



Österreichisches Institut für Bautechnik
Schenkenstrasse 4 | 1010 Vienna | Austria
T +43 1 533 65 50 | F +43 1 533 64 23
mail@oib.or.at | www.oib.or.at



European technical approval

ETA-13/0099

(English language translation, the original version is in German language)

Handelsbezeichnung
Trade name

**Hilti Brandschutzstein CFS-BL,
Hilti Brandschutzfüller CFS-FIL,
Hilti Brandschutzbandage CFS-P BA**
Hilti Firestop Block CFS-BL,
Hilti Firestop Filler CFS-FIL,
Hilti Firestop Putty Bandage CFS-P BA

Zulassungsinhaber
Holder of approval

Hilti AG
Feldkircherstrasse 100
9494 Schaan
Liechtenstein

Zulassungsgegenstand
und Verwendungszweck

**Brandschutzsystem Stein für die Verwendung in
Abschottungen**

*Generic type and use of
construction product*

Firestop Kit for use in penetration seals

Geltungsdauer vom
Validity from
bis
to

15.04.2013

14.04.2018

Herstellwerk
Manufacturing plant

Hilti Werk 4a

Diese Europäische
technische Zulassung umfasst
*This European technical
approval contains*

26 Seiten inklusive 16 Anhängen

26 pages including 16 Annexes



European Organisation for Technical Approvals
Europäische Organisation für Technische Zulassungen
Organisation Européenne pour l'Agrément Technique

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Österreichisches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products 1 modified by Council Directive 93/68/EEC 2 and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - Bauproduktengesetz. LGBl. V Nr. 33/1994;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁴;
 - Guideline ETAG 026 for European technical approval of Firestopping and Firesealing Products: Part 2: Penetration Seals.
- 2 The Österreichisches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant(s). Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Österreichisches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Österreichisches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated in EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities N° L 40, 11.2.1989, p. 12

² Official Journal of the European Communities N° L 220, 30.8.1993, p. 1

³ Official Journal of the European Union N° L 284, 31.10.2003, p.1

⁴ Official Journal of the European Communities N° L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product(s) and intended use

1.1 Definition of the construction product

This European technical approval refers to firestop block kit comprising firestop blocks (designated Hilti Firestop Block CFS-BL) and filler (designated Hilti Firestop Filler CFS-FIL) used to seal penetrations. In some cases a firestop putty bandage (designated Hilti Firestop Putty Bandage CFS-P BA) is used in addition (for details see Annex 2).

Hilti Firestop Block CFS-BL is provided in a brick like form. Hilti Firestop Filler CFS-FIL is an intumescent mastic available in cartridge or foil pack. Hilti Firestop Putty Bandage CFS-P BA is delivered as a 3 mm thick and 100 mm wide bandage available in form of a roll. For a description of the installation procedure of the firestop block kit see 4.3.

1.2 Intended use

Hilti firestop block kit components are intended to form or form part of a penetration seal which is used to maintain the fire resistance of a separating element (wall or floor) when and where services pass through.

Annex 2 gives details of penetration seals for which fire resistance tests were carried out. This ETA covers assemblies installed in accordance with the provisions given in Annex 2.

Hilti firestop block kit components are designed for environmental conditions as defined by use category Y₁, according to EOTA TR 024.

Although a penetration seal is recommended for indoor applications only, the construction process may result in it being subjected to more exposed conditions for a period before the building envelope is closed. For this case provisions shall be made to protect temporarily exposed penetration seals according to the instructions of the manufacturer.

The provisions made in this European technical approval are based on an assumed working life of the firestop block kit of 10 years, provided the conditions laid down in clauses 4 and 5 relating to manufacturing, 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 approval body, but are to be used 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 essential requirements.

2 Characteristics of the product and methods of verification

The identification tests and the assessment of the fitness for use according to the Essential Requirements were carried out in compliance with the “ETA Guidance no. 026-Part 2” concerning Penetration Seals (called ETAG 026-2 in this ETA).

ETAG Clause No.	ETA Clause No.	Characteristic	Assessment of characteristic
Safety in case of fire			
2.4.1	2.1	Reaction to fire	Class E according to EN 13501-1:2010
2.4.2	2.2	Resistance to fire	See 2.2 and Annex 2

ETAG Clause No.	ETA Clause No.	Characteristic	Assessment of characteristic
Hygiene, health and environment			
2.4.3	2.3	Air permeability (material property)	No performance determined
2.4.4	2.4	Water permeability (material property)	No performance determined
2.4.5	2.5	Release of dangerous substances	VOC Certificate
Safety in use			
2.4.6	2.6	Mechanical resistance and stability	No performance determined
2.4.7	2.7	Resistance to impact/movement	No performance determined
2.4.8	2.8	Adhesion	No performance determined
Protection against noise			
2.4.9	2.9	Airborne sound insulation	CFS-BL R_w (C;Ctr): 51 (1;-4)
Energy economy and heat retention			
2.4.10	2.10	Thermal properties	$\lambda = 0,089\text{W/mK}$
2.4.11	2.11	Water vapour permeability	No performance determined
General aspects relating to fitness for use			
2.4.12	2.12	Durability and serviceability	<ul style="list-style-type: none"> • Electrical volume resistivity: $2,17\text{E}+9 (\pm 0.5)\Omega\text{cm}$; • Electrical surface resistivity: $49,6\text{E}+9 (\pm 10)\Omega$ • Y_1

2.1 Reaction to fire

Hilti firestop block kit components CFS-BL, CFS-FIL and CFS-P BA fulfil the requirements for reaction to fire class E according to EN 13501-1:2010.

2.2 Resistance to fire

The resistance to fire performance according to EN 13501-2 of penetration seals incorporating kit components is given in Annex 2.

2.3 Air permeability

No performance determined

2.4 Water permeability

No performance determined

2.5 Dangerous substances

According to the manufacturer's declaration, the product specification has been compared with the list of dangerous substances of the European Commission to verify that that it does not contain such substances above the acceptable limits.

A written declaration in this respect was submitted by the ETA-holder.

Note: In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Product Directive, these requirements need also to be complied with, when and where they apply.

2.6 Mechanical resistance and stability

Large floor seals or wall penetrations have to be protected to avoid risk of injury to people e.g. by installation of a metal sheet/wire mesh.

2.7 Resistance to impact/movement

See 2.6

2.8 Adhesion

See 2.6

2.9 Airborne sound insulation

Test reports dealing with noise reduction according to EN ISO 140-3 have been provided. The acoustic tests were performed in a flexible wall, both sides attached by a double layer of 15,8 mm (5/8") gypsum board. The void between the plaster boards was filled with 100 mm mineral wool insulation.

Hilti Firestop Block CFS-BL was tested as blank seal. The acoustic characteristic of the walls itself has been measured before an opening of 588 x 288 mm was made. Single number rating is determined: $R_w (C; C_{tr}) = 51 (1; -4)$.

R_w : weighted sound reduction index (given with spectrum adaptation terms C and C_{tr})

2.10 Thermal properties

Hilti Firestop Block CFS-BL was tested according EN 12667.
Thermal conductivity $\lambda = 0,089$ W/mK and thermal resistance $R = 0,563$ m²K/W.

2.11 Water vapour permeability

No performance determined.

2.12 Durability and serviceability

2.12.1 Durability

Hilti firestop block kit components fulfil the requirements of use category Y_1 , in accordance with ETAG 026-2, clause 1.2. Since the requirements for type Y_1 are met also the requirements for type Y_2 , Z_1 and Z_2 are fulfilled.

Type Y_1 : Products intended for use at temperatures between -5 °C and $+70\text{ °C}$ with exposure to UV but without exposure to rain.

Type Y_2 : Products intended for use at temperatures between -5 °C and $+70\text{ °C}$ but without exposure to rain and UV.

Type Z_1 : Products intended for use at internal conditions with high humidity, excluding temperatures below 0 °C .⁵

Type Z_2 : Products intended for uses at internal conditions with humidity classes other than Z_1 , excluding temperatures below 0 °C .

2.12.2 Serviceability

2.12.2.1 Electrical properties

- Electrical volume resistivity (according to DIN IEC 60093 (VDE 0303 Part 30):1993-12):
Mean value: CFS-BL: $2.17\text{E}+9\ \Omega\text{cm}$ (± 0.5)
- Electrical surface resistivity (according to DIN IEC 60093 (VDE 0303 Part 30):1993-12):
Mean Value: CFS-BL: $49,6\text{E}+9\ \Omega\text{cm}$ (± 10)

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity system

According to the decision 1999/454/EC of the European Commission⁶ the system 1 of attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by a notified certification body on the basis of:

(a) Tasks for the manufacturer:

- (1) factory production control;
- (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;

(b) Tasks for the notified body

- (3) initial type-testing of the product;
- (4) initial inspection of factory and of factory production control;
- (5) continuous surveillance, assessment and approval of factory production control.

⁵ These uses apply for internal humidity class 5 in accordance with EN ISO 13788

⁶ Official Journal of the European Communities N° L 178, 14.7.1999, p. 52

3.2 Responsibilities

3.2.1 Tasks of the Manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this European technical approval.

The manufacturer may only use initial / raw / constituent materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the Control Plan of 25.10.2012 relating to the European technical approval ETA-13/0099 issued on 15.04.2013 which is part of the technical documentation of this European technical approval. The "Control Plan" is laid down in the context of the factory production control system operated by the manufacturer and deposited at the Österreichisches Institut für Bautechnik.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the "Control Plan".

3.2.1.2 Other tasks of manufacturer

Additional information

The manufacturer shall provide a technical data sheet and an installation instruction with the following minimum information (as far as relevant):

technical data sheet:

- Field of application:
 - Building elements in which the product may be installed, type and properties of the building elements like minimum thickness, density, and - in case of lightweight constructions - the construction requirements.
 - Services which may penetrate the building element, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings (e.g. cable trays), separations etc.
 - Design of the penetration seal(s) including limits in size, minimum thickness, separations etc. of the penetration seal(s)
 - Definitions of ancillary products (e.g. backfilling material) with clear indication whether they are generic or specific.
 - Environmental conditions covered by the ETA.

Installation instruction:

- Steps to be followed
- Procedure in case of retrofitting.
- Stipulations on maintenance, repair and replacement

The manufacturer shall, on the basis of a contract, involve a body (bodies) which is (are) approved for the tasks referred to in clause 3.1 in the field of penetration seals in order to undertake the actions laid down in clause 3.3. For this purpose, the "control plan" referred to in clauses 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body or bodies involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

3.2.2 Tasks of Notified Bodies

The notified body shall perform the

- initial type-testing of the product
- initial inspection of factory and of factory production control,

continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the control plan of this European technical approval.

The notified body shall retain the essential points of its (their) actions referred to above and state the results obtained and conclusions drawn in a written report.

The notified product certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform the Österreichisches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on the product itself, on a label attached to it, on its packaging or on the commercial documents accompanying the components of the product. The letters „CE“ shall be followed by the identification number of the Notified Body involved and be accompanied by the following additional information:

- the name or identifying mark and address of the ETA holder,
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- the number of the ETAG (ETAG N° 026 part 2)
- the name and intended use of the product
- “see ETA-13/0099 for relevant characteristics”

4 Assumptions under which the fitness of the product(s) for the intended use was favourably assessed

4.1 General

4.1.1 For evaluating resistance to fire of the penetration seal using Hilti firestop block kit as specified in Annex 2 it is assumed that

- the installation of the penetration seal does not affect the stability of the adjacent building elements – even in case of fire,
- the installations are fixed to the adjacent building elements (not to the seal) in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed on the seal,
- the support of the installations is maintained for the classification period required and
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

- 4.1.2 This European technical approval 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.
- 4.1.3 This European technical approval 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 pipe work.
The mounting or hanging of the pipes or the layout of the pipe work shall be implemented in such a way that the pipes and the fire-resistant building elements shall remain functional for at least that time corresponding to the target period of fire resistance.
- 4.1.4 The durability assessment does not take account of the possible effect on the penetration seal of substances permeating through surface of service materials.

4.2 Manufacturing

Hilti firestop block kit components shall be produced in accordance with the manufacturing process deposited with Österreichisches Institut für Bautechnik.

The European technical approval is issued for the product on the basis of agreed data/information, deposited with 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 Österreichisches Institut für Bautechnik before the changes are introduced. Österreichisches Institut für Bautechnik will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

4.3 Installation

The arrangement and installation of Hilti firestop block kit shall be done in accordance with the details given in Annex 2 and 3 for the penetration seal(s).

5 Indications to the manufacturer

5.1 Packaging, transport and storage

In the accompanying document and/or on the packaging the manufacturer shall give information as to transport and storage.

At least the following shall be indicated: storing temperature, type of storage, maximum duration of storage and required data related to minimum temperature for transport and storage.

5.2 Use, maintenance, repair

The fire resistance of penetration seals installed with Hilti firestop block kit shall not be negatively affected by future changes to buildings or building elements.
The assessment of the fitness for use is based on the assumption that damaged seals are replaced or repaired. It is also assumed that replacement of components during maintenance/repair will be undertaken using materials specified by the European technical approval.

On behalf of Österreichisches Institut für Bautechnik

Rainer Mikulits
Managing Director

ANNEX 1

DESCRIPTION OF PRODUCT(S) & PRODUCT LITERATURE

1.1 Product

A detailed specification of the products listed below is given in document "Identification / Product Specification relating to the European technical approval ETA-13/0099 - Hilti Firestop Block CFS-BL, Hilti Firestop Filler CFS-FIL, Hilti Firestop Putty Bandage CFS-P BA", which is a non-public part of this ETA.

1.1.1 Hilti Firestop Block CFS-BL

Blocks are 200 x 130 x 50 mm in size.

The Control Plan is defined in document "Control Plan relating to the European technical approval ETA-13/0099– Hilti Firestop Block CFS-BL", which is a non-public part of this ETA.

1.1.2 Hilti Firestop Filler CFS-FIL

The filler is available as a cartridge of 310 ml or as a foil pack of 580 ml.

The Control Plan is defined in document "Control Plan relating to the European technical approval ETA-13/0099 – Hilti Firestop Filler CFS-FIL", which is a non-public part of this ETA.

Suitable dispensers:

Hilti CFS-DISP / CS 201-P1 (for 310 ml cartridge)

Hilti CS 270-P1 (for 580 ml foil pack)

1.1.3 Hilti Firestop Putty Bandage CFS-P BA

The putty is delivered 100 mm in width, 3 mm in height and 5 m in length on a roll.

The Control Plan is defined in document "Control Plan relating to the European technical approval ETA-13/0099 – Hilti Firestop Putty Bandage CFS-P BA", which is a non-public part of this ETA.

1.2 Ancillary products

1.2.1 Hilti Firestop Coating CFS-CT

Hilti Firestop Coating CFS-CT is used as additional protection for penetration seals for waveguides. For details to the product see ETA-11/0429.

A detailed specification of the product is contained in document "Identification / Product Specification relating to the European technical approval ETA-11/0428 and ETA-11/0429 - Hilti Firestop Coating CFS-CT" which is a non-public part of that ETA.

The Control Plan is defined in document "Control Plan relating to the European technical approval ETA-11/0428 and ETA-11/0429 - Hilti Firestop Coating CFS-CT" which is a non-public part of that ETA.

1.3 Technical product literature:

Technical Data Sheet Hilti Firestop Block CFS-BL including all components of the kit

ANNEX 2

RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF THE KIT COMPONENTS HILTI FIRESTOP BLOCK CFS-BL, HILTI FIRESTOP FILLER CFS-FIL AND HILTI FIRESTOP PUTTY BANDAGE CSF-P BA

2.1 General Information

2.1.1 Wall/floor constructions

a) Flexible wall:

The wall must have a minimum thickness of 100 mm and comprise of timber or steel studs lined on both faces with minimum 2 layers of 12,5 mm thick boards according EN 520 type F.

In steel stud construction the space between linings has not to be completely filled with insulation material, especially in the vicinity to the seal. Nevertheless the wall has to be set up according requirements.

For timber stud walls there must be a minimum distance of 100 mm of the seal to any stud and the cavity between stud and seal must be closed by a minimum of 100 mm insulation of Class A1 or A2 (in accordance with EN 13501-1).

b) Rigid wall:

The wall must have a minimum thickness of 100 mm and comprise of concrete, aerated concrete or masonry, with a minimum density of 600 kg/m³.

c) Rigid floor:

The floor must have a minimum thickness of 150 mm and comprise of aerated concrete or concrete with a minimum density of 600 kg/m³.

The walls / floors must be classified in accordance with EN 13501-2 for the required fire resistance period or fulfil the requirements of the relevant Eurocode. This ETA does not cover use of the product as a penetration seal in sandwich panel constructions.

2.1.2 Aperture framing / beading

The penetration seal depth is always 200 mm independent of the thickness of the wall or floor. In case of walls or floors with a thickness of less than 200 mm an aperture framing or a beading has to be used.

Aperture framing: box frame of 200 mm depth perpendicular to the wall/floor surface made of gypsum or calcium silicate boards, of at least 12,5 mm thickness, centred in the wall (figure 1a, d) / flush to the soffit of the floor.

Beading: gypsum or calcium silicate board strips of at least 100 mm width (w_A , figure 1e) are installed around the opening with the necessary number of layers to form a frame on the top side of a floor or two frames of the same height on both sides of a wall (figure 1b, c, e).

In walls penetration seal is installed centred (figure 1a, b), in floors flush to the soffit of the floor (figure 1c).

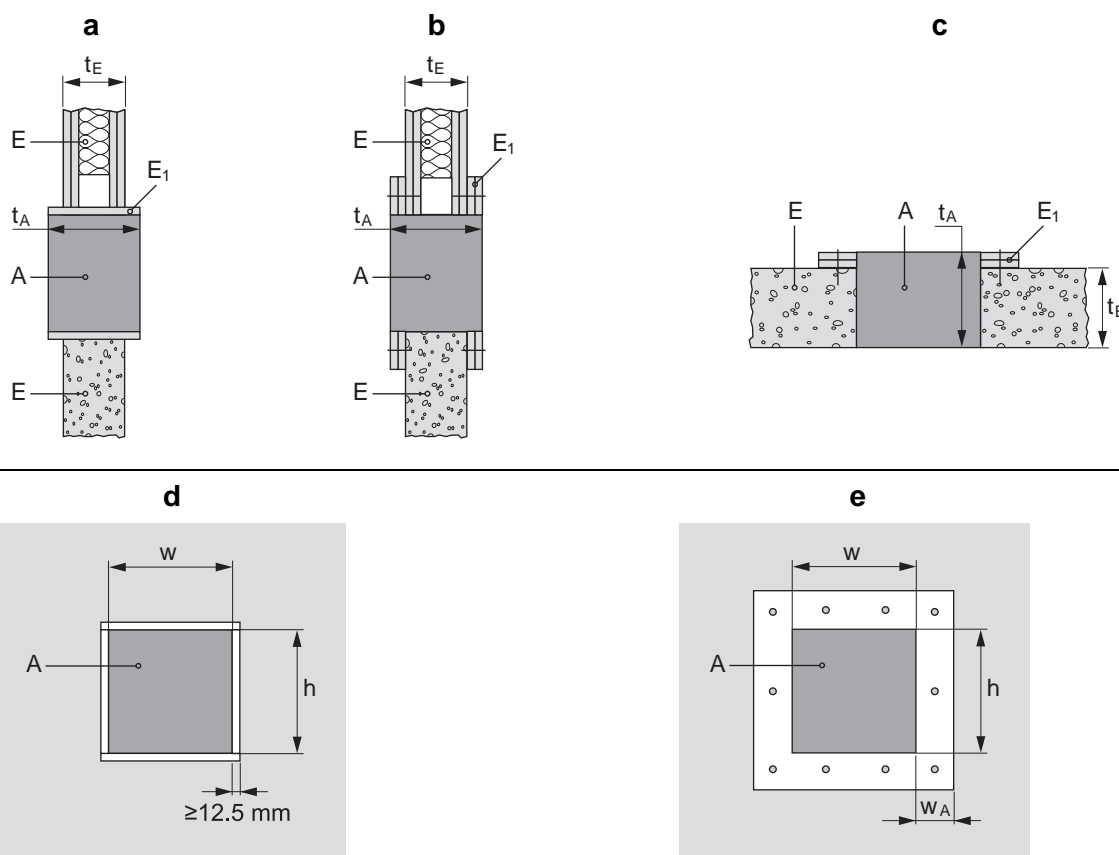


Figure 1: aperture framing / beading and position of the seal in walls / floors

A	Hilti firestop product	t_E	Thickness of the building element
E	Building element (rigid or flexible wall construction, floor)	w	Width of the seal
E1	Support frame	h	Height of the seal
t_A	Thickness of the seal	w_A	Width of the frame

2.1.3 Penetration seal types

2.1.3.1 Penetration seal type Filler

a) Services without cable supports (baskets, ladders, trays) in the penetration seal

- Gaps between services and Hilti Firestop Blocks CFS-BL (A) are filled with Hilti Firestop Filler CFS-FIL (A_{1a}), depth 20 mm.

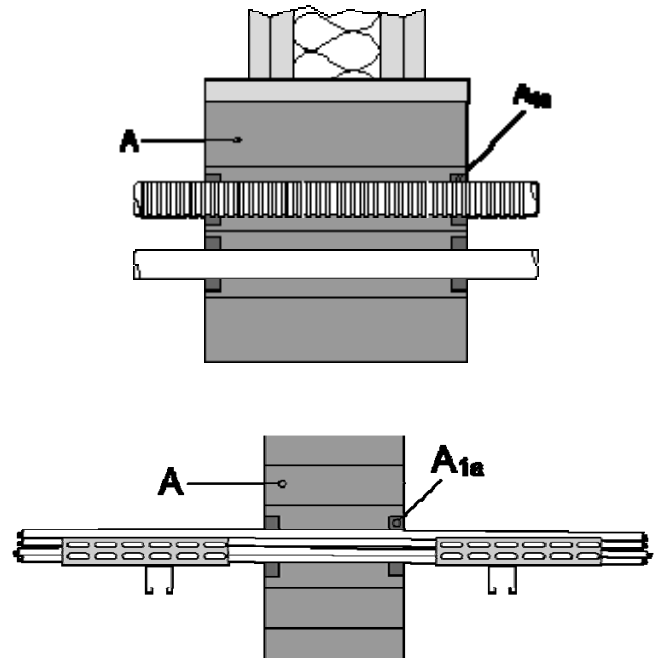


Figure 2: seal type A_{1a}

b) Services on cable supports (baskets, ladders, trays) in the penetration seal

- Gaps between services and Hilti Firestop Blocks CFS-BL (A) are filled with Hilti Firestop Filler CFS-FIL (A_{1b}) over the entire depth of the seal (200 mm).

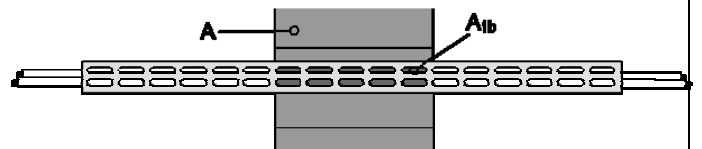


Figure 3: seal type A1b

2.1.3.2 Penetration seal type putty 1x (A_{2a})

a) Services without cable supports (baskets, ladders, trays) in the penetration seal

- Gaps between services and Hilti Firestop Blocks CFS-BL (A) are filled with Hilti Firestop Filler CFS-FIL (A_{1a}), depth 20 mm.
- One layer of Hilti Firestop Putty Bandage CFS-P BA (A_{2a}) is wrapped around the services or group of services.

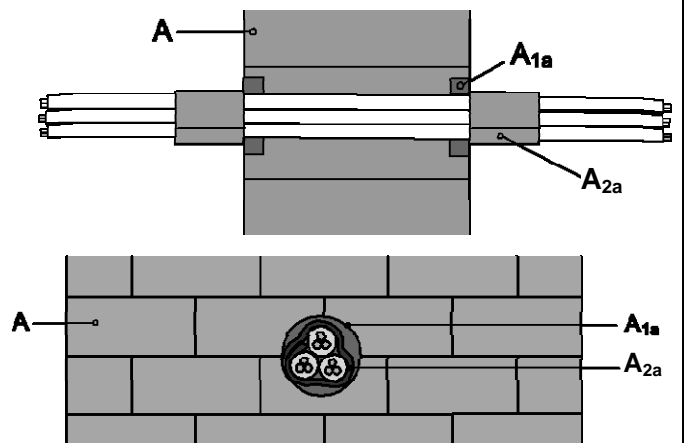
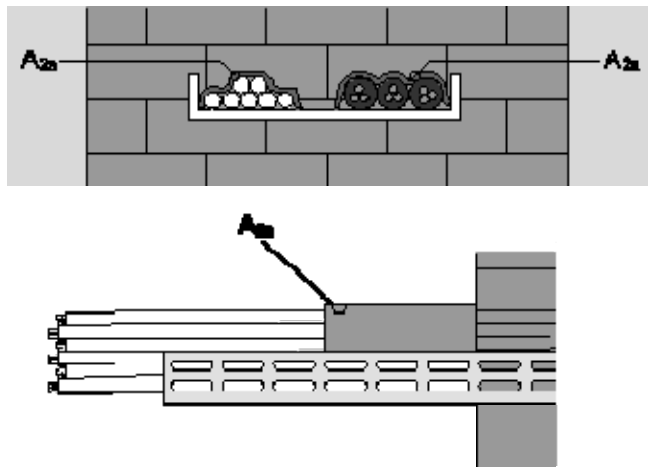
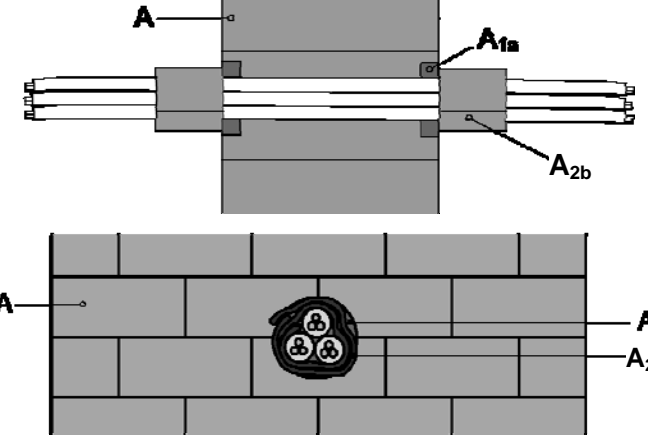


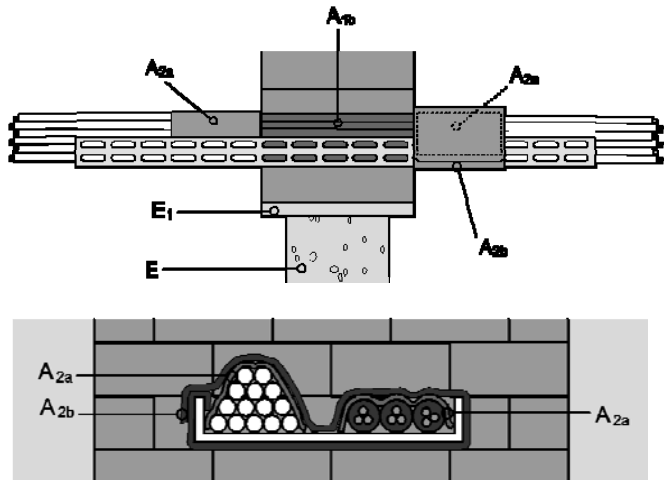
Figure 4: filler (A_{1a}) plus 1 layer putty

<p>b) <u>Services on cable supports (baskets, ladders, trays) in the penetration seal</u></p> <ul style="list-style-type: none"> • Gaps between services and Hilti Firestop Blocks CFS-BL (A) are filled with Hilti Firestop Filler CFS-FIL, depth 20 mm. • Services are additionally covered by a layer of Hilti Firestop Putty Bandage CFS-P BA (A_{2a}) following the contour of the services. 	 <p>Figure 5: filler (A_{1b}) plus 1 layer putty (A_{2a}), support tray</p>
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Hilti Firestop Putty Bandage CFS-P BA must be installed with the mesh outside/upside
 For floor applications, Hilti Firestop Putty Bandage CFS-P BA is required on the top side, only.
 The overlap of the putty wrapping must be at least 20 mm and is recommended to position on top or on the side

2.1.3.3 Penetration seal type putty 2 (A_{2b}) – blocks, filler and 2 layers putty bandage

<p>a) <u>Services without cable supports (baskets, ladders, trays) in the penetration seal</u></p> <ul style="list-style-type: none"> • Gaps between services and Hilti Firestop Blocks CFS-BL (A) are filled with Hilti Firestop Filler CFS-FIL (A_{1a}), depth 20 mm. <p>Two layers of Hilti Firestop Putty Bandage CFS-P BA (A_{2b}) are wrapped around the services or group of services.</p>	 <p>Figure 6: filler (A_{1a}) plus 2 layers of putty (A_{2b})</p>
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<p>b) <u>Services on cable supports (baskets, ladders, trays) in the penetration seal</u></p> <ul style="list-style-type: none"> • Gaps between services and Hilti Firestop Blocks CFS-BL (A) are filled with Hilti Firestop Filler CFS-FIL (A_{1b}) over the entire depth of the seal (200 mm).. • Services are additionally covered by a layer of Hilti Firestop Putty Bandage CFS-P BA (A_{2a}) following the contour of the services. • A second layer of Hilti Firestop Putty Bandage CFS-P BA (A_{2b}) is laid on top of the first and then wrapped around including the cable supports (A_{2b}).. 	 <p>Figure 7: filler (A_{1b}) plus 2 layers of putty (A_{2b})</p>
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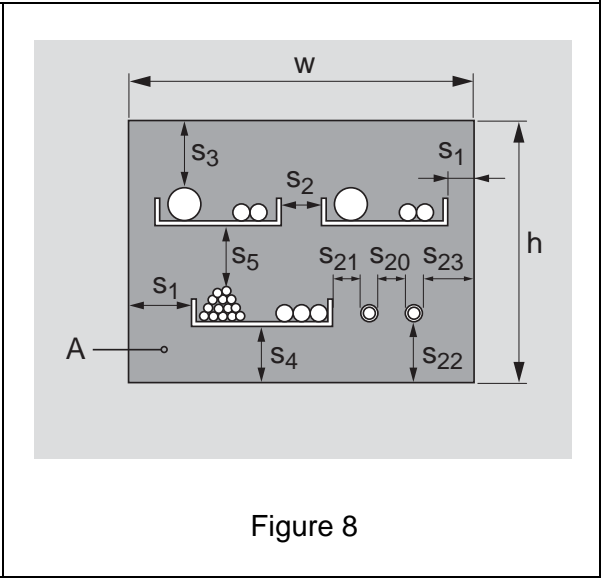
Hilti Firestop Putty Bandage CFS-P BA must be installed with the mesh outside/upside
 For floor applications, Hilti Firestop Putty Bandage CFS-P BA is required on the top side, only.
 The overlap of the putty wrapping must be at least 20 mm and is recommended to position on top or on the side

2.1.4 Distance Rule

Distances valid for wall and floor installations.

Minimum distances in **mm** (see illustration):

- $s_1 = 0$ (distance between cables/cable supports and vertical seal edge)
- $s_2 = 0$ (distance between cable supports)
- $s_3 = 0$ (distance between cables and upper seal edge)
- $s_4 = 0$ (distance between cable supports and bottom seal edge)
- $s_5 = 50$ (distance between cables and cable support above)
- $s_{20,21,22} = 0$ $\varnothing \leq 16$ mm
- $s_{20} = 0$ $\varnothing > 16$ mm (distance between conduits to each other)
- $s_{21,22} = 20$ $\varnothing > 16$ mm (distance between conduits and other services or seal edges)



2.2 Flexible or rigid walls according to 2.1.1 - minimum wall thickness 100 mm

2.2.1 Blank seal (no services) *

Maximum seal size: 1000 x 1000 mm

- Construction details (for symbols and abbreviations see Annex 4.1):
- Hilti Firestop Blocks CFS-BL (A) of thickness $t_A \geq 200$ mm, centered regarding the thickness of the wall (E); aperture framing or beading (E1) according to 2.1.3.

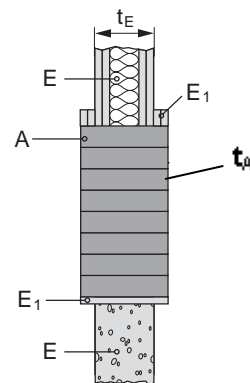


Figure 9: blank seal

Classification

EI 120

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

2.2.2 Penetrating services – wall 100 mm

Maximum seal size: 1000 x 1000 mm

Services have to be supported at ≤ 250 mm from both faces of wall

Abbreviation	Description
A, A ₁ , A ₂ ,...	Firestop products: A: Block A ₁ : Filler A ₂ : Putty bandage
C, C ₁ , C ₂ ,...	Penetrating services
E, E ₁ , E ₂ ,...	Building elements
t_E	Thickness of the building element

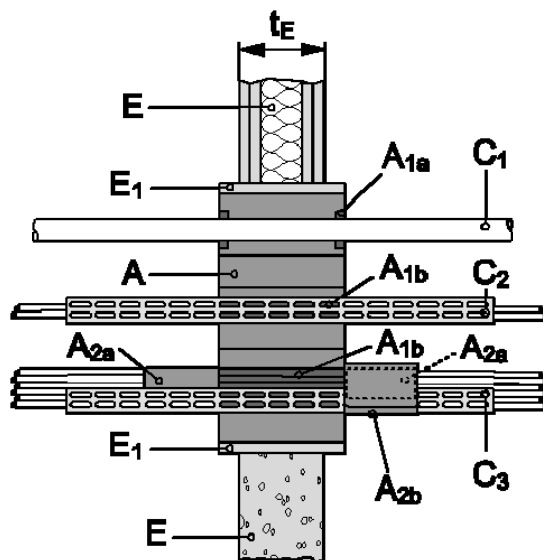
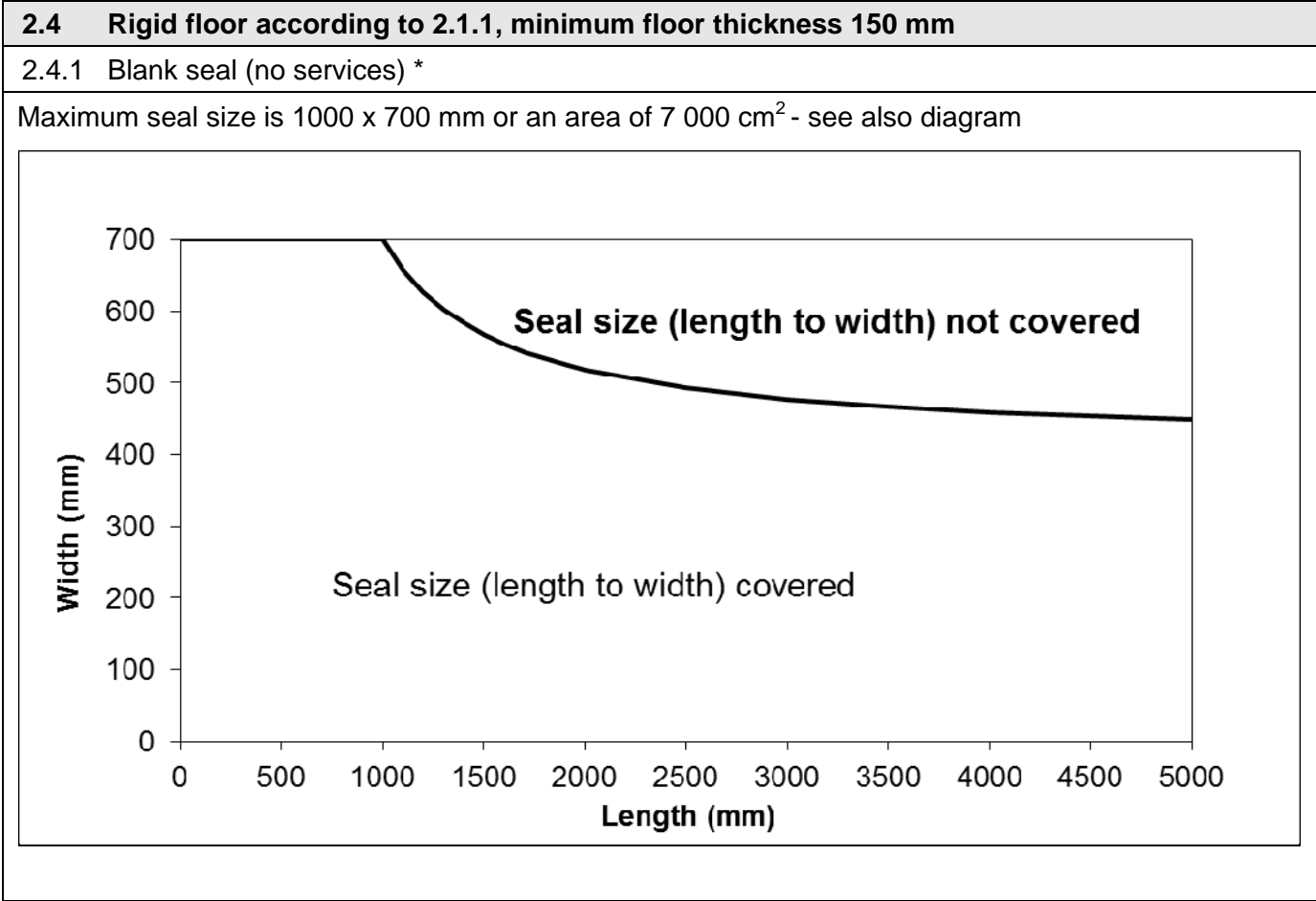


Figure 10: wall penetration

2.2.2.a) Cables		
Construction details		
<ul style="list-style-type: none"> Hilti Firestop Blocks CFS-BL (A) of thickness $t_A \geq 200$ mm, Centered regarding the thickness of the wall (E); Aperture framing or beading (E1) according to 2.1.2. Penetrating services C_2, C_3 with or without a support tray running through the seal Illustration see figure 10 	Penetrations without support tray - seal type: <ul style="list-style-type: none"> Filler – A_{1a} (2.1.3.1a) Putty 2x, A_{2a} (2.1.3.3a) Services on support tray - seal type: <ul style="list-style-type: none"> Filler – A_{1b} (2.1.3.1b) Putty 2x, A_{2b} (2.1.3.3b) 	
All cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables) with or without cable supports		
	Classification	
Penetration seal type:	Filler	Filler + 2x Putty
All sheathed cable:		
$\varnothing \leq 80$ mm	EI 90	EI 120
Tied cable bundle $\leq \varnothing 100$ mm; \varnothing single cable ≤ 21 mm		
Non-sheathed cables (wires) $\varnothing \leq 24$ mm	EI 60	
2.2.2.b) Small conduits and tubes		
Construction details		
<ul style="list-style-type: none"> Illustration figure 10 Services – C_1 	Seal type with or without support tray <ul style="list-style-type: none"> Filler – A_{1a} (2.1.3.1a) 	
	Classification	
$\varnothing \leq 16$ mm, wall thickness ≥ 1 mm, arranged linear, with or without cables, with or without cable supports, minimum distance to each other = 0 mm	Filler	
Plastic conduits and tubes	EI 120 U/U	
Steel conduits and tubes	EI 120 C/U	
2.2.2.c) Conduits		
Construction details		
<ul style="list-style-type: none"> Illustration figure 10 Services – C_1 Wall thickness of rigid conduits: PO: 1,55 to 2,30 mm PVC: 1,90 to 2,80 mm 	Penetrations without support tray - seal type: <ul style="list-style-type: none"> Filler – A_{1a} (2.1.3.1a) Services on support tray - seal type: <ul style="list-style-type: none"> Filler – A_{1b} (2.1.3.1b) 	

		Diameter [mm]		Classification
		PO	PVC	Filler
Flexible conduits	with cable	16 - 40	16 - 20	EI 120 U/U
	without cable	16 - 20	16 - 20	
Rigid conduits	with and without cable	16 - 40	16 - 40	
Bundle of rigid or flexible conduits, Ø of single conduits ≤ 20 mm	with and without cable	≤ 100		
PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride				
2.2.2.d) Waveguides (coaxial)				
<ul style="list-style-type: none"> • Illustration figure 10 • Services – C₁ 		Penetrations without support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1a} (2.1.3.1a) Services on support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1b} (2.1.3.1b) Additional protection: <ul style="list-style-type: none"> • 0,7 mm thick Hilti Firestop Coating CFS-CT over a length of 150 mm from the surface of the penetration seal on each side of the wall. 		
				Classification
				Filler
Waveguides (coaxial): 27,8 mm ≤ Ø ≤ 59,9 mm RFS Cellflex LCF 78-50 JA Ø 27,8 mm RFS Cellflex LCF 214-50 J Ø 59,9 mm RFS Helifex HCA 78-50 JFNA Ø 28,0 mm RFS Helifex HCA 158J Ø 59,9 mm RFS Radialflex RLKW 78-50 Ø 28,5 mm RFS Radialflex RLKU 158-50 JFLA Ø 48,2 mm				EI 120-U/C

2.3 Flexible or rigid walls according to 2.1.1, minimum wall thickness 130 mm				
Maximum seal size: 1000 x 1000 mm Services have to be supported at ≤ 250 mm from both faces of wall				
Penetrating services (single, multiple or mixed):				
2.3.1 Cables				
Construction details				
<ul style="list-style-type: none"> • Illustration figure 10 • Services – C₁ 		Penetrations without support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1a} (2.1.3.1a) • Putty 1x, A_{2a} (2.1.3.2a) • Putty 2x, A_{2b} (2.1.3.3a) Services on support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1b} (2.1.3.1b) • Putty 1x, A_{2a} (2.1.3.2b) • Putty 2x, A_{2b} (2.1.3.3b) 		
All cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables) with or without cable supports				
Penetration seal type:		Classification		
		Filler	Filler + 1x Putty	Filler + 2x Putty
All sheathed cable:				
$\varnothing \leq 50$ mm		EI 90	EI 120	EI 120
$50 \leq \varnothing \leq 80$ mm			EI 90	
Tied cable bundle $\leq \varnothing 100$ mm; \varnothing single cable ≤ 21 mm		EI 120	EI 120	
Non-sheathed cables (wires) $\varnothing \leq 24$ mm		EI 60	EI 90	



- Hilti Firestop Blocks CFS-BL (A) of a length of $t_A \geq 200$ mm, flush with the soffit of the floor (E); aperture framing or beading (E1) according to 2.1.3; for abbreviations see Figure 1 or appendix 4.1.
- Additional support construction for large, not penetrated seals: metal band of minimum 30 mm width and of 2 mm thickness at w_1 (500 mm).

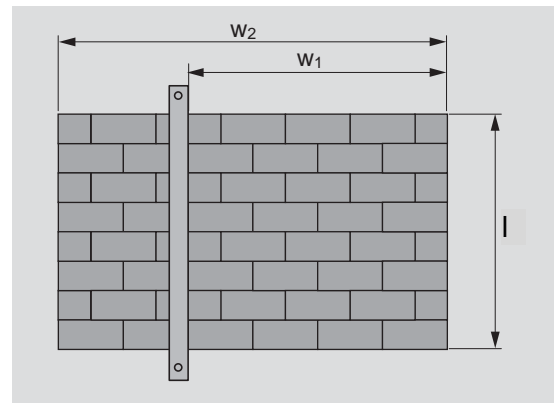


Figure 11: blank seal floor

		Classification
without support construction ($w_2 \times l$) :	1000 x 700 mm,	EI 60
with support construction ($w_2 \times l$):	1000 x 700 mm (support at w_1) or a support every 500 mm – see area diagram	EI 120
without support construction ($w_1 \times l$):	500 x 700 mm	

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

2.4.2 Penetrating services – floor application - 150 mm	
Maximum size of seal as blank seal. Services have to be supported at ≤ 250 mm from both faces of floor	
Abbreviation	Description
A, A ₁ , A ₂ ,...	Firestop products: A: Block A ₁ : Filler A ₂ : Putty bandage
C, C ₁ , C ₂ ,...	Penetrating services
E, E ₁ , E ₂ ,...	Building elements
t _E	Thickness of the building element

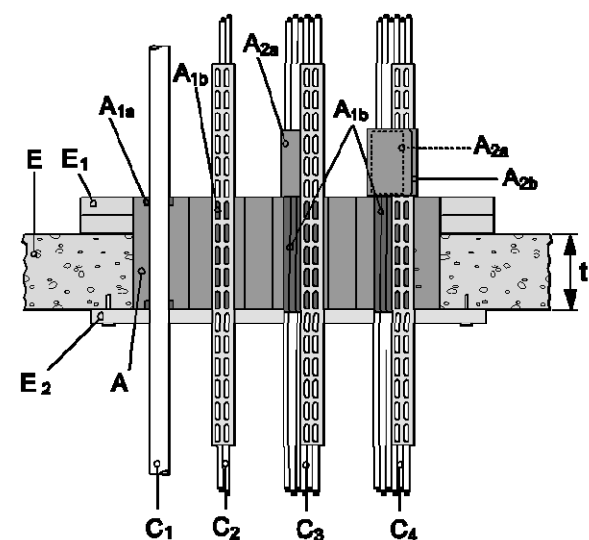


Figure 12: floor penetration

2.4.2.a) Cables

Construction details	
<ul style="list-style-type: none"> Hilti Firestop Blocks CFS-BL (A) of thickness t_A ≥ 200 mm, flush with the soffit of the floor (E); Aperture framing or beading (E1) according to 2.1.2. Putty is applied on upper side of floor only. Penetrating services C₂, C₃, C₄ with or without a support tray running through the seal 	<p>Penetrations without support tray - seal type:</p> <ul style="list-style-type: none"> Filler – A_{1a} (2.1.3.1a) Putty 2x, A_{2b} (2.1.3.3a) <p>Services on support tray - seal type:</p> <ul style="list-style-type: none"> Filler – A_{1b} (2.1.3.1b) Putty 2x, A_{2b} (2.1.3.3b)

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

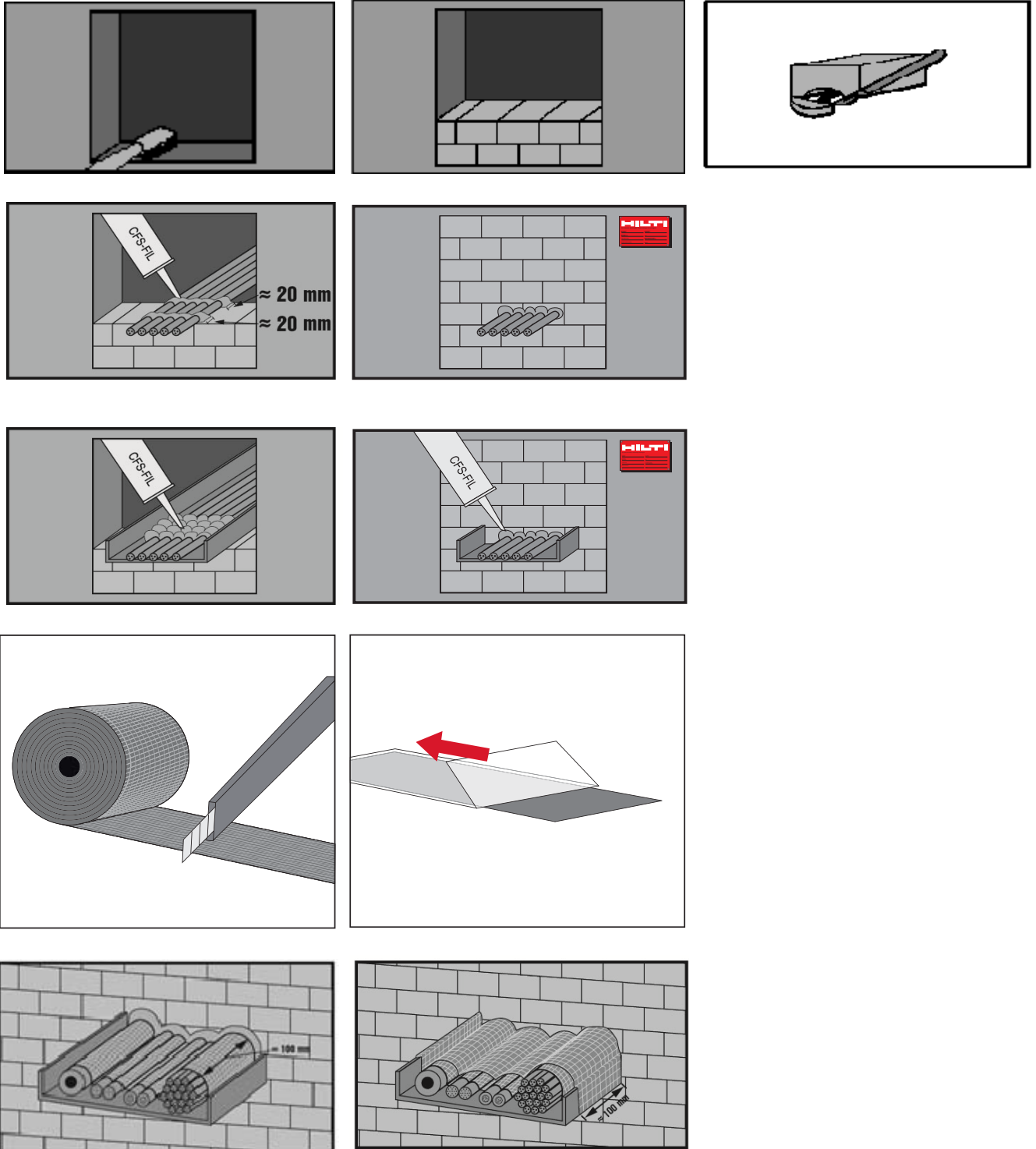
Penetration seal type:	Classification	
	Filler	Filler + 2x Putty
All sheathed cable: $\varnothing \leq 80$ mm	EI 90	EI 120
Tied cable bundle $\varnothing \leq 100$ mm; \varnothing single cable ≤ 21 mm		
Non-sheathed cables (wires) $\varnothing \leq 17$ mm		
Non-sheathed cables (wires) $\varnothing \leq 24$ mm	EI 60	

2.4.2.b) Small conduits and tubes				
Construction details				
<ul style="list-style-type: none"> • Illustration figure 12 • Services – C₁ 		Seal type with or without support tray <ul style="list-style-type: none"> • Filler – A_{1a} (2.1.3.1a) 		
			Classification	
Ø ≤ 16 mm, wall thickness ≥ 1 mm, arranged linear, with or without cables, with or without cable supports, minimum distance to each other = 0 mm			Filler	
Plastic conduits and tubes			EI 120 U/U	
Steel conduits and tubes			EI 120 C/U	
2.4.2.c) Conduits				
Construction details				
<ul style="list-style-type: none"> • Illustration figure 12 • Services – C₁ • Wall thickness of rigid conduits: PO: 1,55 to 2,30 mm PVC: 1,90 to 2,80 mm 		Penetrations without support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1a} (2.1.3.1a) Services on support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1b} (2.1.3.1b) 		
		Diameter [mm]		Classification
		PO	PVC	Filler
Flexible conduits	with cable	16 - 40	16 - 20	EI 120 U/U
	without cable	16 - 20	16 - 20	
Rigid conduits	with and without cable	16 - 40	16 - 40	
Bundle of rigid or flexible conduits, Ø of single conduits ≤ 20 mm	with and without cable	≤ 100		
PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride				
2.4.2.d) Waveguides (coaxial)				
<ul style="list-style-type: none"> • Illustration figure 12 • Services – C₁ 		Penetrations without support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1a} (2.1.3.1a) Services on support tray - seal type: <ul style="list-style-type: none"> • Filler – A_{1b} (2.1.3.1b) Additional protection: <ul style="list-style-type: none"> • 0,7 mm thick Hilti Firestop Coating CFS-CT over a length of 150 mm from the surface of the penetration seal on top side of the floor. 		

	Classification
	Filler
Waveguides (coaxial): $27,8 \text{ mm} \leq \varnothing \leq 59,9 \text{ mm}$ RFS Cellflex LCF 78-50 JA $\varnothing 27,8 \text{ mm}$ RFS Cellflex LCF 214-50 J $\varnothing 59,9 \text{ mm}$ RFS Heliflex HCA 78-50 JFNA $\varnothing 28,0 \text{ mm}$ RFS Heliflex HCA 158J $\varnothing 59,9 \text{ mm}$ RFS Radialflex RLKW 78-50 $\varnothing 28,5 \text{ mm}$ RFS Radialflex RLKU 158-50 JFLA $\varnothing 48,2 \text{ mm}$	EI 120-U/C

2.5 Combination of Hilti Firestop Block CFS-BL with other Hilti Firestop products	
Hilti Firestop Block CFS-BL may be combined with other Hilti Firestop products. <ul style="list-style-type: none"> In cases when services are only running through the area where additional products are used, then ETA specification of this product has to be followed 	
Hilti Firestop Brick CP 657-EN	Penetrations partially filled with Hilti Firestop Block CFS-BL may be completed with Hilti Firestop Brick CP 657-EN (CP 657-EN: ETA-11/0238) or vice versa.
Hilti Firestop Foam CFS-F FX	a) Hilti Firestop Foam CFS-F FX is used in areas without services as gap filling of upper space of penetration where otherwise a Hilti Firestop Block CFS-BL has to be cut to complete penetration. Classification of penetration is as blank seal EI120, seal depth 200mm. b) Service penetrations within foam seal– maximum size of foam area 400x400 mm: <ul style="list-style-type: none"> Hilti Firestop Blocks CFS-BL are installed in penetration partially for e.g. in the lower part, only or CFS-BL is used to build a frame. This frame can be built also after applying the foam, around the foam seal. Services running through the opening or the block frame are sealed with Hilti Firestop Foam CFS-F FX according ETA 10/0109 Distance rules are applied according ETA 10/0109 to aperture frame or services defined. Block frame is considered as aperture frame.
Hilti Firestop Plug CFS-PL $\varnothing 110$ within a plastic sleeve	Hilti Firestop Plug CFS-PL $\varnothing 110$ can be used in a wall or floor penetration sealed by Hilti Firestop Blocks CFS-BL. <ul style="list-style-type: none"> The plug has to be placed in a PVC pipe sleeve (wall thickness of pipe: 2 to 6 mm) of 200 mm in length, installed flush with the block seal. The distances to other services or edges are at least 50 mm. The sleeve is closed by Hilti Firestop Plug CFS-PL $\varnothing 110$ on each side. Penetrations through the plug seal are classified as documented in Hilti Firestop Plug CFS-PL ETA-13/0125.

ANNEX 3 INSTALLATION OF THE PRODUCT AND ANCILLARY PRODUCT(S)



ANNEX 4

ABBREVIATIONS AND REFERENCE DOCUMENTS

4.1 Abbreviations used in drawings

Abbreviation	Description	Abbreviation	Description
A, A ₁ , A ₂ ,..	Firestop products	t _A	Thickness of penetration seal
C, C ₁ , C ₂ ,..	Penetrating services	t _E	Thickness of the building element
E, E ₁ , E ₂ ,...	Building elements (wall, floor)	W	Max size of wall penetration
h	Height/length of penetration seal	W ₁	Max size of floor penetration without support
s ₁ , s ₂ , s _n	Distances	W ₂	Max size of floor penetration with support

4.2 References to standards mentioned in the ETA:

DIN IEC 60093 (VDE 0303 Part 30)	Methods of test for insulating materials for electrical purposes: Volume resistivity and surface resistivity of solid electrical insulating materials
EN 1026	Windows and doors – Air permeability – 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, excluding ventilation services
EN ISO 140-3	Acoustics – Measurement of sound insulation in buildings and of building elements – Part 3: Laboratory measurements of airborne sound insulation of building elements

4.3 Other reference documents:

EOTA TR 001	Determination of impact resistance of panels and panel assemblies
EOTA TR 024	Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products
Safety Data Sheet according to 1907/2006/EC, Article 31, for Hilti fire block kit component CFS-BL, CFS-FIL and CFS-P BA.	

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