



NL

# PRESTATIEVERKLARING

overeenkomstig Bijlage III van de Verordening (EU) nr. 305/2011  
(Verordening betreffende bouwproducten)

## Hilti brandwerende acrylkit CFS-S ACR

Nr. Hilti CFS-S ACR "0761-CPD-0174"

### 1. Unieke identificatiecode van het producttype:

Hilti brandwerende acrylkit CFS-S ACR

### 2. Beoogd gebruik:

Brandwerend en afdichtend product voor doorvoerafdichtingen, zie ETA-10/0292 (31-01-2018)

Pijpdoorvoeringen	Geïsoleerde en niet-geïsoleerde metalen buizen Geïsoleerde composietbuizen
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### 3. Fabrikant:

HILTI Corporation, Feldkircherstrasse 100, 9494 Schaan, Vorstendom Liechtenstein

### 4. Systeem voor de beoordeling en verificatie van de prestatiebestendigheid:

Systeem 1

### 5. Europees beoordelingsdocument:

EAD 350454-00-1104 'Brandwerende en brandafdichtende producten - doorvoeringsafdichting'

#### Europese technische beoordeling:

ETA-10/0292 (31-01-2018)

#### Technische beoordelingsinstantie:

OIB Oostenrijkse Instituut voor Bouwtechniek

#### Aangewezen instantie(s):

MPA Braunschweig, nr. 0761

### 6. Aangegeven prestaties:

Essentiële kenmerken	Aangegeven prestaties/geharmoniseerde technische specificaties
Reactie bij brand	Klasse D - s1 d0 overeenkomstig EN 13501-1
Brandwerendheid	Brandwerendheidsprestaties en toepassingsgebied volgens EN 13501-2. Zie bijlage
Luchtdoorlatendheid	Getest overeenkomstig EN 1026. Zie bijlage
Waterdoorlatendheid	Getest overeenkomstig EAD 350454-00-1104. Zie bijlage
Duurzaamheid en bruikbaarheid	Y <sub>2</sub> , overeenkomstig EAD 350454-00-1104.

De prestaties van het hierboven omschreven product zijn conform de aangegeven prestaties. Deze prestatieverklaring wordt in overeenstemming met verordening (EU) 305/2011 en onder de exclusieve verantwoordelijkheid van de hierboven vermelde fabrikant verstrekt.

Ondertekend voor en namens de fabrikant door:

Productmanager  
Afdeling voor brandwerende producten  
© Hilti Corporation

Kwaliteitsverantwoordelijke  
Afdeling voor brandwerende producten  
Hilti Corporation



Gemeente Breda

Schaan, 31-03-2020

Bijlage bij besluit

Z2020-000974 -V01

23-04-2020 Ven L

DoP\_nl\_04-01\_000000002538\_Hilti CFS-S\_ACR

### Intended use

"Hilti Firestop Acrylic Sealant CFS-S ACR" is intended to be used as a pipe penetration seal to temporarily or permanently reinstate the fire resistance performance of flexible wall constructions, rigid wall constructions and rigid floor constructions where they have been penetrated by metal pipes, plastic pipes and composite pipes.

The thickness of the penetration seal in flexible walls has to be minimum 100 mm.

The thickness of the penetration seal in rigid walls has to be minimum 100 mm.

The thickness of the penetration seal in rigid floors has to be minimum 150 mm.

The maximum opening size of the penetration seal has to comply with the dimensions as specified in the following table. For details see Annex C of the ETA.

"Hilti Firestop Acrylic Sealant CFS-S ACR" can only be used as penetration seal for metal pipes, plastic pipes, and composite pipes. Further details are given in Annex C of the ETA. Other parts or service support constructions shall not penetrate the penetration seal.

"Hilti Firestop Acrylic Sealant CFS-S ACR" can be installed only in the types of separating elements as specified in the following table.

Separating element	Construction	Maximum opening size of the penetration seal
Flexible walls	<ul style="list-style-type: none"><li>&gt; Timber or steel studs lined on both faces with minimum 2 layers of boards (minimum thickness 12,5 mm) with classification A2-s1,d0 or A1 according to EN 13501-1</li><li>&gt; For timber stud walls there must be a minimum distance of 100 mm of the penetration seal to any timber stud. The cavity between the penetration seal and the timber stud has to be closed with minimum 100 mm of insulation with classification A1 or A2 according to EN 13501-1</li><li>&gt; Minimum thickness 100 mm</li><li>&gt; Classification according to EN 13501-2: <math>\geq</math> EI 90</li><li>&gt; This European Technical Assessment does not cover sandwich panel constructions and flexible walls where the lining does not cover studs on both sides</li></ul>	<p>Ø 300 mm For details see Annex C of the ETA</p>

Separating element	Construction	Maximum opening size of the penetration seal
Rigid walls	<ul style="list-style-type: none"> <li>&gt; Aerated concrete, concrete, masonry</li> <li>&gt; Minimum density 650 kg/m<sup>3</sup></li> <li>&gt; Minimum thickness 100 mm</li> <li>&gt; The rigid wall shall be classified in accordance with EN 13501-2 for the required fire resistance period</li> </ul>	Ø 300 mm For details see Annex C of the ETA
Rigid walls	<ul style="list-style-type: none"> <li>&gt; Aerated concrete, concrete, masonry</li> <li>&gt; Minimum density 550 kg/m<sup>3</sup></li> <li>&gt; Minimum thickness 200 mm</li> <li>&gt; The rigid wall shall be classified in accordance with EN 13501-2 for the required fire resistance period</li> </ul>	Ø 300 mm For details see Annex C of the ETA
Rigid walls	<ul style="list-style-type: none"> <li>&gt; Concrete, masonry</li> <li>&gt; Minimum density 2400 kg/m<sup>3</sup></li> <li>&gt; Minimum thickness 150 mm</li> <li>&gt; The rigid wall shall be classified in accordance with EN 13501-2 for the required fire resistance period</li> </ul>	Ø 300 mm For details see Annex C of the ETA
Rigid floors	<ul style="list-style-type: none"> <li>&gt; Aerated concrete, concrete</li> <li>&gt; Minimum density 550 kg/m<sup>3</sup></li> <li>&gt; Minimum thickness 150 mm</li> <li>&gt; The rigid floor shall be classified in accordance with EN 13501-2 for the required fire resistance period</li> </ul>	Ø 300 mm For details see Annex C of the ETA
Rigid floors	<ul style="list-style-type: none"> <li>&gt; Concrete</li> <li>&gt; Minimum density 2400 kg/m<sup>3</sup></li> <li>&gt; Minimum thickness 150 mm</li> <li>&gt; The rigid floor shall be classified in accordance with EN 13501-2 for the required fire resistance period</li> </ul>	Ø 300 mm For details see Annex C of the ETA

#### Resistance to fire

"Hilti Firestop Acrylic Sealant CFS-S ACR" was tested according to EAD 350454-00-1104 clause 2.2.2, EN 1363-1 and EN 1366-3:2009.

Based upon the gained test results and the field of application specified within EN 1363-1 and EN 1366-3:2009 the penetration seal "Hilti Firestop Acrylic Sealant CFS-S ACR" has been classified according to EN 13501-2:2007+A1:2009. The individual fire resistance classes are listed in Annex C.1 to C.6 of the ETA.

The maximum fire resistance class of the penetration seal in vertical or horizontal separating elements depends on the fire resistance class of the penetrating elements. The fire resistance class of the penetration seal is reduced to the fire resistance class of the penetrating element with the lowest fire resistance classification.

#### Air permeability

The air permeability of "Hilti Firestop Acrylic Sealant CFS-S ACR" with a thickness of 10 mm was assessed as part of gas permeability tests according to EN 1026. The following flow rates per area (q/A) have been achieved for the given air pressure differences ( $\Delta p$ ). The flow rate index indicates the type of gas:

$\Delta P$ [Pa]	q/A air [m <sup>3</sup> /(h·m <sup>2</sup> )]	q/A N <sub>2</sub> [m <sup>3</sup> /(h·m <sup>2</sup> )]	q/A CO <sub>2</sub> [m <sup>3</sup> /(h·m <sup>2</sup> )]	q/A CH <sub>4</sub> [m <sup>3</sup> /(h·m <sup>2</sup> )]
q/A air [m <sup>3</sup> /(h·m <sup>2</sup> )]	impermeable	impermeable	impermeable	
50	$\leq 1,9E-06$	$\leq 1,1E-06$	$\leq 6,4E-06$	$\leq 4,3E-06$
250	$\leq 9,7E-06$	$\leq 5,5E-06$	$\leq 3,2E-06$	$\leq 2,1E-06$

#### Water permeability

The water permeability of "Hilti Firestop Acrylic Sealant CFS-S ACR" has been tested according to Annex C of EAD 350454-00-1104. The specimen consisted of 2 mm "Hilti Firestop Acrylic Sealant CFS-S ACR" (dry film thickness) on mineral wool. Test result: Water tight to 1000 mm head of water or 9806 Pa.

#### Abbreviations used in drawings

Abbreviation	Description	Abbreviation	Description
A, A <sub>1</sub> , A <sub>2</sub> ,...	Hilti Firestop Acrylic Sealant CFS-S ACR	s <sub>1</sub> , s <sub>2</sub>	Distances
B	Backfilling material	t <sub>A</sub>	Thickness of penetration seal
C, C <sub>1</sub> , C <sub>2</sub> ,...	Penetrating services	t <sub>B</sub>	Thickness of backfilling material
D	Pipe insulation	t <sub>C</sub>	Pipe wall thickness
E, E <sub>1</sub> , E <sub>2</sub> ,...	Building element (wall, floor)	t <sub>D</sub>	Thickness of insulation
L <sub>D</sub>	Length of insulation	t <sub>E</sub>	Thickness of the building element
d <sub>C</sub>	Pipe diameter	w <sub>A</sub>	Width of penetration seal (annular space)
h	Height/length of penetration seal		

**RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF  
"HILTI FIRESTOP ACRYLIC SEALANT CFS-S ACR"**

**C.1 General Information**

**C.1.1 Wall / floor constructions**

**a) Flexible wall:**

The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with minimum 2 layers of 12.5 mm thick boards according to EN 520 type F.

In steel stud construction the space between linings has not to be completely filled with insulation material, especially in the neighbourhood to the penetration seal. Nevertheless the wall has to be set up according to the requirements.

For timber stud walls there must be a minimum distance of 100 mm of the seal to any stud and the cavity between stud and seal must be closed and a minimum of 50 mm insulation of Class A1 or A2 (in accordance with EN 13501-1) in the cavity between stud and seal is necessary.

**b) Rigid walls:**

The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m<sup>3</sup>.

**c) Rigid walls:**

The wall must have a minimum thickness of 200 mm and comprise aerated concrete, concrete or masonry, with a minimum density of 550 kg/m<sup>3</sup>.

**d) Rigid walls:**

The wall must have a minimum thickness of 150 mm and comprise concrete or masonry, with a minimum density of 2400 kg/m<sup>3</sup>.

**e) Rigid floors:**

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

**f) Rigid floors:**

The floor must have a minimum thickness of 150 mm and comprise concrete with a minimum density of 2400 kg/m<sup>3</sup>.

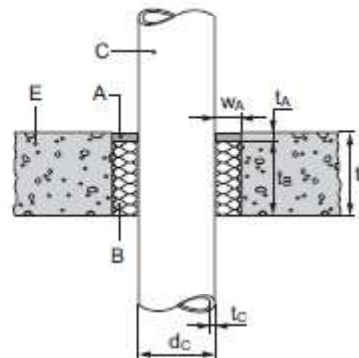
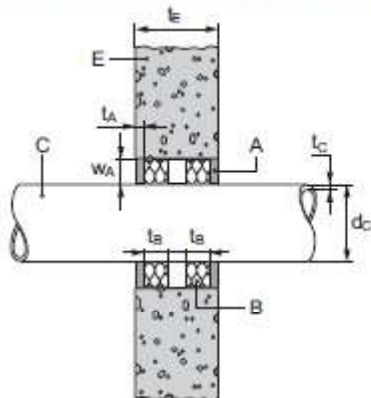
The walls / floors must be classified in accordance with EN 13501-2 for the required fire resistance period or fulfil the requirements of the relevant Eurocode. This ETA does not cover use of the product as a penetration seal in sandwich panel constructions.

## C.2 Rigid walls and rigid floors according to Annex C.1.1 d) and f) of the ETA

### Penetration seal:

Wall: 15 mm ( $t_A$ ) Hilti Firestop Acrylic Sealant CFS-S ACR (A) on both sides, stone wool according to Annex B.2 of the ETA as backfilling material ( $t_B$  = minimum 50 mm on both sides)

Floor: 15 mm Hilti Firestop Acrylic Sealant CFS-S ACR (A) on the upper side, stone wool according to Annex B.2 of the ETA as backfilling material ( $t_B$  = gap filled completely)



### Penetrating services

### Classification

#### Steel pipes non-insulated (C)

##### Single penetration

Distance between pipe and seal edge:

Wall (width of annular space,  $w_A$ ): 10,5 - 35,5 mm;

Floor: Maximum penetration seal diameter: 260 mm (annular space  $w_A$  depending on pipe diameter)

Pipe diameter ( $d_c$ ) between Ø32 mm and Ø159 mm, with minimum wall thickness ( $t_c$ ) 1,8 mm and 4,5 mm respectively<sup>3</sup>, maximum wall thickness 14,2 mm<sup>4</sup>

E 180-C/U

The field of application given above is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1100°C, e.g. low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys)

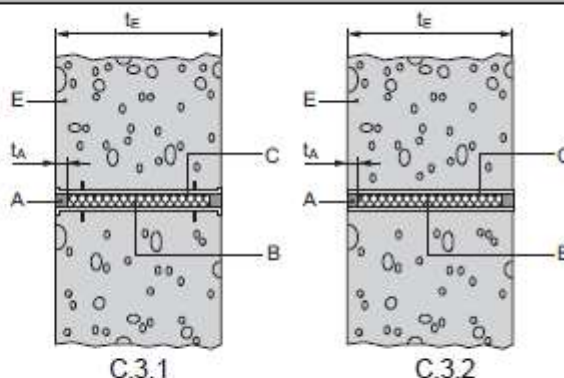
<sup>3</sup> Interpolation of minimum pipe wall thickness between 1,8 mm for diameter 32 mm and 4,5 mm for diameter 159 mm for pipe diameters in between.

<sup>4</sup> 14,2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

### C.3 Rigid walls according to Annex C.1.1 c) of the ETA

#### Penetration seal:

15 mm ( $t_A$ ) Hilti Firestop Acrylic Sealant CFS-S ACR (A) on both sides of the opening of the formwork tie system / formwork distance pipe (C), loose stone wool (B) as backfilling material ( $t_B$  = gap filled completely)



Penetrating services	Classification
C.3.1 OKTAGON formwork tie rod system ("Schalungsspannstelle", "Oktagon-Spreize") - see Annex B.3 of the ETA	EI 120
C.3.2 Formwork distance pipe ("Abstandsrohr", "Distanzrohr") - see Annex B.4 of the ETA	EI 120

### C.4 Flexible wall and rigid wall according to Annex C.1.1 of the ETA

#### Penetration seal:

10 mm ( $t_A$ ) Hilti Firestop Acrylic Sealant CFS-S ACR (A) on both sides of the wall, stone wool according to Annex B2 of the ETA as backfilling material ( $t_B$  = gap filled completely)

Maximum seal diameter: 300 mm (annular space  $w_A$  depending on pipe diameter)

Pipe insulation made of mineral wool according to Annex B.2. of the ETA.

#### C.4.1 Continued pipe insulation

Sustained insulation	Interrupted insulation

Penetrating services	Classification
<b>Steel pipes (C) with continued insulation (D) – sustained</b>	
Insulation thickness ( $t_0$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 48,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 1,6 mm respectively <sup>5</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
Insulation thickness ( $t_0$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 168,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 2,6 mm respectively <sup>6</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
<b>Steel pipes (C) with continued insulation (D) – interrupted</b>	
Insulation thickness ( $t_0$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 48,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 1,6 mm respectively <sup>5</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
Insulation thickness ( $t_0$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 168,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 2,6 mm respectively <sup>6</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1100°C, e.g. low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys)	
<b>Copper pipes (C) with continued insulation (D) – sustained</b>	
Insulation thickness ( $t_0$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 28$ mm and $\varnothing 42$ mm, with minimum wall thickness ( $t_c$ ) 1,0 mm and 1,5 mm respectively <sup>7</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
Insulation thickness ( $t_0$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 42$ mm and $\varnothing 88,9$ mm, with minimum wall thickness ( $t_c$ ) 1,5 mm and 2,0 mm respectively <sup>8</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 90-C/U
<b>Copper pipes (C) with continued insulation (D) – interrupted</b>	
Insulation thickness ( $t_0$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 28$ mm and $\varnothing 42$ mm, with minimum wall thickness ( $t_c$ ) 1,0 mm and 1,5 mm respectively <sup>7</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
Insulation thickness ( $t_0$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 42$ mm and $\varnothing 88,9$ mm, with minimum wall thickness ( $t_c$ ) 1,5 mm and 2,0 mm respectively <sup>8</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U

<sup>5</sup> Interpolation of minimum pipe wall thickness between 1,4 mm for diameter 26,9 mm and 1,6 mm for diameter 48,3 mm for pipe diameters in between.

<sup>6</sup> Interpolation of minimum pipe wall thickness between 1,4 mm for diameter 26,9 mm and 2,6 mm for diameter 168,3 mm for pipe diameters in between.

<sup>7</sup> Interpolation of minimum pipe wall thickness between 1,0 mm for diameter 28 mm and 1,5 mm for diameter 42 mm for pipe diameters in between.

<sup>8</sup> Interpolation of minimum pipe wall thickness between 1,5 mm for diameter 42 mm and 2,0 mm for diameter 88,9 mm for pipe diameters in between.

The field of application given above is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.

### Geberit Mepla pipes (C) with continued insulation (D) – sustained

Produced by Geberit Int., Jona, CH

Insulation thickness ( $t_D$ )  $\geq 20$  mm:

Pipe dimensions ( $d_C$ ,  $t_C$ ):

Ø 16 x 2,25 mm

Ø 20 x 2,5 mm

Ø 26 x 3,0 mm

Ø 32 x 3,5 mm

EI 120-U/C

### C.4.2 Local pipe insulation

Sustained insulation	Interrupted insulation

### Steel pipes (C) with local insulation (D) – sustained

Insulation		Pipe		Classification
thickness ( $t_D$ ) [mm]	length ( $L_D$ ) [mm]	diameter ( $d_C$ ) [mm]	wall thickness ( $t_C$ ) [mm]	
20	$\geq 450$	26,9 – 48,3	1,4 / 1,6 <sup>9</sup> – 14,2 <sup>4</sup>	EI 120-C/U
20 - 40	$\geq 500$	48,3	1,6 – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 450$	48,3 – 168,3	1,6 / 2,6 <sup>9</sup> – 14,2 <sup>4</sup>	EI 90-C/U
40	$\geq 700$	48,3 – 168,3	1,6 / 2,6 <sup>9</sup> – 14,2 <sup>4</sup>	EI 120-C/U

<sup>9</sup> Interpolation of minimum pipe wall thickness between 1,6 mm for diameter 48,3 mm and 2,6 mm for diameter 168,3 mm for pipe diameters in between.

Steel pipes (C) with local insulation (D) – interrupted				
Insulation		Pipe		Classification
thickness (t <sub>b</sub> ) [mm]	length (L <sub>D</sub> ) [mm]	diameter (d <sub>c</sub> ) [mm]	wall thickness (t <sub>c</sub> ) [mm]	
20	≥ 500	26,9 – 48,3	1,4 – 14,2 <sup>4</sup>	EI 120-C/U
40	≥ 500	168,3	2,6 – 4,5	EI 90-C/U
40	≥ 500	168,3	4,5 – 14,2 <sup>4</sup>	EI 120-C/U
40	≥ 700	168,3	2,6 – 14,2 <sup>4</sup>	EI 120-C/U
40	≥ 700	48,3 – 168,3	1,6 / 2,6 <sup>9</sup> – 14,2 <sup>4</sup>	EI 90-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1100°C, e.g. low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys)				
Copper pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness (t <sub>b</sub> ) [mm]	length (L <sub>D</sub> ) [mm]	diameter (d <sub>c</sub> ) [mm]	wall thickness (t <sub>c</sub> ) [mm]	
20	≥ 450	28 – 42	1,0 / 1,5 <sup>7</sup> – 14,2 <sup>4</sup>	EI 120-C/U
20 - 40	≥ 500	42	1,5 – 14,2 <sup>4</sup>	EI 120-C/U
40	≥ 500	42 – 88,9	1,5 / 2,0 <sup>8</sup> – 14,2 <sup>4</sup>	EI 90-C/U
40	≥ 700	88,9	2,0 – 14,2 <sup>4</sup>	EI 120-C/U
Copper pipes (C) with local insulation (D) – interrupted				
Insulation		Pipe		Classification
thickness (t <sub>b</sub> ) [mm]	length (L <sub>D</sub> ) [mm]	diameter (d <sub>c</sub> ) [mm]	wall thickness (t <sub>c</sub> ) [mm]	
20	≥ 500	28 – 42	1,0 / 1,5 <sup>7</sup> – 14,2 <sup>4</sup>	EI 120-C/U
20 - 40	≥ 500	42	1,5 – 14,2 <sup>4</sup>	EI 120-C/U
40	≥ 500	42 – 88,9	1,5 / 2,0 <sup>8</sup> – 14,2 <sup>4</sup>	EI 120-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.				
Geberit Mepla pipes (C) with local insulation (D) – sustained				Classification
Insulation thickness (t <sub>b</sub> ) 20 mm, insulation length (L <sub>D</sub> ) ≥ 500 mm: Pipe dimensions (d <sub>c</sub> , t <sub>c</sub> ): Ø 16 x 2,25 mm Ø 20 x 2,5 mm Ø 26 x 3,0 mm Ø 32 x 3,5 mm				EI 120-C/U

## C.5 Rigid floor according to Annex C.1.1 e) of the ETA

### Penetration seal:

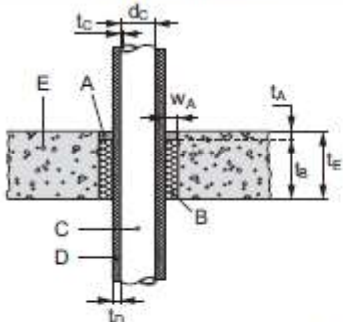
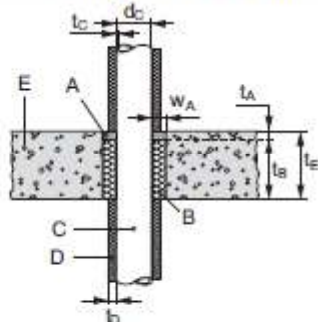
10 mm ( $t_A$ ) Hilti Firestop Acrylic Sealant CFS-S ACR (A) on the top side of the floor construction, stone wool according to Annex B.2 of the ETA as backfilling material ( $t_B$  = gap filled completely)

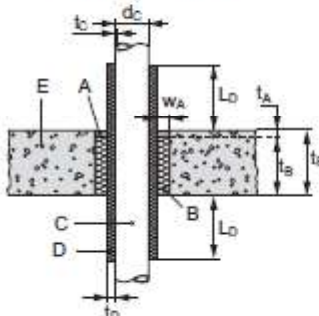
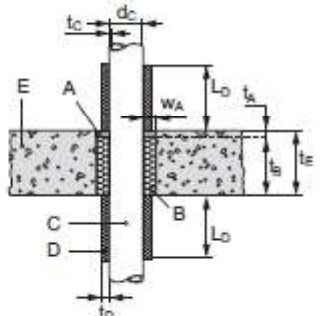
For classifications EI 90-C/U and EI 120-C/U: Maximum penetration seal diameter: 300 mm (annular space  $w_A$  depending on pipe diameter)

For classifications EI 180-C/U: Distance between pipe and seal edge in floor constructions (width of annular space,  $w_A$ ): 13 - 48 mm

Pipe insulation made of mineral wool according to Annex B.2 of the ETA.

### C.5.1 Continued pipe insulation

Sustained insulation	Interrupted insulation	
		
<b>Steel pipes (C) with continued insulation (D) – sustained</b>		Classification
Insulation thickness ( $t_b$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 48,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 1,6 mm respectively <sup>5</sup> , maximum wall thickness 14,2 mm <sup>4</sup>		EI 180-C/U
Insulation thickness ( $t_b$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 168,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 2,6 mm respectively <sup>6</sup> , maximum wall thickness 14,2 mm <sup>4</sup>		EI 120-C/U
<b>Steel pipes (C) with continued insulation (D) – interrupted</b>		
Insulation thickness ( $t_b$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 48,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 1,6 mm respectively <sup>5</sup> , maximum wall thickness 14,2 mm <sup>4</sup>		EI 180-C/U
Insulation thickness ( $t_b$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing 26,9$ mm and $\varnothing 168,3$ mm, with minimum wall thickness ( $t_c$ ) 1,4 mm and 2,6 mm respectively <sup>6</sup> , maximum wall thickness 14,2 mm <sup>4</sup>		EI 120-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1100°C, e.g. low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys)		

Copper pipes (C) with continued insulation (D) – sustained				Classification
Insulation thickness ( $t_D$ ) $\geq 20$ mm: Pipe diameter ( $d_C$ ) $\varnothing 42$ mm, with minimum wall thickness ( $t_C$ ) 1,5 mm and maximum wall thickness 14,2 mm <sup>4</sup>				EI 120-C/U
Insulation thickness ( $t_D$ ) $\geq 40$ mm: Pipe diameter ( $d_C$ ) between $\varnothing 42$ mm and $\varnothing 88,9$ mm, with minimum wall thickness ( $t_C$ ) 1,5 mm and 2,0 mm respectively <sup>8</sup> , maximum wall thickness 14,2 mm <sup>4</sup>				EI 90-C/U
Copper pipes (C) with continued insulation (D) – interrupted				
Insulation thickness ( $t_D$ ) $\geq 20$ mm: Pipe diameter ( $d_C$ ) between $\varnothing 28$ mm and $\varnothing 42$ mm, with minimum wall thickness ( $t_C$ ) 1,0 mm and 1,5 mm respectively <sup>7</sup> , maximum wall thickness 14,2 mm <sup>4</sup>				EI 120-C/U
Insulation thickness ( $t_D$ ) $\geq 40$ mm: Pipe diameter ( $d_C$ ) $\varnothing 42$ mm, with minimum wall thickness ( $t_C$ ) 1,5 mm, maximum wall thickness 14,2 mm <sup>4</sup>				EI 120-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1100°C, e.g. low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys)				
Geberit Mepla pipes (C) with continued insulation (D) – sustained				Classification
Insulation thickness ( $t_D$ ) $\geq 20$ mm: Pipe dimensions ( $d_C, t_C$ ): $\varnothing 16 \times 2,25$ mm $\varnothing 20 \times 2,5$ mm $\varnothing 26 \times 3,0$ mm $\varnothing 32 \times 3,5$ mm				EI 90-U/C
C.5.2 Local pipe insulation				
Sustained insulation		Interrupted insulation		
				
Steel pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness ( $t_D$ ) [mm]	length ( $L_D$ ) [mm]	diameter ( $d_C$ ) [mm]	wall thickness ( $t_C$ ) [mm]	
20	$\geq 450$	26,9 – 48,3	1,4 / 1,6 <sup>5</sup> – 14,2 <sup>4</sup>	EI 180-C/U
40	$\geq 500$	168,3	2,6 – 14,2 <sup>4</sup>	EI 90-C/U
40	$\geq 700$	168,3	2,6 – 14,2 <sup>4</sup>	EI 120-C/U

Steel pipes (C) with local insulation (D) – interrupted				
Insulation		Pipe		Classification
thickness ( $t_D$ ) [mm]	length ( $L_D$ ) [mm]	diameter ( $d_C$ ) [mm]	wall thickness ( $t_C$ ) [mm]	
20	$\geq 500$	26,9 – 48,3	1,4 / 1,6 <sup>5</sup> – 14,2 <sup>4</sup>	EI 180-C/U
40	$\geq 500$	168,3	2,6 – 14,2 <sup>4</sup>	EI 120-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1100°C, e.g. low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys)				
Copper pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness ( $t_D$ ) [mm]	length ( $L_D$ ) [mm]	diameter ( $d_C$ ) [mm]	wall thickness ( $t_C$ ) [mm]	
20	$\geq 450$	42	1,5 – 14,2 <sup>4</sup>	EI 120-C/U
20 - 40	$\geq 700$	42	1,5 – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 700$	42 – 88,9	1,5 / 2,0 <sup>8</sup> – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 500$	88,9	2,0 – 14,2 <sup>4</sup>	EI 90-C/U
40	$\geq 700$	88,9	2,0 – 14,2 <sup>4</sup>	EI 180-C/U
Copper pipes (C) with local insulation (D) – interrupted				
Insulation		Pipe		Classification
thickness ( $t_D$ ) [mm]	length ( $L_D$ ) [mm]	diameter ( $d_C$ ) [mm]	wall thickness ( $t_C$ ) [mm]	
20 - 40	$\geq 600$	28 – 42	1,0 / 1,5 <sup>7</sup> – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 500$	28 – 42	1,0 / 1,5 <sup>7</sup> – 14,2 <sup>4</sup>	EI 120-C/U
20 - 40	$\geq 500$	42	1,5 – 14,2 <sup>4</sup>	EI 120-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.				
Geberit Mepla pipes (C) with local insulation (D) – sustained				Classification
Insulation thickness ( $t_D$ ) 20 mm, insulation length ( $L_D$ ) $\geq 500$ mm: Pipe dimensions ( $d_C, t_C$ ): Ø 16 x 2,25 mm Ø 20 x 2,5 mm Ø 26 x 3,0 mm Ø 32 x 3,5 mm				EI 90-U/C

<b>C.6 Rigid floor according to Annex C.1.1 f) of the ETA</b>	
<b>Penetration seal:</b> See Annex C.5 of the ETA, except that the maximum penetration seal diameter for classifications EI 180-C/U is 260 mm with the annular space ( $w_A$ ) depending on the pipe diameter.	
<b>C.6.1 Continued pipe insulation</b>	
<b>Steel pipes (C) with continued insulation (D) – sustained</b>	<b>Classification</b>
	See Annex C.5 of the ETA
<b>Steel pipes (C) with continued insulation (D) – interrupted</b>	<b>Classification</b>
	See Annex C.5 of the ETA
<b>Copper pipes (C) with continued insulation (D) – sustained</b>	<b>Classification</b>
Insulation thickness ( $t_b$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) $\varnothing$ 28 mm, with minimum wall thickness ( $t_c$ ) 1,0 mm and maximum wall thickness 14,2 mm <sup>4</sup>	EI 180-C/U
Insulation thickness ( $t_b$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) $\varnothing$ between $\varnothing$ 28 mm and $\varnothing$ 42 mm, with minimum wall thickness ( $t_c$ ) 1,0 mm and 1,5 mm respectively <sup>5</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
Insulation thickness ( $t_b$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing$ 42 mm and $\varnothing$ 88,9 mm, with minimum wall thickness ( $t_c$ ) 1,5 mm and 2,0 mm respectively <sup>5</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 90-C/U
<b>Copper pipes (C) with continued insulation (D) – interrupted</b>	<b>Classification</b>
Insulation thickness ( $t_b$ ) $\geq 20$ mm: Pipe diameter ( $d_c$ ) between $\varnothing$ 28 mm and $\varnothing$ 42 mm, with minimum wall thickness ( $t_c$ ) 1,0 mm and 1,5 mm respectively <sup>7</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
Insulation thickness ( $t_b$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) between $\varnothing$ 42 mm and $\varnothing$ 88,9 mm, with minimum wall thickness ( $t_c$ ) 1,5 mm and 2,0 mm respectively <sup>8</sup> , maximum wall thickness 14,2 mm <sup>4</sup>	EI 120-C/U
Insulation thickness ( $t_b$ ) $\geq 40$ mm: Pipe diameter ( $d_c$ ) $\varnothing$ 88,9 mm, with minimum wall thickness ( $t_c$ ) 2,0 mm, maximum wall thickness 14,2 mm <sup>4</sup>	EI 180-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.	
<b>Geberit Mepla pipes (C) with continued insulation (D) – sustained</b>	<b>Classification</b>
	See Annex C.5 of the ETA

<b>C.6.2 Local pipe insulation</b>				
<b>Steel pipes (C) with local insulation (D) – sustained</b>				Classification
				See Annex C.5 of the ETA
<b>Steel pipes (C) with local insulation (D) – interrupted</b>				Classification
				See Annex C.5 of the ETA
<b>Copper pipes (C) with local insulation (D) – sustained</b>				
Insulation		Pipe		Classification
thickness ( $t_b$ ) [mm]	length ( $L_D$ ) [mm]	diameter ( $d_c$ ) [mm]	wall thickness ( $t_c$ ) [mm]	
20	$\geq 425$	28	1,0 – 14,2 <sup>4</sup>	EI 180-C/U
20	$\geq 450$	28 – 42	1,0 / 1,5 <sup>7</sup> – 14,2 <sup>4</sup>	EI 120-C/U
20 - 40	$\geq 700$	42	1,5 – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 700$	42 – 88,9	1,5 / 2,0 <sup>8</sup> – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 500$	88,9	2,0 – 14,2 <sup>4</sup>	EI 90-C/U
40	$\geq 700$	88,9	2,0 – 14,2 <sup>4</sup>	EI 180-C/U
<b>Copper pipes (C) with local insulation (D) – interrupted</b>				
Insulation		Pipe		Classification
thickness ( $t_b$ ) [mm]	length ( $L_D$ ) [mm]	diameter ( $d_c$ ) [mm]	wall thickness ( $t_c$ ) [mm]	
20 - 40	$\geq 500$	28 – 42	1,0 / 1,5 <sup>7</sup> – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 500$	42 – 88,9	1,5 / 2,0 <sup>8</sup> – 14,2 <sup>4</sup>	EI 120-C/U
40	$\geq 500$	88,9	2,0 – 14,2 <sup>4</sup>	EI 180-C/U
The field of application given above is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100°C, e.g. unalloyed steel, low alloyed steel, cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.				
<b>Geberit Mepla pipes (C) with local insulation (D) – sustained</b>				Classification
				See Annex C.5 of the ETA