F FX | EI 60 / E 90 U/C |

B 3.2.2.3. Conduits

<table>
<tr><td colspan="2">Construction details:<br>• Illustration figure 11<br>• Services: $C_1$<br><br>Annular space sealing of box see B 1.4</td><td colspan="4">• Wall and wave height of flexible PO conduits:<br><br>S: wall thickness; $W_d$: Wave thickness; PO: Polyolefin<br><table><tr><th>Ø of conduit</th><th>S</th><th>$W_d$</th></tr><tr><td>16</td><td>0,2</td><td>5,9</td></tr><tr><td>25</td><td>0,2</td><td>6,5</td></tr><tr><td>32</td><td>0,2</td><td>7,5</td></tr><tr><td>50</td><td>0,2</td><td>10,5</td></tr></table></td></tr>
<tr><td colspan="2"></td><td>Box Insert</td><td>PO Diameter [mm]</td><td colspan="2">Classification</td></tr>
<tr><td>Flexible / Rigid Conduits</td><td rowspan="2">with and without cable</td><td rowspan="2">CFS-F FX</td><td>16 – 50</td><td colspan="2">EI 60 / E 90 U/C</td></tr>
<tr><td>Bundle of flexible conduits; Ø of single conduits ≤ 50 mm</td><td>≤ 100</td><td colspan="2">EI 60 / E 90 U/C</td></tr>
</table>

## B 4. Floor according to Annex B 1.1.c of the ETA

### B 4.1. Blank seal (no services)* floors – 150 mm floor thickness

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

- Hilti Firestop Module Box (2xA full box).
- Clustered up to 9 boxes in a rectangular manner) – see B 1.3
- Hilti Firestop Module Box half (1xU shape, 1xA), open side faced towards a surface (wall, floor); integration into wall / floor as for the complete box (B 1.4.1).
- Box insert: CFS-BL P, CFS-F FX

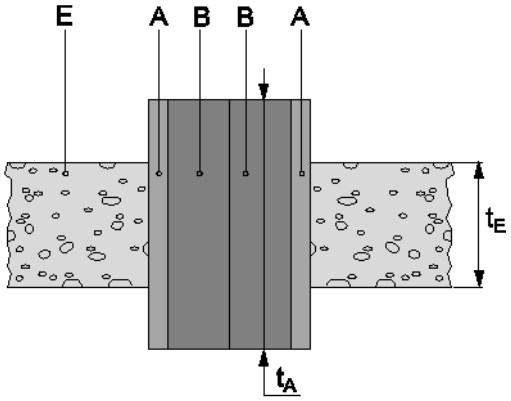



Figure 12: Blank seals in floors

**Classification:** EI 90

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

### B 4.2. Penetrating services in floors – 150 mm floor thickness

First support: Services shall be supported at maximum distance of 300 mm from top side of the floor

| Abbreviation | Description |
|---|---|
| A, $A_1$, $A_2$, ... | Firestop products:<br>A Hilti Firestop Module Box CFS-MB<br>$A_{1a}$ Hilti Firestop Filler CFS-FIL<br>B Hilti Firestop Foam CFS-F FX |
| $C_1$, $C_2$, $C_3$ | Penetrating services<br>$C_1$ Conduits (with / without cables)<br>$C_{2,3}$ cable; cable bundle |
| E, $E_1$, $E_2$, … | Separating elements |
| $t_A$ | Thickness of penetration seal |
| $t_E$ | Thickness of supporting construction |

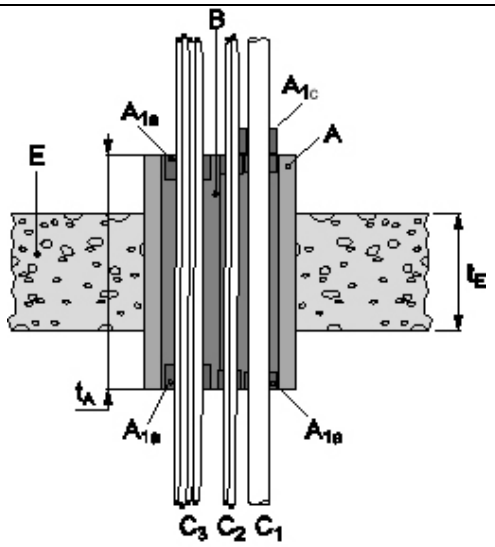



Figure 13: Penetrating services in floors

B 4.2.1. Cables

Construction details:
- Hilti Firestop Module Box (2x U shapes; 2xA); Seal thickness $t_A$ = 200 mm, centered to floor (E).
- Hilti Firestop Module Box Half (1xU shape - 1xA); open side facing surface; seal thickness $t_A$ = 200 mm, centered to floor (E).
- Services see figure 13 ($C_2$,$C_3$)
- Filler: $A_{1a}$
- Filler coating: $A_{1c}$

All types of cables currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, without cable supports)

| | | **Classification** | |
|---|---|---|---|
| All sheathed cable: | **Box insert** | | Filler coating (additional insulation) |
| Ø ≤ 21 mm | CFS-BL P | EI 90 / E 120 | --- |
| | CFS-F FX | EI 90 / E 120 | --- |
| 21 ≤ Ø ≤ 50 mm | CFS-BL P | EI 60 / E 120 | EI 90 (50 mm in length coated with filler) |
| | CFS-F FX | EI 60 / E 120 | EI 90 (100 mm in length coated with CFS-F FX) |
| Tied cable bundle ≤ Ø 100 mm; Ø single cable ≤ 21 mm; | CFS-F FX, CFS-BL P | EI 90 / E 120 | --- |
| 100% filled penetration with Ø single cables ≤ 21 mm | (only smoke tight with CFS-FIL) | EI 90 / E 120 | --- |
| Non-sheathed cables (wires) Ø ≤ 24 mm | CFS-F FX, CFS-BL P | EI 30 / E 120 | --- |

B 4.2.2. Small conduits and tubes

Construction details:
- Illustration figure 13
- Services: $C_1$
- Filler: $A_{1a}$

Ø ≤ 16 mm, wall thickness ≥ 1 mm, arranged linear or clustered, with or without cables, without cable supports, minimum distance to each other = 0 mm

| | **Box Insert** | **Classification** |
|---|---|---|
| Plastic conduits / pipes and tubes | CFS-BL P / CFS-F FX | EI 90 / E 120 U/U |
| Steel conduits / pipes and tube | | EI 90 / E 120 C/U |

B 4.2.3. Conduits

Construction details:
- Illustration figure 13
- Services: $C_1$
- Filler: $A_{1a}$
- Wall thickness of rigid conduits:
  PO: 1,55 – 2,30 mm
  PVC: 1,90 – 2,80 mm

| | | Diameter [mm] | | Box Insert | Classification |
|---|---|---|---|---|---|
| | | PO | PVC | | |
| Flexible Conduits | with and without cable | 16 – 32 | 16 – 32 | CFS-BL P / CFS-F FX | EI 90 / E 120 U/U |
| Rigid Conduits | with and without cable | 16 – 32 | 16 – 32 | | |
| Bundle of rigid or flexible conduits; Ø of single conduits ≤ 32 mm | with cable | ≤ 100 | | | |
| | without cable | | | | |
| PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride | | | | | |

B 4.2.4. Waveguides (coaxial)

Construction details:
- Illustration figure 13
- Services: $C_1$
- Filler: $A_{1a}$

| Waveguides (coaxial): 27,8 mm ≤ Ø ≤ 59,9 mm | Box Insert | Classification |
|---|---|---|
| RFS Cellflex LCF 78-50 JA Ø 27,8 mm<br>RFS Cellflex LCF 214-50 J Ø 59,9 mm<br>RFS Heliflex HCA 78-50 JFNA Ø 28,0 mm<br>RFS Heliflex HCA 158J Ø 59,9 mm<br>RFS Radialflex RLKW 78-50 Ø 28,5 mm<br>RFS Radialflex RLKU 158-50 JFLA Ø 48,2 mm | CFS-BL P / CFS-F FX | EI 90 / E 120 U/C |

B 4.2.5. Air conditioning – clima split application

| Modulbox two halves (2xA) or one half (1xA) | Box Insert | Classification |
|---|---|---|
| • Sangi twin copper pipe 12/6 mm x 1,0 mm pre-insulated by PE insulation of 9mm thickness (Ø 30 or 24 mm)<br>• Plastic condenser tube Ø 24 mm x 4,3mm (Rehau Rauflame-E, flex PVC)<br>• electrical lines: two lines, each 5 x 1,5 mm²<br>all services are bundled together with no distance in between | CFS-BL P | EI 90 / E120 |

## ANNEX C - REFERENCE DOCUMENTS

| | |
|---|---|
| EN 520 | Gypsum plasterboards - Definitions, requirements and test method |
| EN 1366-3 | Fire resistance tests for service installations - Part 3: Penetration seals |
| EN 13501-1 | Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests |
| EN 13501-2 | Fire classification of construction products and building elements – Part 2: Classification using test data from fire resistance tests |
| EN 16351 | Timber structures - Cross laminated timber - Requirements |
| EN 16516 | Construction products: Assessment of release of dangerous substances – Determination of emissions into indoor air |
| EN ISO 10140-1 | Acoustics; Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products |
| EN ISO 10140-2 | Acoustics; Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation |
| EN ISO 717-1 | Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation |

## ANNEX D - ABBREVATIONS USED IN DRAWINGS

| Abbreviation | Description |
|---|---|
| A, $A_1$, $A_2$,.. | Hilti Firestop Module Box CFS-MB |
| B | Hilti Firestop Product (CFS-F FX, CFS-BL P, CFS-FIL) |
| C, $C_1$, $C_2$,.. | Penetrating services |
| E, $E_1$, $E_2$,… | Building elements (wall, floor) inclusive framing/beading etc. |
| h | Height of penetration seal |
| $s_1$, $s_2$, $s_n$ | Distances |
| $t_A$ | Thickness of penetration seal |
| $t_E$ | Thickness of the building element |
| $t_F$ | Annular space between wall and box |
| w | Width of penetration seal |