

appointed according to Article 29 of Construction Products Regulation 2011 as amended by the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and the Construction Products (Amendment etc.) (EU Exit) Regulations 2020

UK Technical Assessment

0843-UKTA-22/0057
of 29/05/2024

Technical Assessment Body Issuing the UKTA:

UL International (UK) Ltd

Trade name of the construction product

Hilti Firestop Cable Collar CFS-RCC

Product family to which the construction product belongs

Fire Stopping and Fire Sealing Products - Penetration Seals

Manufacturer

Hilti Corporation
Feldkircherstrasse 100
9494 Schaan
LIECHTENSTEIN

Manufacturing plant(s)

HILTI production plant 4a
HILTI production plant 5b

This UK Technical Assessment contains

35 pages including Annexes A to C which form an integral part of this assessment

This UK Technical Assessment* is issued, on the basis of

EAD 350454-00-1104, September 2017

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* in accordance with Construction Products Regulation 2011 as amended by the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and the Construction Products (Amendment etc.) (EU Exit) Regulations 2020

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SPECIFIC PARTS OF THE UK TECHNICAL ASSESSMENT

1 Technical description of the product

Hilti Firestop Cable Collar CFS-RCC is a device used to form penetration seals where combustible pipes, cables and metal pipes with insulation penetrate walls and floors.

Hilti Firestop Cable Collar CFS-RCC is supplied in two versions: Hilti Firestop Cable Collar CFS-RCC (two intumescent inlays and metal housing) and Hilti Firestop Cable Collar Extension CFS-RCC Ext (two intumescent inlays and metal housing). The wording Hilti Firestop Cable Collar shall refer to both versions.

Hilti Firestop Cable Collar CFS-RCC:

The inlay consists of a pre-cured, preformed PU foam with dimensions of 200 mm x 200 mm and an initial height of 85 mm. The inlay is enclosed by a metal housing. The height of the metal housing is 80 mm. The collar is surface mounted with at least one fixation per side and per housing element. Exception is one single collar in a basic configuration. It must be fixed with at least 3 fixations with maximum one fixation per side. The fixation on maximum one of the two sides where the U-shaped parts of the metal housing meet each other can be omitted.

Hilti Firestop Cable Collar Extension CFS-RCC Ext:

The inlay consists of a pre-cured, preformed PU foam with dimensions of 200 mm x 200 mm and an initial height of 85 mm. The inlay is enclosed by a metal housing. The height of the metal housing is 80 mm. The CFS-RCC Ext allows the installer to combine up to three inlays in a horizontal or vertical way. The collar is surface mounted with at least one fixation per side and per housing element.

Ancillary Products:

The ancillary products are used as needed for annular space filling, gap filling or additional insulation.

Ancillary Product	Description
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 UK Technical Assessment UKTA-22/0049 – Hilti Firestop Filler CFS-FIL", which is a non-public part of that UKTA. Suitable dispensers: Hilti CFS-DISP / CS 201-P1 (for 310 ml cartridge)
Hilti Firestop Foam CFS-F FX	The foam is available as a foil pack of 325 ml. The control plan is defined in document "Control Plan relating to the UK Technical Assessment UKTA-22/0041 – Hilti Firestop Foam CFS-F FX", which is a non-public part of that UKTA. Suitable dispensers: Hilti MD 2000 / or HDM 330 (manual operation) Hilti ED 3500 / or HD 500-A22 (battery operation)
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 UK Technical Assessment UKTA-22/0040 – Hilti Firestop Putty Disc CFS-D 25", which is a non-public part of that UKTA.
Mortar	Any mortar, normal gypsums and lime or cement-based mortars, with a compressive strength equal to or lower than 10 N/mm ² (M1-M10) can be used. E.g. Hilti Firestop Mortar CP 633 is delivered in bags of 25 kg.

2 Specification of the intended use(s) in accordance with the applicable UK Assessment Document (Pre-Exit European Assessment Document): EAD 350454-00-1104

2.1 Intended use

The intended use of system Hilti Firestop Cable Collar CFS-RCC is to reinstate the fire resistance performance of flexible wall and rigid wall constructions, where they are penetrated by services.

The specific elements of construction that the system Hilti Firestop Cable Collar may be used to provide a penetration seal in, are as follows:

Construction-element	Construction
Rigid walls	The wall must have a minimum thickness 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 550 kg/m ³ .
Rigid floors	The floors must have a minimum thickness of 150 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 550 kg/m ³ .
Flexible walls	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 gypsum boards. In timber stud walls, no part of the penetration shall be closer than 100 mm to a stud, the cavity must be closed between the penetration seal and the stud and minimum 100 mm of insulation of class A1 or A2 according to EN 13501-1, is provided within the cavity between the penetration seal and the stud.

The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.

The system Hilti Firestop Cable Collar CFS-RCC may be used to provide a penetration seal with specific supporting constructions and substrates (for details see Annex A).

2.2 Use conditions

“Hilti Firestop Cable Collar CFS-RCC” is intended for use in internal conditions with humidity lower than 85 % RH excluding temperatures below 0° C, without exposure to rain or UV, and can therefore - according to EAD 350454-00-1104, clause 1.2.1 – be categorized as Type Z₂.

2.3 Working life

The provisions made in this UK Technical Assessment are based on an assumed working life of “Hilti Firestop Cable Collar CFS-RCC” of 10 years, provided the conditions laid down in the technical literature of the manufacturer relating to packaging, transport, storage, installation, use and repair are met.

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

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

2.4 Manufacturing

The UK Technical Assessment is issued for the product on the basis of agreed data/information, deposited with UL International (UK) Ltd, 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 UL International (UK) Ltd before the changes are introduced.

UL International (UK) Ltd will decide whether or not such changes affect the UK Technical Assessment and consequently the validity of the UKCA marking on the basis of the UK Technical Assessment and if so whether further assessment or alterations to the UK Technical Assessment, shall be necessary.

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

Essential characteristics, method of verification and their performance

Basic requirements for construction works	Essential characteristic	Method of Verification	Performance
BWR 2	Reaction to fire	EN 13501-1	Clause 3.1.1
	Resistance to fire	EN 13501-2	Clause 3.1.2 and Annex A
BWR 3	Air permeability	EN 1026	Clause 3.2.1
	Water permeability	No performance assessed	
	Content and/or release of dangerous substances	Declaration of conformity by the manufacturer	Clause 3.2.3
BWR 4	Mechanical resistance and stability	No performance assessed	
	Resistance to impact/movement	No performance assessed	
	Adhesion	No performance assessed	
	Durability	Section 2.2.9 of EAD 350454-00-1104	Clause 3.3.4
BWR 5	Airborne sound insulation	EN ISO 10140-1, EN ISO 10140-2, EN ISO 717-1	Clause 3.4.1
BWR 6	Thermal properties	EN 12667	Clause 3.5.1
	Water vapour permeability	No performance assessed	

3.1 Safety in case of fire (BWR 2)

3.1.1 Reaction to fire

"Hilti Firestop Cable Collar CFS-RCC" is classified 'E' in accordance with EN 13501-1.

3.1.2 Resistance to fire

"Hilti Firestop Cable Collar CFS-RCC" has been tested in accordance with EN 1366-3: 2009. Based upon the test results and the field of direct application specified within EN 1366-3: 2009, the system Hilti Firestop Cable Collar CFS-RCC has been classified in accordance with EN 13501-2, as given in Annex A

The seals may only be penetrated by the services described in Annex A; other parts or support constructions must not penetrate the seal.

The service support construction must be fixed to the building element containing the penetration seal or a suitable adjacent building element, in such a manner that in the case of fire, no additional load is imposed on the seal. Furthermore, it is assumed that the unexposed face support is maintained for the required period of fire resistance.

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

3.2 Hygiene, health and environment (BWR 3)

3.2.1 Air permeability

"Hilti Firestop Cable Collar CFS-RCC" was assessed in accordance with EN 1026: 2000. Test results for the air permeability are as follows:

Pressure	Leakage
50 Pa	0.23 m ³ /hm ²
250 Pa	1.91 m ³ /hm ²
600 Pa	4.44 m ³ /hm ²

3.2.2 Water permeability

No performance assessed.

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

The manufacturer has provided a declaration on the content, emission and/or release of dangerous substances in relation to their products with the title "Statement on Product Regulatory Compliance: Version 1.3 October 2023).

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

3.3 Safety and accessibility in use (BWR 4)

3.3.1 Mechanical resistance and stability

No performance assessed.

3.3.2 Resistance to impact and movement

No performance assessed.

3.3.3 Adhesion

No performance assessed.

3.3.4 Durability

“Hilti Firestop Cable Collar CFS-RCC” has been tested in accordance with EAD 350454-00-1104 for the intended use condition.

“Hilti Firestop Cable Collar CFS-RCC” is therefore appropriate for use in internal conditions with humidity lower than 85 % RH excluding temperatures below 0° C, without exposure to rain or UV, and can therefore – according to EAD 350454-00-1104, clause 1.2.1 – be categorized as Type Z₂.

3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation

Test reports from noise reduction according to EN ISO 10140-1, EN ISO 10140-2 and EN ISO 717-1 have been provided.

The result for the airborne sound insulation of “Hilti Firestop Cable Collar CFS-RCC” is ‘R_w (C;Ctr): 63 (-3;-9)’.

3.5 Energy economy and heat retention (BWR 6)

3.5.1 Thermal properties

“Hilti Firestop Cable Collar CFS-RCC” was assessed according to EN 12667. The test results provide the following values:

- $\lambda = 0.089 \text{ W/mK}$
- $R = 0.55 \text{ m}^2 \text{ K/W}$

3.5.2 Water vapour permeability

No performance assessed.

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

According to the Statutory Instrument 2019 No. 465 – made 5th March 2019 and cited as the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and coming into force on exit day and Statutory Instrument 2020 No. 1359 – made 26th November 2020 and cited as the Construction Products (Amendment etc.) (EU Exit) Regulations 2020 and coming into force immediately before the 2019 Regulations come into force, on the procedure for attesting the conformity of construction products as regards fire stopping, fire sealing and fire protective products, published as ‘Pre-Exit’ European Assessment Documents, (see <https://www.gov.uk/guidance/pre-exit-european-assessment-documents-construction-products>), the system of assessment and verification of constancy of performance (see Annex V to Construction Products Regulation 2011 as amended by the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and the Construction Products (Amendment etc.) (EU Exit) Regulations 2020) given in the following table(s) apply.

Product(s)	Intended use(s)	Level(s) or class(es)	System
Fire Stopping and Fire Sealing Products	For fire compartmentation and/or fire protection or fire performance	any	1

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

Tasks of the manufacturer:

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 UK Technical Assessment.

The manufacturer may only use initial / raw / constituent materials stated in the technical documentation of this UK Technical Assessment.

The factory production control shall be in accordance with the Control Plan of 27/06/2016 relating to the UK Technical Assessment 0843-UKTA-22/0057 issued on 29/05/2024 which is part of the technical documentation of this UK technical Assessment. The "Control Plan" is laid down in the context of the factory production control system operated by the manufacturer and deposited at UL International (UK) Ltd.

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

Other tasks of the manufacturer

Additional information

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

(a) Technical data sheet:

- Field of application:
- 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.
- Limits in size, minimum thickness etc. of the penetration seal
- 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.
- Services which the penetration seal is suitable, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings (e.g. pipe trays)

(b) Installation instruction:

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

Issued on: 29th May 2024

Report by:



C. Sweeney
Project Engineer
Built Environment

For and on behalf of UL International (UK) Ltd

Reviewed by:



C. Johnson
Senior Staff Engineer
Built Environment

Annex A RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF “HILTI FIRESTOP CABLE COLLAR CFS-RCC”

A.1 General Information

A.1.1 Wall / floor constructions

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 Type F boards according to EN 520.

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.

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/m³.

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/m³.

The walls / floors must be classified in accordance with EN 13501-2 for the required fire resistance period or fulfil the requirements of the relevant Eurocode.

A.1.2 Seal types

A.1.2.1 Seal type – Both sides

The penetration seal depth is approximately 260/310 mm (t_A) comprised by a wall/floor of at least 100/150 mm (t_E) and two times the thickness of the Hilti Cable Collar (A), as displayed in Figure 1.

Aperture framing is not necessary.

In some cases for cables a Hilti Firestop Putty Bandage CFS-P BA (see Figure 1a/1b) or increasing the t_E for higher ratings is required.

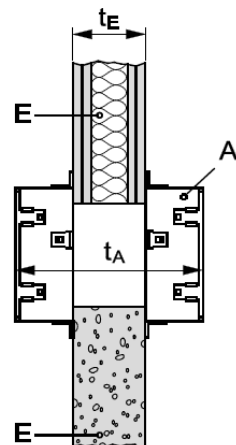


Figure 1: both sides

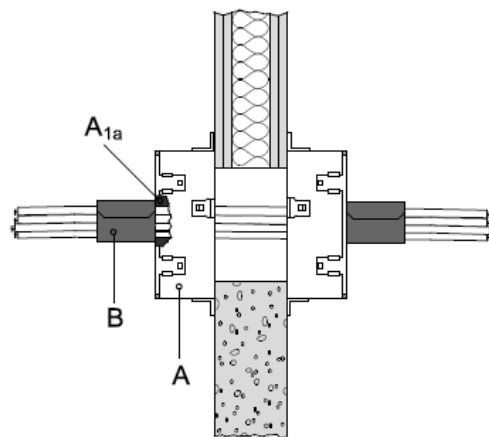


Figure 1a: CFS-P BA wall

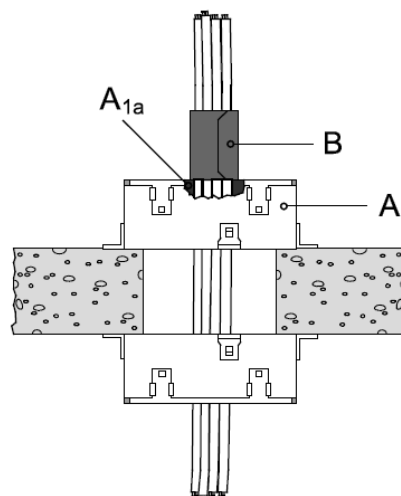
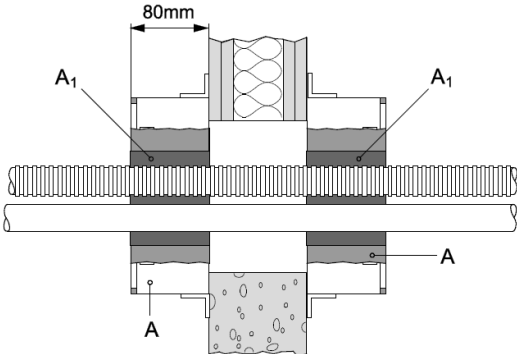
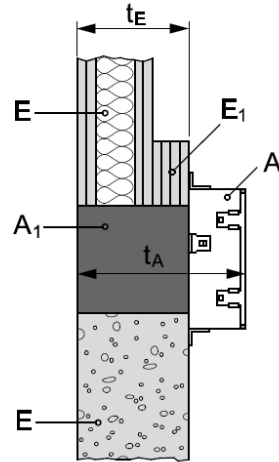
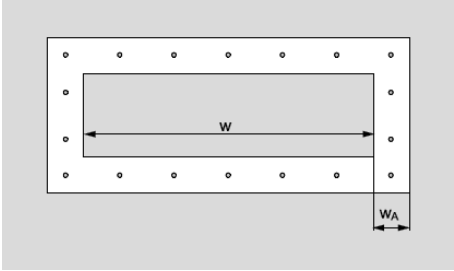
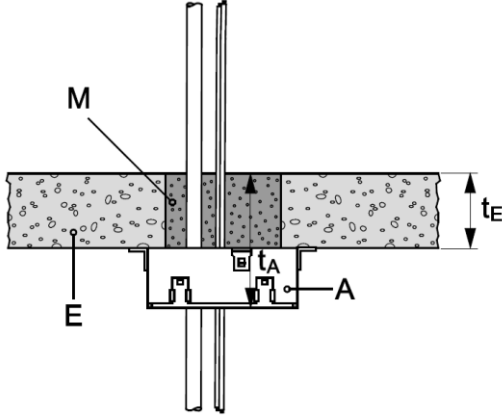


Figure 1b: CFS-P BA floor

<p>A.1.2.2 Seal type – Both sides + foam inlay</p> <p>The penetration seal depth is approximately 260/310 mm comprised by a wall/floor of at least 100/150 mm and two times the thickness of the Hilti Cable Collar (A) where all visible PU inlay (until the corner profile of the metal housing) is replaced by another foam (type: Hilti Firestop Foam CFS-F FX), as displayed in Figure 2.</p> <p>Aperture framing is not necessary.</p>	 <p>Figure 2: Seal type – both sides + foam inlay</p>
<p>A.1.2.3 Seal type – Single sided wall</p> <p>For single sided applications a frame made from gypsum board (E_1) may be fixed to the wall around the opening to increase the thickness of the building element (t_E) to ≥ 150 mm. The penetration seal depth is approximately 230 mm (t_A), as shown in Figure 3.</p> <p>The frame (E_1) must cover a width (w_A) ≥ 100 mm and must be fixed with metal screws, as shown in Figure 4.</p> <p>The opening has to be filled out completely with Hilti Firestop Foam CFS-F FX (A_1) for wall applications.</p>	 <p>Figure 3: Seal type – Single sided</p>  <p>Figure 4: Gypsum frame – front view</p>
<p>A.1.2.4 Seal type – Single sided floor</p> <p>For floor applications the annular space between services and floor edges (E) has to be filled out with normal gypsums and lime or cement-based mortars (M) with a compressive strength equal to or lower than 10 N/mm² (M1-M10 mortar, e.g. HILTI CP 633), as displayed in Figure 5.</p> <p>Gaps between services and Hilti Firestop Cable Collar (A) are filled with Hilti Firestop Filler CFS-FIL, depth 20 mm. Seal thickness (t_A) is nominally 230 mm (t_E 150 + 80 mm). In some cases, a t_E of 200 mm is required to achieve a higher rating (see A.2).</p>	 <p>Figure 5: Seal type – Single sided floor</p>

A.1.3 Filling of gaps in penetration seal

Gaps between services and Hilti Firestop Cable Collar CFS-RCC are filled with Hilti Firestop Filler CFS-FIL (A_{1a}), depth 20 mm, as shown in Figure 6.

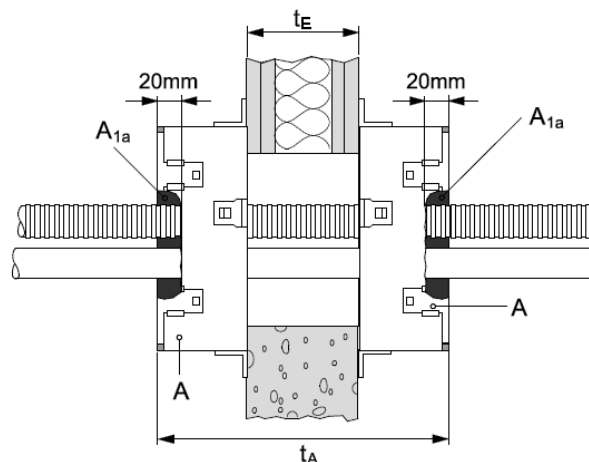


Figure 6: Penetration seal with filler

A.1.4 Housing concepts and maximum dimensions

The products Hilti Firestop Cable Collar CFS-RCC and Hilti Firestop Cable Collar Extension CFS-RCC Ext can be combined as single, double or triple application. The installer can combine up to three inlays in a horizontal or vertical manner (see Figure 7).

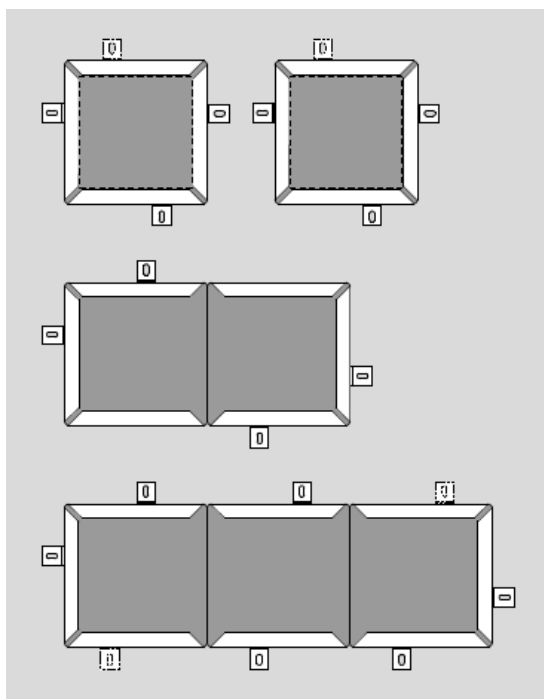


Figure 7: Basic configuration of CFS-RCC

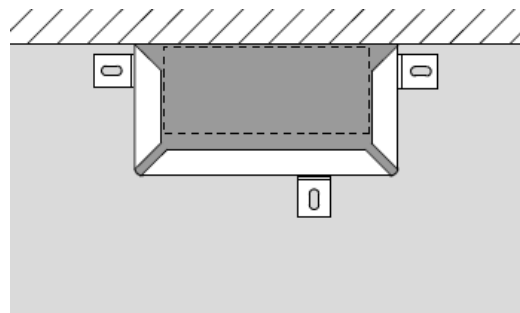


Figure 8: Side configuration of CFS-RCC

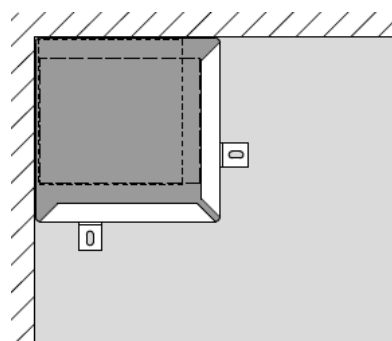


Figure 9: Corner configuration of CFS-RCC

The inlay can also be cut in half and the housing adjusted in size accordingly.

Figure 8 highlights this application for a single application. Up to three inlays can be combined in this configuration.

The inlay can be installed in corner applications. Enclosing walls or floors can make two housing sides redundant as shown in Figure 9.

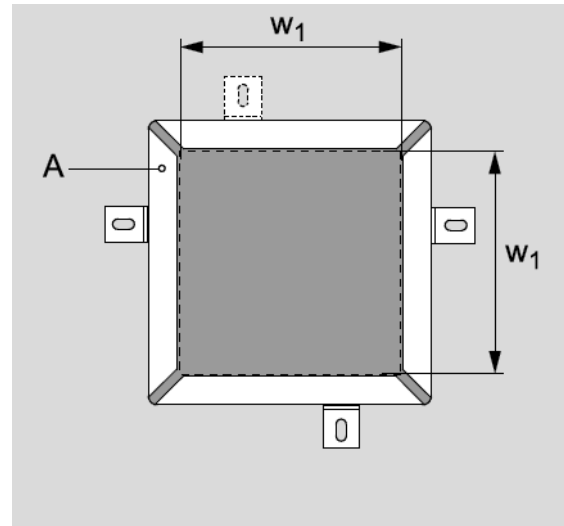
The maximum seal and opening sizes are given below:

Maximum dimensions (mm x mm)	Basic configuration	Corner configuration	Side configuration
Seal	600 x 200	600 x 200	600 x 200
Opening ($w_1 \times w_1$)	562 x 162	581 x 181	581 x 162

Cable collar inlay must be cut to fit to penetrating services.

A boundary stripe of minimum 19mm inlay must be left to each free edge of collar.

The total cross section of the cables (including cable supporting systems like cable trays etc.) must not be more than 60 % of the total seal size. In the single application the area $w_1 \times w_1$ corresponds to 60 % of the total seal size and can be 100 % filled with cables.



Single application with maximum opening size

A.1.5 Angle of penetrating services

Cables must be perpendicular to the seal surface.

Cables of size $\varnothing \leq 21$ mm can additionally be phased out in a 90° bend manner parallel to the wall / floor surface, see Figure 10.

In this case up to 2 metal segments can be taken out to open space for cable penetration.

Three fixing hooks must be used for fixation of collar.

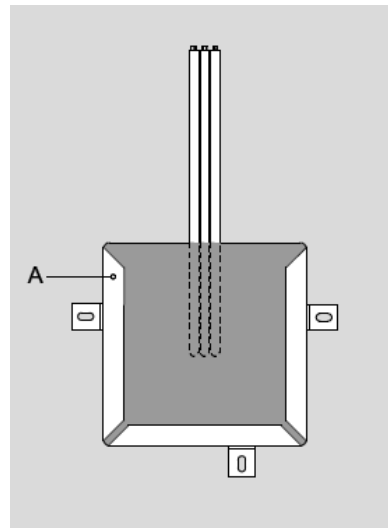


Figure 10: Bended cables

A.1.6 Cluster arrangement and distances

Minimum distances (see Figure 11):

$s_a = 60$ mm (horizontal distance between cable collars linear)

$s_b = 60$ mm (vertical distance between cable collars in cluster arrangement)

Note:

When s_a and s_b are at least 60 mm, the distance between openings is 100 mm.

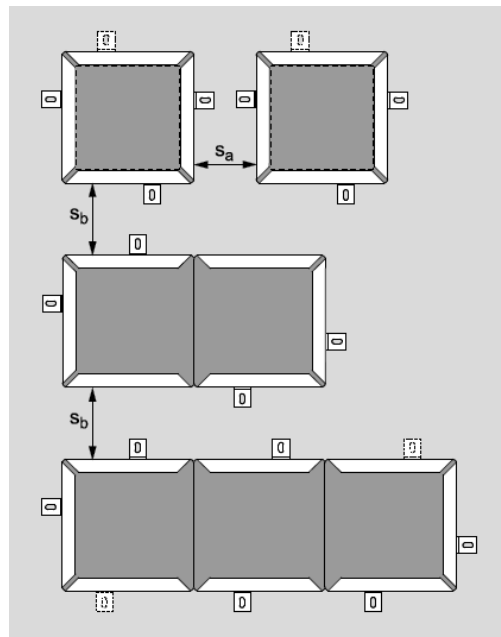


Figure 11: Cluster arrangement

A.1.7 Application with existing firestop or renovation

A.1.7.1 Hilti CFS-RCC – both sides

Old materials (A', e.g. unknown material, paper, boards, foams, intumescent products, sleeved opening/cladding tubes...) are allowed to remain inside the wall or floor opening in between two Hilti Cable Collars (A). These have no negative influence of the fire resistance performance of the collar system. The application is illustrated in Figure 12.

A.1.7.2 Hilti CFS-RCC – single sided wall

The single sided application of the Hilti Cable Collar CFS-RCC requires Hilti Firestop Foam CFS-F FX in the opening. (A.1.2.3) (see Figure 3)

A.1.7.3 Hilti CFS-RCC – single sided floor

The single sided application of the Hilti Cable Collar requires mortar (see Figure 5) in the opening. (A.1.2.4)

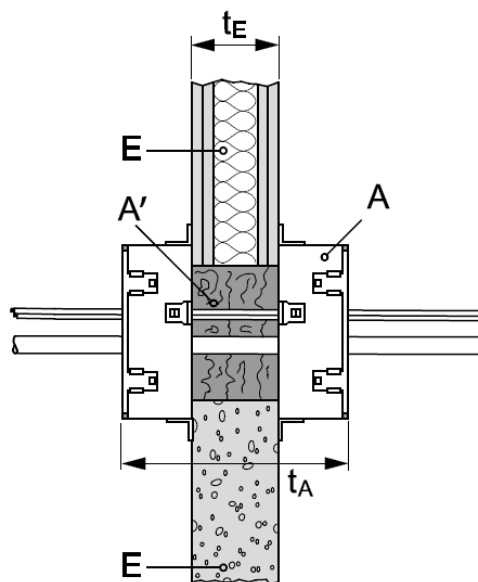


Figure 12: Application with old materials in the seal

A.1.8 Penetrating services

A.1.8.1 Cables

Penetrating services	Description
Small cables:	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) with a diameter $\varnothing \leq 21$ mm.
Medium and large cables:	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) with a diameter $21 < \varnothing \leq 80$ mm.
Cable bundle:	Tied cable bundle with a diameter $\varnothing \leq 150$ mm consisting of small cables with a diameter $\varnothing \leq 21$ mm. For tied cable bundles the space between the cables does not require sealing.
Cable support construction:	Perforated, non-perforated metal cable trays and cable steel ladders with a melting point higher than 1100°C (e.g. galvanised steel, stainless steel). Trays with organic coatings are covered if their overall classification is minimum A2 according to EN 13501-1. All cables are classified with and without cable support construction.
Non-sheathed cables:	Non sheathed cables (wires) with a diameter $\varnothing \leq 24$ mm.
Waveguides:	Waveguides (coaxial): $27.8 \text{ mm} \leq \varnothing \leq 59.9 \text{ mm}$ RFS Cellflex LCF 78-50 JA $\varnothing 27.8 \text{ mm}$ RFS Cellflex LCF 214-50 J $\varnothing 59.9 \text{ mm}$ RFS Heliflex HCA 78-50 JFNA $\varnothing 28.0 \text{ mm}$ RFS Radialflex RLKW 78-50 $\varnothing 28.5 \text{ mm}$ RFS Radialflex RLKU 158-50 JFLA $\varnothing 48.2 \text{ mm}$

A.1.8.2 Conduits

Penetrating services	Description
Single conduits $\varnothing \leq 16$ mm:	Rigid, flexible and pliable plastic conduits and metal conduits with a diameter $\varnothing \leq 16$ mm with or without cables.
Single conduits $\varnothing \leq 50$ mm:	Rigid, flexible and pliable plastic conduits with a diameter $\varnothing \leq 50$ mm with or without cables.
Conduit bundle:	Bundle with a diameter $\varnothing \leq 80$ mm of rigid, flexible and pliable plastic conduits with a max. diameter $\varnothing \leq 50$ mm with or without cables.

A.1.8.3 Foamed elastomeric insulation – combustible insulation

Foamed elastomeric insulations include the following brand names:

Armstrong Armaflex AF, Armstrong Armaflex SH, Armstrong Armaflex Ultima, Armstrong Armaflex HT, nmc Insul-Tube normal quality, nmc Insul-Tube H-Plus, Kaimann Kaiflex KK, Kaimann Kaiflex KK-Plus, L'isolante k-Flex H, L'isolante k-Flex HT, L'isolante k-Flex ECO, L'isolante k-Flex ST, L'isolante k-Flex ST-Plus

A.1.8.4 Mineral wool insulation – non-combustible insulation

Mineral wool pipe insulation, (with/without aluminium foil faced) must have a melting point $\geq 1000^\circ\text{C}$, with a reaction to fire class (min) A2L-s1, d0 according to EN 13501-1.

A.1.8.5 Special penetration bundle, e.g. Clima-split

Penetrating service is a bundle (distance between $C_1/C_2/C_3 \geq 0\text{mm}$) consisting of 2 cables (C_1), 1 condensate pipe (C_2) and 2 copper pipes (C_3) with combustible insulation as shown in Figure 13.

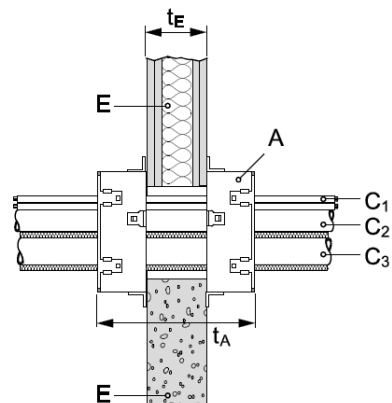


Figure 13: e.g. Clima-split system

Bundle can be applied with a distance $\geq 0\text{mm}$ to the seal of edge (s_1) and a distance $\geq 0\text{mm}$ between all the services ($C_1/C_2/C_3$) (Figure 13a).

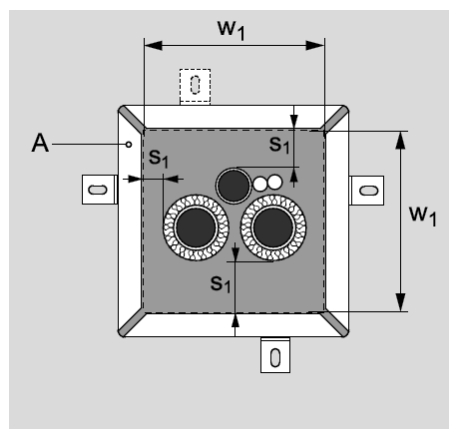


Figure 13a: distance between $C_1/C_2/C_3$

A.1.8.5.1 Bundle with foamed elastomeric insulation – (combustible insulation)

Copper pipe (C_3) (C/U) with 9 mm foamed elastomeric insulation e.g. AF 1		Condensate Pipe (C_2) (U/U)	Cables (C_1)	
Pipe 1 \varnothing mm x wall thickness	Pipe 2 \varnothing mm x wall thickness	(PVC, PE, fabric tube, ..) \varnothing mm x wall thickness	Cable 1 mm^2	Cable 2 mm^2
42 x 1.2	28 x 1.0 18 x 1.0 12 x 0.8 8 x 0.8 6 x 0.8	40 x 2.0 32 x 2.0 25 x 2.0 20 x 2.0	5 x 6 5 x 1.5	5 x 6 5 x 1.5
35 x 1.2				
28 x 1.0				
18 x 1.0				
12 x 0.8				
8 x 0.8				
6 x 0.8				
35 x 1.2	35 x 1.2			

A.1.8.5.2 Bundle with PE / PEF insulation – (combustible insulation)

Copper pipe (C ₃) (C/U) with 9 mm PE / PEF insulation e.g. pre-insulated pipes (WicuFlex or SangiTwin)		Condensate Pipe (C ₂) (U/U)	Cables (C ₁)	
Pipe 1 Ø mm x wall thickness	Pipe 2 Ø mm x wall thickness	(PVC, PE, fabric tube, ..) Ø mm x wall thickness	Cable 1 mm ²	Cable 2 mm ²
22 x 1.0 19 x 1.0 18 x 1.0 12 x 0.8 8 x 0.8 6 x 0.8	22 x 1.0 12.7 x 0.8 18 x 1.0 12 x 0.8 8 x 0.8 6 x 0.8	32 x 2.0 25 x 2.0 20 x 2.0	5 x 6 5 x 1.5	5 x 6 5 x 1.5

A.1.8.6 Pipes

A.1.8.6.1 Combustible pipes – (non-insulated)

Type	Pipe Ø ≤ (mm)	Wall thickness (mm)	Condition
PVC pipes (EN 1451-1 / 1452-2)	50	1.8 ≤ t ≤ 3.7	U/U
PE pipes (EN ISO 15494) / ABS (1455-1) / SAN+PVC (EN 1565-1)	50	1.8 ≤ t ≤ 4.6	U/U
PP pipes (EN 1451)	50	1.8 ≤ t ≤ 3.0	U/U
PP pipes (other/no standard)	50	1.8 ≤ t ≤ 2.0	U/U

PP pipes other/non-standard include the following brand names:

Friatec db blue, Rehau Raupiano, Poloplast Polokail NG, Wavin SiTec, Geberit Silent PP, Coes Blue Power, Coes PhoNoFire, Valsir Triplus, Pipelive Master 3, Marely Silent, Mainpex Mainpower, Poloplast Polokal 3S, Ostendorf Slolan db, Valsir Silere Wavin AS.

A.1.8.6.2 Copper pipes – Insulated

Insulation Type	Pipe Ø (mm)	Wall thickness (mm)	Pipe insulation thickness (mm)	Total pipe insulation length (mm) LS	Condition
Foamed elastomeric insulation	12 – 28	1.0 ≤ t ≤ 14.2	7.5 – 35.0 e.g. AF1 – AF6	≥ 800	C/U
	28 – 42	1.0 ≤ t ≤ 14.2	13.5 – 36.5 e.g. AF2 – AF6	≥ 800	C/U
Mineral wool insulation	12 – 28	1.0 ≤ t ≤ 14.2	20 e.g. Rockwool RS 800	≥ 800	C/U
	28 – 42	1.0 ≤ t ≤ 14.2	40 e.g. Rockwool RS 800	≥ 1000	C/U

A.1.8.6.3 Steel pipes – Insulated

Insulation Type	Pipe Ø (mm)	Wall thickness (mm)	Pipe insulation thickness (mm)	Total pipe insulation length (mm) LS	Condition
Foamed elastomeric insulation	40 – 108	$1.2 \leq t \leq 14.2$	13.5 – 23.0 e.g. AF2 – AF4	≥ 1100	C/U
	108 – 114	$2.0 \leq t \leq 14.2$	14.5 – 23.5 e.g. AF2 – AF4	≥ 1100	C/U
Mineral wool insulation	12 – 108	$1.2 \leq t \leq 14.2$	20 e.g. Rockwool RS 800	≥ 1000	C/U
	108 – 114	$2.0 \leq t \leq 14.2$	20 e.g. Rockwool RS 800	≥ 1000	C/U

A.1.8.6.4 Aluminium composite pipes – Insulated

Insulation Type	Pipe Ø (mm)	Wall thickness (mm)	Pipe insulation thickness (mm)	Total pipe insulation (symmetric) length (mm) LS	Condition
Foamed elastomeric insulation	16 – 42	$2.0 \leq t \leq 6.0$	8.0 – 36.0 e.g. AF1 – AF6	≥ 800	U/C

Aluminum composite pipes include the following brand names:

Geberit Mepla, Frankische Alpex F50 Profi, Rehau Rautitan stabil, GF Sanipex, Prineto Stabil, Kekelit Kelox, TECEflex, Uponor Uni Pipe Plus, Viega SANIFIX Fosta

A.1.8.7 Mixed seals

A.1.8.7.1 Mixed seals with electrical cables

A mixed penetration seal allows the installation / combination of all different types of services according to Annex A.2 in one opening: (distinct small / medium / large cables, see Annex A.2).

A.1.8.7.2 Mixed seals without electrical cables (multiple pipe seal)

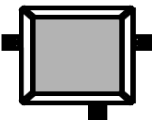
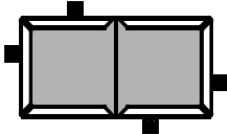
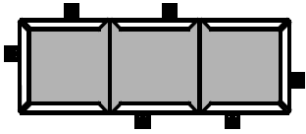
A mixed penetration seal allows the installation / combination of all different types of services according to Annex A.2 in one opening, excluding cables.

A.1.9 Fixing of Hilti Firestop Cable Collar CFS-RCC

A.1.9.1 Selection of fixing elements

Fixing components		Drywall	Rigid wall	Floor
Screw anchors:	HUS3-H 6	x	x	x
	HUS3-P 6	x	x	x
Expansion anchor:	HSA3 M6		x	x
	HST3 M6		x	x
Undercut anchor:	HPD M6		x	x
Internally threaded anchor:	HKD M8/30		x	x
Hollow core:	HTBS / HTB	x		
	HHD M6	x		
Others:	DBZ 6/4,5		x	x
	HHD-S M6 25x64		x	x
	Screws with washer (M6 or larger)	x		
	Threaded rods with nuts and washer (M6 or larger)	x		

A.1.9.2 Number of fixations

			
Basic configuration According to A.1.4 Figure 7	3	4	6
Side configuration According to A.1.4. Figure 8	3	3	4
Corner configuration According to A.1.4. Figure 9	2	3	4

Note:

At least one fixation per side and per housing element. For single basic configuration at least 3 times. Minimum one on the long side of the U-shaped is mandatory. For side and corner configurations, no fixations required at the side where the collar meets the connecting building element (e.g. wall, floor).

A.1.10 Annular spaces

Following separations must be respected:

Unmixed penetration seals in walls and floors:

Service	Minimum distance between any cable and the seal edge (mm)	Minimum distance between any two or more cables (mm)
Cables	0	0
Conduits ≤ 16 mm	0	0

Service	Minimum distance between any service and the seal top edge (mm)	Minimum distance between any service and the seal side edge (mm)	Minimum distance between any two or more services (mm)
Conduits ≤ 16 mm	0	0	20
Waveguides	0	0	20
Plastic pipes	0	0	20
Metal pipes	0	0	20
Aluminium composite pipes	0	0	20
Special penetration bundle	0	0	0

Mixed penetration seals in walls:

Distance from – to (mm)	Cables	Conduits	Waveguides	Plastic pipes	Metal pipes - combustible insulation	Metal pipes – non-combustible insulation	Aluminium composite pipes	Special applications bundles/systems	Seal edge
Cables	0	10	20	20	10	10	10	20	0
Conduits	10	0	20	0	20	20	20	20	0
Waveguides	20	20	20	20	20	20	20	20	0
Plastic pipes	20	0	20	20	0	0	0	20	0
Metal pipes - combustible insulation	10	20	20	0	20	10	0	20	0
Metal pipes – non-combustible insulation	10	20	20	0	10	0	0	20	0
Aluminium composite pipes	10	20	20	0	0	0	20	20	0
Special penetration bundle	20	20	20	20	20	20	20	20	0
Seal edge	0	0	0	0	0	0	0	0	0

Mixed penetration seals in floors:

Distance from – to (mm)	Cables	Conduits	Waveguides	Plastic pipes	Metal pipes - combustible insulation	Metal pipes – non- combustible insulation	Aluminium composite pipes	Special applications bundles/systems	Seal edge
Cables	0	20	20	20	10	10	10	20	0
Conduits	20	20	20	0	20	20	20	20	0
Waveguides	20	20	20	20	20	20	20	20	0
Plastic pipes	20	0	20	20	20	20	20	20	0
Metal pipes - combustible insulation	10	20	20	20	20	10	20	20	0
Metal pipes – non- combustible insulation	10	20	20	20	10	0	20	20	0
Aluminium composite pipes	10	20	20	20	20	20	20	20	0
Special penetration bundle	20	20	20	20	20	20	20	20	0
Seal edge	0	0	0	0	0	0	0	0	0










A.1.11 Distances for pipe and cable support constructions

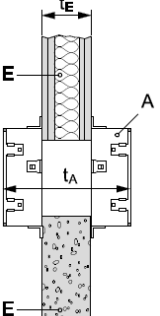
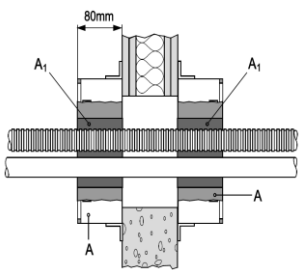
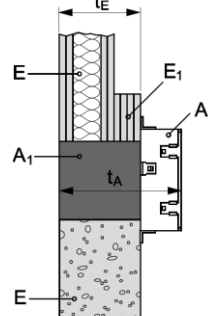









The distances from the surface of the separating element to the first supporting construction:

- a) Wall (distance from the face of the wall on both sides): ≤ 500 mm
- b) Floor (distance from upper side of floor): ≤ 500 mm










A.2 Classification

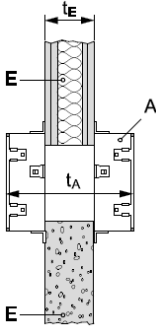
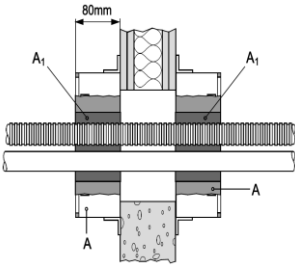
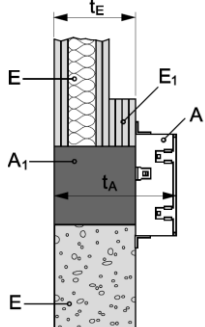









A.2.1 Wall $t_E \geq 100$ mm as described in A.1.1 for basic configuration according to A.1.4

Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.3		
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Blank seal	EI 120	EI 120	EI 120	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90
Cables									
Small cables $\varnothing \leq 21$ mm	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90
Small cables $\varnothing \leq 21$ mm, bended 90°	EI 90	EI 90	EI 90	-	-	-	-	-	-
Medium and large cables $21 \leq \varnothing \leq 80$ mm	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90
Cable bundle $\varnothing \leq 150$ mm	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90
Non sheathed cables (wires)	EI 60	EI 60	EI 60	-	-	-	-	-	-
Waveguides	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 90	EI 90
Conduits									
Single conduits $\varnothing \leq 16$ mm	EI 120	EI 120	EI 120	EI 90	EI 90	EI 90	EI 120	EI 90	EI 90
Single conduits $\varnothing \leq 50$ mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Conduit bundle	EI 120	EI 120	EI 120	-	-	-	-	-	-
Special penetration bundle									
Bundle with PE / PEF insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 90	EI 90
Bundle with foamed elastomeric insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 90	EI 90
Pipes									
Combustible pipes (U/U)	EI 120	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with non-combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Steel pipes (C/U) with combustible insulation $\varnothing \leq 108$ mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Steel pipes (C/U) with combustible insulation $\varnothing \leq 114$ mm	EI 90	EI 90	EI 90	-	-	-	-	-	-

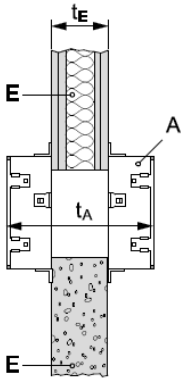
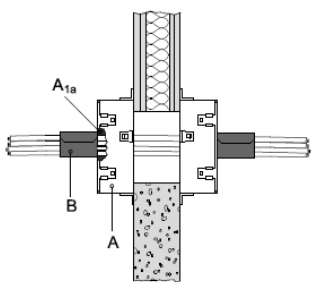
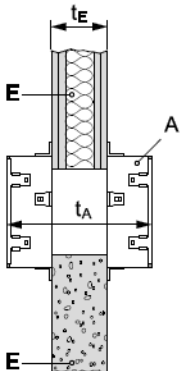









Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.3		
									
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Steel pipes (C/U) with non-combustible insulation $\varnothing \leq 108 \text{ mm}$	EI 120	EI 120	EI 120	-	-	-	-	-	-
Steel pipes (C/U) with non-combustible insulation $\varnothing \leq 114 \text{ mm}$	EI 90	EI 90	EI 90	-	-	-	-	-	-
Aluminium composite pipes (U/C) with combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Mixed seals according to A.1.8.7									
Mixed seals without electrical cables	EI 120	EI 120	EI 120	-	-	-	-	-	-
Mixed seals with up to large electrical cables	EI 90	EI 90	EI 90	-	-	-	-	-	-

A.2.2 Wall $t_E \geq 100$ mm as described in A.1.1 for corner and side configuration according to A.1.4

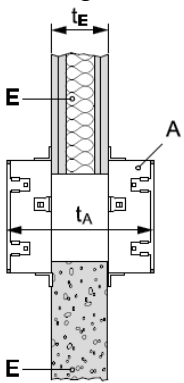
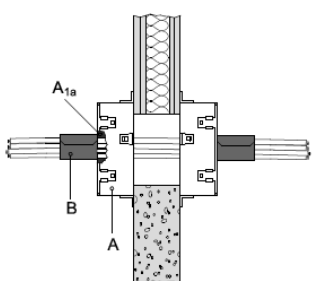
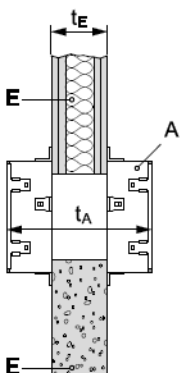









Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.3		
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Blank seal	EI 120	EI 120	EI 120	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90
Cables									
Small cables $\varnothing \leq 21$ mm	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90
Small cables $\varnothing \leq 21$ mm, bended 90°	EI 90	EI 90	EI 90	-	-	-	-	-	-
Medium and large cables $21 \leq \varnothing \leq 80$ mm	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90
Cable bundle $\varnothing \leq 150$ mm	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90	EI 120	EI 90	EI 90
Non sheathed cables (wires)	EI 60	EI 60	EI 60	-	-	-	-	-	-
Waveguides	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 90	EI 90
Conduits									
Single conduits $\varnothing \leq 16$ mm	EI 120	EI 120	EI 120	EI 90	EI 90	EI 90	EI 120	EI 90	EI 90
Single conduits $\varnothing \leq 50$ mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Conduit bundle	EI 120	EI 120	EI 120	-	-	-	-	-	-

Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.3		
									
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Special penetration bundle									
Bundle with PE / PEF insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 90	EI 90
Bundle with foamed elastomeric insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 90	EI 90
Pipes									
Combustible pipes (U/U)	EI 120	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with non-combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Steel pipes (C/U) with combustible insulation $\varnothing \leq 114$ mm	EI 90	EI 90	EI 90	-	-	-	-	-	-
Steel pipes (C/U) with combustible insulation $\varnothing \leq 114$ mm	EI 90	EI 90	EI 90	-	-	-	-	-	-
Aluminium composite pipes (U/C) with combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Mixed seals according to A.1.8.7									
Mixed seals without electrical cables	EI 120	EI 120	EI 120	-	-	-	-	-	-
Mixed seals with up to large electrical cables	EI 90	EI 90	EI 90	-	-	-	-	-	-










A.2.3 Rigid wall $t_E \geq 150 \text{ mm} / 200 \text{ mm}$ as described in A.1.1 for basic configuration according to A.1.4










Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + 2 layers CFS-P BA on each side According to A.1.2.1			Both sides According to A.1.2.1 $t_E = 200 \text{ mm}$		
									
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Cables									
Small cables $\varnothing \leq 21 \text{ mm}$	EI 120	EI 90	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120
Small cables $\varnothing \leq 21 \text{ mm}$, bended 90°	EI 120	EI 90	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120
Medium and large cables $21 \leq \varnothing \leq 80 \text{ mm}$	EI 90	EI 90	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120
Cable bundle $\varnothing \leq 150 \text{ mm}$	EI 120	EI 90	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120

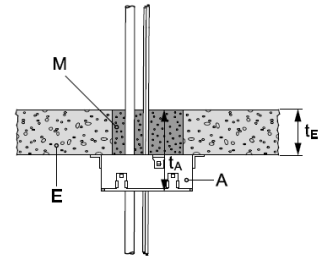
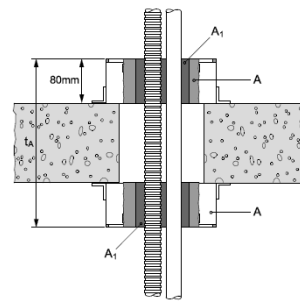
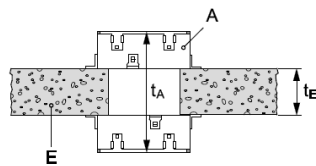
A.2.4 Rigid wall $t_E \geq 150 \text{ mm} / 200 \text{ mm}$ as described in A.1.1 for corner and side configuration according to A.1.4

Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + 2 layers CFS-P BA on each side According to A.1.2.1			Both sides According to A.1.2.1 $t_E = 200 \text{ mm}$		
									
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Cables									
Small cables $\varnothing \leq 21 \text{ mm}$	EI 120	EI 90	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120
Small cables $\varnothing \leq 21 \text{ mm}$, bended 90°	EI 90	EI 90	EI 90	EI 90	EI 120	EI 120	EI 90	EI 120	EI 120
Medium and large cables $21 \leq \varnothing \leq 80 \text{ mm}$	EI 90	EI 90	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120
Cable bundle $\varnothing \leq 150 \text{ mm}$	EI 120	EI 90	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120










A.2.5 Rigid floor $t_E \geq 150$ mm as described in A.1.1 for basic configuration according to A.1.4

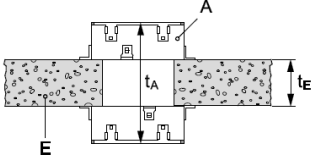
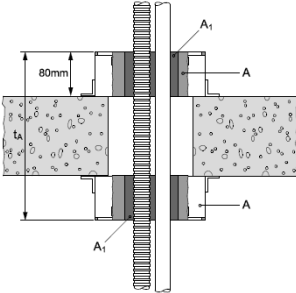
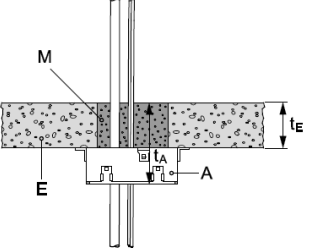









Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.4		
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Blank seal	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 120	EI 120	EI 120
Cables									
Small cables $\varnothing \leq 21$ mm	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Small cables $\varnothing \leq 21$ mm, bended 90°	EI 180	EI 180	EI 180	-	-	-	-	-	-
Medium and large cables $21 \leq \varnothing \leq 80$ mm	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90
Cable bundle $\varnothing \leq 150$ mm	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120
Non sheathed cables (wires)	EI 90	EI 90	EI 90	-	-	-	EI 120	EI 120	EI 120
Waveguides	EI 180	EI 120	EI 120	-	-	-	EI 120	EI 120	EI 120
Waveguides - Heliflex	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 120	EI 120
Conduits									
Single conduits $\varnothing \leq 16$ mm	EI 180	EI 180	EI 180	EI 90	EI 90	EI 90	EI 180	EI 180	EI 180
Single conduits $\varnothing \leq 50$ mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Conduit bundle	EI 120	EI 120	EI 120	-	-	-	-	-	-
Special penetration bundle									
Bundle with PE / PEF insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 120	EI 120
Bundle with foamed elastomeric insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 120	EI 120
Pipes									
Combustible pipes (U/U)	EI 180	EI 180	EI 180	-	-	-	-	-	-
Copper pipes (C/U) with combustible insulation	EI 180	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with non-combustible insulation up to 28 mm	EI 180	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with non-combustible insulation up to 42 mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Steel pipes (C/U) with combustible insulation up to 114 mm	EI 120	EI 120	EI 120	-	-	-	-	-	-

Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.4		
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Steel pipes (C/U) with non-combustible insulation up to 108 mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Aluminium composite pipes (U/C) with combustible insulation	EI 180	EI 180	EI 180	-	-	-	-	-	-
Mixed seals according to A.1.8.7									
Mixed seals with small electrical cables	EI 120	EI 120	EI 120	-	-	-	-	-	-
Mixed seals with up to large electrical cables	EI 90	EI 90	EI 90	-	-	-	-	-	-

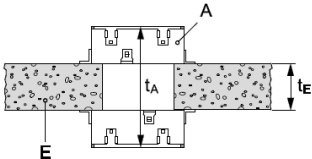
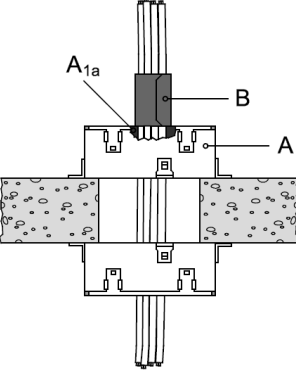
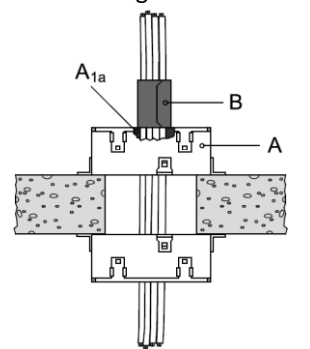











A.2.6 Rigid floor $t_E \geq 150$ mm as described in A.1.1 for corner and side configuration according to A.1.4

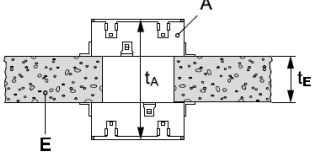
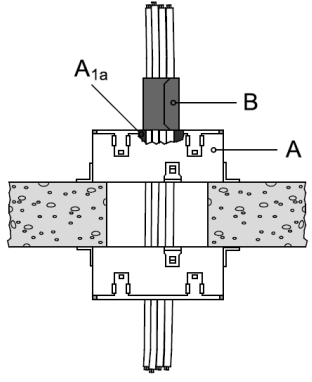
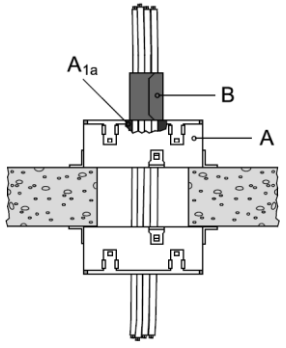









Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.4		
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Blank seal	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 120	EI 120	EI 120
Cables									
Small cables $\varnothing \leq 21$ mm	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Medium and large cables $21 \leq \varnothing \leq 80$ mm	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90	EI 90
Cable bundle $\varnothing \leq 150$ mm	EI 120	EI 120	EI 120	EI 120	EI 180	EI 180	EI 120	EI 120	EI 120
Non sheathed cables (wires)	EI 90	EI 90	EI 90	-	-	-	EI 120	EI 120	EI 120
Waveguides	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 120	EI 120
Conduits									
Single conduits $\varnothing \leq 16$ mm	EI 180	EI 180	EI 180	EI 90	EI 90	EI 90	EI 180	EI 180	EI 180
Single conduits $\varnothing \leq 50$ mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Conduit bundle	EI 120	EI 120	EI 120	-	-	-	-	-	-
Special penetration bundle									
Bundle with PE / PEF insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 120	EI 120
Bundle with foamed elastomeric insulation	EI 120	EI 120	EI 120	-	-	-	EI 120	EI 120	EI 120
Pipes									
Combustible pipes (U/U)	EI 180	EI 180	EI 180	-	-	-	-	-	-
Copper pipes (C/U) with combustible insulation 42 mm	EI 180	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with non-combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Copper pipes (C/U) with non-combustible insulation	EI 120	EI 120	EI 120	-	-	-	-	-	-
Steel pipes (C/U) with combustible insulation 114 mm	EI 180	EI 120	EI 120	-	-	-	-	-	-
Steel pipes (C/U) with combustible insulation up to 114 mm	EI 120	EI 120	EI 120	-	-	-	-	-	-

Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + foam inlay According to A.1.2.2			Single sided According to A.1.2.4		
									
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Steel pipes (C/U) with non-combustible insulation up to 114 mm	EI 120	EI 120	EI 120	-	-	-	-	-	-
Aluminium composite pipes (U/C) with combustible insulation	EI 180	EI 180	EI 180	-	-	-	-	-	-
Mixed seals according to A.1.8.7									
Mixed seals with small electrical cables	EI 120	EI 120	EI 120	-	-	-	-	-	-
Mixed seals with up to large electrical cables	EI 90	EI 90	EI 90	-	-	-	-	-	-

A.2.7 Rigid floor $t_E \geq 150$ mm / 200 mm as described in A.1.1 for basic configuration according to A.1.4

Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + 2 layers CFS-P BA on top side According to A.1.2.1			Both sides + 2 layers CFS-P BA on top side $t_E = 200$ mm According to A.1.2.1		
									
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Blank seal	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Cables									
Small cables $\varnothing \leq 21$ mm	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Small cables $\varnothing \leq 21$ mm, bended 90°	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Medium and large cables $21 \leq \varnothing \leq 80$ mm	EI 90	EI 90	EI 90	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Cable bundle $\varnothing \leq 150$ mm	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120

A.2.8 Rigid floor $t_E \geq 150$ mm / 200 mm as described in A.1.1 for corner and side configuration according to A.1.4

Housing concept According to A.1.4	Both sides According to A.1.2.1			Both sides + 2 layers CFS-P BA on top side According to A.1.2.1			Both sides + 2 layers CFS-P BA on top side $t_E = 200$ mm According to A.1.2.1		
									
	Single 	Double 	Triple 	Single 	Double 	Triple 	Single 	Double 	Triple 
Cables									
Small cables $\varnothing \leq 21$ mm	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Medium and large cables $21 \leq \varnothing \leq 80$ mm	EI 90	EI 90	EI 90	EI 180	EI 180	EI 180	EI 180	EI 180	EI 180
Cable bundle $\varnothing \leq 150$ mm	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120	EI 120

Annex B ABBREVIATIONS USED IN DRAWINGS

Abbreviation	Description
A	Hilti Firestop Cable Collar CFS-RCC
E	Building element (rigid or flexible wall construction, floor)
t_E	Thickness of building element
t_A	Thickness of seal
A ₁	Hilti Firestop Foam CFS-F FX
A _{1a}	Hilti Firestop Filler CFS-FIL
E ₁	Gypsum frame
B	2 layers Hilti Firestop Putty Bandage CFS-P BA
W _A	Width of frame
W	Width of opening
M	Mortar
W ₁	Opening dimension
A'	Old material (e.g. paper, boards, foams, intumescent products, .)
C ₁	Cables
C ₂	Condensate pipe
C ₃	Copper pipe
S ₁	Distance between penetration and seal edge
S _a	Horizontal distance between cable collars linear in cluster arrangement
S _b	Vertical distance between cable collars in cluster arrangement

Annex C REFERENCES TO STANDARDS MENTIONED IN THE UKTA

DIN EN 980	Graphical symbols for use in the labelling of medical devices
EN 1366-3	Fire resistance tests for service installations - Part 3: Penetration seals
EN ISO 717-1	Acoustics - Rating of sound insulation of buildings and of building elements - Part 1: Airborne sound insulation
EN 10140-2	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation
EN 1026	Windows and doors - Air permeability - Test method
EN 12086	Thermal insulating products for building applications - Determination of water vapour transmission properties
EN ISO 12572	Hygrothermal performance of building materials and products - Determination of water vapour transmission properties (ISO 12572 2001)
EN 1226	Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Test method to prove the resistance to initial ring deflection
EN 12664	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products with medium and low thermal resistance
EN 12267	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 12939	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Thick products of high and medium thermal resistance
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 1451-1	Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Polypropylene (PP) - Part 1: Specifications for pipes, fittings and the system
EN 1451-2	Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Pipes
EN 520	Gypsum plasterboards - Definitions, requirements and test methods
EN ISO 15494	Plastics piping systems for industrial applications - Polybuten (PB), polyethylene (PE) and polypropylene (PP) - Specifications for components and the system; Metric series
EOTA TR001	Determination of impact resistance of panels and panel assemblies
EOTA TR 024	Characterization, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products
EAD 350454-00-1104	Fire stopping and fire sealing products - Penetration seals