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

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European Technical Assessment

ETA-14/0088
of 25/04/2014

General part

Technical Assessment Body issuing the ETA	Austrian Institute of Construction Engineering (OIB)
Trade name of the construction product	Hilti Firestop Module Box CFS-MB
Product family to which the construction product belongs	Fire Stopping and Sealing Product: Penetration seal
Manufacturer	Hilti AG Feldkircherstrasse 100 9494 Schaan Liechtenstein
Manufacturing plant	HILTI production plant 4a
This European Technical Assessment contains	22 pages including 4 Annexes which form an integral part of this Assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	Guideline for European technical approval (ETAG) No. 026-2 Fire Stopping and Fire Sealing Products – Part 2: Penetration Seals, edition August 2011, used as European Assessment Document (EAD)

Specific parts

1. Technical description of the product

1.1 Definition of the construction product

This European Technical Assessment refers to Hilti Firestop Module Box CFS-MB in combination with Hilti Firestop Block CFS-BL P or Hilti Firestop Foam CFS-F FX (ETA/10-0109)/CP 660. For a description of the installation procedure see Annex 3.

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

2.1 Intended use

Hilti Firestop Module Box CFS-MB (two halves) or its halves are intended to form a penetration seal when filled completely with cables or partially and then combined with one of the above mentioned Hilti firestop products blocks or foam. Hilti Firestop Module Box CFS-MB or its halves are 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 classification is given. This ETA covers assemblies installed in accordance with the provisions given in Annex 2.

Hilti Firestop Module Box CFS-MB is designed for environmental conditions as defined by use category Y_1, 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.

2.2 Use category

Hilti Firestop Module Box CFS-MB is intended for environmental conditions as defined by use category Y_1 in ETAG 026 Part 2, Annex B.3, B.4, B.10.1 and EOTA TR 024 clause 3.1.4, 4.2.5 (Type Y_1- table 4-1)

2.3 General assumptions

For evaluating resistance to fire of the penetration seal using "Hilti Firestop Module Box" as specified in Annex 2 it is assumed that

a) damages to the penetration seal are repaired accordingly,

b) the installation of the penetration seal does not effect the stability of the adjacent building element – even in case of fire,

c) the installations are fixed to the adjacent building element in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal,

d) the support of the installations is maintained for the required period of fire resistance and

e) pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

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

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

The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this European Technical Assessment.

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

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

2.4 Manufacturing

The European Technical Assessment is issued for “Hilti Firestop Module Box CFS-MB” on the basis of agreed data/information, deposited with the Österreichisches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to the Österreichisches Institut für Bautechnik before the changes are introduced. The Österreichisches Institut für Bautechnik will decide whether or not such changes affect the European Technical Assessment and consequently the validity of the CE marking on the basis of the European Technical Assessment and if so whether further Assessment or alterations to the European Technical Assessment, shall be necessary.

2.5 Installation

“Hilti Firestop Module Box CFS-MB” shall be installed and used in accordance with the details given in Annex 2 and 3 for the penetration seal(s) as described in this European Technical Assessment. Additional marking of the penetration seal shall be done in case of national requirements.

3. Performance of the product and references to the methods used for its Assessment

Basic requirements for construction works	Essential characteristics	Method of verification	Performance
BWR 1	None	Not relevant	
BWR 2	Reaction to fire	EN 13501-1	Class E
	Resistance to fire	EN 13501-2:2007+A1:2009	See Annex 2
BWR 3	Air permeability (material property)	No Performance Determined (NPD)	
	Water permeability (material property)	No Performance Determined (NPD)	
	Content and/or release of dangerous substances	European Council Directive 67/548/EEC-Dangerous Substances Directive and Regulation (EC) No 1272/2008	Declaration of conformity by the manufacturer
BWR 4	Mechanical resistance and stability	No Performance Determined (NPD)	
	Resistance to impact / movement	No Performance Determined (NPD)	
	Adhesion	No Performance Determined (NPD)	
BWR 5	Airborne sound insulation	ISO 140-10:2010, EN ISO 10140-1:2010, EN ISO 10140-2:2010 and EN ISO 717-1:2013	filled with block: R_w (C; Ctr) = 59 (-3;-5) dB filled with foam: R_w (C; Ctr) = 61 (-1;-6) dB
BWR 6	Thermal properties	No Performance Determined (NPD)	
	Water vapour permeability	No Performance Determined (NPD)	
BWR 7	No Performance Determined (NPD)		

3.1 Mechanical resistance and stability (BWR 1)

Not relevant.

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to fire
Hilti Firestop Module Box CFS-MB fulfils the requirements for reaction to fire class E according to EN 13501-1:2010.

3.2.2 Resistance to fire
The resistance to fire performance according to EN 13501-2 of penetration seals is given in Annex 2.
Information of supporting or additional products fire tested within this assessment are listed in Annex 1

3.3 Hygiene, health and environment (BWR 3)

3.3.1 Air permeability
No performance determined.

3.3.2 Water permeability
No performance determined.

3.3.3 Release of dangerous substances
According to the manufacturer's declaration Hilti Firestop Module Box CFS-MB does not contain dangerous substances detailed in Council Directive 67/548/EEC and Regulation (EC) no 1272/2008.

In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, 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 Regulation, these requirements need also to be complied with, when and where they apply.

3.4 Safety and accessibility in use (BWR 4)

3.4.1 Mechanical resistance and stability
Penetrations made of one module box are of small area and no measurements are necessary. In case of clusters it has to be considered to protect the area with wire mesh (wall) or with a metal plate (floor) with respect to avoid injury of persons.

3.4.2 Resistance to impact / movement
See clause 3.4.1

3.4.2 Adhesion
See clause 3.4.1

3.5 Protection against noise (BWR 5)

3.5.1 Airborne sound insulation
Test reports dealing with noise reduction according to ISO 140-10:2010, EN ISO 10140-1:2010, EN ISO 10140-2:2010 and EN ISO 717-1:2013 have been provided.

The acoustic tests were performed in a flexible wall, both sides attached by a double layer of 12,5 mm gypsum board. The void between the plaster boards was filled with mineral wool insulation.

Hilti Firestop Module Box was tested as blank seal and with cable penetration.

The Box was filled either with Hilti Firestop block CFS-BL P or Hilti Firestop Foam CFS-F FX.
Single number rating is expressed as R_w value, weighted sound reduction index (given with spectrum adaptation terms C and Ctr)

filled with block:
Rw (C; Ctr) = 59 (-3;-5) dB
Inclusive cables: R_w (C; Ctr) = 60 (-2;-6) dB

filled with foam:
Rw (C; Ctr) = 61 (-1;-6) dB

3.6 Energy economy and heat retention (BWR 6)

3.6.1 Thermal properties
No performance determined.

3.6.2 Water vapour permeability
No performance determined.

3.7 Sustainable use of natural resources (BWR 7)

No performance determined.

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

4.1 AVCP system

According to the Decision 1999/454/EC[1] of the European Commission the system of assessment and verification of constancy of performance (see Annex V of Regulation (EU) No 305/2011) given in the following table apply:

Products	Intended uses	Level or Class	System
Fire stopping and fire sealing products	For fire compartmentation and / or fire protection or fire performance	Any	System 1

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

5.1 Tasks of the manufacturer

5.1.1 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 insure that the product is in conformity with this European Technical Assessment.

The manufacturer may only use initial/raw/constituent materials stated in the Technical documentation[2] of this European Technical Assessment

For the components, which the ETA-holder does not manufacture by himself, he shall make sure that factory production control carried out by the other manufacturers gives the guarantee of the components compliance with the European Technical Assessment.

The factory production control and the provisions taken by the ETA-holder for components not produced by himself shall be in accordance with the control plan[3] relating to this European Technical Assessment, which is a confidential part of the Technical documentation of this European Technical Assessment.

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1 Official Journal of the European Communities no. L 178, 14.7.1999, p. 52

2 The technical documentation of this European Technical Assessment has been deposited at the Österreichisches Institut für Bautechnik and, as far as relevant for the tasks of the notified product certification body involved in the assessment and verification of constancy of performance, is handed over to the notified product certification body.

3 The control plan has been deposited at Österreichisches Institut für Bautechnik and is handed over only to the notified product certification body involved in the assessment and verification of constancy of performance.

The results and details of the extent, nature and frequency of controls be performed within the factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

5.1.2 Other tasks of the manufacturer
The manufacturer shall provide a technical data sheet and an installation instruction with the following minimum information:

Technical data sheet:

a) Field of application:
   1) Building elements for which the penetration seal is suitable, type and properties of the building elements like minimum thickness, density, and – in case of lightweight constructions – the construction requirements
   2) Services which may pass through the penetration seal, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings
   3) Limits in size, minimum thickness etc. of the penetration seal
   4) Environmental conditions covered by this European Technical Assessment

b) Construction of the penetration seal including the necessary components and additional products (e.g. backfilling material) with clear indication whether they are generic or specific.

Installation instruction:

a) Steps to be followed

b) Stipulations on maintenance, repair and replacement

The manufacturer shall, based on a contract, involve a notified product certification body, which is notified for the tasks referred to in clause 4.1 of the ETA in the field of Assessment product. For this purpose, the control plan referred to in clause 5.1.1 and 5.1.2 of the ETA shall be handed over by the manufacturer to the notified product certification body involved.

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

5.1.3 Further testing of samples taken at the factory
Testing of samples taken at the factory by the manufacturer is not required.

5.2 Tasks of notified product certification body

The Notified Body shall retain the essential points of its actions referred to clause 5.2.1 to 5.2.3, state the results obtained and conclusions drawn in written report.

These tasks shall be performed in accordance with the provisions laid down in the control plan of this European Technical Assessment.

5.2.1 Determination of the product type
Notified bodies undertaking tasks under Systems 1 shall consider the European Technical Assessment issued for the construction product in question as the Assessment of the performance of that product. Notified bodies shall therefore not undertake the tasks referred to in point 1.2 (b)(i), in Annex V of Regulation (EU) No 305/2011, unless there are changes in the manufacture or manufacturing plant. In such cases, the necessary initial type testing has to be agreed between the Österreichisches Institut für Bautechnik and notified product certification body involved.

5.2.2 Initial inspection of the manufacturing plant and of factory production control
The notified product certification body shall ascertain that, in accordance with the control plan, the manufacturing plant, in particular personnel and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the kit according to the specifications given in clause 2 and in the Annexes of the European Technical Assessment.

5.2.3 Continuous surveillance, assessment and evaluation of factory production control
The notified product certification body shall visit the factory at least once a year for surveillance of the manufacturer.

It has to be verified that the system of factory production control and the specified manufacturing process are maintained taking into account the control plan.

Continuous surveillance and Assessment of factory production control have to be performed according to the control plan.

The results of continuous surveillance shall be made available on demand by the notified product certification body or the Österreichisches Institut für Bautechnik. In cases where the provisions of the European Technical Assessment and the control plan are no longer fulfilled, the certificate of constancy of performance shall be withdrawn.

Issued in Vienna on 25.04.2014
by Österreichisches Institut für Bautechnik

Rainer Mikulits
Managing Director

Member of EOTA

ANNEX 1

DESCRIPTION OF PRODUCT(S) & PRODUCT LITERATURE

1.1 Product

The detailed specification and control plan of the products listed below is given in document “Identification / Product Specification” and “Control Plan” relating to their corresponding European technical approval; which are a non-public part of the ETA.

1.1.1 Hilti Firestop Module Box CFS-MB

The half of a module box is moulded in U-shape. Two U-shapes fit together to build a box of approximately 130 mm in height, 160 mm in width and 200 mm in length. The Hilti Firestop Module Box half is used open (U shape) against a surface or as a box (2x U halves) free placed in walls or floors.

1.1.2 Hilti Firestop Block CFS-BL P

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

1.1.3 Hilti Firestop Foam CFS-F FX/ CP 660

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

1.2. Ancillary Products

Ancillary products are used for annular space or gap filling.

1.2.1 Hilti Firestop Filler CFS-FIL

The filler is available as a cartridge of 310 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)

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 Putty Bandage CFS-P BA", which is a non-public part of that ETA.

1.3 Technical product literature:

Technical Data Sheet Hilti Firestop Module Box CFS-MB including ancillary product.

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ANNEX 2
RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF HILTI FIRESTOP MODULE BOX CFS-MB

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 550 kg/m^3.

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^3.

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 200 mm (t_A) comprising by at least a wall/floor of 100/150 mm (t_E). Aperture framing or beading is not necessary.

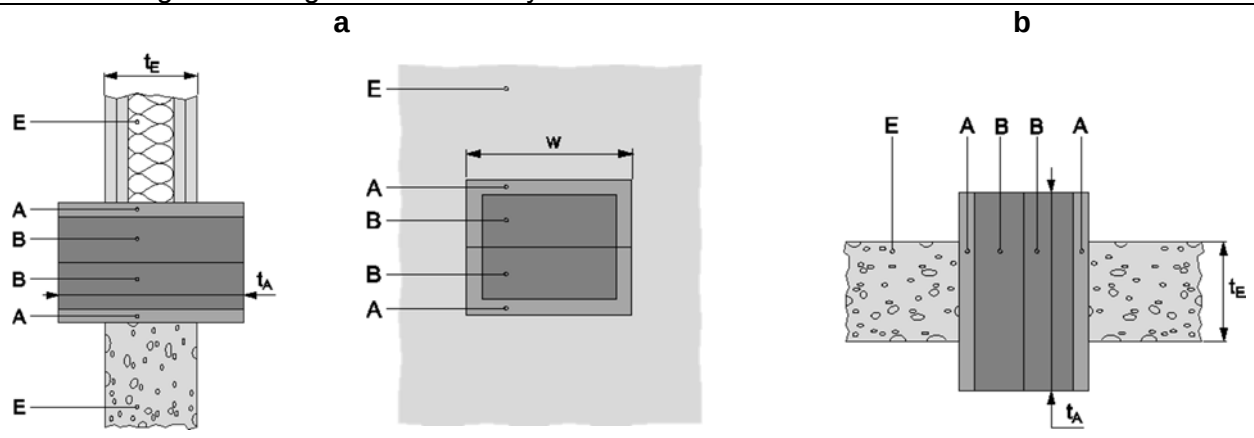
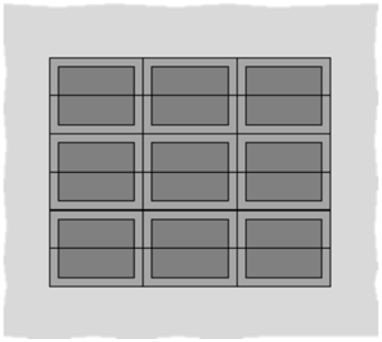
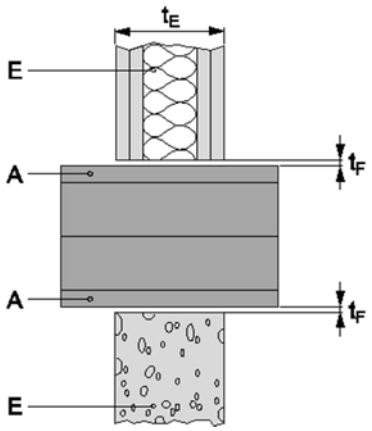
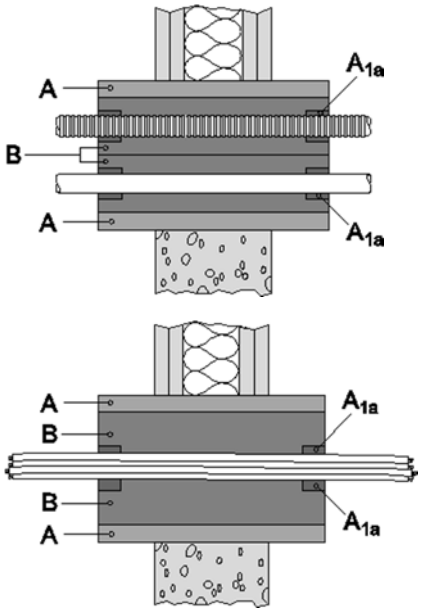
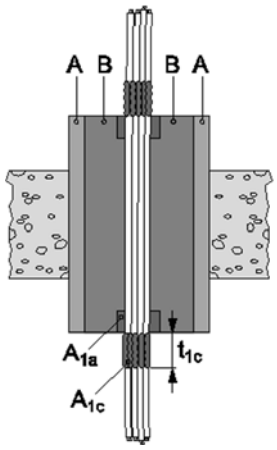


Figure 1: position of the seal in walls a) / floors b)

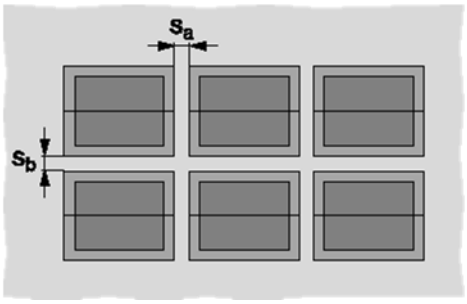
A	Hilti firestop product	t_E	Thickness of building element
B	Hilti firestop product	w	Width of seal
E	Building element (rigid or flexible wall construction, floor)		
t_A	Thickness of seal		

2.1.3 Maximum Seal Size	
• Hilti Firestop Module Box can be used as half or as box (two U halves); box can be clustered. • The maximum cluster is 3x3 boxes aside which cover an area of approximately 495 to 405 mm (width x height).	 Figure 2

2.1.4 Penetration sealings	
2.1.4.1 General installation	
• Hilti Firestop Module Box CFS-MB (2xA) or its half (A) is put into a rectangular void of wall or floor; centred within wall/floor. In case only the half is used, the open side has to face a wall or floor. • The gap between wall/floor and box must not exceed 15 mm (t_F) and can be closed with Hilti Firestop Filler CFS-FIL, Hilti Firestop Sealant CFS-S ACR or plaster. • See figure 3	 Figure 3
• Gaps between services and Hilti Firestop Module Box CFS-MB (A) or blocks (B) are filled with Hilti Firestop Filler CFS-FIL (A_{1a}), depth 20 mm. • In case Hilti Firestop Foam CFS-F FX is used instead of blocks to fill the module box cavity CFS-FIL is not applied.	 Figure4: basic sealing - A_{1a}

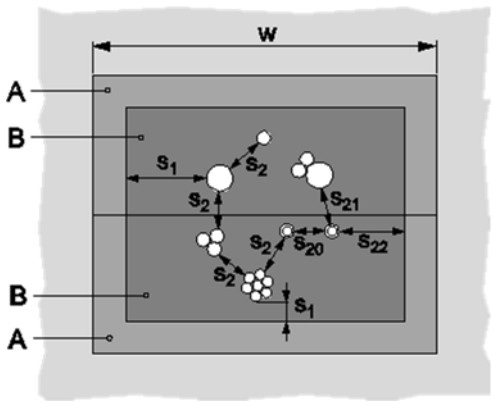
2.1.4.2 Additional protection - Filler coating (A_{1c})	
• Gaps between services and Hilti Firestop Module Box CFS-MB (2xA) and blocks (B) are filled with Hilti Firestop Filler CFS-FIL (A_{1a}), depth 20 mm. • In some cases Filler coating can be used to improve classification. Cables are then covered by Hilti Firestop Filler CFS-FIL at a length of approximately 50 mm (t_{1c}) and 5 mm in thickness (A_{1c}). • In case foam is used to fill up box, coating (A_{1c}) can be done with foam like as filler at 5 mm thickness, but at a length of 100 mm.	 Figure 4: Coating with filler or foam (A_{1c})

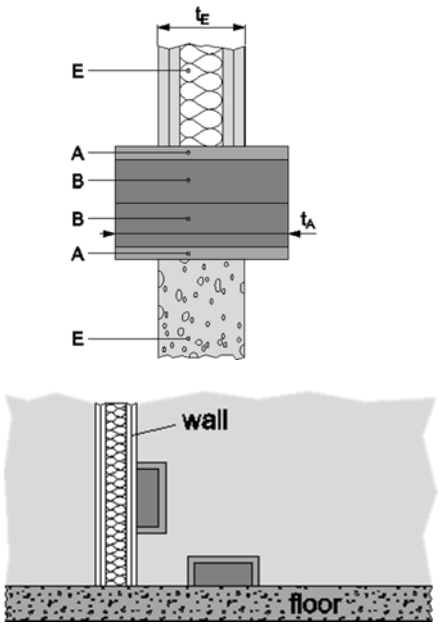
2.1.5 Cluster arrangement

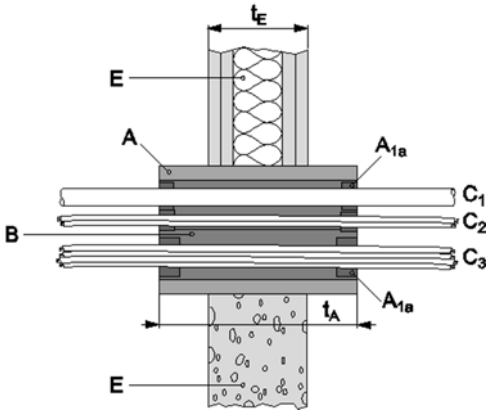
Minimum distances in mm (see illustration): S_a = 0 (distance between module boxes linear) S_b = 0 (distance between module boxes in cluster arrangement)	 Figure 6

2.1.6 Distance Rule

Distances valid for wall and floor installations.

Minimum distances in mm (see illustration): s_1 = 0 (distance between cables and box edge) s_2 = 0 (distance between cables or bundles) $s_{20,21,22}$ = 0 (conduits Ø≤16 mm) s_{20} = 0 (conduits Ø>16 mm; distance between conduits to each other) s_{22} = 10 (conduits Ø>16 mm; distance between conduits to box edge) s_{21} = 20 (conduits Ø>16 mm; distance of conduits to other services)	 Figure 7

2.2 Flexible or rigid walls according to 2.1.1 - minimum wall thickness 100 mm	
2.2.1 Blank seal (no services) *	
• Construction details (for symbols and abbreviations see Annex 4.1): • Hilti Firestop Module Box (2x U shape). • Clustered up to 9 boxes in a rectangular manner (495x405 mm / width x height) – see 2.1.5 • Hilti Firestop Module Box half (1x U shape), open side faced towards a surface (wall, floor); integration into wall/floor as for the complete box - see 2.1.4.1	 Figure 8: blank seal
	Classification
Seal Size box: aprox. 160 x 130 mm (width x height) or half shell 160x70 (width x height)	EI 90
* If services are added later on in a blank seal only these services listed in the tables below may be added that fulfill the required classification.	

2.2.2 Penetrating services		
Services have to be supported at ≤ 300 mm from both faces of wall.		
Abbreviation	**Description**	 Figure 9: wall penetration
A, A_1, A_2,..	Firestop products: A: Module Box B: Block, Foam A_{1a}: Filler	
C_1, C_2, C_3,..	Penetrating services C1 – wave guides, conduits (with /without calbles) C2,3 – cable, cable bundle	
E, E_1, E_2,…	Building elements	
t_A	Thickness of the penetration	
t_E	Thickness of the building element	

2.2.2.a) Cables		
Construction details		
• Hilti Firestop Module Box (2xA), seal thickness t_A of approximately. 200 mm. • Centered regarding to thickness of wall (E); • Abbreviations see figure 9 (C_2,C_3)	• Filler A_{1a} (2.1.4.1)	
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
All sheathed cable:	**Box Insert**	
Ø ≤ 21 mm	CFS-BL P / CFS-F FX	EI 90
21 ≤ Ø ≤ 50 mm	CFS-BL P / CFS-F FX	EI 90
Tied cable bundle ≤ Ø 100 mm; Ø single cable ≤ 21 mm;	CFS-BL P / CFS-F FX	EI 90
100% filled penetration with Ø single cables ≤ 21 mm	-	EI 90
Non-sheathed cables (wires) Ø ≤ 24 mm	CFS-BL P / CFS-F FX	EI 30

Construction details		
• Hilti Firestop Module Box half (A), seal thickness t_A of approximately. 200 mm; open side facing surface. • Centered regarding to thickness of wall (E); • Abbreviations see figure 9 (C_2,C_3)	• Filler A_{1a} (2.1.4.1)	
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
All sheathed cable:	**Box Insert**	
Ø ≤ 21 mm	CFS-BL P / CFS-F FX	EI 90
21 ≤ Ø ≤ 50 mm	CFS-BL P / CFS-F FX	EI 90
Tied cable bundle ≤ Ø 100 mm; Ø single cable ≤ 21 mm;	CFS-BL P / CFS-F FX	EI 90
100% filled penetration with Ø single cables ≤ 21 mm	-	EI 90
Non-sheathed cables (wires) Ø ≤ 24 mm	CFS-BL P / CFS-F FX	EI 30

2.2.2.b) Small conduits / pipes and tubes	
Construction details	
• Illustration figure 9 • Services – C_1	• Filler – A_{1a} (2.1.4.1)

Ø ≤ 16 mm, wall thickness ≥ 1 mm, arranged linear or clustered, with or without cables, with or without cable supports, minimum distance to each other = 0 mm	**Classification**
Plastic conduits / pipes and tubes	EI 90 U/U
Steel conduits / pipes and tubes	EI 90 C/U

2.2.2.c) Conduits				
Construction details				
• Illustration figure 9 • Services – C_1 • Wall thickness of rigid conduits: PO: 1,2 to 2,30 mm PVC: 1,80 to 2 mm		• Filler – A_{1a} (2.1.4.1)		
		Diameter [mm]		**Classification**
		PO	PVC	
Flexible conduits	with and without cable	16 - 32	16 - 32	EI 90 U/U
Rigid conduits	with and without cable	16 - 32	16 - 32	EI 90 U/U
Bundle of rigid or flexible conduits, Ø of single conduits ≤ 32 mm	with cable	≤ 100		EI 90 U/U
	without cable			
PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride				

2.2.2.d) Waveguides (coaxial)	
• Illustration figure 9 • Services – C_1	• Filler – A_{1a} (2.1.4.1)

Waveguides (coaxial): 27,8 mm ≤ Ø 59,9 mm	**Classification**
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 RFS Radialflex RLKW 78-50 Ø 28,5 mm RFS Radialflex RLKU 158-50 JFLA Ø 48,2 mm	EI 90 U/C

2.3 Floor according to 2.1.1, minimum floor thickness 150 mm

2.3.1 Blank seal (no services) *

- Hilti Firestop Module Box (2xU shapes, 2xA).
- Clustered up to 9 boxes in a rectangular manner – see 2.1.5.
- Hilti Firestop Module Box half (1xU shape,1xA)), open side faced towards a surface (wall, floor); integration into wall/floor as for the complete box (2.1.4.1).
- for abbreviations see 2.1.2 Figure 1.

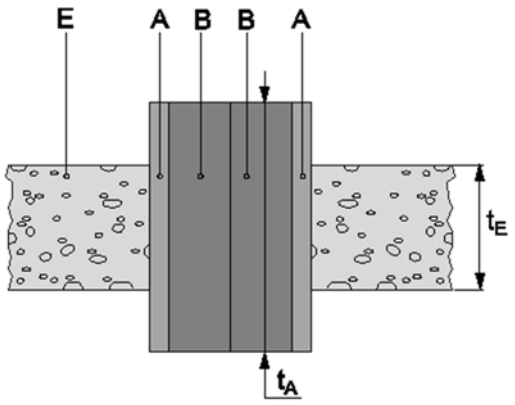


Figure 10: blank seal floor

	Classification
All tested products (CFS-BL P, CFS-F FX)	EI 90

* 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

Services have to be supported at ≤ 300 mm from top of floor.

Abbreviation	Description
A, A_1, A_2,..	Firestop products: A: Module Box B: Blocks, Foam A_{1a}: Filler A_2: Putty bandage
C_1, C_2, C_3,..	Penetrating services
E, E_1, E_2,…	Building elements
t_E	Thickness of the building element

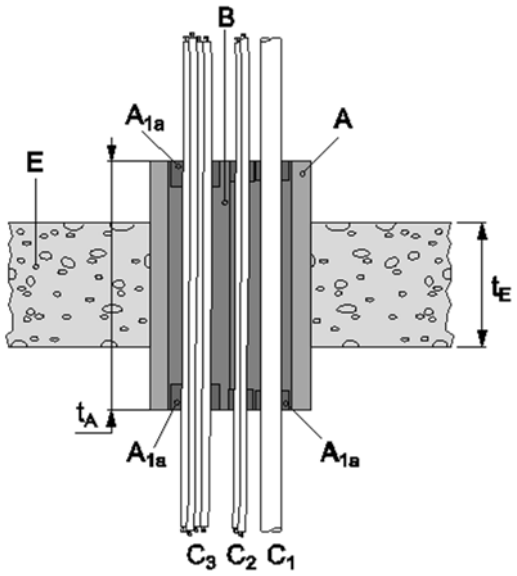


Figure 11: floor penetration

2.3.2.a) Cables

Construction details

• Hilti Firestop Module Box (2x U shapes; 2xA); Seal thickness t_A of approximately 200 mm, centered to floor (E). • Hilti Firestop Module Box Half (1xU shape; 1xA); open side facing surface; seal thickness t_A of approximately 200 mm, centered to floor (E). • Putty Bandage CFS-P BA is applied on upper side of floor only. • Services see figure 11 (C_2,C_3)	• Filler A_{1a} (2.1.4.1) • Filler Coating A_{1c} (2.1.4.2)

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	
	Additional Protection:		**Filler Coating**
All sheathed cable:	**Box Insert**		
Ø ≤ 21 mm	CFS-BL P	EI 90	
	CFS-F FX	EI 90	
21 ≤ Ø ≤ 50 mm	CFS-BL P	EI 60	EI 90 (50 mm in length coated with filler)
	CFS-F FX	EI 60	EI 90 (100 mm in length; coated with foam)
Tied cable bundle ≤ Ø 100 mm; Ø single cable ≤ 21 mm;	all	EI 90	
100% filled penetration with Ø single cables ≤ 21 mm	-	EI 90	
Non-sheathed cables (wires) Ø ≤ 24 mm	all	EI 30	

Construction details	
• Hilti Firestop Module Box half (A), seal thickness t_A of approximately. 200 mm; open side facing surface. • Centered regarding to thickness of wall (E); • Abbreviations see figure 9 (C_2,C_3)	• Filler A_{1a} (2.1.4.1)

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	
	Additional Protection:		**Filler Coating**
All sheathed cable:	**Box Insert**		
Ø ≤ 21 mm	CFS-BL P	EI 90	
	CFS-F FX	EI 90	
21 ≤ Ø ≤ 50 mm	CFS-BL P	EI 60	EI 90
	CFS-F FX	EI 60	EI 90 (100 mm in length; coated with foam)
Tied cable bundle ≤ Ø 100 mm; Ø single cable ≤ 21 mm;	all	EI 90	
Non-sheathed cables (wires) Ø ≤ 24 mm	all	EI 30	

2.3.2.b) Small conduits / pipes and tubes

Construction details	
• Illustration figure 11 • Services – C_1	• Filler – A_{1a} (2.1.4.1)

Ø ≤ 16 mm, wall thickness ≥ 1 mm, arranged linear, with or without cables, minimum distance to each other = 0 mm	**Classification**
Plastic conduits / pipes and tubes	EI 90 U/U
Steel conduits / pipes and tubes	EI 90 C/U

2.3.2.c) Conduits				
Construction details				
• Illustration figure 11 • Services – C_1 • Wall thickness of rigid conduits: PO: 1,55 to 2,30 mm PVC: 1,90 to 2,80 mm		• Filler – A_{1a} (2.1.4.1)		
		Diameter [mm]		**Classification**
		PO	PVC	
Flexible conduits	with and without cable	16 - 32	16 - 32	EI 90 U/U
Rigid conduits	with and without cable	16 - 32	16 - 32	
Bundle of rigid or flexible conduits Ø of single conduits ≤ 32 mm	with and without cable	Ø ≤ 100		EI 90 U/U
PO: Polyolefin (PE, PP, PPE, PPO, ...); PVC: Polyvinylchloride				

2.3.2.d) Waveguides (coaxial)	
• Illustration figure 11 • Services – C_1	• Filler – A_{1a} (2.1.4.1)
Waveguides (coaxial): 27,8 mm ≤ Ø ≤ 59,9 mm	**Classification**
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 RFS Radialflex RLKW 78-50 Ø 28,5 mm RFS Radialflex RLKU 158-50 JFLA Ø 48,2 mm	EI 90 U/C

2.4 Aditional Applications	
Following additional applications are tested and proved to reach classification as stated above for both wall or floor applications. Deviations from before mentioned conditions or classifications are described.	
2.4.1 Fire rating of air conditioner services	
• Split-type air conditioner	• Insolated copper pipes including plastic condenser water tubes of split-type air conditioner are fire-rated: Wall: EI 90 (copper pipe C/U; condenser water tube U/U, cables) Floor: EI 90 (C/U copper pipe, U/U condenser water tube, cables). • Constellation: o Sangi twin copper pipe 12/6 mm x 1,0 mm, preinsulated by PEP insulation of 9mm thickness (Ø 30 or 24 mm) o plastic condenser tube Ø 24 mm x 4,3mm (Rehau Rauflame-E, flex PVC) o electrical lines: two lines, each 5 x 1,5 mm² o all services are bundled together with no distance in between

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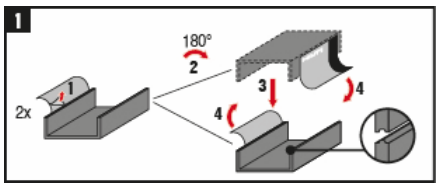
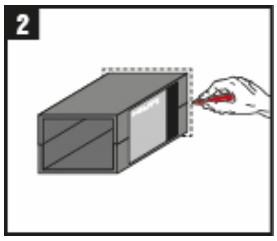
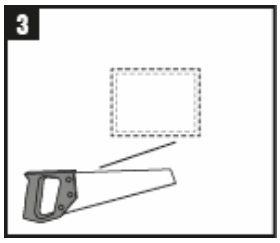
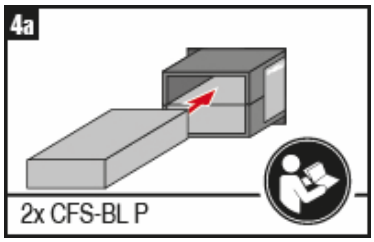
ANNEX 3

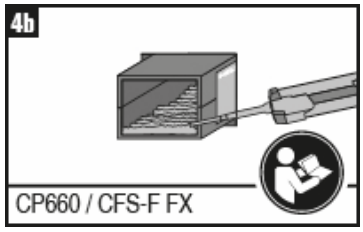
INSTALLATION OF THE PRODUCT AND ANCILLARY PPRODUCT(S)

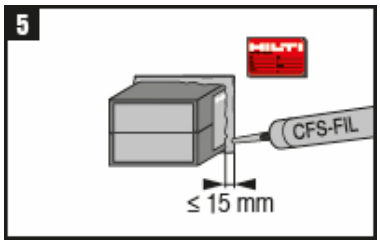












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ANNEX 4

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_1, C_2, C_3,..	Penetrating services	t_E	Thickness of the building element
E, E_1, E_2,…	Building elements (wall, floor)	W_P	Max diameter of seal penetration
s_1, s_2, s_n	Distances	W_A	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 Firestop Module Box CFS-MB