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**OiB**  
Member of EOTA

## European technical approval

**ETA-13/0704**

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

Handelsbezeichnung  
*Trade name*

**Hilti Brandschutzkabelmanschette CFS-CC**  
**Hilti Firestop Cable Collar CFS-CC**

Zulassungsinhaber  
*Holder of approval*

**Hilti AG**  
**Feldkircherstrasse 100**  
**9494 Schaan**  
**Liechtenstein**

Zulassungsgegenstand  
und Verwendungszweck

**Brandschutzkabelmanschette zur Abschottung**

*Generic type and use of  
construction product*

**Firestop Cable Collar for use in penetration seals**

Geltungsdauer vom  
*Validity* from  
bis  
to

**28.06.2013**

**27.06.2018**

Herstellwerk  
*Manufacturing plant*

**Hilti Werk 5b**

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

**26 Seiten inklusive 4 Anhängen**

*26 pages including 4 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<sup>1</sup> modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - 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/EC<sup>4</sup>;
  - Guideline 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.
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- 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.

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

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

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

<sup>4</sup> 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 Hilti Firestop Cable Collar CFS-CC using temporarily ancillary products like M10 mortar, gab filler (designated Hilti Firestop Filler CFS-FIL) or additional protection by a putty bandage (designated Hilti Firestop Putty Bandage CFS-P BA) (for details see Annex 2). Hilti Firestop Cable Collar is provided as two half of a plug with a metal housing around. For a description of the installation procedure of the Hilti Firestop cable collar CFS-CC see 4.3.

#### **1.2 Intended use**

Hilti Firestop cable collar CFS-CC is intended to form 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 cable collar is designed for environmental conditions as defined by use category Z<sub>2</sub>, 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 product 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
<b>Safety in case of fire</b>			
2.4.1	2.1	Reaction to fire	Class E acc. 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
<b>Hygiene, health and environment</b>			
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
<b>Safety in use</b>			
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
<b>Protection against noise</b>			
2.4.9	2.9	Airborne sound insulation	CFS-CC $R_w$ (C;Ctr): 59 (-3;-9)
<b>Energy economy and heat retention</b>			
2.4.10	2.10	Thermal properties	See 2.10 Thermal conductivity
2.4.11	2.11	Water vapour permeability	No performance determined
<b>General aspects relating to fitness for use</b>			
2.4.12	2.12	Durability and serviceability	<ul style="list-style-type: none"> <li>• Electrical volume resistivity: 2,17E+9 (<math>\pm</math> 0.5)<math>\Omega</math>cm;</li> <li>• Electrical surface resistivity: 49,6E+9 (<math>\pm</math> 10 )<math>\Omega</math></li> <li>• Inlay Y<sub>1</sub>, Housing Z<sub>2</sub></li> </ul>

### 2.1 Reaction to fire

Hilti Firestop cable collar CFS-CC 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 acc. to EN 13501-2 of penetration seals 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 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**

Penetrations are of small diameter ( $\leq \varnothing 108$  mm) and no measurements are therefore necessary.

### **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 10140-2 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 Cable Collar was tested as blank seal. The acoustic characteristic of the wall itself has been measured before an opening of 4" (110mm) was made. The opening was closed by mounting Hilti Firestop Cable Collar CFS-CC on both sides. Single number rating is determined:  $R_w (C; C_{tr}) = 59 (-3; -9)$ .

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

### **2.10 Thermal properties**

Hilti Firestop Cable Collar inlay was tested according EN 12667.

Thermal conductivity  $\lambda = 0,089$  W/mK and thermal resistance  $R = 0,563$  m<sup>2</sup>K/W.

### **2.11 Water vapour permeability**

No performance determined.

### **2.12 Durability and serviceability**

#### **2.12.1 Durability**

The inlay of Hilti Firestop Cable Collar fulfils 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<sub>2</sub>, Z<sub>1</sub> and Z<sub>2</sub> are fulfilled. The housing of Hilti Firestop Cable Collar fulfils the requirements of use category Z<sub>2</sub>, in accordance with ETAG 026-2, clause 1.2.

Type Y<sub>1</sub>: Products intended for use at temperatures between -5 °C and + 70°C with exposure to UV but without exposure to rain.

Type Y<sub>2</sub>: Products intended for use at temperatures between -5 °C and + 70°C but without exposure to rain and UV.

Type Z<sub>1</sub>: Products intended for use at internal conditions with high humidity, excluding temperatures below 0°C.<sup>5</sup>

Type Z<sub>2</sub>: Products intended for uses at internal conditions with humidity classes other than Z<sub>1</sub>, excluding temperatures below 0°C.

## 2.12.2 Serviceability

### 2.12.2.1 Electrical properties

- Electrical volume resistivity of inlay (according to DIN IEC 60093 (VDE 0303 Part 30):1993- 12):

Mean value: CFS-CC: 2.17E+9 Ωcm (± 0.5)

- Electrical surface resistivity of inlay (according to DIN IEC 60093 (VDE 0303 Part 30):1993-12):

Mean Value: CFS-CC: 49,6E+9 Ωcm (± 10 )<sup>3</sup> Evaluation of Conformity and CE marking

## 3 Attestation of conformity system and CE Marking

### 3.1 Attestation of conformity system

According to the decision 1999/454/EC of the European Commission<sup>6</sup> 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;

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<sup>5</sup> These uses apply for internal humidity class 5 in accordance with EN ISO 13788

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

- (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.

## **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 relating to this European technical approval 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-13/0704 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 cable collar 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 Cable Collar 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 Cable Collar shall be done in accordance with the details given in Annex 2 and 3 for the penetration seal(s).

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 Cable Collar 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 Cable Collar 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 cable collar 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\_CFS-CC" relating to the European technical approval ETA-13/0704 - Hilti Firestop Cable Collar which is a non-public part of this ETA.

#### 1.1.1 Hilti Firestop Cable Collar CFS-CC

The PU foam inlay consists of two halves, together add up to a diameter of approximately 150 mm and are enclosed by a metal housing. The height of the metal housing is approximately 50 mm. The collar is surface mounted with at least two fixing hooks which are delivered with the product.

The Control Plan is defined in document "Control Plan\_CFS-CC" relating to the European technical approval ETA-13/0704 – Hilti Firestop Cable Collar, which is a non-public part of this ETA.

#### 1.1.2 Ancillary Products

Ancillary products are used as needed for annular space filling, gap filling or additional insulation

##### 1.1.2.1. 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 Block KIT", which is a non-public part of that ETA.

Suitable dispensers:

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

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

##### 1.1.2.2 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 Block Kit", which is a non-public part of that ETA.

##### 1.1.2.3 Hilti Firestop Mortar CP 633

Hilti Firestop Mortar CP 633 is delivered in bags of 25kg. Any mortar classified according EN 998-2 2003-09 and with strength class equal or higher than M10 can be used.

##### 1.1.2.4 Hilti Cable Collar CFS-CC - Fixing Anchors

Anchoring Solution		Drywall	Rigid Wall	Floor
Screw anchors:	HUS-H 6x40/5	x	x	x
	HUS-P 6x40/5	x	x	x
Expansion anchor:	HAS M8 20/10		x	x
	HST M8		x	x
Undercut anchor:	HPD M10/8		x	x
Internally threaded anchor:	HKD M8/30		x	x
Hollow core	HTBS 6/60	x		
	HHD-S M6 25x64	x		

<b>Anchoring Solution</b>		<b>Drywall</b>	<b>Rigid Wall</b>	<b>Floor</b>
Others	DBZ 6/45		x	x
	HHD-S M6 25x64		x	x
	screws with washer	x		
	threaded rods with nuts and washer	x		

**1.2 technical product literature:**

- technical Data Sheet Hilti Firestop Cable Collar CFS-CC including all ancillary products

## ANNEX 2

### RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF HILTI FIRESTOP CABLE COLLAR CFS-CC

#### 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 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 neighbourhood 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 and a minimum of 100 mm insulation of Class A1 or A2 (in accordance with EN 13501-1) in the cavity between stud and seal is necessary.

b) Rigid wall:

The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 600 kg/m<sup>3</sup>.

c) Rigid floor:

The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 550 kg/m<sup>3</sup>.

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 approximately 200 mm ( $t_A$ ) comprising by at least a wall/floor of 100 mm ( $t_E$ ) and two times the thickness of the cable collar (Figure 1a,b).

Aperture framing is not necessary.

In some cases a beading is used to thicken a 100 mm thick wall to 150 mm by two 12,5 mm board parts on each side. The remaining stripes have a width of about 50mm (Figure 1c;  $W_A$ ).

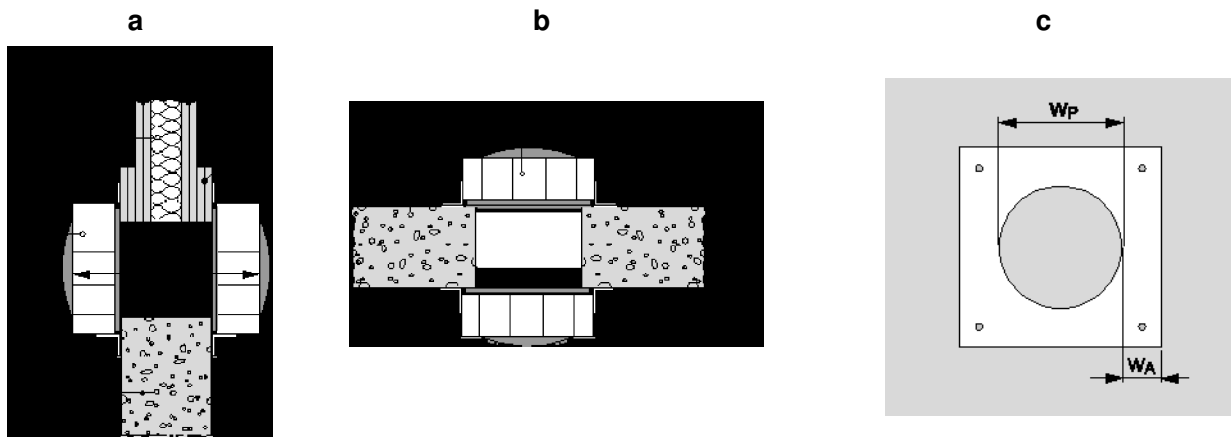


Figure 1: aperture framing / beading and position of the seal in walls / floors

A	Hilti firestop product	$t_E$	Thickness of building element
E	Building element (rigid or flexible wall construction, floor)	$W_P$	Width of penetration diameter
E1	Beading	$W_A$	Width of frame
$t_A$	Thickness of seal		

### 2.1.3 Maximum Seal Size

- Cable collar inlay has to be cut to fit to penetrating cables
- Maximum diameter of cut out part is approximately 108 mm (convex core,  $w$ ), so a boundary stripe of appr. 20 mm inlay is left to edge of collar ( $\varnothing$  150 mm).

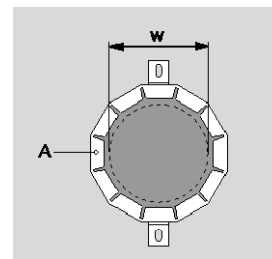
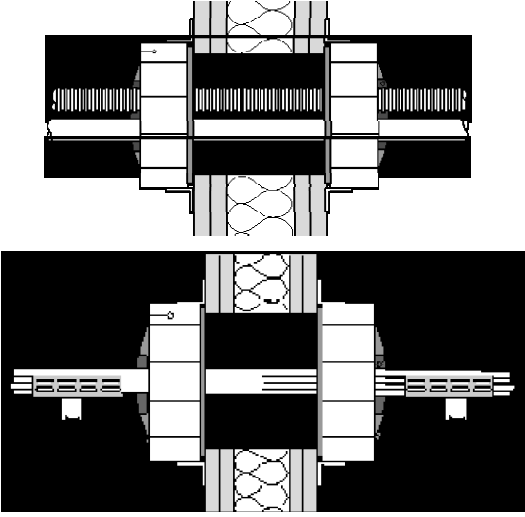
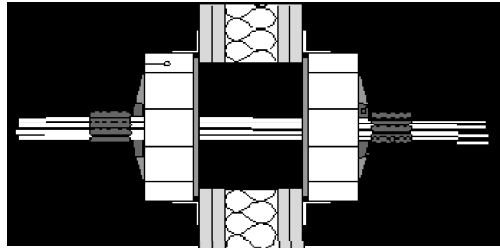
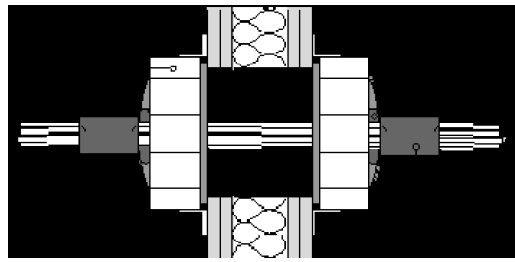


Figure 2: maximum seal size  $w$

2.1.4 Penetration Sealing	
2.1.4.1 Basic sealing with filler (A <sub>1a</sub> )	
<ul style="list-style-type: none"> <li>Gaps between services and Hilti Firestop Cable Collar CFS-CC (A) are filled with Hilti Firestop Filler CFS-FIL (A<sub>1a</sub>), depth 20 mm.</li> </ul>	 <p>Figure 3: Filler (A<sub>1a</sub>)</p>
2.1.4.2 Additional protection: filler coating (A <sub>1b</sub> )	
<ul style="list-style-type: none"> <li>Gaps between services and Hilti Firestop Cable Collar CFS-CC (A) are filled with Hilti Firestop Filler CFS-FIL (A<sub>1a</sub>), depth 20 mm.</li> <li>Cables are covered by Hilti Firestop Filler CFS-FIL at 50 mm in length (t<sub>R</sub>) and approximately 5 mm in thickness (A<sub>1b</sub>).</li> </ul>	 <p>Figure 4 Filler Coating (A<sub>1b</sub>):</p>
2.1.4.3 Additional protection: putty 2x (A <sub>2</sub> )	
<ul style="list-style-type: none"> <li>Gaps between services and Hilti Firestop Cable Collar CFS-CC (A) are filled with Hilti Firestop Filler CFS-FIL (A<sub>1a</sub>), depth 20 mm.</li> <li>Two layers of Hilti Firestop Putty Bandage CFS-P BA (A<sub>2</sub>) are wrapped around the services or group of services.</li> </ul>	 <p>Figure 5: filler (A<sub>1a</sub>) plus 2 layers of putty (A<sub>2</sub>)</p>
<p>Hilti Firestop Putty Bandage CFS-P BA must be installed with the mesh outside/upside: The overlap of the putty wrapping must be at least 20 mm and is recommended to position on top or on the side. For floor applications, Hilti Firestop Putty Bandage CFS-P BA is required on the top side, only.</p>	

#### 2.1.4.4 Additional sealing: mortar (floors only)

- Annular space between services and floor edges are filled with Mortar M10 (CP 633; Figure 6).
- Gaps between services and Hilti Firestop Cable Collar CFS-CC (A) are filled with Hilti Firestop Filler CFS-FIL (A<sub>1a</sub>), depth 20 mm.
- Seal thickness is about 200 mm (150 +50 mm)

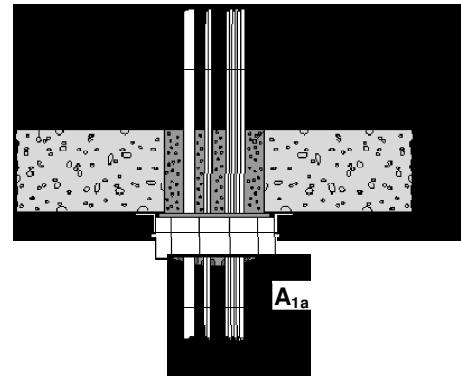


Figure 6: Mortar as gapfiller (M)

#### 2.1.5 Cluster arrangement

Minimum distances in mm (see illustration):

- S<sub>a</sub> = 0 (distance between cable collars linear)  
 S<sub>b</sub> = 0 (distance between cable collars in cluster arrangement)

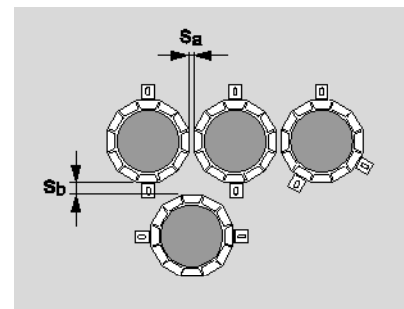


Figure 7

#### 2.1.6 Distance Rule

Distances valid for wall and floor installations.

Minimum distances in mm (see illustration):

- S<sub>1</sub> = 0 (distance between cables and seal edge)  
 S<sub>2</sub> = 0 (distance between cables or bundles)  
 S<sub>20,21,22</sub> = 0 (conduits Ø ≤ 16 mm)  
 S<sub>20</sub> = 0 (conduits Ø > 16 mm; distance between conduits to each other)  
 S<sub>21,22</sub> = 15 (conduits Ø > 16 mm distance of conduits to other services or seal border ----)

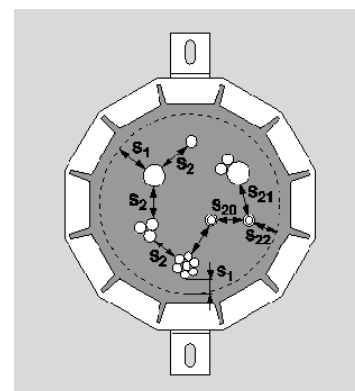


Figure 8



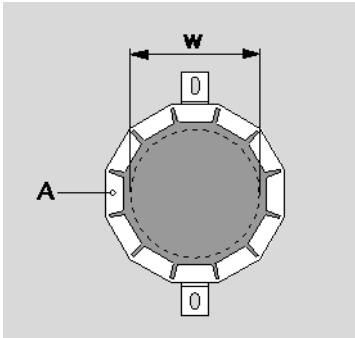
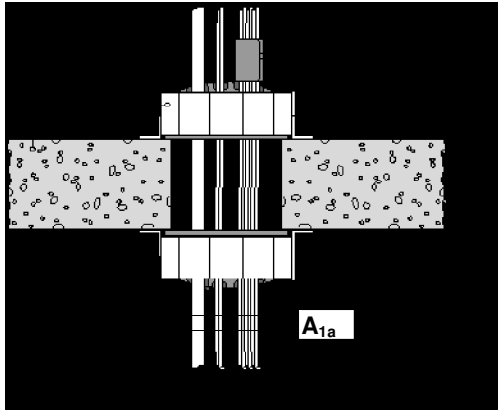
<b>2.2 Flexible or rigid walls according to 2.1.1 - minimum wall thickness 100 mm</b>	
<b>2.2.1 Blank seal (no services) *</b>	
<ul style="list-style-type: none"> <li>• Construction details (for symbols and abbreviations see Annex 4.2):</li> <li>• With two Hilti Firestop Cable Collars CFS-CC (A) a seal of thickness <math>t_A</math> of approximately 200 mm is formed, centered to wall (E)</li> <li>• W: <math>\varnothing</math> of penetration, seal size</li> </ul>	<p>Figure 9: blank seal</p>
<b>Classification</b>	
Seal Size $\varnothing$ : 108 mm	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.	

<b>2.2.2 Penetrating services</b>		
Services have to be supported at $\leq 300$ mm from both faces of wall. Cable collars are fixed on the surface by 2 to 3 fixing hooks evenly spaced around the diameter		
<b>Abbreviation</b>	<b>Description</b>	<p>Figure 10: wall penetration</p>
A, A <sub>1</sub> , A <sub>2</sub> ,...	Firestop products: A: Cable Collar A <sub>1a</sub> : Filler A <sub>2</sub> : Putty bandage	
C, C <sub>1</sub> , C <sub>2</sub> ,...	Penetrating services	
E, E <sub>1</sub> , E <sub>2</sub> ,...	Building elements	
t <sub>E</sub>	Thickness of the building element	

2.2.2.a) Cables				
Construction details				
<ul style="list-style-type: none"> <li>Hilti Firestop Cable Collar CFS-CC (A), seal thickness <math>t_A</math> of approximately. 200 mm,</li> <li>centered regarding the thickness of the wall (E);</li> <li>beading (E1) according to 2.1.2.</li> <li>abbreviations see figure 10</li> </ul>		<ul style="list-style-type: none"> <li>Filler, <math>A_{1a}</math> (2.1.3.1)</li> <li>Filler coating of 50 mm in length and of 5mm thickness – <math>A_{1b}</math> (2.1.3.2)</li> <li>Putty 2x, <math>A_2</math> (2.1.3.2)</li> </ul>		
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)				
<b>Additional Protection:</b>		<b>Classification</b>		
		<b>Filler Coating</b>	<b>Putty 2x</b>	<b>Beading</b>
<b>Wall thickness at penetration seal</b>		<b>100 mm</b>		<b>150 mm (100 +2x25)</b>
All sheathed cable:				
$\varnothing \leq 21$ mm ( $\varnothing 108$ mm can be filled 100% with cable of this diameter)		EI 90	-	EI 120
$21 \leq \varnothing \leq 50$ mm		EI 60	EI 90	EI 90
Tied cable bundle $\leq \varnothing 100$ mm; $\varnothing$ single cable $\leq 21$ mm		EI 90	-	EI 120
Non-sheathed cables (wires) $\varnothing \leq 24$ mm		EI 30	EI 60	

2.2.2.b) Small conduits and tubes	
Construction details	
<ul style="list-style-type: none"> <li>Illustration figure 10</li> <li>Services – <math>C_1</math></li> </ul>	<ul style="list-style-type: none"> <li>Filler – <math>A_{1a}</math> (2.1.3.1)</li> </ul>
<b>Classification</b>	
$\varnothing \leq 16$ mm, wall thickness $\geq 1$ mm, arranged linear or clustered, with or without cables, with or without cable supports, minimum distance to each other = 0 mm	
<b>Gap Filler</b>	
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"> <li>• Illustration figure 10</li> <li>• Services – C<sub>1</sub></li> <li>• Wall thickness of rigid conduits: PO: 1,2 to 2,30 mm PVC: 1,80 to 2 mm</li> </ul>		<ul style="list-style-type: none"> <li>• Filler – A<sub>1a</sub> (2.1.3.1)</li> </ul>		
		Diameter [mm]		
		PO	PVC	<b>Classification</b>
Flexible conduits	with and without cable	16 - 32	16 -32	EI 120 U/U
Rigid conduits	with and without cable	16 - 32	16 - 32	EI 120 U/U
Bundle of rigid or flexible conduits, Ø of single conduits ≤ 32 mm	with cable	≤ 80		EI 120 U/U
	without cable			EI 90 U/U
PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride				
2.2.2.d) Waveguides (coaxial)				
<ul style="list-style-type: none"> <li>• Illustration figure 10</li> <li>• Services – C<sub>1</sub></li> </ul>		<ul style="list-style-type: none"> <li>• Filler – A<sub>1a</sub> (2.1.3.1)</li> </ul>		
Waveguides (coaxial): 27,8 mm ≤ Ø 59,9 mm				<b>Classification</b>
RFS Cellflex LCF 78-50 JA Ø 27,8 mm RFS Cellflex LCF 214-50 J Ø 59,9 mm RFS Heliflex HCA 78-50 JFNA Ø 28,0 mm RFS Heliflex HCA 158J Ø 59,9 mm				EI 90-U/C
RFS Radialflex RLKW 78-50 Ø 28,5 mm RFS Radialflex RLKU 158-50 JFLA Ø 48,2 mm				EI 120-U/C

<b>2.3 Rigid floor according to 2.1.1, minimum floor thickness 150 mm</b>		
2.3.1 Blank seal (no services) *		
<ul style="list-style-type: none"> <li>• Hilti Firestop cable collar CFS-CC (A) is mounted on each side of the floor.</li> <li>• seal thickness <math>t_A</math> approximately 250 mm using 2 cable collars CFS-CC.</li> <li>• for abbreviations see 2.1.2 Figure 1</li> <li>• <math>w</math>: <math>\varnothing</math> of penetration, seal size</li> </ul>	 <p>Figure 11: blank seal floor</p>	
<b>Classification</b>		
Seal Size ( $w$ ) $\varnothing$ : 108 mm	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.		
2.3.2 Penetrating services – floor application - 150 mm		
<p>Services have to be supported at <math>\leq 300</math> mm from both faces of floor. Cable collars are fixed on the surface by 2 or 3 fixing hooks. Hooks have to be spaced at sufficient distance to each other. The maximum seal size is <math>\varnothing 108</math>mm.</p>		
<b>Abbreviation</b>	<b>Description</b>	 <p>Figure 12: floor penetration</p>
A, A <sub>1</sub> , A <sub>2</sub> ,...	Firestop products: A: Cable Collar A <sub>1a</sub> : Filler A <sub>2</sub> : Putty bandage	
C, C <sub>1</sub> , C <sub>2</sub> ,...	Penetrating services	
E, E <sub>1</sub> , E <sub>2</sub> ,...	Building elements	
$t_E$	Thickness of the building element	

2.3.2.a) Cables		
Construction details		
<ul style="list-style-type: none"> <li>Hilti Firestop Cable Collar CFS-CC (A); Seal thickness <math>t_A</math> of approximately 250 mm, flush with the soffit of the floor (E); .</li> <li>putty is applied on upper side of floor only.</li> </ul>	<ul style="list-style-type: none"> <li>Filler – A<sub>1a</sub> (2.1.3.1)</li> <li>Putty 2x, A<sub>2</sub> (2.1.3.3)</li> <li>Mortar as gap filler of annular space</li> </ul>	
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)		
Additional Protection:	Classification	
		Putty 2x
All sheathed cable:	EI 90	EI 120
$\varnothing \leq 21$ mm		
$21 \leq \varnothing \leq 50$ mm		
Tied cable bundle $\leq \varnothing 80$ mm; $\varnothing$ single cable $\leq 21$ mm		
Non-sheathed cables (wires) $\varnothing \leq 24$ mm	EI 30 /	EI 120

<ul style="list-style-type: none"> <li>annular space of penetration filled with M10 firestop mortar (CP 633)</li> <li>For details see 2.1.4.4</li> </ul>	Classification	
	CFS-CC 1x (lower floor side only)	CFS-CC 1x (lower floor side only)
<b>Additional Sealing:</b>	<b>Mortar</b>	<b>Mortar</b>
<b>Additional protection:</b>		<b>Putty 2x</b>
All sheathed cable		
$\varnothing \leq 21$ mm;	EI 120	
$21 \leq \varnothing \leq 50$ mm	EI 60	EI 120
Non-sheathed cables (wires) $\varnothing \leq 24$ mm	EI 90	EI 120

2.3.2.b) Small conduits and tubes			
Construction details			
<ul style="list-style-type: none"> <li>• Illustration figure 12</li> <li>• Services – C<sub>1</sub></li> </ul>		<ul style="list-style-type: none"> <li>• Filler – A<sub>1a</sub> (2.1.3.1)</li> </ul>	
$\varnothing \leq 16$ mm, wall thickness $\geq 1$ mm, arranged linear, with or without cables, minimum distance to each other = 0 mm			<b>Classification</b>
Plastic conduits and tubes			EI 120 U/U
Steel conduits and tubes			EI 120 C/U
2.3.2.c) Conduits			
Construction details			
<ul style="list-style-type: none"> <li>• Illustration figure 12</li> <li>• Services – C<sub>1</sub></li> <li>• Wall thickness of rigid conduits: PO: 1,55 to 2,30 mm PVC: 1,90 to 2,80 mm</li> </ul>		<ul style="list-style-type: none"> <li>• Gap Filler – A<sub>1a</sub> (2.1.3.1)</li> </ul>	
		Diameter [mm]	
		PO	PVC
		<b>Classification</b>	
Flexible conduits	with and without cable	16 - 32	16 - 32
Rigid conduits	with and without cable	16 - 32	16 - 32
Bundle of rigid or flexible conduits $\varnothing$ of single conduits $\leq 32$ mm	with and without cable	$\varnothing \leq 80$	
PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride			

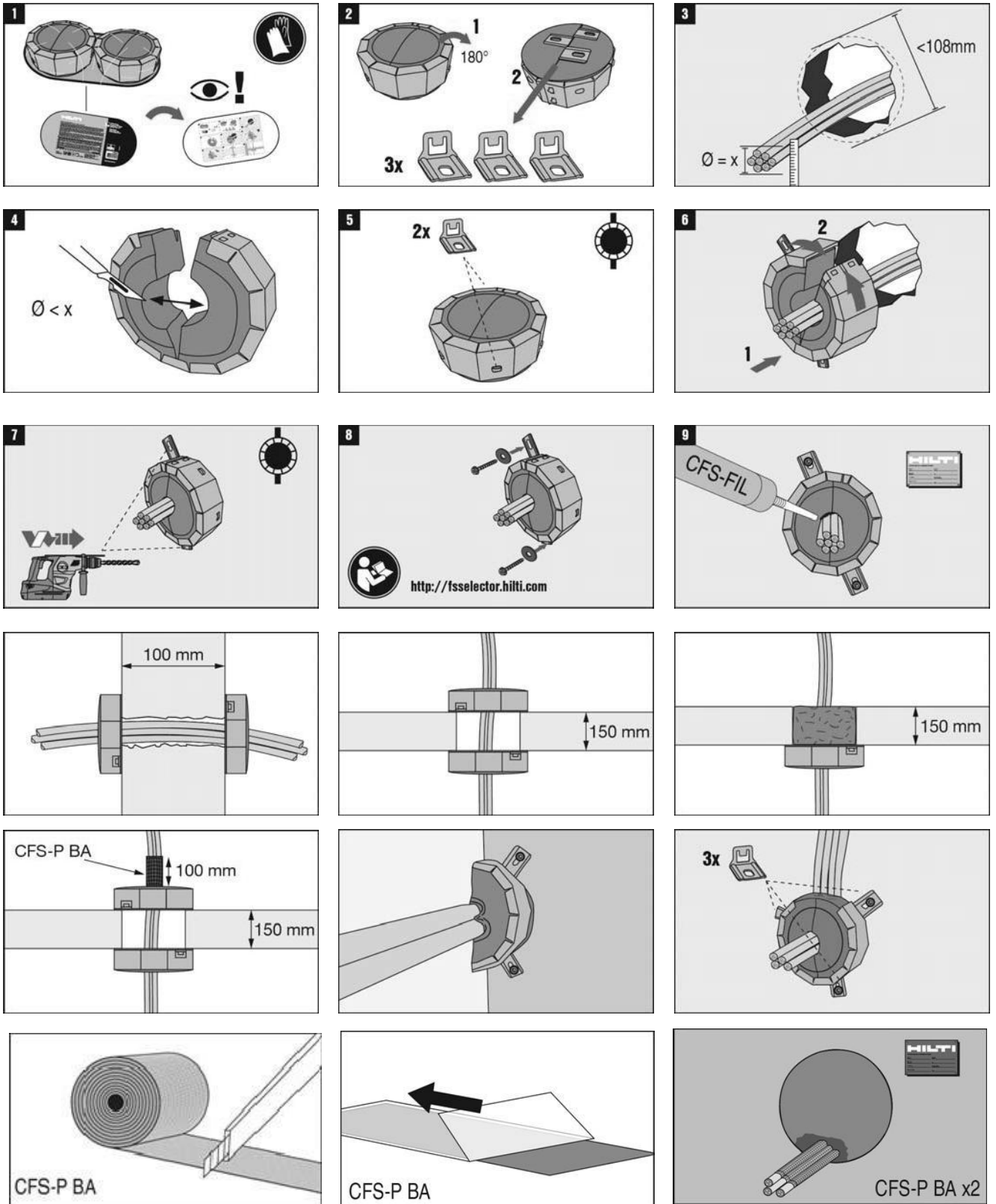
2.3.2.d) Waveguides (coaxial)	
<ul style="list-style-type: none"> <li>• Illustration figure 12</li> <li>• Services – C<sub>1</sub></li> </ul>	<ul style="list-style-type: none"> <li>• Filler – A<sub>1a</sub> (2.1.3.1)</li> </ul>
Waveguides (coaxial): 27,8 mm ≤ Ø ≤ 59,9 mm	<b>Classification</b>
RFS Heliflex HCA 78-50 JFNA Ø 28,0 mm RFS Heliflex HCA 158J Ø 59,9 mm	EI 90-U/C
RFS Cellflex LCF 78-50 JA Ø 27,8 mm RFS Cellflex LCF 214-50 J 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

<b>2.4 Additional Application</b>	
Following additional applications are tested and proved to reach classification as stated above for both wall or floor constellations. Deviations from before mentioned conditions or classifications are described.	
2.4.1 Protection of collar edge	
<ul style="list-style-type: none"> <li>• Protective edge strip</li> </ul>	<ul style="list-style-type: none"> <li>• in cases where a damage of cable might be risked a rubber protection stripe can be used on circular edges of collar</li> </ul>
2.4.2 Installation of part of collar	
<ul style="list-style-type: none"> <li>• To fit cable collar to corner of wall / wall/ floor or wall/wall or wall/floor edges</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 6 metal segments of cable collar can be taken out (½ size metal cage).</li> <li>• The cable collar is mounted with compression against the corner by pushing the tailored foam inlay. The inlay may comprise of two parts.</li> <li>• At least two fixing hooks have to be used at sufficient distance to each other.</li> </ul>
<ul style="list-style-type: none"> <li>• Perpendicular out-bending of cables</li> </ul>	<ul style="list-style-type: none"> <li>• Cables of size Ø ≤ 21 mm can be phased out in a perpendicular manner through cable collar along wall/floor. In parallel, additional cables might run straight through as in standard configuration.</li> <li>• In this case up to 3 metal segments can be taken out to open space for cable penetration.</li> <li>• Three fixing hooks have to be used for fixation of collar</li> <li>• For wall and floor classification is EI 120.</li> </ul>

<b>2.4.3 Special smoke guide pipe application</b>	
<ul style="list-style-type: none"> <li>• Chemical high resistant smoke guide pipes</li> </ul>	<ul style="list-style-type: none"> <li>• Smoke guide pipes made of ABS plastic (EN ISO 15493) of Ø 25 mm and 2,3 mm wall thickness are fire-rated by cable collar with a classification of EI 120 U/U</li> </ul>
<b>2.4.4 Fire rating of air conditioner services</b>	
<ul style="list-style-type: none"> <li>• Split-type air conditioner</li> </ul>	<ul style="list-style-type: none"> <li>• Insolated copper pipes including plastic condenser tubes of split-type air conditioner are fire-rated EI 120 by cable collar.</li> <li>• Constellation: <ul style="list-style-type: none"> <li>○ Sangi twin copper pipe 12/6 mm x1,0mm, preinsulated by <ul style="list-style-type: none"> <li>▪ PEP insulation of 9mm thickness (Ø 30 or 24 mm)</li> </ul> </li> <li>○ plastic condenser tube Ø 24mmx4,3mm (Rehau Rauflame-E, flex PVC)</li> <li>○ electrical lines: two lines, each 5x1,5 mm<sup>2</sup></li> <li>○ all services are bundled together with no distance in between</li> </ul> </li> </ul>
<b>2.4.5 Isolated copper pipe</b>	
<ul style="list-style-type: none"> <li>• Protection of isolated copper pipe Ø 22 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Copper pipe is isolated with RS 800 Rockwool mineral wool locally sustained (LS), protruding at a length of 200mm on each side. Classification: wall EI 90 C/U / floor EI 120 C/U</li> </ul>



**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 <sub>1</sub> , A <sub>2</sub> ,..	Firestop products	t <sub>A</sub>	Thickness of penetration seal
C, C <sub>1</sub> , C <sub>2</sub> ,..	Penetrating services	t <sub>E</sub>	Thickness of the building element
E, E <sub>1</sub> , E <sub>2</sub> ,...	Building elements (wall, floor)	W <sub>P</sub>	Max diameter of seal penetration
S <sub>1</sub> , S <sub>2</sub> , S <sub>n</sub>	Distances	W <sub>A</sub>	Width of frame

#### 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 998-2 2003-09	Specification for mortar for masonry Part2
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
EN ISO 140-10	Acoustics – Measurements of sound insulation in buildings and of building elements – Part 10: Laboratory measurement of airborne sound insulation of small building elements
EN ISO 717-1	Acoustics – Rating of sound insulation of buildings and of building elements – Part 1: Airborne sound insulation

#### 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 firestop Cable Collar CFS-CC and the ancillary products Hilti Firestop Filler CFS-FIL, Hilti Putty Bandage CFS-P BA and Hilti Firestop Mortar CP 633.

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