### European technical approval

**ETA-13/0516**

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

<table>
<thead>
<tr>
<th>Handelsbezeichnung</th>
<th>Trade name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hilti Firestop Cable Transit</td>
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<table>
<thead>
<tr>
<th>Zulassungsinhaber</th>
<th>Holder of approval</th>
</tr>
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<tbody>
<tr>
<td>Hilti AG</td>
<td></td>
</tr>
<tr>
<td>Feldkircherstrasse 100</td>
<td></td>
</tr>
<tr>
<td>9494 Schaan</td>
<td></td>
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<tr>
<td>Liechtenstein</td>
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</table>

<table>
<thead>
<tr>
<th>Zulassungsgegenstand und Verwendungszweck</th>
<th>Generic type and use of construction product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandschutzmodulsystem für die Verwendung in Abschottungen</td>
<td></td>
</tr>
<tr>
<td>Firestop Cable Transit for Use in Penetration Seals</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Geltungsdauer vom</th>
<th>from</th>
<th>to</th>
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<tbody>
<tr>
<td>28.06.2013</td>
<td></td>
<td></td>
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<tr>
<td>27.06.2018</td>
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<thead>
<tr>
<th>Herstellwerk</th>
<th>Manufacturing plant</th>
</tr>
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<tbody>
<tr>
<td>Hilti Werk 5</td>
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</table>

<table>
<thead>
<tr>
<th>Diese Europäische technische Zulassung umfasst This European technical approval contains</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 Seiten inklusive 34 Anhängen</td>
</tr>
<tr>
<td>45 pages including 34 Annexes</td>
</tr>
</tbody>
</table>

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European Organisation for Technical Approvals
Europäische Organisation für Technische Zulassungen
Organisation Européenne pour l’Agrément Technique
I  LEGAL BASES AND GENERAL CONDITIONS

1  This European technical approval is issued by Österreichisches Institut für Bautechnik in accordance with:
   - Bauproduktegesetz. LGBl. V Nr. 33/1994;

2  The Österreichisches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant(s). Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3  This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4  This European technical approval may be withdrawn by Österreichisches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5  Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Österreichisches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6  The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated in EOTA. Translations into other languages have to be designated as such.

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4 Official Journal of the European Communities N° L 17, 20.1.1994, p. 34
II  SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1  Definition of product(s) and intended use

The penetration seal „Hilti Firestop Cable Transit System CFS-T” is designed and installed in accordance with the ETA-holder’s design and installation instructions, deposited at the Österreichisches Institut für Bautechnik. The approval holder is ultimately responsible for the penetration seal „Hilti Firestop Cable Transit System CFS-T”.

1.1  Definition of the construction product

This European technical approval refers to the Hilti Firestop Cable Transit system for use in Penetration Seals with the designation Hilti Firestop Cable Transit CFS-T and is designed as a modular system.

The Hilti Firestop Cable Transit System CFS-T consists of:

- Frames made of galvanised steel / stainless steel for rectangular openings:
  - SB Frame (cast in) as single or multiple frame or
  - SBO Frame (surface mounted) as single or multiple frame

  The SB or SBO frames are available as single frame in min. sizes from 120mm x 101mm (CFS-T SB 2x1 or CFS-T SBO 2x1) up to multiple frame in max. size of 504mm x 562mm (CFS-T SB 8+8x4 or CFS-T SBO 8+8x4).

- Frames made of galvanised steel / stainless steel for round openings:
  - SLF Frame (surface mounted) as single version

  The round frames (SLF) are available in sizes from Ø50mm up to Ø200mm.

- Round plug seals
  - CFS-T RR
  - CFS-T RRS

- Cable Transit Modules consist of halogen free elastomeric rubber (HFE)
  - in different sizes acc. to penetration diameter

- Filler blocks
  - in different sizes

- Compression unit consists of
  - Wedge seal (galvanised steel / stainless steel)
  - Anchor plates & Fixing anchor plates
  - Lubricant

- Anchor plate sets (galvanised steel / stainless steel)

Hilti Firestop Cable Transit CFS-T System consists of several component and sizes – for further details see Annex 1 and technical literature of the manufacturer.
### 1.2 Intended Use

Hilti Firestop Cable Transit CFS-T is intended to form a penetration seal, which is used to maintain the fire resistance of a separating element (rigid wall or rigid floor) when and where services pass through.

<table>
<thead>
<tr>
<th>The “Hilti Firestop Cable Transit CFS-T” is made of galvanised steel / stainless steel frame in single or multiple configurations, cast in or fixed with metal anchors surface mounted to rigid walls and floors (see 1.2.2), for rectangular openings.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>The installed cables have to be sealed with Cable Transit Modules consist on:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Basic modules</td>
</tr>
<tr>
<td>• Adapter modules</td>
</tr>
<tr>
<td>• Core modules</td>
</tr>
<tr>
<td>• Filler modules</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To adjust the different penetration (cable / pipe) diameters, in combination with Anchor plates and Wedge compression unit. The Anchor plate facilitates assembly of the cable modules and filler modules, secures these within the frame and increases the tightness of the seal against static and dynamic pressure. The anchor plate is available in galvanised steel / stainless steel material. The wedge compression unit is used to allow quick and easy compression of modules and filler modules for an effective seal. The sealing wedge can be placed anywhere within the frame.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>The “Hilti Firestop Cable Transit CFS-T” for round penetration openings, consists on round galvanised steel / stainless steel frame CFS-T SLF fixed with metal anchors surface mounted to rigid walls and floors (see 1.2.2).</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>The round plug seal CFS-T RR and CFS-T RRS can be inserted either in the galvanised steel / stainless steel frame CFS-T SLF or inside rigid wall and floor opening. The plug seal CFS-T RR and CFS-T RRS consists of an elastic, halogen free elastomeric rubber (HFE) insert with tensioning bolts and plates made from galvanised steel / stainless steel material. The square opening inside the plug seal will be filled with Cable Transit Modules or Filler Modules for sealing around the cable/-pipe penetrations.</th>
</tr>
</thead>
</table>

For the purpose of smoke tightness, between the frame and the rigid wall/floor, the Hilti Firestop Acrylic Sealant CFS-S ACR (see ETA-10/0292 and ETA-10/0389) has to be used when not cast in.

The support construction must be classified in accordance with EN 13501-2 for the required fire resistance period or fulfill the requirements of the relevant Eurocode.
Hilti Firestop Cable Transit CFS-T may be used to provide a penetration seal with the following specific services, single, multiple or in combination:
- Blank seal no services, as given in Annex 2
- Cables Services as given in Annex 2
- Metal pipes Services as given in Annex 2
- Mixed (combination) Services as given in Annex 2

For the maximum seal size see Annex 2.

Penetration seals require a minimum separation of 200 mm. For minimum distances between services within a penetration seal (multiple or mixed penetration seal) see Annex 2.

Maximum distance [mm] from surface of the building element for first support / fixing of services: see Annex 2.

Annex 2 gives details of penetration seals for which fire resistance tests were carried out. This ETA covers assemblies installed in accordance with the provisions given in 4.3 and Annex 3.

The Hilti Firestop Cable Transit CFS-T is intended for environmental conditions as defined by use category Type X, for the system with components made of stainless steel or galvanised steel (conditions exposed to weathering) and Z₂, internal conditions with humidity lower than 85% RH excluding temperatures below 0°C.

The provisions made in this European technical approval are based on an assumed working life of Hilti Firestop Cable Transit CFS-T of 10 years, provided that the conditions laid down in sections 4.2/5.1/5.2 for the packaging / transport / storage / installation / use / repair are met.

The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be used as a means for selecting the appropriate product in relation to be 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.

1.2.1 Additional protection for cable/pipe penetrations and metal frame

Depending on the required fire resistance additional protection (AP) may be required (for details see Table 1, Table 2 and Annex 2):

AP₁: cables / Stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm, wrapped around cables, fixed with wire
AP₂: pipes / Stone wool acc. table 2 with density of 100 kg/m³ and a thickness of 30mm wrapped around pipes
AP₃: frames and plugs / Stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm, fixed with pins washers and with wire

1.2.2 Support construction for cables and metal pipe penetrations

The support construction that Hilti Firestop Cable Transit CFS-T may be used to provide a penetration seal in, are as follows:

Rigid walls: The wall must have a minimum thickness of 150 mm and comprise concrete, with a minimum density of 2200 kg/m³.

Rigid floors: The floor must have a minimum thickness of 200 mm and comprise concrete, with a minimum density of 2200 kg/m³.
2 Characteristics of the product and methods of verification

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

<table>
<thead>
<tr>
<th>ETAG Clause No.</th>
<th>Characteristic</th>
<th>Assessment of characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mechanical resistance and stability</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Safety in case of fire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.1</td>
<td>Reaction to fire</td>
<td>Class E according to EN 13501-1:2007</td>
</tr>
<tr>
<td>2.4.2</td>
<td>Resistance to fire</td>
<td>See clause 2.2</td>
</tr>
<tr>
<td>Hygiene, Health and the Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.3</td>
<td>Air permeability</td>
<td>See clause 2.3</td>
</tr>
<tr>
<td>2.4.4</td>
<td>Water permeability</td>
<td>See clause 2.4</td>
</tr>
<tr>
<td>2.4.5</td>
<td>Release dangerous substances</td>
<td>See clause 2.5</td>
</tr>
<tr>
<td>Safety in use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.6</td>
<td>Mechanical resistance and stability</td>
<td>No performance determined</td>
</tr>
<tr>
<td>2.4.7</td>
<td>Resistance to impact/movement</td>
<td>See clause 2.7</td>
</tr>
<tr>
<td>2.4.8</td>
<td>Adhesion</td>
<td>No performance determined</td>
</tr>
<tr>
<td>Protection against noise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.9</td>
<td>Airborne sound insulation</td>
<td>No performance determined</td>
</tr>
<tr>
<td>2.4.10</td>
<td>Impact sound insulation</td>
<td>No performance determined</td>
</tr>
<tr>
<td>Energy economy and heat retention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.11</td>
<td>Thermal properties</td>
<td>No performance determined</td>
</tr>
<tr>
<td>2.4.12</td>
<td>Water vapour permeability</td>
<td>No performance determined</td>
</tr>
<tr>
<td>General aspects relating to fitness for use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.13</td>
<td>Durability and serviceability</td>
<td>X</td>
</tr>
</tbody>
</table>

2.1 Reaction to fire

The modules of the Hilti Firestop Cable Transit System CFS-T fulfil the requirements for reaction to fire class “E” according to EN 13501-1.

Hilti Firestop Acrylic Sealant CFS-S ACR fulfils the requirements for reaction to fire class "D-s1 d0" according to EN 13501-1.

2.2 Resistance to fire

The resistance to fire performance according to EN 13501-2 of penetration seals made of Hilti Firestop Cable Transit System CFS-T is given in Annex 2.

Information on ancillary products which were tested within the framework of this European technical approval for evaluating resistance to fire is given in Annex 1.
2.3  **Air permeability**

Air permeability for a multiple penetration of cables fire stopped with Hilti Firestop Cable Transit CFS-T and has been tested subjected to an overpressure of 7 bar for Type CFS-T SS/SB. Test result: No air leakage over a test duration of 24 hours has been determined.

2.4  **Water permeability**

Water tightness for a multiple penetration of cables fire stopped with Hilti Firestop Cable Transit CFS-T and has been tested subjected to an overpressure of 11 bar for Type CFS-T-RR 200 and 7 bar for Type CFS-T SS/SB. Test result: No water leakage over a test duration of 24 hours has been determined.

2.5  **Dangerous substances**

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

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

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

2.6  **Mechanical resistance and stability**

No performance determined.

2.7  **Resistance to impact/movement**

In impact tests according to EOTA TR001 the requirements for the highest risk zone type (Type IV) have been fulfilled as defined for internal walls in EOTA TR 001 A.1 for:

- Safety in use/Internal Walls (500 Nm soft body impact, 10 Nm hard body impact)
- Serviceability/Internal Walls (120 Nm soft body impact, 6 Nm hard body impact)
- Safety in use/Roofs/ Ceilings (1200 Nm soft body impact, 10 Nm hard body impact)
- Serviceability/Roofs/Ceilings (1200 Nm soft body impact, 6 Nm hard body impact)
- Safety in use/Floors (1200 Nm soft body impact, 10 Nm hard body impact)
- Serviceability/Floors (1200 Nm soft body impact, 6 Nm hard body impact)

The maximum dimension of the penetration seal is 624 x 642 mm.

2.8  **Adhesion**

No performance determined.

2.9  **Airborne sound insulation**

No performance determined.

2.10  **Impact sound insulation**

No performance determined.
2.11 **Thermal properties**

No performance determined.

2.12 **Water vapour permeability**

No performance determined.

2.13 **Durability**

The Hilti Firestop Cable Transit CFS-T is intended for environmental conditions as defined by use category Type X in accordance with ETAG 026-2, Section 1.2. Since the requirements for type X are met also the requirements for type Y₁, Y₂, Z₁ and Z₂ are fulfilled.

Type X: Products for penetration seals intended for use at conditions exposed to weathering

Type Y₁: Products intended for use at temperatures between -5 °C and + 70°C with exposure to UV but without exposure to rain.

Type Y₂: Products intended for use at temperatures between -5 °C and + 70°C but without exposure to rain and UV.

Type Z₁: Products intended for use at internal conditions with high humidity, excluding temperatures below 0°C.

Type Z₂: Products intended for uses at internal conditions with humidity classes other than Z₁, excluding temperatures below 0°C

3 **Evaluation and attestation of conformity and CE marking**

3.1 **System of attestation of conformity**

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

This system of attestation of conformity is defined as follows:

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

(a) Tasks for the manufacturer:

(1) factory production control;

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

(b) Tasks for the notified body

(3) initial type-testing of the product;

(4) initial inspection of factory and of factory production control;

(5) continuous surveillance, assessment and approval of factory production control.

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5 These uses apply for internal humidity class 5 in accordance with EN ISO 13788
6 Official Journal of the European Communities N° L 178, 14.7.1999, p. 52
3.2 Responsibilities

3.2.1 Tasks of the Manufacturer

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

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

The factory production control shall be in accordance with the Control Plan relating to this European technical approval which is part of the technical documentation of this European technical approval. The “Control Plan” is laid down in the context of the factory production control system operated by the manufacturer and deposited at the Österreichisches Institut für Bautechnik.

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

3.2.1.1 Other tasks of the manufacturer

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

technical data sheet:

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

Installation instruction:

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

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of penetration seals in order to allow the manufacturer to undertake the actions laid down in section 3.3. For this purpose, the “control plan” referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approval body or bodies involved.

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

The notified body shall perform the
- initial type-testing of the product
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

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

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

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

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

3.3 CE marking

The CE marking shall be affixed on the product itself, on a label attached to it, on its packaging or on the commercial documents accompanying the components of the product. The letters “CE” shall be followed by the identification number of the Notified Body involved and be accompanied by the following additional information:
- the name and address of the producer (legal entity responsible for the manufacturer),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- the number of the guideline for European technical approval,
- the name and intended use of the product,
- “see ETA-13/0516 for relevant characteristics”

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

4.1 General

4.1.1 For evaluating resistance to fire of the penetration seal using “Hilti Firestop Cable Transit CFS-T” as specified in Annex 2 it is assumed that
- the installation of the penetration seal does not affect the stability of the adjacent building elements – even in case of fire,
- the installations are fixed and adjacent building elements (not the seal) in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed on the seal,
- the support or the installations is maintained or the classification period required and
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.
4.2 Manufacturing

Hilti Firestop Cable Transit CFS-T shall be produced in accordance with the manufacturing process deposited with Österreichisches Institut für Bautechnik.

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

4.3 Installation

The arrangement and installation of Hilti Firestop Cable Transit CFS-T shall be done in accordance with the details given in Annex 3 for the penetration seal(s).

5 Indications to the manufacturer

5.1 Packaging, transport and storage

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

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

- Storage: Store in a dry place protected from moisture
- Storage temperature: -20° up to max. +50°C

5.2 Use, maintenance, repair

The fire resistance of penetration seals executed using Hilti Firestop Cable Transit CFS-T shall not be negatively affected by future changes to buildings or building elements.

The assessment of the fitness for use is based on the assumption that damaged seals are replaced or repaired. It is also assumed that replacement of components during maintenance/repair will be undertaken using materials specified by the European technical approval.

On behalf of Österreichisches Institut für Bautechnik

Rainer Mikulits  
Managing Director
### ANNEX 1

**DESCRIPTION OF THE PRODUCT AND ANCILLARY PRODUCT(S) FOR “HILTI FIRESTOP CABLE TRANSIT CFS-T”:**

#### Type overview:

<table>
<thead>
<tr>
<th>System component</th>
<th>Type element (min-max)</th>
<th>Frame range outer dimension (min-max, mm)</th>
<th>Recommended opening size (Ø, mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frame SB</strong></td>
<td>Single: min. CFS-T SB 2x1 – max. CFS-T SB 8x1&lt;br&gt;Multiple: min. CFS-T SB 4x2 – max. CFS-T SB 8+8x4</td>
<td>181x240 – 357x240&lt;br&gt;240x368 – 624x642</td>
<td>120x101 – 120x277&lt;br&gt;248x160 – 504x562</td>
</tr>
<tr>
<td><strong>Frame SBO</strong></td>
<td>Single: min. CFS-T SBO 2x1 – max. CFS-T SBO 8x1&lt;br&gt;Multiple: min. CFS-T SBO 4x2 – max. CFS-T SBO 8+8x4</td>
<td>181x240 – 357x240&lt;br&gt;240x368 – 624x642</td>
<td>120x101 – 120x277&lt;br&gt;248x160 – 504x562</td>
</tr>
<tr>
<td><strong>Frame SLF</strong></td>
<td>Min.: CFS-T SLF 50 – Max.: CFS-T SLF 200</td>
<td>Ø 57x3,2 – Ø 219,1x1,8</td>
<td>–</td>
</tr>
<tr>
<td><strong>Plug seals</strong></td>
<td>Min.: CFS-T RR-50 – Max.: CFS-T RR-200&lt;br&gt;Min.: CFS-T RRS-43 – Max. CFS-T RRS-100</td>
<td>–</td>
<td>Ø 50–51 / Ø 200-205&lt;br&gt;Ø 43-45 / Ø 100-103</td>
</tr>
<tr>
<td><strong>Cable Transit modules</strong></td>
<td>Min.: CFS-T 15/0+3-9, CFS-T 20/0+5-12, CFS-T 30/0+13-23, CFS-T 40/0+23-33, CFS-T 60/0+34-51, CFS-T 90/0+52-78, Max.: CFS-T 120/0+79-99</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Filler blocks</strong></td>
<td>Min.: CFS-T FB 24x5/0, CFS-T FB 12x10/0, CFS-T FB 15/0, CFS-T FB 20/0, Max.: CFS-T FB 30/0</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Wedge seals &amp; Anchor plates</strong></td>
<td>CFS-T WD 120 GS (galvanized)</td>
<td>–</td>
<td>–</td>
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<tr>
<td></td>
<td>CFS-T WD 120 S/S (stainless steel)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Anchor plate set</strong></td>
<td>CFS-T AP 120 GS (galvanized)</td>
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<td>–</td>
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<tr>
<td></td>
<td>CFS-T AP 120 S/S (stainless steel)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Fixing anchor plate set</strong></td>
<td>CFS-T FAP 120 S/S (stainless steel)</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
1.1 Product: SB series

1.1.1 System description

The modular system Type “Hilti Firestop Cable Transit CFS-T SB” consists of two cast in flanged steel combination frame installed flush to surface, stone wool insulation, elastomeric rubber modules, wedge compression kit and lubricant.

Frame (A1):
- Material: galvanized steel, Type - Hilti Transit frame CFS-T SB (integrated).
- Max dimensions: 624mm x 644mm x 60mm height (type CFS-T SB 8+8x4)
- Position: casted inside the wall/floor, flush with the surface on both sides of the wall/floor (two Frames are placed back to back on an intermediate distance of 30mm (wall) or 80mm (floor).

Module (A2):
- Material: flexible, non-flammable, halogen free elastomeric rubber (HFE).
- Types: Hilti CFS-T 15, CFS-T 20, CFS-T 30, CFS-T 40, CFS-T 60, CFS-T 90
  Hilti CFS-T FB 15, CFS-T FB 20, CFS-T FB 30
  Selection according diameter of penetration (see installation instruction Annex 3)
- Position: inside the rectangular opening(s) of the frame.
- Possible additional parts: core module and filler module used for blank seals and for sealing between cables and basic modules
- Number of modules depending on penetrations.

Wedge compression kit (A3):
- Material: galvanized steel, Type - Hilti CFS-T WD 120 GS wedge compression kit.
- Comprising: anchor plates, fixing anchor plate and wedge seal.
- Position: inside the rectangular opening(s) of the frame.
- Fixed: clamped by tightening the bolt in the wedge seal.

Seal insulation:

Cable insulation (AP1):
- Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
- Position: insulation on the cables, additional to the seal insulation, on both sides of the wall / on lower side of the floor
- Fixed: with steel gauze (thickness 0.7mm). Insulation lengths of the cables see Annex 2

Pipe insulation (AP2):
- Material: stone wool acc. table 2, thickness see Annex 2
- Position: insulation on the pipe, additional to the seal insulation, on both sides of the wall / on lower side of the floor
- Insulation lengths of the pipes see Annex 2

Steel frame insulation (AP3):
- Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
- Position: on the seal (including frame if present), on both sides of the wall/ on lower side of the floor
1.1.2 Seal size
Range: min. 120mm x 101mm (CFS-T SB 2x1) to max. 504mm x 562mm (CFS-T SB 8+8x4)

1.1.3 Number of penetrations
Depends on selected frame type, and details given in Annex 2.

1.2 Product: SBO series

1.2.1 System description
The modular system Type “Hilti Firestop Cable Transit CFS-T SBO” consists of two surface mounted flanged steel combination frame, stone wool insulation, elastomeric rubber modules, wedge compression kit and lubricant.

Frame (A1):
- Material: galvanized steel, Type - Hilti Transit frame CFS-T SBO (surface mounted).
- Max dimensions: 624mm x 644mm x 60mm height (type CFS-T SBO 8+8x4)
- Position: surface mounted both sides of the wall/floor
- Fixed: with 4 anchor bolts to the wall/floor

Smoke tightness between frame and support construction according Annex 1.8.

Module (A2):
- Material: flexible, non-flammable, halogen free elastomeric rubber (HFE).
- Types: Hilti CFS-T 15, CFS-T 20, CFS-T 30, CFS-T 40, CFS-T 60, CFS-T 90
  Hilti CFS-T FB 15, CFS-T FB 20, CFS-T FB 30
  Selection according diameter of penetration (see installation instruction Annex 3)
- Position: inside the rectangular opening(s) of the frame.
- Possible additional parts: core module and filler module used for blank seals and for sealing between cables and basic modules
- Number of modules depending on penetrations.

Wedge compression kit (A3):
- Material: galvanized steel, Type - Hilti CFS-T WD 120 GS wedge compression kit.
- Comprising: anchor plates, fixing anchor plate and wedge seal.
- Position: inside the rectangular opening(s) of the frame.
- Fixed: clamped by tightening the bolt in the wedge seal.

Seal insulation:

Cable insulation (AP1):
- Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
- Position: insulation on the cables, additional to the seal insulation, on both sides of the wall / on lower side of the floor
- Fixed: with steel gauze (thickness 0,7mm). Insulation lengths of the cables see Annex 2
Pipe insulation (AP₂):
- Material: stone wool acc. table 2, thickness see Annex 2
- Position: insulation on the pipe, additional to the seal insulation, on both sides of the wall / on lower side of the floor
- Insulation lengths of the pipes see Annex 2

Steel frame insulation (AP₃):
- Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
- Position: on the seal (including frame if present), on both sides of the wall / on lower side of the floor
- Fixed: with pins (diameter 4mm) and washers

1.2.2 Seal size
Range: min. 120mm x 101mm (CFS-T SBO 2x1) to max. 504mm x 562mm (CFS-T SBO 8+8x4)

1.2.3 Number of penetrations
Depends on selected frame type, and details given in Annex 2.

1.3 Product: RR series

1.3.1 System description
The modular system Type “Hilti Firestop Cable Transit CFS-T RR” consists of an elastic plug seal, stone wool insulation, elastomeric rubber modules and lubricant.

Plug seal (A₄):
- Material: flexible, non-flammable, halogen free elastomeric rubber (HFE)
- Max dimensions: Ø200mm (type CFS-T RR 200)
- Types: Hilti CFS-T RR-50, CFS-T RR-70, CFS-T RR-100, CFS-T RR-125, CFS-T RR-150, CFS-T RR-200
- Position: inside the opening(s) of the wall/floor.
- Fixed: clamped inside the wall/floor opening by tightening the bolts of the clamp plates.

Module (A₂):
- Material: flexible, non-flammable, halogen free elastomeric rubber (HFE).
- Types: Hilti CFS-T 15, CFS-T 20, CFS-T 30, CFS-T 40, CFS-T 60, CFS-T 90
  Hilti CFS-T FB 15, CFS-T FB 20, CFS-T FB 30
  Selection according diameter of penetration (see installation instruction Annex 3)
- Position: inside the rectangular opening(s) of the frame.
- Possible additional parts: core module and filler module used for blank seals and for sealing between cables and basic modules
- Number of modules depending on penetrations.
Seal insulation:

Cable insulation (AP₁):
- Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
- Position: insulation on the cables, additional to the seal insulation, on both sides of the wall / on lower side of the floor
- Fixed: with steel gauze (thickness 0.7mm). Insulation lengths of the cables see Annex 2

Plug insulation (AP₃):
- Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
- Position: on the plug on both sides of the wall / on lower side of the floor
- Fixed: with pins (diameter 4mm) and washers

1.3.2 Seal size
Range: min. Ø50mm (CFS-T RR-50) up to max. Ø205mm (CFS-T RR-200)

1.3.3 Number of penetrations
Any number of single openings Hilti CFS-T RR-50 up to Hilti CFS-T RR-200, and details given in Annex 2

1.4 Product: RR series + SLF series

1.4.1 System description
The modular system Type “Hilti Firestop Cable Transit CFS-T RR + CFS-T SLF” consists of a flanged steel sleeve, elastic plug seal, stone wool insulation, elastomeric rubber modules and lubricant.

Steel Sleeve (A₁):
- Material: mild steel primed (MSP)
- Max. dimensions: Ø200mm (type CFS-T SLF 200)
- Types: Hilti CFS-T SLF 50, CFS-T SLF 70, CFS-T SLF 100, CFS-T SLF 125, CFS-T SLF 150, CFS-T SLF 200 MSP (surface mounted).
- Max dimensions: outer diameter 320mm, height 70mm, thickness 5mm and 8mm (type CFS-T SLF 200 MSP)
- Fixed: with 4 anchor bolts to the wall/floor

Smoke tightness between frame and support construction according Annex 1.8.

Plug seal (A₄):
- Material: flexible, non-flammable, halogen free elastomeric rubber (HFE)
- Max dimensions: Ø200mm (type CFS-T RR 200)
- Types: Hilti CFS-T RR-50, CFS-T RR-70, CFS-T RR-100, CFS-T RR-125, CFS-T RR-150, CFS-T RR-200
- Position: inside the steel sleeve of the wall/floor.
- Fixed: clamped inside the steel sleeve opening by tightening the bolts of the clamp plates.
- **Module (A<sub>2</sub>):**
  - Material: flexible, non-flammable, halogen free elastomeric rubber (HFE).
  - Types: Hilti CFS-T 15, CFS-T 20, CFS-T 30, CFS-T 40, CFS-T 60, CFS-T 90
    Hilti CFS-T FB 15, CFS-T FB 20, CFS-T FB 30
  - Selection according diameter of penetration (see installation instruction Annex 3)
  - Position: inside the rectangular opening(s) of the frame.
  - Possible additional parts: core module and filler module used for blank seals and for sealing between cables and basic modules
  - Number of modules depending on penetrations.

**Seal insulation:**

- **Cable insulation (A<sub>P</sub>):**
  - Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
  - Position: insulation on the cables, additional to the seal insulation, on both sides of the wall / on lower side of the floor
  - Fixed: with steel gauze (thickness 0,7mm). Insulation lengths of the cables see Annex 2

- **Steel sleeve insulation (AP<sub>3</sub>):**
  - Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
  - Position: on the steel sleeve on both sides of the wall / on lower side of the floor
  - Fixed: with pins (diameter 4mm), washers and with steel gauze (thickness 0,7mm)

1.4.2 Seal size
- Range: min. Ø50mm (CFS-T RR-50) up to max. Ø205mm (CFS-T RR-200)

1.4.3 Number of penetrations
- Any number of single openings CFS-T RR-50 + CFS-T SLF 50 MSP up to CFS-T RR-200 + CFS-T SLF 200 MSP, and details given in Annex 2

1.5 **Product: RRS series**

1.5.1 System description
- The modular system Type “Hilti Firestop Cable Transit CFS-T RRS” consists of an elastic plug seal, stone wool insulation, elastomeric rubber modules and lubricant.

**Plug seal (A<sub>4</sub>):**
- Material: flexible, non-flammable, halogen free elastomeric rubber (HFE)
- Max dimensions: Ø100mm (type CFS-T RRS 100)
- Types: Hilti CFS-T RRS-43, CFS-T RRS-50, CFS-T RRS-70, CFS-T RRS-100
  - Selection according diameter of penetration (see installation instruction Annex 3)
  - Position: inside the opening(s) of the wall/floor.
  - Fixed: clamped inside the wall/floor opening by tightening the bolts of the clamp plates.
• Adapter Material: flexible, non-flammable, halogen free elastomeric rubber (HFE).
  Position: inside the plug seal in order to adjust the cable diameter by using black, grey or red adapter

Seal insulation:

Cable insulation (AP₁):
• Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
• Position: insulation on the cables, additional to the seal insulation, on both sides of the wall / on lower side of the floor
• Fixed: with steel gauze (thickness 0.7mm). Insulation lengths of the cables see Annex 2

Plug insulation (AP₃):
• Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
• Position: on the plug on both sides of the wall / on lower side of the floor
• Fixed: with pins (diameter 4mm) and washers

1.5.2 Seal size
  Range: min. Ø43mm (CFS-T RRS-43) up to max. Ø103mm (CFS-T RRS-100)

1.5.3 Number of penetrations
  Any number of single openings Hilti CFS-T RRS-43 up to Hilti CFS-T RRS-100, and details given in Annex 2

1.6 Product: RRS series + SLF series

1.6.1 System description

The modular system Type “Hilti Firestop Cable Transit CFS-T RRS” consists of a flanged steel sleeve installed both sides, an elastic plug seal, stone wool insulation, elastomeric rubber modules and lubricant.

Steel Sleeve (A₁):
• Material: mild steel primed (MSP)
• Max. dimensions: Ø100mm (type CFS-T SLF 100)
• Types: Hilti CFS-T SLF 50, CFS-T SLF 70, CFS-T SLF 100 MSP (surface mounted)
• Max dimensions: outer diameter 208mm, height 70mm, thickness 5mm and 8mm (type CFS-T SLF 100 MSP)
• Fixed: with 4 anchor bolts to the wall/floor

Smoke tightness between frame and support construction according Annex 1.8.

Plug seal (A₄):
• Material: flexible, non-flammable, halogen free elastomeric rubber (HFE)
• Max dimensions: Ø100mm (type CFS-T RRS 100)
• Types: Hilti CFS-T RRS-43, CFS-T RRS-50, CFS-T RRS-70, CFS-T RRS-100
  Selection according diameter of penetration (see installation instruction Annex 3)
• Position: inside the steel sleeve of the wall/floor
• Fixed: clamped inside the steel sleeve opening by tightening the bolts of the clamp plates.
• Adapter Material: flexible, non-flammable, halogen free elastomeric rubber (HFE).
  Position: inside the plug seal in order to adjust the cable diameter by using black, grey or red adapter

Seal insulation:

Cable insulation (AP₁):
• Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
• Position: insulation on the cables, additional to the seal insulation, on both sides of the wall/ on lower side of the floor
• Fixed: with steel gauze (thickness 0,7mm). Insulation lengths of the cables see Annex 2 in order to adjust the cable diameter by using black, grey or red adapter

Steel sleeve insulation (AP₃):
• Material: stone wool acc. table 1 with density of 80 kg/m³ and a thickness of 30mm
• Position: on the steel sleeve on both sides of the wall/ on lower side of the floor
• Fixed: with pins (diameter 4mm), washers and with steel gauze (thickness 0,7mm)

1.6.2 Seal size
  Range: min. Ø43mm (CFS-T RRS-43) up to max. Ø103mm (CFS-T RRS-100)

1.6.3 Number of penetrations
  Any number of single openings Hilti CFS-T RRS-43 up to Hilti CFS-T RRS-100, and details given in Annex 2

1.7 Insulation material

1.7.1 Mineral wool products for additional cable, plug and metal frame protection

Table 1: Specification for mineral wool products suitable for being used as additional protection for cables, plugs and metal frames according to 1.2.1 (relevant for Annex 1.1, 1.2, 1.3, 1.4, 1.5, 1.6)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone wool according to EN 14303</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction to fire class according to EN 13501-1</td>
<td>A1</td>
<td>-</td>
</tr>
<tr>
<td>Thermal conductivity at 20°C</td>
<td>≤ 0.040</td>
<td>W/(mK)</td>
</tr>
<tr>
<td>Density</td>
<td>≤ 80</td>
<td>kg/m³</td>
</tr>
</tbody>
</table>

The following list contains suitable products but may not be exhaustive:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isover</td>
<td>MD 100</td>
</tr>
<tr>
<td>Isover</td>
<td>MD 2</td>
</tr>
<tr>
<td>Isover</td>
<td>ULTIMATE TECH WIRED MAT 5.0 N</td>
</tr>
<tr>
<td>Rockwool</td>
<td>ProRox WM 80</td>
</tr>
<tr>
<td>Rockwool</td>
<td>RTD Plus</td>
</tr>
</tbody>
</table>
1.7.2 Mineral wool products for additional pipe protection

Table 2: Specification for mineral wool products suitable for being used as pipe insulation according to 1.2.1 (relevant for Annex 1.1, 1.2, 1.3, 1.4, 1.5, 1.6)

<table>
<thead>
<tr>
<th>Interrupted insulation</th>
<th>Additional insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone wool according to EN 14303, class A2 or A1 according to EN 13501-2, Al-faced</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>Isover</td>
<td>Coquilla AT-LR</td>
</tr>
<tr>
<td>Isover</td>
<td>Protect BSR 90 alu</td>
</tr>
<tr>
<td>Paroc</td>
<td>Section AluCoat T</td>
</tr>
<tr>
<td>Rockwool</td>
<td>Conlit Pipe sections</td>
</tr>
<tr>
<td>Rockwool</td>
<td>Klimarock</td>
</tr>
<tr>
<td>Rockwool</td>
<td>RS 800 pipe sections</td>
</tr>
</tbody>
</table>

1.8 Smoke tightness

Ancillary products “Hilti Firestop Acrylic Sealant CFS-S ACR” (A5) for smoke tightness:

A detailed specification of the product CFS-S ACR is contained in document “Identification / Product Specification relating to the European technical approval ETA-10/0292 and ETA-10/0389 - Hilti Firestop Acrylic Sealant CFS-S ACR” which is a non-public part of the referenced approvals.

The Control Plan is defined in document "Control Plan relating to the European technical approval ETA-10/0292 and ETA-10/0389 - Hilti Firestop Acrylic Sealant CFS-S ACR” which is a non-public part of the referenced ETAs.
ANNEX 2
RESISTANCE TO FIRE CLASSIFICATION OF PENETRATIONS SEALS
“HILTI FIRESTOP CABLE TRANSIT CFS-T”

2.1 General Information
The seals may only be penetrated by the services described in Annex 2. 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, on both sides of the penetration in such a manner that in the case of fire, no additional load is imposed on the seal. Furthermore it is assumed that this support is maintained on the unexposed side, for the required period of fire resistance.

Specific considerations:
- Pipes must be perpendicular to the seal surface.
- It is assumed that compressed air systems are switched off by other means in the case of fire.
- The function of the pipe seal in case of pneumatic dispatch systems, pressurized air systems etc. is guaranteed only when the systems are shut off in case of fire.
- The approval does not address any risks associated with leakage of dangerous liquids or gases caused by failure of the pipe(s) in case of fire.
- The durability assessment does not take account of the possible effect of substances permeating through the pipe on the penetration seal.

The classifications relate to C/U (capped inside the furnace/uncapped outside) for metal pipes. For further information refer to national regulations.

2.1.1 Wall/Floor construction

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Rigid walls: The wall must have a minimum thickness of 150 mm and comprise concrete, with a minimum density of 2200 kg/m³.</td>
</tr>
<tr>
<td>b)</td>
<td>Rigid floors: The floor must have a minimum thickness of 200 mm and comprise concrete with a minimum density of 2200 kg/m³.</td>
</tr>
</tbody>
</table>
### 2.2 Penetration seal system Hilti CFS-T SB and CFS-T SBO in rigid walls and floors acc. to 2.1.1

Maximum distance for 1st service support: 420 mm.

Maximum seal size: 504 x 562 mm (width x height).

Minimum distances in mm cable and metal pipe penetration seal:

- \( s_1 = 5 \)  (distance between cables and the side seal edge)
- \( s_3 = 5 \)  (distance between cables and upper seal edge)
- \( s_6 = 0 \)  (distance between the insulation of metal pipes and the seal edge)
- \( s_8 = 0 \)  (distance between the insulation of metal pipes)
- \( s_{13} = 90 \)  (distance between cables and metal pipes)

Minimum distances in mm (see illustration of distances below):

<table>
<thead>
<tr>
<th>Distance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>( s_1 )</td>
<td>5 mm (distance between cables and the side seal edge)</td>
</tr>
<tr>
<td>( s_3 )</td>
<td>5 mm (distance between cables and upper seal edge)</td>
</tr>
<tr>
<td>( s_6 )</td>
<td>0 mm (distance between the insulation of metal pipes and the seal edge)</td>
</tr>
<tr>
<td>( s_8 )</td>
<td>0 mm (distance between the insulation of metal pipes)</td>
</tr>
<tr>
<td>( s_{13} )</td>
<td>90 mm (distance between cables and metal pipes)</td>
</tr>
</tbody>
</table>

Results in 2.2 are also valid for mixed penetration!

#### 2.2.1 Rigid Walls according to 2.1.1 – minimum wall thickness 150 mm

**2.2.1.1 Blank seal (no services)**

**System:** CFS-T SB

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI 180</td>
</tr>
</tbody>
</table>

Single frame,  
Maximum seal size: 277mm x 120mm (CFS-T SB 8x1),  
Construction details (for symbols and abbreviations see Annex 4):
Multiple frame,
Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4),
Construction details (for symbols and abbreviations see Annex 4):
### 2.2.1.3 Non-combustible pipe penetration

**System: CFS-T SB**

**Maximum seal size:** 504mm x 562mm (CFS-T SB 8+8x4)

<table>
<thead>
<tr>
<th>Pipe diameter (d_C) (mm)</th>
<th>Pipe wall thickness (t_C) (mm)</th>
<th>Thickness of pipe insulation (t_{D2}) (mm)</th>
<th>Length of pipe insulation (L_{D2}) (mm)</th>
<th>Arrangement pipe insulation</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>1 – 14,2</td>
<td>≥ 30</td>
<td>≥ 500</td>
<td>LI</td>
<td>EI 180</td>
</tr>
<tr>
<td>15 – 28</td>
<td>1 – 14,2</td>
<td>≥ 30</td>
<td>≥ 500</td>
<td>LI</td>
<td>EI 120-C/U, E 180-C/U</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>≥ 30</td>
<td>≥ 500</td>
<td>LI</td>
<td>EI 180</td>
</tr>
<tr>
<td>15 – 28</td>
<td>1 – 14,2</td>
<td>≥ 30</td>
<td></td>
<td>Cl</td>
<td>EI 180</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>≥ 30</td>
<td></td>
<td>Cl</td>
<td>EI 180</td>
</tr>
</tbody>
</table>

### 2.2.2 Rigid Floors according to 2.1.1 – minimum floor thickness 200 mm

**2.2.2.1 Blank seal (no services)**

**System: CFS-T SB**

- **Single frame,**
  - Maximum seal size: 277mm x 120mm (CFS-T SB 8x1),
  - Construction details (for symbols and abbreviations see Annex 4):
    - ![Diagram](image1)
  - **Classification:** EI 180

- **Multiple frame,**
  - Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4),
  - Construction details (for symbols and abbreviations see Annex 4):
    - ![Diagram](image2)
  - **Classification:** EI 180
2.2.2.2 Cable penetration
System: CFS-T SB

Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Cable diameter $C_1$ (mm)</th>
<th>Cable insulation thickness $t_{D_1}$ (mm)</th>
<th>Cable insulation length $L_{D_1}$ (mm)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
<td>300</td>
<td>EI 180</td>
</tr>
<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>300</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>300</td>
<td>EI 120</td>
</tr>
</tbody>
</table>

2.2.2.3 Non-combustible pipe penetration
System: CFS-T SB

Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4)

<table>
<thead>
<tr>
<th>Pipe diameter $d_C$ (mm)</th>
<th>Pipe wall thickness $t_c$ (mm)</th>
<th>Thickness of pipe insulation $t_{D_2}$ (mm)</th>
<th>Length of pipe insulation $L_{D_2}$ (mm)</th>
<th>Arrangement pipe insulation</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 28</td>
<td>1 – 14,2</td>
<td>$\geq$ 30</td>
<td>$\geq$ 400</td>
<td>LI</td>
<td>EI 120-C/U, E 180-C/U</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>$\geq$ 30</td>
<td>$\geq$ 500</td>
<td>LI</td>
<td>EI 180</td>
</tr>
<tr>
<td>15 – 28</td>
<td>1 – 14,2</td>
<td>$\geq$ 30</td>
<td></td>
<td>CI</td>
<td>EI 180</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>$\geq$ 30</td>
<td></td>
<td>CI</td>
<td>EI 180</td>
</tr>
</tbody>
</table>
2.2.3 Rigid Walls according to 2.1.1 – minimum wall thickness 150 mm

2.2.3.1 Blank seal (no services)
System: CFS-T SBO

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
</table>

Single frame,
Maximum seal size: 120mm x 277mm (CFS-T SBO 8x1),
Construction details (for symbols and abbreviations see Annex 4):

![Single Frame Diagram](image1)

EI 180

Multiple frame,
Maximum seal size: 504mm x 562mm (CFS-T SBO 8+8x4),
Construction details (for symbols and abbreviations see Annex 4):

![Multiple Frame Diagram](image2)

EI 180
2.2.3.2 Cable penetration
System: CFS-T SBO
Maximum seal size: 504mm x 562mm (CFS-T SBO 8+8x4)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Cable diameter C₁ (mm)</th>
<th>Cable insulation thickness t₀₁ (mm)</th>
<th>Cable insulation length L₀₁ (mm)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
<td>150</td>
<td>EI 180</td>
</tr>
<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>150</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>150</td>
<td>EI 120</td>
</tr>
</tbody>
</table>

2.2.3.3 Non-combustible pipe penetration
System: CFS-T SBO
Maximum seal size: 504mm x 562mm (CFS-T SB 8+8x4)

<table>
<thead>
<tr>
<th>Pipe diameter dₚ (mm)</th>
<th>Pipe wall thickness tₚ (mm)</th>
<th>Thickness of pipe insulation t₀₂ (mm)</th>
<th>Length of pipe insulation L₀₂ (mm)</th>
<th>Arrangement pipe insulation</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>1 – 14,2</td>
<td>≥ 30</td>
<td>≥ 250</td>
<td>LI</td>
<td>EI 180</td>
</tr>
<tr>
<td>15 – 28</td>
<td>1 – 14,2</td>
<td>≥ 30</td>
<td>≥ 250</td>
<td>LI</td>
<td>EI 120-C/U, E 180-C/U</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>≥ 30</td>
<td>≥ 500</td>
<td>LI</td>
<td>EI 180</td>
</tr>
<tr>
<td>15 – 28</td>
<td>1 – 14,2</td>
<td>≥ 30</td>
<td></td>
<td>CI</td>
<td>EI 180</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>≥ 30</td>
<td></td>
<td>CI</td>
<td>EI 180</td>
</tr>
</tbody>
</table>
### 2.2.4 Rigid Floors according to 2.1.1 – minimum floor thickness 200 mm

**2.2.4.1 Blank seal (no services)**  
System: CFS-T SBO

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
</table>
| **Single frame,**  
Maximum seal size: 277mm x 120mm (CFS-T SBO 8x1),  
Construction details (for symbols and abbreviations see Annex 4): |

![Diagram of single frame]

| EI 180 |

| **Multiple frame,**  
Maximum seal size: 520mm x 580mm (CFS-T SBO 8+8x4),  
Construction details (for symbols and abbreviations see Annex 4): |

![Diagram of multiple frame]

| EI 180 |
### 2.2.4.2 Cable penetration

**System: CFS-T SBO**

Maximum seal size: 504mm x 562mm (CFS-T SBO 8+8x4)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Cable diameter $C_1$ (mm)</th>
<th>Cable insulation thickness $t_{D1}$ (mm)</th>
<th>Cable insulation length $L_{D1}$ (mm)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
</tbody>
</table>

All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:

- **Small cable group**
  - max. Ø21mm
  - Classification: EI 180

- **Medium cable group**
  - max. Ø50mm
  - Classification: EI 180

- **Large cable group**
  - max. Ø80mm
  - Classification: EI 180

### 2.2.4.3 Non-combustible pipe penetration

**System: CFS-T SBO**

Maximum seal size: 520mm x 580mm (CFS-T SB 8+8x4)

<table>
<thead>
<tr>
<th>Pipe diameter $d_C$ (mm)</th>
<th>Pipe wall thickness $t_C$ (mm)</th>
<th>Thickness of pipe insulation $t_{D2}$ (mm)</th>
<th>Length of pipe insulation $L_{D2}$ (mm)</th>
<th>Arrangement pipe insulation</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 – 28</td>
<td>1 – 14,2</td>
<td>$\geq 30$</td>
<td>$\geq 300$</td>
<td>LI</td>
<td>EI 120-C/U, E 180-C/U</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>$\geq 30$</td>
<td>$\geq 500$</td>
<td>LI</td>
<td>EI 180</td>
</tr>
<tr>
<td>15 – 28</td>
<td>1 – 14,2</td>
<td>$\geq 30$</td>
<td></td>
<td>CI</td>
<td>EI 180</td>
</tr>
<tr>
<td>28 – 54</td>
<td>1/1,5 – 14,2</td>
<td>$\geq 30$</td>
<td></td>
<td>CI</td>
<td>EI 180</td>
</tr>
</tbody>
</table>
### 2.3 Penetration seal system Hilti CFS-T RR and CFS-T RRS in rigid walls and floors acc. to 2.1.1

Maximum distance for 1st service support: 420 mm.

Maximum seal size: Ø 205mm (diameter).

Minimum distances in mm cable and metal pipe penetration seal:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s_1$</td>
<td>5</td>
<td>distance between cables and the side seal edge</td>
</tr>
<tr>
<td>$s_3$</td>
<td>5</td>
<td>distance between cables and upper seal edge</td>
</tr>
<tr>
<td>$s_6$</td>
<td>0</td>
<td>distance between the insulation of metal pipes and the seal edge</td>
</tr>
<tr>
<td>$s_8$</td>
<td>0</td>
<td>distance between the insulation of metal pipes</td>
</tr>
<tr>
<td>$s_{13}$</td>
<td>90</td>
<td>distance between cables and metal pipes</td>
</tr>
</tbody>
</table>

Minimum distances in mm (see illustration of distances below):
2.3.1 Rigid Walls according to 2.1.1 – minimum wall thickness 150 mm

2.3.1.1 Blank seal (no services)

System: CFS-T RR

| Maximum seal size: Ø205mm (CFS-T RR-200), |
| Classification: EI 180 |

Construction details (for symbols and abbreviations see Annex 4):

![Diagram of a blank seal system]

2.3.1.2 Cable penetration

System: CFS-T RR

| Maximum seal size: Ø205mm (CFS-T RR-200) |

Construction details (for symbols and abbreviations see Annex 4):

![Diagram of a cable penetration system]

<table>
<thead>
<tr>
<th>Cable diameter $C_1$ (mm)</th>
<th>Cable insulation thickness $t_{D1}$ (mm)</th>
<th>Cable insulation length $L_{D1}$ (mm)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>250</td>
<td>EI 120</td>
</tr>
</tbody>
</table>

All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:}
2.3.2 Rigid Floors according to 2.1.1 – minimum floor thickness 200 mm

2.3.2.1 Blank seal (no services)
System: CFS-T RR

Maximum seal size: Ø205mm (CFS-T RR-200),

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Construction details</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EI 180</td>
</tr>
</tbody>
</table>

2.3.2.1 Cable penetration
System: CFS-T RR

Maximum seal size: Ø205mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Cable diameter C₁ (mm)</th>
<th>Cable insulation thickness t₀₁ (mm)</th>
<th>Cable insulation length L₀₁ (mm)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
<td>300</td>
<td>EI 180</td>
</tr>
<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>300</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>300</td>
<td>EI 180</td>
</tr>
</tbody>
</table>
2.3.3 Rigid Walls according to 2.1.1 – minimum wall thickness 150 mm

2.3.3.1 Blank seal (no services)
System: CFS-T RR + CFS-T SLF

Maximum seal size: Ø205mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Construction details</th>
</tr>
</thead>
<tbody>
<tr>
<td>System: CFS-T RR + CFS-T SLF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI 180</td>
</tr>
</tbody>
</table>

2.3.3.2 Cable penetration
System: CFS-T RR + CFS-T SLF

Maximum seal size: Ø205mm (CFS-T RR-200)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Construction details</th>
</tr>
</thead>
<tbody>
<tr>
<td>System: CFS-T RR + CFS-T SLF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI 180</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable diameter C₁ (mm)</th>
<th>Cable insulation thickness t₁₁ (mm)</th>
<th>Cable insulation length L₁₁ (mm)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
<td>150</td>
<td>EI 180</td>
</tr>
<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>150</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>150</td>
<td>EI 180</td>
</tr>
</tbody>
</table>

All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:
### 2.3.4 Rigid Floors according to 2.1.1 – minimum floor thickness 200 mm

#### 2.3.4.1 Blank seal (no services)
System: CFS-T RR + CFS-T SLF

<table>
<thead>
<tr>
<th>Maximum seal size: Ø205mm (CFS-T RR-200)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction details (for symbols and abbreviations see Annex 4):</td>
<td>EI 180</td>
</tr>
</tbody>
</table>

#### 2.3.4.2 Cable penetration
System: CFS-T RR + CFS-T SLF

<table>
<thead>
<tr>
<th>Maximum seal size: Ø205mm (CFS-T RR-200)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction details (for symbols and abbreviations see Annex 4):</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable diameter $C_1$ (mm)</th>
<th>Cable insulation thickness $t_{D1}$ (mm)</th>
<th>Cable insulation length $L_{D1}$ (mm)</th>
<th>Classification</th>
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</thead>
<tbody>
<tr>
<td>All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
<td>25</td>
<td>EI 180</td>
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<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
</tbody>
</table>
2.3.5 Rigid Walls according to 2.1.1 – minimum wall thickness 150 mm

2.3.5.1 Blank seal (no services)
System: CFS-T RRS

Maximum seal size: Ø103mm (CFS-T RRS-100)

Classification

Construction details (for symbols and abbreviations see Annex 4):

![Diagram of wall cross-section with symbols and dimensions]

### 2.3.5.2 Cable penetration
System: CFS-T RRS

Maximum seal size: Ø103mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Cable diameter $C_1$ (mm)</th>
<th>Cable insulation thickness $t_{D1}$ (mm)</th>
<th>Cable insulation length $L_{D1}$ (mm)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
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<td>30</td>
<td>250</td>
<td>EI 180</td>
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<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>250</td>
<td>EI 120</td>
</tr>
</tbody>
</table>
## 2.3.6 Rigid Floors according to 2.1.1 – minimum floor thickness 200 mm

### 2.3.6.1 Blank seal (no services)
- **System:** CFS-T RRS

<table>
<thead>
<tr>
<th>Maximum seal size: Ø103mm (CFS-T RRS-100)</th>
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</thead>
<tbody>
<tr>
<td>Construction details (for symbols and abbreviations see Annex 4):</td>
<td>EI 180</td>
</tr>
</tbody>
</table>

### 2.3.6.2 Cable penetration
- **System:** CFS-T RRS

<table>
<thead>
<tr>
<th>Maximum seal size: Ø103mm (CFS-T RRS-100)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Construction details (for symbols and abbreviations see Annex 4):</td>
<td></td>
</tr>
</tbody>
</table>

### Construction details

#### Cable diameter
- **C1 (mm)**

#### Cable insulation thickness
- **tD1 (mm)**

#### Cable insulation length
- **L_D1 (mm)**

#### Classification

<table>
<thead>
<tr>
<th>All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Small cable group max. Ø21mm</td>
<td>30</td>
</tr>
<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
</tr>
<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
</tr>
</tbody>
</table>
### 2.3.7 Rigid Walls according to 2.1.1 – minimum wall thickness 150 mm

#### 2.3.7.1 Blank seal (no services)
System: CFS-T RRS + CFS-T SLF

<table>
<thead>
<tr>
<th>Maximum seal size: Ø103mm (CFS-T RRS-100)</th>
<th>Classification</th>
</tr>
</thead>
</table>

Construction details (for symbols and abbreviations see Annex 4):

![Diagram of rigid wall]

#### 2.3.7.2 Cable penetration
System: CFS-T RRS + CFS-T SLF

<table>
<thead>
<tr>
<th>Maximum seal size: Ø103mm (CFS-T RRS-100)</th>
<th>Classification</th>
</tr>
</thead>
</table>

Construction details (for symbols and abbreviations see Annex 4):

![Diagram of cable penetration]

<table>
<thead>
<tr>
<th>Cable diameter ( C_1 ) (mm)</th>
<th>Cable insulation thickness ( t_{D1} ) (mm)</th>
<th>Cable insulation length ( L_{D1} ) (mm)</th>
<th>Classification</th>
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</thead>
<tbody>
<tr>
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<td>30</td>
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<td>EI 180</td>
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<tr>
<td>Medium cable group max. Ø50mm</td>
<td>30</td>
<td>150</td>
<td>EI 180</td>
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<tr>
<td>Large cable group max. Ø80mm</td>
<td>30</td>
<td>150</td>
<td>EI 180</td>
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</table>

### 2.3.8 Rigid Floors according to 2.1.1 – minimum floor thickness 200 mm

#### 2.3.8.1 Blank seal (no services)
System: CFS-T RRS + CFS-T SLF
Maximum seal size: Ø103mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EI 180</td>
</tr>
</tbody>
</table>

2.3.8.2 Cable penetration

System: CFS-T RRS + CFS-T SLF

Maximum seal size: Ø103mm (CFS-T RRS-100)

Construction details (for symbols and abbreviations see Annex 4):

<table>
<thead>
<tr>
<th>Cable diameter C1 (mm)</th>
<th>Cable insulation thickness tD1 (mm)</th>
<th>Cable insulation length L01 (mm)</th>
<th>Classification</th>
</tr>
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<tr>
<td>50mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
<tr>
<td>80mm</td>
<td>30</td>
<td>250</td>
<td>EI 180</td>
</tr>
</tbody>
</table>

All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, except waveguide and non-sheathed cables with a diameter of:

- Small cable group max. Ø21mm
- Medium cable group max. Ø50mm
- Large cable group max. Ø80mm
ANNEX 3

3.1 INSTALLATION OF THE PRODUCT AND ANCILLARY PRODUCT(S) OF HILTI FIRESTOP CABLE TRANSIT CFS-T SB:

The arrangement and installation of Hilti Firestop Cable Transit CFS-T shall be done in accordance with the details given below and in Annex 2 for the penetration seal(s).

3.1.1 SB (Frame)
3.1.2 CFS-T (Transit system)

Exchange cable transit CFS-T
3.2 INSTALLATION OF THE PRODUCT AND ANCILLARY PRODUCT(S) OF HILTI FIRESTOP CABLE TRANSIT CFS-T SBO:

3.2.1 SBO (Frame)

3.2.2 CFS-T (Transit system)
See details on 3.1.2 (CFS-T)
3.3 INSTALLATION OF THE PRODUCT AND ANCILLARY PRODUCT(S) OF HILTI FIRESTOP CABLE TRANSIT CFS-T RR

3.3.1 CFS-T RR (Plug seal and Transit system)
3.4 INSTALLATION OF THE PRODUCT AND ANCILLARY PRODUCT(S) OF HILTI FIRESTOP CABLE TRANSIT CFS-T RR + CFS-T SLF

3.4.1 SLF (Sleeve)

3.4.2 CFS-T RR (Plug seal and Transit system)
See details on 3.3.1 (CFS-T)
3.5 INSTALLATION OF THE PRODUCT AND ANCILLARY PRODUCT(S) OF HILTI FIRESTOP CABLE TRANSIT CFS-T RRS + CFS-T SLF

3.5.1 SLF (Sleeve)
See details on 3.4.1 (CFS-T SLF)

3.5.2 CFS-T RRS (Plug seal)
ANNEX 4
ABBREVIATIONS AND REFERENCE DOCUMENTS

4.1 Abbreviations used in drawings

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A₁</td>
<td>Hilti Firestop Cable Transit Frame (Sleeve)</td>
</tr>
<tr>
<td>A₂</td>
<td>Hilti Firestop Cable Transit Modules</td>
</tr>
<tr>
<td>A₃</td>
<td>Hilti Firestop Cable Transit Wedge</td>
</tr>
<tr>
<td>A₄</td>
<td>Hilti Firestop Cable Transit Plug Seal</td>
</tr>
<tr>
<td>A₅</td>
<td>Sealing with Hilti Firestop Acrylic Sealant CFS-S ACR</td>
</tr>
<tr>
<td>C₁</td>
<td>Cable</td>
</tr>
<tr>
<td>C₂</td>
<td>Pipe</td>
</tr>
<tr>
<td>dₜ</td>
<td>Pipe diameter (nominal outside diameter)</td>
</tr>
<tr>
<td>AP₁</td>
<td>Cable Insulation</td>
</tr>
<tr>
<td>AP₂</td>
<td>Pipe Insulation</td>
</tr>
<tr>
<td>AP₃</td>
<td>Transit Frame Insulation</td>
</tr>
<tr>
<td>E</td>
<td>Building element (wall, floor)</td>
</tr>
<tr>
<td>F</td>
<td>Fixing of the frame (sleeve)</td>
</tr>
<tr>
<td>s₁</td>
<td>Minimum distance between single penetration seals</td>
</tr>
<tr>
<td>tₜ</td>
<td>Pipe wall thickness</td>
</tr>
<tr>
<td>t₀₁</td>
<td>Insulation thickness / cable</td>
</tr>
<tr>
<td>t₀₂</td>
<td>Insulation thickness / pipe</td>
</tr>
<tr>
<td>t₀₃</td>
<td>Insulation thickness / transit frame</td>
</tr>
<tr>
<td>tₑ</td>
<td>Thickness of the building element</td>
</tr>
<tr>
<td>L₀₁</td>
<td>Length of Cable Insulation</td>
</tr>
<tr>
<td>L₀₂</td>
<td>Length of Pipe Insulation</td>
</tr>
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</table>

4.1.2 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 13238  Reaction to fire tests for building products: Conditioning procedures and general rules for selection of substrates
EN 13501  Fire classification of construction products and building elements –
  Part 1: Classification using test data from reaction to fire tests
  Part 2: Classification using test data from fire resistance tests, excluding ventilation services
EN 14303  Thermal insulation products for building equipment and industrial installations - Factory made mineral wool (MW) products – Specification

4.1.3 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