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European Technical Assessment

ETA-10/0403
of 28.06.2018

General part

Technical Assessment Body issuing the European Technical Assessment

Österreichisches Institut für Bautechnik (OIB)
 Austrian Institute of Construction Engineering

Trade name of the construction product

Hilti Firestop Collar CFS-C

Product family to which the construction product belongs

Fire Stopping and Fire Sealing Products:
 Penetration Seals

Manufacturer

Hilti AG
 Feldkircherstrasse 100
 9494 Schaan
 LIECHTENSTEIN

Manufacturing plant

Hilti production plant 5a and 5b

This European Technical Assessment contains

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

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

European Assessment Document
 EAD 350454-00-1104 "Fire stopping and fire sealing products – Penetration seals"

This European Technical Assessment replaces

European technical approval ETA-10/0403 with validity from 28.06.2013 to 27.06.2018

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Specific parts

1 Technical description of the product

“Hilti Firestop Collar CFS-C” is a pipe collar used as a pipe penetration seal based on the components according the tables below.

Component	Characteristics
Hilti Firestop Collar CFS-C	Pipe collar with galvanized steel housing and an inlay made of intumescent material and a foam strip that fills the space between inlay and the pipe to avoid passage of smoke, according to Annex B.1 of the ETA.

Additional components	Characteristics
Hilti Firestop Acrylic Sealant CFS-S ACR	Water-based acrylic dispersion, according to Annex B.2 of the ETA.
Mineral wool	Backfilling material for “Hilti Firestop Acrylic Sealant CFS-S ACR”. For suitable products see Annex B.5 of the ETA.
Cementitious mortar	Any cementitious mortar suitable for use with the intended type of rigid walls or floors may be used, according to Annex B.4 of the ETA.
Gypsum plaster	Any gypsum plaster suitable for use with flexible wall constructions or the intended type of rigid walls or floors may be used, according to B.3 of the ETA.

“Hilti Firestop Collar CFS-C” is supplied in several sizes – see table below.

Collar size	For pipes with nominal outside diameters (mm)	Recommended opening size (mm)	Required number of fastening hooks
CFS-C 50/1.5"	50	62	2
CFS-C 63/2"	63	77	2
CFS-C 75/2.5"	75	82	3
CFS-C 90/3"	90	112	3
CFS-C 110/4"	110	122	4
CFS-C 125/5"	125	142	4
CFS-C 160/6"	160	182	4
CFS-C 180/7"	180	205	8
CFS-C 225/9"	225	255	10
CFS-C 250/10"	250	280	12

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

2.1 Intended use

“Hilti Firestop Collar CFS-C” is a pipe closure device installed around plastic pipes to form a 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 provided with apertures which are penetrated by plastic pipes.

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by the producer or the Technical Assessment Body, but are to be regarded only as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

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

2.4 General assumptions

2.4.1 It is assumed that

- > damages to the penetration seal are repaired accordingly,
- > the installation of the penetration seal does not affect the stability of the adjacent building element – even in case of fire,
- > the lintel or floor above the penetration seal is designed structurally and in terms of fire protection such that no additional mechanical load (other than its own weight) is imposed on the penetration seal,
- > the installations are fixed to the adjacent building element in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal,
- > the support of the installations is maintained for the required period of fire resistance and
- > pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

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

2.4.3 This European Technical Assessment does not verify the prevention of destruction of adjacent building elements with fire separating function or of the pipes themselves due to distortion forces caused by extreme temperatures. These risks shall be accounted for by taking appropriate measures when designing or installing the pipe work.

The mounting or hanging of the pipes or the layout of the pipe work shall be implemented in such a way that the pipes and the fire resistant building elements shall remain functional within a period of time which corresponds to the fire resistance period required.

2.4.4 The risk of downward spread of fire caused by burning material which drips through a pipe to floors below, is not considered in this European Technical Assessment (see EN 1366-3:2009, clause 1).

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

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

2.5 Manufacturing

The European Technical Assessment is issued for the product on the basis of agreed data / information, deposited with the Österreichisches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data / information being incorrect, should be notified to the Österreichisches Institut für Bautechnik before the changes are introduced.

The Österreichisches Institut für Bautechnik will decide whether or not such changes affect the European Technical Assessment and consequently the validity of the CE marking on the basis of the European Technical Assessment and if so whether further assessment or alterations to the European Technical Assessment, shall be necessary.

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

Basic requirements for construction works	Essential characteristic	Method of verification	Performance
BWR 2	Reaction to fire	EN 13501-1:2007+A1:2009	Clause 3.1.1 of the ETA
	Resistance to fire	EN 13501-2:2007+A1:2009	Clause 3.1.2 and Annex C.1 to C.6 of the ETA
BWR 3	Air permeability	No performance assessed	
	Water permeability	No performance assessed	
	Content, emission and/or release of dangerous substances	No performance assessed	
BWR 4	Mechanical resistance and stability	No performance assessed	
	Resistance to impact / movement	No performance assessed	
	Adhesion	No performance assessed	
	Durability	EAD 350454-00-1104 clause 2.2.9	Clause 3.3.4 of the ETA
BWR 5	Airborne sound insulation	No performance assessed	
BWR 6	Thermal properties	No performance assessed	
	Water vapour permeability	No performance assessed	

3.1 Safety in case of fire (BWR 2)

3.1.1 Reaction to fire

The components of “Hilti Firestop Collar CFS-C” were assessed according to EAD 350454-00-1104 clause 2.2.1 and classified according to EN 13501-1:2007+A1:2009.

Component	Class according to EN 13501-1:2007+A1:2009
Hilti Firestop Collar CFS-C – inlay	F
Hilti Firestop Collar CFS-C – housing	A1

3.1.2 Resistance to fire

“Hilti Firestop Collar CFS-C” 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 Collar CFS-C” 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 element 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.

3.2 Hygiene, health and the environment (BWR 3)

3.2.1 Air permeability

No performance assessed.

3.2.2 Water permeability

No performance assessed.

3.2.3 Content, emission and/or release of dangerous substances

No performance assessed.

3.3 Safety and accessibility in use (BWR 4)

3.3.1 Mechanical resistance and stability

No performance assessed.

3.3.2 Resistance to impact / movement

No performance assessed.

3.3.3 Adhesion

No performance assessed.

3.3.4 Durability

All components of "Hilti Firestop Collar CFS-C" fulfil the requirements for the intended use condition.

"Hilti Firestop Collar CFS-C" is therefore appropriate for use at internal conditions with humidity classes other than Z₁, excluding temperatures below 0°C and can – according to EAD 350454-00-1104 clause 2.2.9.3.1 – be categorized as Type Z₂.

3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation

No performance assessed.

3.5 Energy economy and heat retention (BWR 6)

3.5.1 Thermal properties

No performance assessed.

3.5.2 Water vapour permeability

No performance assessed.

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

According to the Decision 1999/454/EC¹, amended by Decision 2001/596/EC² of the European Commission the system(s) of assessment and verification of constancy of performance (see Annex V of Regulation (EU) No 305/2011) is given in the following table.

Product(s)	Intended use(s)	Level(s) or class(es) (resistance to fire)	System of assessment and verification of constancy of performance
Fire Stopping and Fire Sealing Products	for fire compartmentation and/or fire protection or fire performance	any	1

In addition, according to the Decision 1999/454/EC, amended by Decision 2001/596/EC of the European Commission the system(s) of assessment and verification of constancy of performance, with regard to reaction to fire, is given in the following table.

Product(s)	Intended use(s)	Level(s) or class(es) (reaction to fire)	System of assessment and verification of constancy of performance
Fire Stopping and Fire Sealing Products	For uses subject to regulations on reaction to fire	A1*, A2*, B*, C*	1
		A1**, A2**, B**, C**, D, E	3
		(A1 to E)***, F	4
* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material) ** Products/materials not covered by footnote (*) *** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of class A1 according to Commission Decision 96/603/EC, as amended)			

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

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

Issued in Vienna on 28.06.2018
by Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits
Managing Director

¹ Official Journal of the European Communities no. L 178, 14.7.1999, p. 52
² Official Journal of the European Communities no. L 209, 2.8.2001, p. 33

ANNEX A LIST OF ABBREVIATIONS

A.1 Abbreviations used in drawings

Abbreviation	Description
A ₁	Hilti Firestop Collar CFS-C
A ₂	Annular gap seal
A ₃	Annular gap seal with gypsum plaster or cementitious mortar
B	Backfilling material (mineral wool)
C	Plastic Pipe
C ₁	Sound decoupling strip
D	External diameter of insulated composite "COOL-FIT" pipe
d	Internal diameter of insulated composite "COOL-FIT" pipe
d _c	Pipe diameter (nominal outside diameter)
E	Building element (wall, floor)
F	Fixing of the collar
s ₁	Minimum distance between single penetration seals
t _{A2}	Thickness of Hilti Firestop Acrylic Sealant CFS-S ACR
t _C	Pipe wall thickness
t _E	Thickness of the building element

ANNEX B DESCRIPTION OF PRODUCT(S) & PRODUCT LITERATURE

B.1 Hilti Firestop Collar CFS-C

A detailed specification of the product is contained in document "Identification / Product Specification relating to the European technical approval ETA-10/0403 - Hilti Firestop Collar CFS-C" which is a non-public part of this ETA.

The Control Plan is defined in document "Control Plan relating to the European Technical Assessment ETA-10/0403 - Hilti Firestop Collar CFS-C" which is a non-public part of this ETA.

B.2 Hilti Firestop Acrylic Sealant CFS-S ACR

See ETA-10/0292 and ETA-10/0389

B.3 Gypsum plaster

Any gypsum plaster suitable for use with flexible wall constructions or the intended type of rigid walls or floors may be used.

B.4 Cementitious Mortar

"Hilti Firestop Mortar CP 633" or any mortar classified according EN 998-2 and with strength class equal or higher than M10 can be used.

B.5 Mineral wool

Loose mineral wool products suitable for being used as backfilling material of Hilti Firestop Acrylic Sealant CFS-S ACR

Product	Manufacturer	Specification
Heralan LS	Knauf Insulation GmbH	Product data sheet of Knauf
Isover loose wool SL	Saint-Gobain ISOVER	Product data sheet of Isover
Isover Universal-Stopfwole	Saint-Gobain ISOVER	Product data sheet of Isover
Rockwool RL	Rockwool	Product data sheet of Rockwool
Paroc Pro Loose Wool	Paroc OY AB	Product data sheet of Paroc

B.6 Sound decoupling strip

Any sound decoupling strip based on PE (foam) may be used with a maximum thickness as given in Annex C of the ETA.

ANNEX C
RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF
HILTI FIRESTOP COLLAR CFS-C

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.

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

b) Rigid wall:

The wall must have a minimum thickness as given in Annex C of the ETA and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m³.

c) Rigid floor:

The floor must have a minimum thickness as given in Annex C of the ETA and comprise concrete with a minimum density of 2400 kg/m³ (floor type A) or 550 kg/m³ (floor type B) respectively.

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.

“Hilti Firestop Collar CFS-C” may be used to provide a penetration seal with the following specific services, single only:

PVC pipes: for details on diameters, wall thickness and pipe standards see Annex C of the ETA.

PE pipes: for details on diameters, wall thickness and pipe standards see Annex C of the ETA.

insulated composite “COOL-FIT” pipes: for details on diameters, wall thickness and pipe standards see Annex C of the ETA.

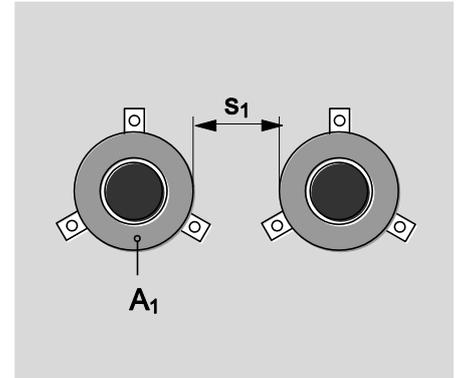
Apertures for the penetration of pipes require separation of minimum 200 mm.

Pipes shall be supported at maximum 300 mm away from both faces of wall constructions and maximum 240 mm from the upper face of floor constructions.

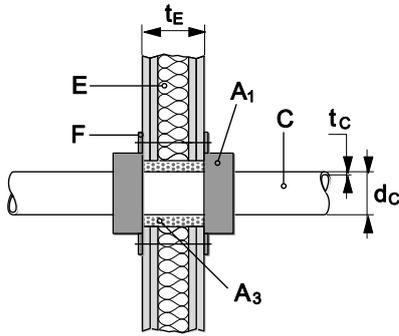
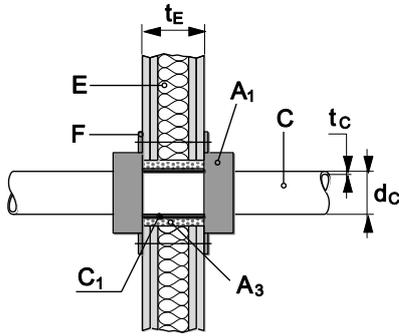
C.2 Flexible or rigid walls according to Annex C.1 of the ETA - minimum wall thickness 100 mm

Penetration seal - Single penetration:

- Hilti Firestop Collar CFS-C on both sides (A_1), annular gap filled either with gypsum plaster (A_3) over the entire thickness of the wall or with Hilti Firestop Acrylic Sealant CFS-S ACR (A_2) on both sides with a depth of minimum 25 mm from the surface of the wall. In case of a rigid wall cementitious mortar may be used as an alternative to gypsum plaster.
- The sealant may be backfilled with mineral wool.
- Minimum distance between collars / annular gap (s_1): 200 mm
- Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the wall.
- Collars fixed by hooks (F) and threaded rods M8 through the wall fixed with nuts on both sides of the wall. In high density rigid walls alternatively metal anchors with minimum \varnothing 8 mm may be used. For minimum number of hooks see table below.
- Sound decoupling: maximum thickness 5 mm (C_1 - used in combination with gypsum plaster or mortar).



Annular gap penetration seal

Gypsum plaster (A_3)	
Gypsum plaster (A_3) together with sound decoupling (C_1)	

Penetrating services

C.2.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,4 – 5,6	CFS-C 50/1.5"	2	EI 120-U/C
63	3,0 – 4,7	CFS-C 63/2"	2	EI 120-U/C
75	2,2 – 3,6	CFS-C 75/2.5"	3	EI 120-U/C
90	2,7 – 4,3	CFS-C 90/3"	3	EI 120-U/C
110	1,8 – 2,2	CFS-C 110/4"	4	EI 90-U/C E 120 U/C
110	2,2 – 8,1	CFS-C 110/4"	4	EI 120-U/C
125	3,7 – 6,0	CFS-C 125/5"	4	EI 90-U/C E 120 U/C
125	6,0	CFS-C 125/5"	4	EI 120-U/C
160	2,5 – 11,8	CFS-C 160/6"	4	EI 120-U/C

The results are also valid for PVC-C pipes according to EN 1566-1³ and PVC-U pipes according EN 1329-1 and EN 1453-1.

C.2.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,9 – 4,6	CFS-C 50/1.5"	2	EI 120-U/C
63	1,8 – 5,8	CFS-C 63/2"	2	EI 120-U/C
75	1,9 – 6,8	CFS-C 75/2.5"	3	EI 120-U/C
90	2,2 – 8,2	CFS-C 90/3"	3	EI 120-U/C
110	2,7 – 10,0	CFS-C 110/4"	4	EI 120-U/C
125	3,1 – 7,1	CFS-C 125/5"	4	EI 120-U/C
160	4,0 – 9,1	CFS-C 160/6"	4	EI 120-U/C

C.2.3 PE pipes according to EN 1519-1

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	3,0	CFS-C 50/1.5"	2	EI 120-U/C
63	3,0	CFS-C 63/2"	2	EI 120-U/C
75	3,0	CFS-C 75/2.5"	3	EI 120-U/C
90	3,0	CFS-C 90/3"	3	EI 120-U/C
110	4,3	CFS-C 110/4"	4	EI 120-U/C
125	4,9	CFS-C 125/5"	4	EI 120-U/C
160	6,2	CFS-C 160/6"	4	EI 120-U/C

The results are also valid for PE pipes according to EN 12201-2 and EN 12666-1.

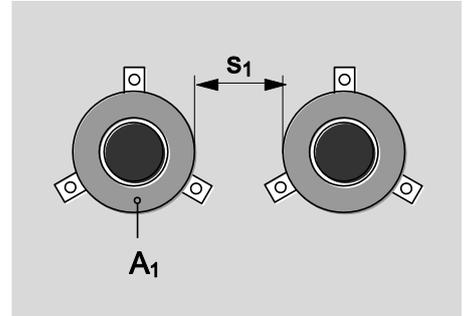
³ It is recommended only to use gypsum plaster or cementitious mortar as annular gap seal for PVC-C pipes together with sound decoupling according to Annex B.6 of the ETA

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C.3 Rigid walls according to Annex C.1 of the ETA, minimum wall thickness 150 mm

Penetration seal - Single penetration:

- Hilti Firestop Collar CFS-C on both sides (A_1), annular gap filled with Hilti Firestop Acrylic Sealant CFS-S ACR (A_2) with a depth of minimum 10 mm from the surface of the wall, backfilled with mineral wool.
- Minimum distance between collars / annular gap (s_1): 200 mm
- Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the wall except stated otherwise in the tables below.
- Collars fixed by hooks (F) and metal anchors with minimum \varnothing 8 mm. In low density rigid walls threaded rods M8 through the wall fixed with nuts on both sides of the wall are to be used. For minimum number of hooks see table below.
- For further construction details see Annex C.1 of the ETA.



Penetrating services

C.3.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062
 Distance between pipe and penetration seal edge in wall (width of annular gap): ≤ 10 mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	1,8	CFS-C 50/1.5"	2	EI 180-U/C
160	3,2 – 11,9	CFS-C 160/6"	4	EI 180-U/C

The results are also valid for PVC-C pipes according to EN 1566-1³ and PVC-U pipes according EN 1329-1 and EN 1453-1.

C.3.2 PE pipes according to EN ISO 15494 and DIN 8074/8075
 Distance between pipe and penetration seal edge in wall (width of annular gap): ≤ 10 mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,9	CFS-C 50/1.5"	2	EI 180-U/C
160	4,0 – 14,6	CFS-C 160/6"	4	EI 180-U/C

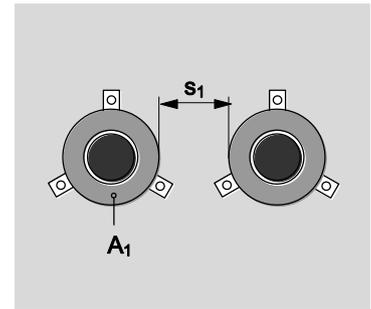
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C.3.3 “COOL-FIT” ABS pipes with PU insulation by Georg Fischer Piping Systems Ltd				
Distance between pipe and penetration seal edge in wall (width of annular gap): ≤ 10 mm				
Pipe internal diameter d (mm)	Pipe composite external diameter D (mm)	Collar size (A ₁)	No. of hooks	Classification
25 - 32	90	CFS-C 90/3”	3	EI 120-U/C
40 - 50	110	CFS-C 110/4”	4	EI 120-U/C
63	125	CFS-C 125/5”	4	EI 120-U/C
75 - 90	140 - 160	CFS-C 160/6”	6	EI 120-U/C
110	180	CFS-C 180/7”	8	EI 120-U/C
140	225	CFS-C 225/9”	10	EI 120-U/C
160	250	CFS-C 250/10”	12	EI 60-U/C E 120 U/C

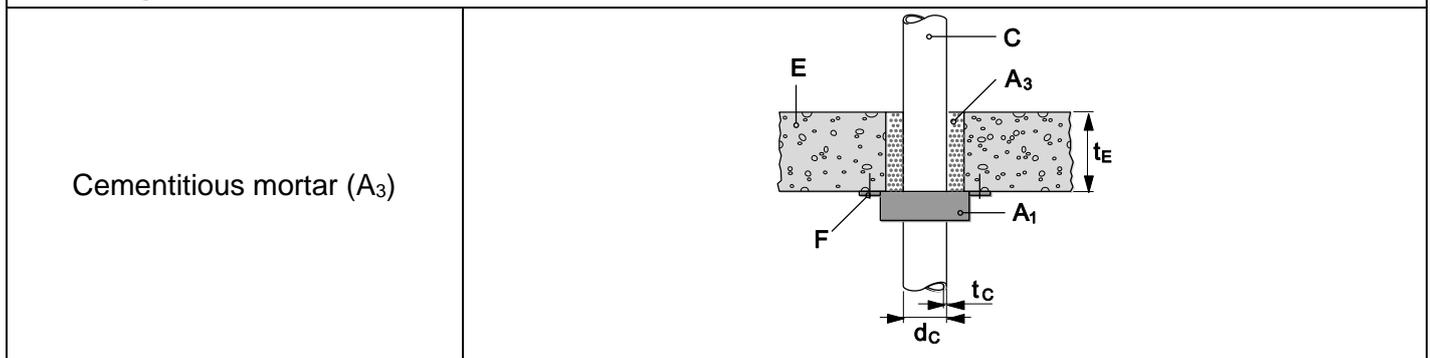
C.4 Rigid floor according Annex C.1 of the ETA (density ≥ 2400 kg/m³), minimum floor thickness 200 mm

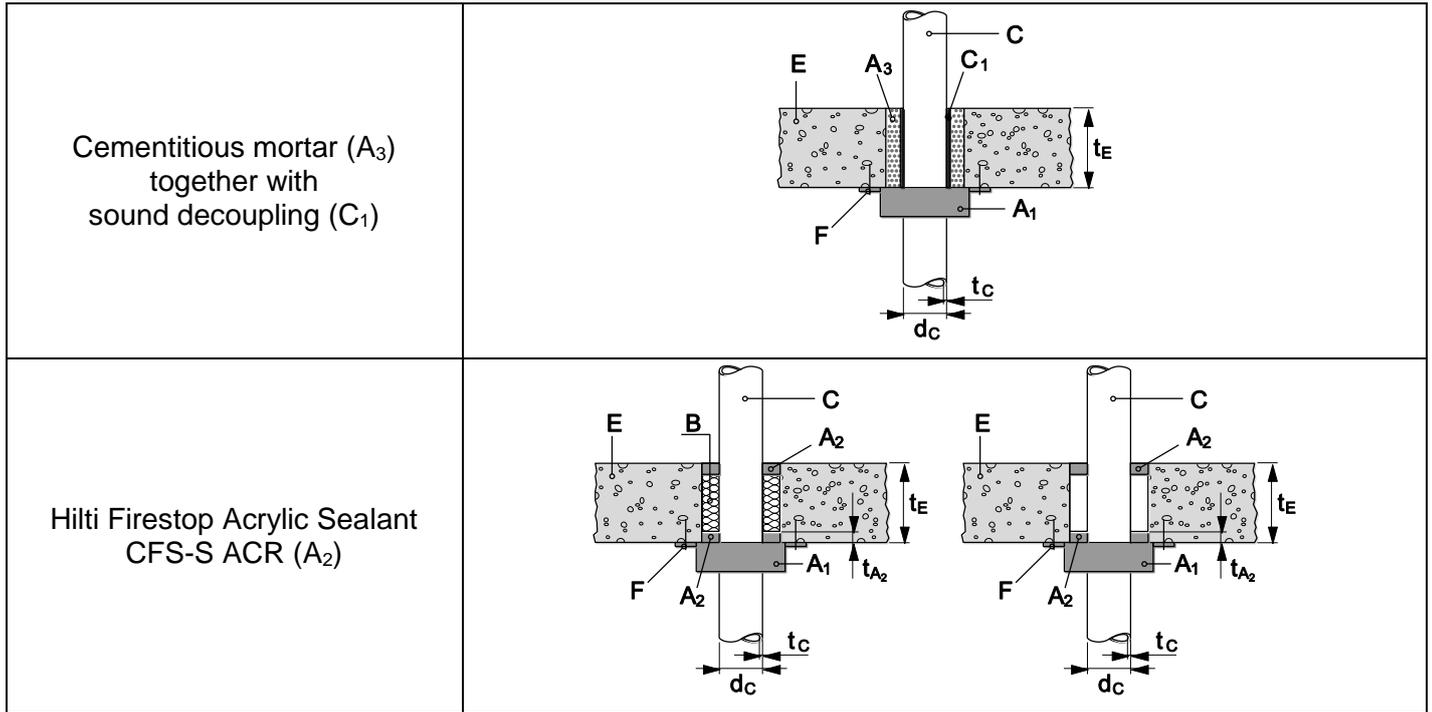
Penetration seal - Single penetration:

- Hilti Firestop Collar CFS-C (A₁) on the underside of the floor, annular gap filled either with gypsum plaster or cementitious mortar (A₃) over the entire thickness of the floor or with Hilti Firestop Acrylic Sealant CFS-S ACR (A₂) on both sides with a depth of minimum 10 mm, backfilled with mineral wool
- Minimum distance between collars / annular gap (s₁): 200 mm
- Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor except stated otherwise in the tables below.
- Collars fixed by hooks (for minimum number see table below) and metal anchors with minimum Ø 6 mm (up to collar size 110/4” and minimum Ø 8 mm (from collar size 125/5” to 250/10”). In low density rigid floors threaded rods M8 through the floor fixed with nuts on both sides of the floor are to be used.
- Sound decoupling: maximum thickness 5 mm (C₁ - used in combination with gypsum plaster or mortar).



Annular gap penetration seal





Penetrating services

C.4.1 PVC-U pipes according EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Distance between pipe and penetration seal edge in floor (width of annular gap): ≤ 11 mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,4 – 5,6	CFS-C 50/1.5"	2	EI 180-U/C
63	3,0 – 4,7	CFS-C 63/2"	2	EI 180-U/C
75	2,2 – 3,6	CFS-C 75/2.5"	3	EI 180-U/C
90	2,7 – 4,3	CFS-C 90/3"	3	EI 180-U/C
110	1,8 – 8,1	CFS-C 110/4"	4	EI 180-U/C
125	3,7 – 6,0	CFS-C 125/5"	4	EI 180-U/C
160	2,5 – 11,8	CFS-C 160/6"	4	EI 180-U/C

The results are also valid for PVC-C pipes according to EN 1566-1 and PVC-U pipes according EN 1329-1 and EN 1453-1.

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C.4.2 PE pipes according to EN ISO 15494 and DIN 8074/8075				
Distance between pipe and penetration seal edge in floor (width of annular gap): ≤ 11 mm				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Collar size (A ₁)	No. of hooks	Classification
50	2,9 – 4,6	CFS-C 50/1.5"	2	EI 180-U/C
63	1,8 – 5,8	CFS-C 63/2"	2	EI 180-U/C
75	1,9 – 6,8	CFS-C 75/2.5"	3	EI 180-U/C
90	2,2 – 8,2	CFS-C 90/3"	3	EI 180-U/C
110	2,7 – 10,0	CFS-C 110/4"	4	EI 180-U/C
125	3,7 – 7,1	CFS-C 125/5"	4	EI 180-U/C
160	4,0 – 9,1	CFS-C 160/6"	4	EI 180-U/C

C.5 Rigid floor type A according to Annex C.1 of the ETA (density ≥ 2400 kg/m³), minimum floor thickness 150 mm

Penetrating services

C.5.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062				
Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor.				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Collar size (A ₁)	No. of hooks	Classification
50	2,4	CFS-C 50/1.5"	2	EI 120-U/C
75	2,2	CFS-C 75/2.5"	3	EI 120-U/C
90	2,7	CFS-C 90/3"	3	EI 120-U/C
125	3,7	CFS-C 125/5"	4	EI 120-U/C
160	2,5 – 11,8	CFS-C 160/6"	4	EI 120-U/C

The results are also valid for PVC-C pipes according to EN 1566-1 and PVC-U pipes according EN 1329-1 and EN 1453-1.

C.5.2 PE pipes according to EN ISO 15494 and DIN 8074/8075				
Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor.				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Collar size (A ₁)	No. of hooks	Classification
75	1,9 – 6,8	CFS-C 75/2.5"	3	EI 120-U/C
160	4,0 – 9,1	CFS-C 160/6"	4	EI 90-U/C E 120 U/C
160	9,1	CFS-C 160/6"	4	EI 120-U/C

C.5.3 PE pipes according to EN 1519-1

Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor.

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	3,0	CFS-C 50/1.5"	2	EI 120-U/C
63	3,0	CFS-C 63/2"	2	EI 120-U/C
75	3,0	CFS-C 75/2.5"	3	EI 120-U/C
90	3,5	CFS-C 90/3"	3	EI 120-U/C
110	4,2	CFS-C 110/4"	4	EI 120-U/C
125	4,8	CFS-C 125/5"	4	EI 120-U/C
160	6,2	CFS-C 160/6"	4	EI 120-U/C

The results are also valid for PE pipes according to EN 12201-2 and EN 12666-1.

C.5.4 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Distance between pipe and penetration seal edge in floor (width of annular gap): ≤ 10 mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	1,8	CFS-C 50/1.5"	2	EI 180-U/C
160	3,2 – 11,9	CFS-C 160/6"	4	EI 180-U/C

The results are also valid for PVC-C pipes according to EN 1566-1 and PVC-U pipes according EN 1329-1 and EN 1453-1.

C.5.5 PE pipes according to EN ISO 15494 and DIN 8074/8075

Distance between pipe and penetration seal edge in floor (width of annular gap): ≤ 10 mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,9	CFS-C 50/1.5"	2	EI 180-U/C
160	4,0 – 14,6	CFS-C 160/6"	4	EI 180-U/C

C.6 Rigid floor type A according to Annex C.1 of the ETA (density $\geq 550 \text{ kg/m}^3$), minimum floor thickness 150 mm

Penetrating services

C.6.1 PVC-U pipes according EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor.

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,4	CFS-C 50/1.5"	2	EI 120-U/C
75	2,2	CFS-C 75/2.5"	3	EI 120-U/C
90	2,7	CFS-C 90/3"	3	EI 120-U/C
125	3,7	CFS-C 125/5"	4	EI 120-U/C
160	2,5 – 11,8	CFS-C 160/6"	4	EI 120-U/C

The results are also valid for PVC-C pipes according to EN 1566-1 and PVC-U pipes according EN 1329-1 and EN 1453-1.

C.6.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor.

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
75	1,9	CFS-C 75/2.5"	3	EI 120-U/C
160	4,0 – 9,1	CFS-C 160/6"	4	EI 90-U/C E 120-U/C
160	9,1	CFS-C 160/6"	4	EI 120-U/C

C.6.3 "COOL-FIT" ABS pipes with PU insulation by Georg Fischer Piping Systems Ltd

Width of annular gap: The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor.

Pipe internal diameter d (mm)	Pipe composite external diameter D (mm)	Collar size (A_1)	No. of hooks	Classification
25 - 32	90	CFS-C 90/3"	3	EI 120-U/C
40 - 50	110	CFS-C 110/4"	4	EI 120-U/C
110	180	CFS-C 180/7"	8	EI 60-U/C E 120 U/C
140	225	CFS-C 225/9"	10	EI 120-U/C
160	250	CFS-C 250/10"	12	EI 120-U/C