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European Technical Assessment

ETA 18/1024
of 2024-05-16

General Part

Technical Assessment Body issuing the European Technical Assessment:	RISE Research Institutes of Sweden AB
Trade name of the construction product	Hilti Firestop Flex Seal CFS-FS Hilti Firestop Block CFS-BL P
Product family to which the construction product belongs	Fire resistant penetrations when incorporated in floors and walls
Manufacturer	Fire resistant penetrations when incorporated in floors and walls
Manufacturing plant(s)	Hilti Production Plant 4a
This European Technical Assessment contains	21 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	European Assessment Document 350454-00-1104, edition September 2017
This version replaces	ETA 18/1024, issued on 2019-01-25
This ETA is corrigendum 1 of	ETA 18/1024, issued on 2024-05-16

List of content

1. Technical description of the product

1.1 Definition of the Construction Product

The Hilti Firestop Flex Seal CFS-FS and the Hilti Firestop Block CFS-BL P are penetration seals.
The mat-shaped Hilti Firestop Flex Seal CFS-FS is based on a fully cured, pre-formed PU-based firestop material with intumescent components.
The Hilti Firestop Block CFS-BL P is a brick-shaped block based on a fully cured, pre-formed PU-based firestop material with intumescent components.

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

2.1 Intended use

The Hilti Firestop Flex Seal CFS-FS and the Hilti Firestop Block CFS-BL P are intended to form a penetration seal, which is used to maintain the fire resistance of a separating element (wall or floor) at the position where services pass through as further detailed in section 7 and 8 (Annex B and C).

2.2 Use category / Durability

According to European Assessment Document 350454-00-1104, edition September 2017, penetration seals may be used in various environmental conditions, which are described by the following use conditions listed in the table below.
The table below includes the information which requirements regarding use category and durability (BWR 4) are fulfilled by the listed products.

Use condition	**Requirements**	**Hilti Firestop Flex Seal CFS-FS**	**Hilti Firestop Block CFS-BL P**
		fulfils requirements of	
Type X	intended for use in conditions exposed to weathering		
Type Y_1	intended for use at temperatures below 0 °C with exposure to UV but no exposure to rain		☑
Type Y_2	intended for use at temperatures below 0 °C, but with no exposure to rain no UV	☑	☑
Type Z_1	intended for use in internal conditions with humidity equal to or higher than 85% RH excluding temperatures below 0 °C, without exposure to rain or UV	☑	☑
Type Z_2	intended for use in internal conditions with humidity lower than 85% RH excluding temperatures below 0 °C, without exposure to rain or UV	☑	☑
Products that meet the requirements for type X, meet the requirements for all other types. Products that meet the requirements for type Y_1 also meet the requirements for type Y_2, Z_1 and Z_2. Products that meet the requirements for type Y_2 also meet the requirements for type Z_1 and Z_2. Products that meet the requirements for type Z_1, also meet the requirements for type Z_2.			

2.3 Working life

The assessment methods included or referred to in the EAD 0350454-00-1104 have been written based on the manufacturer's request to take into account a working life of the products Hilti Firestop Flex Seal and CFS-FS Hilti Firestop Block CFS-BL P for the intended use of 25 years when installed in the works, provided that the products are subject to appropriate installation, use and maintenance according to the manufacturers specifications. These provisions are based upon the current state of the art and the available knowledge and experience.

The indication given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting the EAD 0350454-00-1104 nor by the Technical Assessment Body (RISE Research Institutes of Sweden AB) issuing this ETA based on the EAD 0350454-00-1104, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

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

3.1 Essential characteristics and their performance

Basic works requirement	Essential characteristic	Performance
BWR 2 – Safety in case of fire	Reaction to fire	See 0 of this ETA
	Resistance to fire	See 3.3 of this ETA
BWR 3 – Hygiene, health and the environment	Air permeability	See 3.4 of this ETA
	Water permeability	No performance assessed
	Content, emission and/or release of dangerous substances	See 3.5 of this ETA
BWR 4 – Safety and accessibility in use	Mechanical resistance and stability	No performance assessed
	Resistance to impact/movement	No performance assessed
	Adhesion	No performance assessed
	Durability	See 3.6 of this ETA
BWR 5 – Protection against noise	Airborne sound insulation	See 3.7 of this ETA
BWR 6 – Energy economy and heat retention	Thermal properties	See 3.8 of this ETA
	Water vapour permeability	No performance assessed

3.2 Reaction to fire

The Hilti Firestop Flex Seal CFS-FS and the Hilti Firestop Block CFS-BL P have been classified according to EN 13501-1, class E.

3.3 Resistance to fire

The resistance to fire performance according to EN 13501-2 for penetration seals incorporating Hilti Firestop Flex Seal and CFS-FS Hilti Firestop Block CFS-BL P is given in section 8 (Annex C) of the ETA.

3.4 Air permeability

The air permeability was tested according to EN 1026:2000 and EN 12211:2000 in an aerated concrete wall.

Valid for Hilti Firestop Block **CFS-FS version 200 mm**				Tested opening size 500 mm x 280 mm				
Average values of positive and negative wind pressures								
Pressure differential in Pa	50	100	150	200	250	300	450	600
Flow rate (volume) in m^3/h	0,10	0,22	0,32	0,50	0,55	0,66	1,02	1,31
Overall are-related in $m^3/(h\ m^2)$	0,64	1,42	2,09	3,26	3,57	4,33	6,70	8,57

No failure until pressure differential of (static pressure differential)	2000	Pa

Valid for Hilti Firestop Block **CFS-FS version 130 mm**				Tested opening size 545 mm x 280 mm				
Average values of positive and negative wind pressures								
Pressure differential in Pa	50	100	150	200	250	300	450	600
Flow rate (volume) in m^3/h	0,24	0,48	0,75	0,97	1,13	1,44	2,06	2,66
Overall are-related in $m^3/(h\ m^2)$	1,59	3,17	4,89	6,38	7,39	9,45	13,51	17,43

No failure until pressure differential of (static pressure differential)	1000	Pa

Valid for Hilti Firestop Block **CFS-BL P version 200 mm**				Tested opening size 500 mm x 280 mm				
Average values of positive and negative wind pressures								
Pressure differential in Pa	50	100	150	200	250	300	450	600
Flow rate (volume) in m^3/h	0,08	0,15	0,23	0,27	0,35	0,41	0,59	0,77
Overall are-related in $m^3/(h\ m^2)$	0,51	1,00	1,50	1,78	2,27	2,63	3,80	5,01

No failure until pressure differential of (static pressure differential)	6200	Pa

Valid for Hilti Firestop Block **CFS-BL P version 130 mm**				Tested opening size 545 mm x 280 mm				
Average values of positive and negative wind pressures								
Pressure differential in Pa	50	100	150	200	250	300	450	600
Flow rate (volume) in m^3/h	0,13	0,28	0,40	0,59	0,64	0,78	1,17	1,50
Overall are-related in $m^3/(h\ m^2)$	0,87	1,85	2,60	3,85	4,19	5,09	7,66	9,83

No failure until pressure differential of (static pressure differential)	4000	Pa

3.5 Content, emission and/or release of 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.

The release of semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) has been determined according to EAD 350454-00-1104 clause 2.2.5.1 and prEN 16516:2015 (CFS-BLP) and DIN EN 16516:2020-10 (CFS-FS). The loading factor used for emission testing was 0,007m^2/m^3.

	Hiti Firestop Flex Seal CFS-FS	**Hilti Firestop Block CFS-BL P**
Total emission of SVOC of product after 3 days [mg/m^3]:	< 0.005	< 0.005
Total emission of SVOC of product after 28 days [mg/m^3]:	< 0.005	< 0.005
Total emission of VOC of product after 3 days [mg/m^3]:	0.072	0.043
Total emission of VOC of product after 28 days [mg/m^3]:	0.032	0.0053

3.6 Durability

The durability tests have been carried out according to EOTA TR 024. The results for durability are listed in chapter 2.2 of this ETA.

3.7 Airborne sound insulation

Test reports from noise reduction according to EN ISO 10140-2 and EN ISO 717-1 have been provided. The tests were performed in flexible wall backfilled with compressed mineral wool.

The reached values for the airborne sound insulation are given in the following table. The opening size of each is 600 x 500 [mm].

Product version	**R_w (C; C_{tr}) in dB**
CFS-FS 200 mm	53 (-3; -8)
CFS-FS 130 mm	51 (-3; -7)
CFS-BL P 200 mm	53 (-2; -9)
CFS-BL P 130 mm	50 (-2; -7)

3.8 Thermal properties

The thermal conductivity shown in the table below was assessed according to EN 12667:2001.

Product version	**Thermal conductivity λ [W/(m K)]**
Hilti Firestop Flex Seal CFS-FS	0.0614
Hilti Firestop Block CFS-BL P	0.089

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

According to the decision 1999/454/EC - Commission decision of date 22 June 1999, published in the Official Journal of the European Union (OJEU) L178 of 14/07/1999, amended by decision 2001/596/EC – Commission decision of date 8 January 2001, published in the Official Journal of the European Union (OJEU) L209 of 02/08/2001, of the European Commission the systems of assessment and verification of constancy of performance (see Annex V to the regulation (EU) No 305/2011) given in the following table apply:

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Fire Stopping and Fire Sealing Products	For fire compartmentation and/or fire protection or fire performance	any	1
	For uses subject to regulations on reaction to fire	A1*, A2*, B*, C*	1
		A1**, A2**, B**, C**, D, E	3
		(A1 to E)***, F	4

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

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

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

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the Technical Assessment Body RISE Research Institutes of Sweden AB.

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

Issued in Borås on 2024-05-16
By RISE Research Institutes of Sweden AB

Martin Tillander
Director, Product certification

6. ANNEX A REFERENCE DOCUMENTS

6.1 References to standards mentioned in the ETA

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
EN 16516	Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air
EN ISO 717-1	Acoustics – Rating of sound insulation of buildings and of building elements – Part 1: Airborne sound insulation
EN ISO 10140-1 EN ISO 10140-2	Acoustics – Laboratory measurement of sound insulation of building elements Part 2: Measurement of airborne sound insulation Part 3: Measurement of impact sound insulation
EN 12667	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance
EN ISO 12572	Hygrothermal performance of building materials and products - Determination of water vapour transmission properties - Cup method (ISO 12572:2016, IDT)
EN 300	Oriented Strand Boards (OSB) - Definitions, classification and specifications
EN 338	Structural timber - Strength classes
EN 520	Gypsum plasterboards - Definitions, requirements and test methods
EN 16351	Timber structures - Cross laminated timber - Requirements
EN 13986	Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking
EN 14081-1	Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements

6.2 Other reference documents

EOTA TR 024	Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products
EOTA TR 001	Determination of impact resistance of panels and panel assemblies
ETA-10/0241 / Z-9.1-501	Leno Brettsperrholz (cross laminated timber - Züblin Timber GmbH)

7. ANNEX B - The product CFS-FS-and CFS-BL P

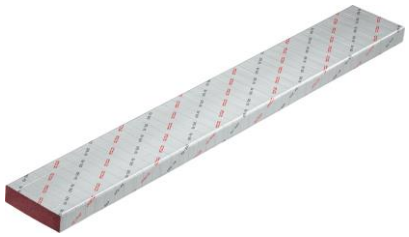
7.1 Description of the products and ancillary product(s)

7.2 Hilti Firestop Flex Seal CFS-FS

The Hilti Firestop Flex Seal CFS-FS is a mat-shaped block, which is based on a fully cured, pre-formed PU-based firestop material with intumescent components. The Hilti Firestop Flex Seal CFS-FS is existing in two sizes as shown in the table below.

Product name	Hilti Firestop Flex Seal CFS-FS	
Short name	CFS-FS L	CFS-FS M
Length [mm]	1000	1000
Width [mm]	200	130
Hight [mm]	35	35

A detailed specification of the product is contained in the document "Identification / Product Specification" relating to this European Technical Assessment 18/1024 – "Hilti CFS-FS Firestop Flex Seal / Hilti Firestop Block CFS-BL P", which is a non-public part of this ETA.
The control plan is defined in the document "Control Plan" relating to this European Technical Assessment 18/1024, which is a non-public part of this ETA.



CFS-FS 130 mm Version

CFS-FS 200 mm Version

7.3 Hilti Firestop Block CFS-BL P

The Hilti Firestop Block CFS-BL P is a brick-shaped block based on a fully cured, pre-formed PU-based firestop material with intumescent components. The Hilti Firestop Block CFS-BL P has the dimensions of 200 mm x 130 mm x 50 mm (l x w x h).

A detailed specification of the product is contained in the document "Identification / Product Specification" relating to this European Technical Assessment 18/1024 – "Hilti CFS-FS Firestop Flex Seal / Hilti Firestop Block CFS-BL P", which is a non-public part of this ETA.
The control plan is defined in the document "Control Plan" relating to this European Technical Assessment 18/1024, which is a non-public part of this ETA.

CFS-BL P

7.4 Hilti Firestop Filler CFS-FIL

- One-component, water based intumescent acrylic sealant
- Available in cartridges and foils
- CFS-FIL is fully described in ETA-21/0256

7.5 Technical product literature

- Technical data sheets for the individual solutions (including all ancillary products) and Material safety Data Sheet (MSDS) see www.hilti.group
- Instruction for Use (see sec. 9)

8. ANNEX C - Resistance to fire classification of "Hilt Firestop Block CFS-BL P and Hilti Firestop Flex Seal CFS-FS

8.1 Intended use of penetrants and reference to relevant sections

Application	Penetration material	CLT floor $t_E \geq 220$ mm	Timber beam floor $t_E \geq 236$ mm	CLT wall $t_E \geq 148$ mm	Timber partition wall $t_E \geq 152$ mm
Cables	sheated cables, glass fibre, cable support systems	8.3.2	8.3.3	8.3.4	8.3.5

8.2 General information

8.2.1 Penetration seal, and penetrant orientation

- Single, multiple and mixed penetration seal
- Penetrants penetrate the wall/floor seal in perpendicular situation only

8.2.2 Suitable building structures, where CFS-FS and CFS-BL P can be used

- CLT wall and floor
- Timber beam floor and
- Stud partition wall
- For details refer to section 8.3

8.2.3 Seal Thickness increase / Aperture framing and beading

- Option 200 mm see section 8.3.1
- No aperture framing to reach seal thickness necessary

8.2.4 Seal Size

- For the approved seal size and E/I-rating in wall and floor (empty and penetrated seal) the maximum opening size is 300 x 300 [mm]

8.2.5 Gap seal

- Penetrants to be sealed with CFS-FIL 20 mm in depth

8.2.6 First support for penetrants

distances of first support from supporting constructions for the 200 mm version	
wall (identical on both sides of the wall):	floor (top side only)
300 mm	500 mm

8.3 Special engineered wall/floor timber construction seal made with CFS-FS or CFS-BL P

All timber constructions shall be classified EI 30, EI 60 or EI 90 depending of the classification according to EN 13501-2 of the penetration seal.

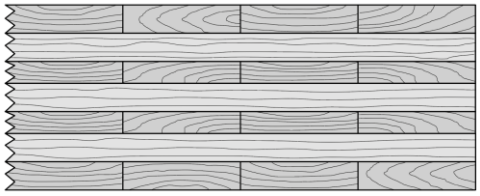
8.3.1 Penetration seal type CFS-FS or CFS-BL P

After fixing the penetrants through the (rectangular) opening the remaining opening is filled with Hilti Firestop Flex Seal CFS-FS or Hilti Firestop CFS-BL P blocks. The thickness of the penetration seal is 200 mm (the blocks are used lengthwise). Where necessary parts of the blocks are cut off to make them fitting the opening. Any remaining openings or gaps (up to maximum 10 mm width) must be filled with Hilti Firestop Filler CFS-FIL, minimum 25 mm depth.

The distance between this penetration and other penetrations needs to be 100 mm or more.

8.3.2 Cross laminated timber floor - type Leno Brettsperrholz - construction type A

- Leno Brettsperrholz cross laminated timber acc. ETA-10/0241
- or CLT types classified according EN 16351
- number of cross-laminated timber layers: ≥ 7 (for wall thickness t_E ≥ 220 mm)
- PU / MUF adhesives permitted
- edge glue not required
- two outer layers and middle one ≥ 34 mm
- the other layers ≥ 24 mm
- valid only for softwood CLT types such as: spruce/fir, pine, larch, stone pine



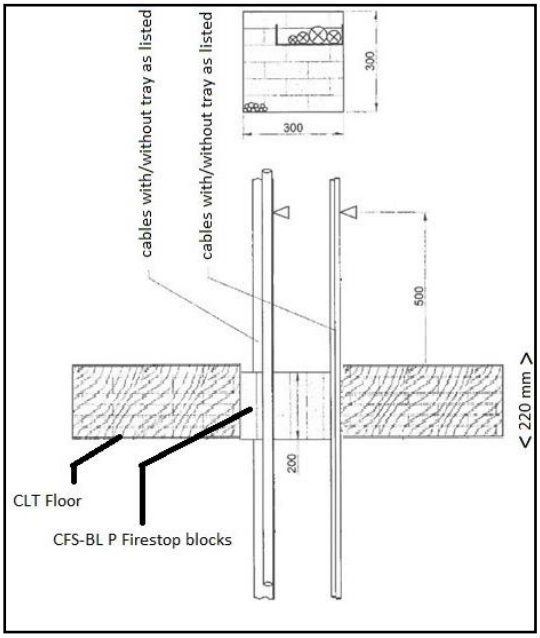
Leno Brettsperrholz floor element

8.3.2.1 Minimum distances for penetrants in Leno Brettsperrholz floor

Minimum distances [mm] in between	Cables	Side seal edge
Cables	0	0

8.3.2.2 Cable seal – single and multiple

- Sheathed cables only
- With and without cable supports penetrating the seal

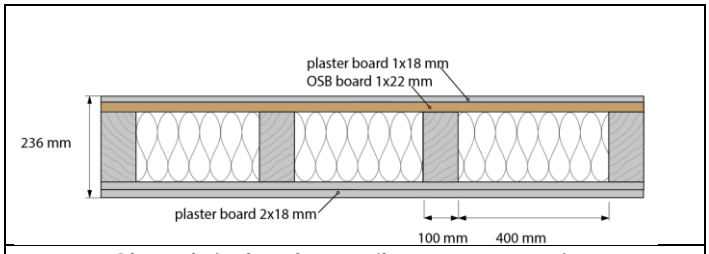
	schematic representation of penetration seal type CFS-FS/CFS-BL P in a CLT floor. see 8.3.2

Single and multiple cable penetration (C)	Diameter (d_C) [mm]	Classification CFS-FS / CFS-BL P
All sheathed cable types* with and without cable tray	≤ 50 mm	EI 90

*currently and commonly used in building practice in Europe; Non-sheathed cables and waveguides not covered

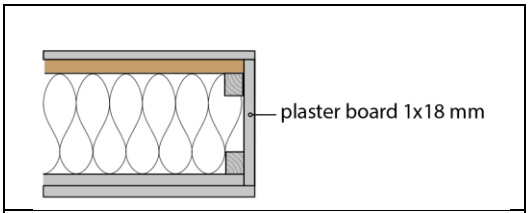
8.3.3 Closed timber beam floor construction - prefabricated timber element – construction type B

- prefabricated timber element
- minimum total thickness ≥ 236 mm
- wood frame strength class C24 acc. EN 338 / ≥ 100 mm in width and ≥ 160 mm in height
- span ≥ 400 mm
- cavity filled with stone wool density ρ ≥ 44 kg/m³ / two layer of 80 mm / 160 mm thick
- bottom side covered with 2x18 mm EN 520 board
- topside covered with inner layer 22 mm OSB / outer layer 1x18 mm EN 520 board
- OSB: type e.g.: "Agepan/Greenline OSB 3 PUR" acc. EN 300 or DIN EN 13986



Closed timber beam floor construction

In the timber beam floor, the opening was framed with a 18 mm thick gypsum plasterboard.



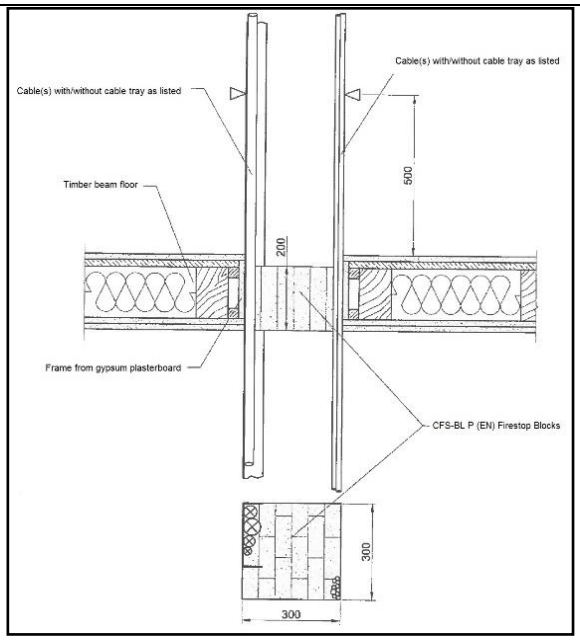
Frame at an opening in a floor

8.3.3.1 Minimum distances for penetrants in closed timber beam floor

Minimum distances [mm] in between	Cables	Side seal edge
Cables	0	0

8.3.3.2 Cable seal – single and multiple

- Sheathed cables only
- With and without cable supports penetrating the seal

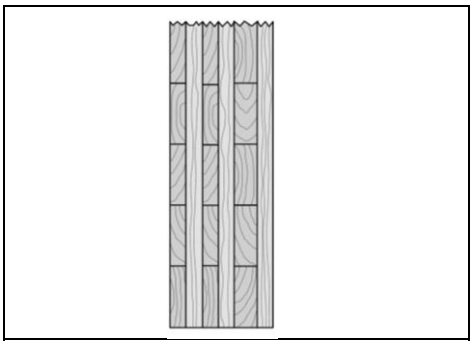
	Schematic representation of penetration seal type CFS-FS/CFS-BL P in a timber beam floor. see 8.3.3

Single and multiple cable penetration (C)	Diameter (d_C) [mm]	Classification CFS-FS / CFS-BL P
All sheathed cable types* with and without cable tray	≤ 50 mm	EI 90

*currently and commonly used in building practice in Europe; Non-sheathed cables and waveguides not covered

8.3.4 Cross laminated timber wall - type Leno Brettsperrholz – construction type C

- "Leno Brettsperrholz" cross laminated timber acc. ETA-10/0241
- or CLT types classified according EN 16351
- minimum total thickness ≥ 148 mm
- number of cross-laminated timber layers: ≥ 6
- PU / MUF adhesives permitted.
- edge glue not required
- one of the second outer layer ≥ 34 mm
- the other layers ≥ 24 mm
- valid only for softwood CLT types such as: spruce/fir, pine, larch, stone pine

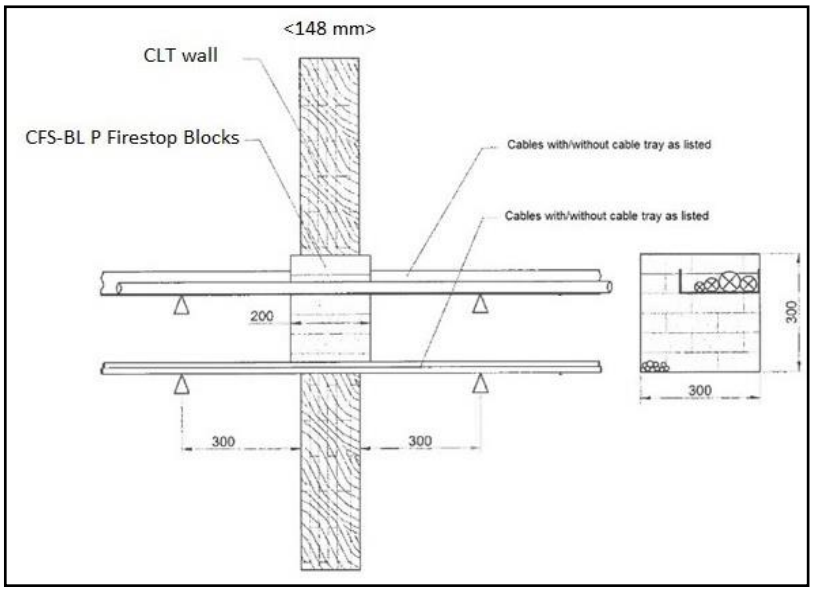

Leno Brettsperrholz wall element

8.3.4.1 Minimum distances for penetrants in Leno Brettsperrholz wall

Minimum distances [mm] in between	Cables up to 21	Cables up to 50	Side seal edge	Upper seal edge	Bottom seal edge
Cables up to 21	0	0	0	0	0
Cables up to 50	0	0	0	70	0

8.3.4.2 Cable seal – single and multiple

- Sheathed cables only
- With and without cable supports penetrating the seal



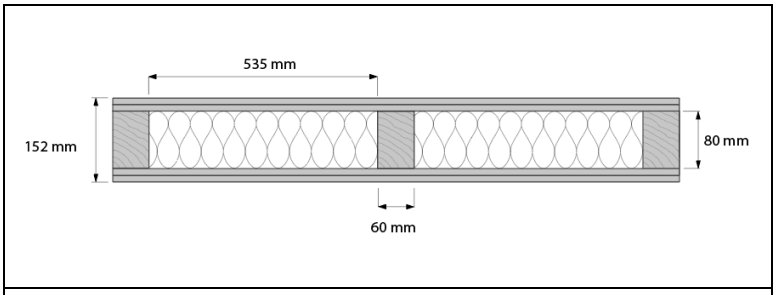
Schematic representation of penetration seal type CFS-FS/CFS-BL P in a CLT wall. see 8.3.4

Single and multiple cable penetration (C)	Diameter (d_C) [mm]	Classification CFS-FS / CFS-BL P
All sheathed cable types* without cable tray	≤ 21 mm	EI 90
All sheathed cable types* with and without cable tray	≤ 50 mm	EI 60, E 90

*currently and commonly used in building practice in Europe; Non-sheathed cables and waveguides not covered

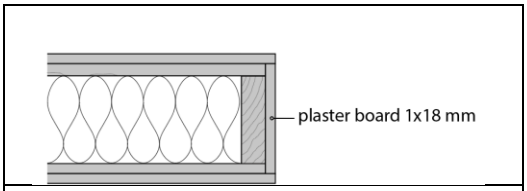
8.3.5 Timber stud partition wall – construction type D

- minimum total thickness ≥ 152 mm
- center to center distance stud ≤ 595 mm
- wood frame strength class C24 acc. EN 338 / min. 60 mm x 80 mm
- symmetric line double layer gypsum plasterboard/ class F acc. EN 520 / each 18 mm thick
- cavity filled with stone wool density ρ ≥ 44 kg/m^3



Timber stud partition wall – top view

In the timber stud wall, the opening was framed with a 18 mm thick gypsum plasterboard.



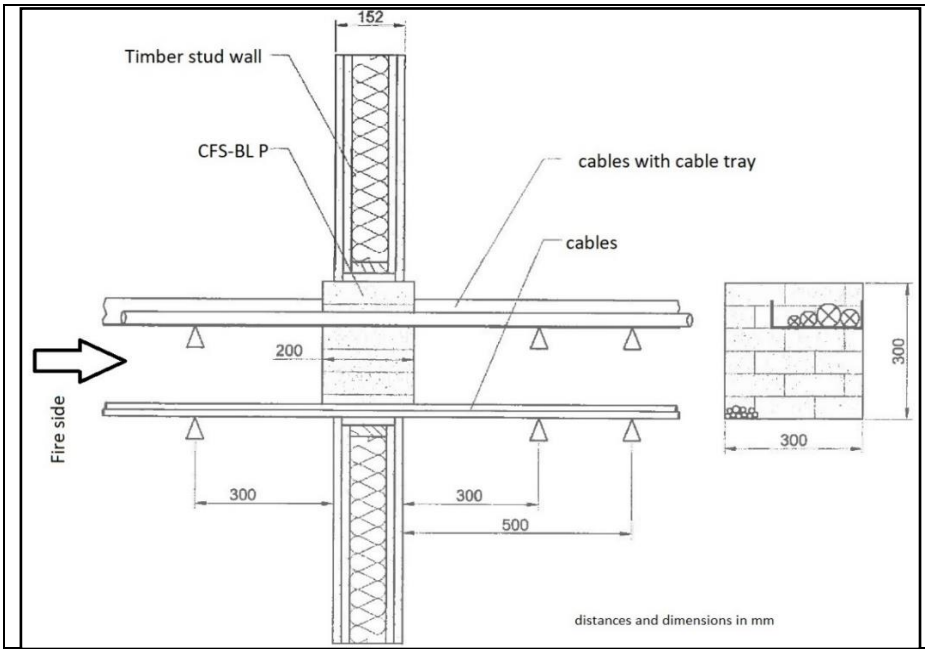
Frame at opening in a wall

8.3.5.1 Minimum distances for penetrants in timber stud partition wall

Minimum distances [mm] in between	Cables up to 21	Cables up to 50	Side seal edge	Upper seal edge	Bottom seal edge
Cables up to 21	0	0	0	0	0
Cables up to 50	0	0	0	70	0

8.3.5.2 Cable seal – single and multiple

- Sheathed cables only
- With and without cable supports penetrating the seal



Schematic representation of penetration seal type CFS-FS/CFS-BL P in a timber stud partition. See 8.3.5

Single and multiple cable penetration (C)	Diameter (d_C) [mm]	Classification CFS-FS / CFS-BL P
All sheathed cable types* without cable tray	≤ 21 mm	EI 60, E 90
All sheathed cable types* with and without cable tray	≤ 50 mm	EI 60, E 90

*currently and commonly used in building practice in Europe; Non-sheathed cables and waveguides not covered

8.3.6 Acceptable variations of construction type A to D

The following variations are acceptable for the elements without a negative effect on the fire resistance performance:

For the cross laminated timber elements (floor type A and wall type C): the cross laminated timber must be manufactured in accordance with the applicable ETA; the CLT elements (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:

- increase in element thickness;
- increase in the thickness of the layers;

For the timber beam floor construction (floor type B); the floor must be classified in accordance with EN 13501-2 for the required fire resistance period or fulfil the requirements of the relevant Eurocode;

- increase in the cross section of the timber beams (to EN 14081-1);
- increase in the thickness of the floor;
- decrease of the span;
- increase in the thickness of the applied boards (gypsum plasterboards (to EN 570) and/or OSB (OSB 3 to EN 13986).

For the timber stud partition (wall type D); the wall must be classified in accordance with EN 13501-2 for the required fire resistance period or fulfil the requirements of the relevant Eurocode;

- increase in the cross section of the timber studs;
- use of suitable metal studs
- increase in the thickness of the wall;
- increase in the thickness of the applied boards.
- the test results will also apply to concrete or masonry wall elements of an overall thickness of 152 mm or more.

9. ANNEX D – Installation of the product (Instruction for use)

The application (appropriate installation) of Hilti Firestop Flex Seal CFS-FS / Hilti Firestop Block CFS-BL P is described and illustrated in chapter 8 – Annex C.

The folder *Instruction for use* is available at Hilti website: www.hilti.group

For safe handling the provisions of the Material Safety Data Sheet for the product shall be followed.