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European Technical Assessment

ETA-10/0405
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 Wrap CFS-W

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 7a

This European Technical Assessment contains

19 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-10/0405 with validity from 28.06.2013 to 27.06.2018

Specific parts

1 Technical description of the product

“Hilti Firestop Wrap CFS-W” is an intumescent wrap used as penetration seal for plastic pipes.

Additional components	Characteristics
Hilti Firestop Acrylic Sealant CFS-S ACR	Water-based acrylic dispersion, according Annex B.2 of the ETA
Mineral wool	Backfilling material of Hilti Firestop Acrylic Sealant CFS-S ACR, according Annex B.3 of the ETA
Cementitious mortar	Any cementitious mortar suitable for use with the intended type of rigid walls or floors may be used, according Annex B.4 of the ETA

“Hilti Firestop Wrap CFS-W” is available as endless wrap (“CFS-W EL”) on a roll with a thickness of 4,5 mm and a width of 45 mm, or as single wraps (“CFS-W SG”), pre-cut to specific to a specific length and width, see table below:

Wrap size	For pipes with nominal outside diameters (mm)	Thickness of wrap (mm)	Recommended aperture diameter (mm)
CFS-W SG 50/1.5"	50	4,5	67
CFS-W SG 63/2"	63	4,5	77
CFS-W SG 75/2.5"	75	4,5	92
CFS-W SG 90/3"	90	9,0	112
CFS-W SG 110/4"	110	9,0	132
CFS-W SG 125/5"	125	9,0	152
CFS-W SG 160/6"	160	13,5	202

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

2.1 Intended use

“Hilti Firestop Wrap CFS-W” is intended to be used as a pipe penetration seal around plastic pipes to temporarily or permanently reinstate the fire resistance performance of wall and floor constructions, where they have been provided with apertures for the penetration of plastic pipes.

The maximum opening size of the penetration seal is related to a maximum pipe diameter of 160 mm with an annular gap of up to 9,5 mm. For more details regarding the maximum opening size, see Annex C of the ETA.

“Hilti Firestop Wrap CFS-W” can be installed only in the types of separating elements as specified in the following table.

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.3 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

“Hilti Firestop Wrap CFS-W” was 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 Wrap CFS-W	E

3.1.2 Resistance to fire

“Hilti Firestop Wrap CFS-W” was tested according to EAD 350454-00-1104 clause 2.2.2, EN 1363-1 and EN 1366-3:2009.

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

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ANNEX A
LIST OF ABBREVIATIONS

A.1 Abbreviations used in drawings

Abbreviation	Description
A ₁	Hilti Firestop Wrap CFS-W
A ₂	Annular gap seal with Hilti Firestop Acrylic Sealant CFS-S ACR
A ₃	Annular gap seal with cementitious mortar
B	Backfilling material (mineral wool)
C	Plastic Pipe
d _C	Pipe diameter (nominal outside diameter)
E	Building element (wall, floor)
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 Wrap CFS-W

A detailed specification of the product is contained in document "Identification / Product Specification relating to the European technical approval ETA-10/0405 - Hilti Firestop Wrap CFS-W" 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-10/0405 - Hilti Firestop Wrap CFS-W" 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 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.4 Cementitious mortar

Any cementitious mortar suitable for use with the intended type of rigid walls or floors may be used.

B.5 Sound decoupling means

Any sound decoupling means based on PE (foam) may be used with a maximum thickness of 5 mm.

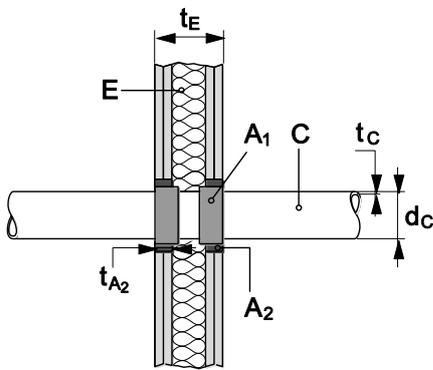
ANNEX C
RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF HILTI FIRESTOP WRAP CFS-W

C.1 Flexible walls and rigid walls type A according to clause 2.1 of the ETA, minimum wall thickness 100 mm

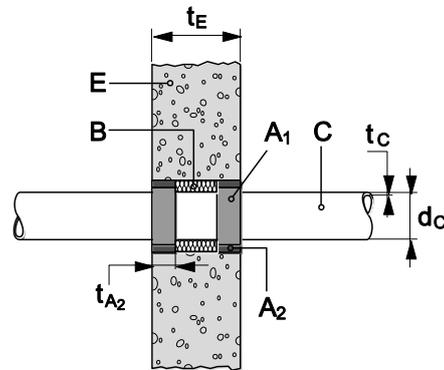
Penetration seal - Single penetration:

- Hilti Firestop Wrap CFS-W on both sides (A_1), outer edge of the wrap flush with the surface of the wall.
- Annular gap filled within:
 - *Flexible walls (see construction details below):*
 Hilti Firestop Acrylic Sealant CFS-S ACR (A_2) on both sides with a depth (t_{A2}) of minimum 25 mm from the surface of the wall supported by mineral wool of minimum 100 kg/m^3 density in the gap between the wall lining around the opening with a depth of minimum 100 mm;
 - *Rigid walls (see construction details below):*
 Cementitious mortar (A_3) over the entire thickness of the wall or Hilti Firestop Acrylic Sealant CFS-S ACR (A_2) on both sides with a depth (t_{A2}) of minimum 15 mm from the surface of the wall. The sealant may be backfilled with mineral wool (for suitable mineral wool products see Annex B.3 of the ETA).
- The maximum annular gap width is given in the tables below;
- Minimum distance between single penetration seals (s_1): 200 mm.

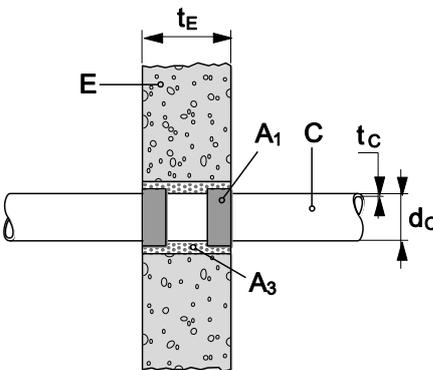
Construction details:



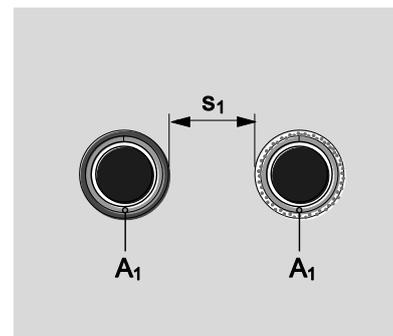
Application in a flexible wall (with Hilti Firestop Acrylic Sealant CFS-S ACR - A_2)



Application in a rigid wall (with Hilti Firestop Acrylic Sealant CFS-S ACR - A_2)



Application in a rigid wall (with cementitious mortar - A_3)



Penetrating services

C.1.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Distance between wrap and penetration seal edge in wall (width of annular gap): $\leq 9,5$ mm.

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
50	2,2 – 3,6	CFS-W SG	50/1.5"	EI 120-U/C
63	2,2 – 3,6	CFS-W SG	63/2"	EI 120-U/C
75	2,2 – 3,6	CFS-W SG	75/2.5"	EI 120-U/C
≤ 75	2,2 – 3,6	CFS-W EL	1	EI 120-U/C
90	3,7 – 6,0	CFS-W SG	90/3"	EI 90-U/C
110	3,7 – 6,0	CFS-W SG	110/4"	EI 90-U/C
125	3,7 – 6,0	CFS-W SG	125/5"	EI 90-U/C
$>75 \leq 125$	3,7 – 6,0	CFS-W EL	2	EI 90-U/C
160	2,5 – 11,8	CFS-W SG	160/6"	EI 60-U/C
$> 125 \leq 160$	2,5 – 11,8	CFS-W EL	3	EI 60-U/C
160	11,8	CFS-W SG	160/6"	EI 90-U/C
160	11,8	CFS-W EL	3	EI 90-U/C

The results are also valid for PVC-C pipes according to EN 1566-1³ and PVC-U pipes according to EN 1329-1⁴ and EN 1453-1⁴.

C.1.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Distance between wrap and penetration seal edge in wall (width of annular gap): $\leq 9,5$ mm.

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
50	1,9 – 6,8	CFS-W SG	50/1.5"	EI 120-U/C
63	1,9 – 6,8	CFS-W SG	63/2"	EI 120-U/C
75	1,9 – 6,8	CFS-W SG	75/2.5"	EI 120-U/C
≤ 75	1,9 – 6,8	CFS-W EL	1	EI 120-U/C
90	3,2 – 7,1	CFS-W SG	90/3"	EI 120-U/C
110	3,2 – 7,1	CFS-W SG	110/4"	EI 120-U/C
125	3,2 – 7,1	CFS-W SG	125/5"	EI 120-U/C
$>75 \leq 125$	3,2 – 7,1	CFS-W EL	2	EI 120-U/C
160	4,0 – 9,1	CFS-W SG	160/6"	EI 60-U/C
$> 125 \leq 160$	4,0 – 9,1	CFS-W EL	3	EI 60-U/C
160	9,1	CFS-W SG	160/6"	EI 90-U/C
160	9,1	CFS-W EL	3	EI 90-U/C

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.5 of the ETA

⁴ In Germany the pipes have additionally to comply with DIN 19531-10

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C.1.3 PE pipes according to EN 1519-1⁵				
Distance between wrap and penetration seal edge in wall (width of annular gap): ≤ 4,5 mm.				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Type of CFS-W (A ₁)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
50	3,0	CFS-W SG	50/1.5"	EI 120-U/C
63	3,0	CFS-W SG	63/2"	EI 120-U/C
75	3,0	CFS-W SG	75/2.5"	EI 120-U/C
≤ 75	3,0	CFS-W EL	1	EI 120-U/C
90	4,9	CFS-W SG	90/3"	EI 120-U/C
110	4,9	CFS-W SG	110/4"	EI 120-U/C
125	4,9	CFS-W SG	125/5"	EI 120-U/C
>75 ≤ 125	4,9	CFS-W EL	2	EI 120-U/C
The results are also valid for PE pipes according to EN 12201-2 and EN 12666-1.				

C.2 Rigid walls according to clause 2.1 of the ETA

Penetration seal - Single penetration:

- Hilti Firestop Wrap CFS-W on both sides (A₁)
- Annular gap filled either with cementitious mortar (A₃) over the entire thickness of the wall or with Hilti Firestop Acrylic Sealant CFS-S ACR (A₂) with a depth of minimum 15 mm from the surface of the wall. The sealant may be backfilled with mineral wool (for suitable mineral wool products see Annex B.3 of the ETA). The maximum annular gap width is given in the tables below;
- Minimum distance between single penetration seals (s₁): 200 mm;
- For further construction details see Annex C.1 of the ETA.

C.2.1 Rigid walls type A according to clause 2.1 of the ETA (density ≥ 650 kg/m³), minimum wall thickness 150 mm

Penetrating services

C.2.1.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062				
Distance between wrap and penetration seal edge in wall (width of annular gap): ≤ 7,5 mm				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Type of CFS-W (A ₁)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
160	2,5 – 11,8	CFS-W SG	160/6"	EI 180-U/C
> 125 ≤ 160	2,5 – 11,8	CFS-W EL	3	EI 180-U/C
The results are also valid for PVC-C pipes according to EN 1566-1 ³ and PVC-U pipes according EN 1329-1 ⁴ and EN 1453-1 ⁴ .				

⁵ In Germany the pipes have additionally to comply with DIN 19535-10.

C.2.1.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Distance between wrap and seal edge in wall (width of annular gap): $\leq 7,5$ mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
160	4,0 – 9,1	CFS-W SG	160/6"	EI 180-U/C
$> 125 \leq 160$	4,0 – 9,1	CFS-W EL	3	EI 180-U/C

C.2.1.3 PE pipes according to EN 1519-1⁵

Distance between wrap and penetration seal edge in wall (width of annular gap): $\leq 7,5$ mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
160	6,2	CFS-W SG	160/6"	EI 180-U/C
$> 125 \leq 160$	6,2	CFS-W EL	3	EI 180-U/C

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

C.2.2 Rigid walls type B according to clause 2.1 of the ETA (density ≥ 1100 kg/m³), minimum wall thickness 175 mm

Penetrating services

C.2.2.1 PVC pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Distance between wrap and penetration seal edge in wall (width of annular gap): $\leq 8,5$ mm

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 240-U/C
90	3,2	CFS-W SG	90/3"	EI 240-U/C
110	3,2	CFS-W SG	110/4"	EI 240-U/C
$> 75 \leq 110$	3,2	CFS-W EL	2	EI 240-U/C
160	3,2 – 13,0	CFS-W SG	160/6"	EI 240-U/C
$> 125 \leq 160$	3,2 – 13,0	CFS-W EL	3	EI 240-U/C

The results are also valid for PVC-C pipes according to EN 1566-1³ and PVC-U pipes according to EN 1329-1⁴ and EN 1453-1⁴.

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C.2.2.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Distance between wrap and penetration seal edge in wall (width of annular gap): $\leq 8,5$ mm

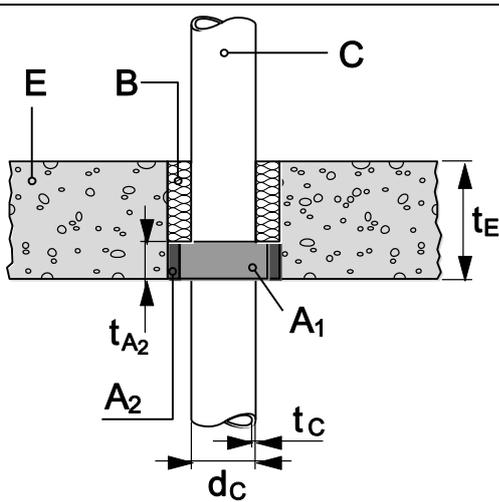
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 240-U/C
90	2,7	CFS-W SG	90/3"	EI 240-U/C
110	2,7	CFS-W SG	110/4"	EI 240-U/C
$> 75 \leq 110$	2,7	CFS-W EL	2	EI 240-U/C
160	4,0 – 14,6	CFS-W SG	160/6"	EI 240-U/C
$> 125 \leq 160$	4,0 – 14,6	CFS-W EL	3	EI 240-U/C

C.3 Rigid floors according to clause 2.1 of the ETA

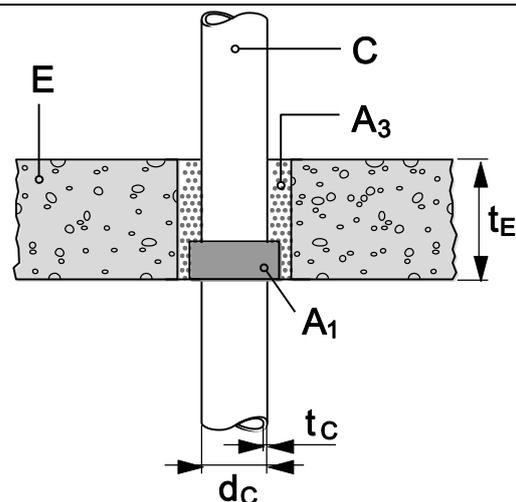
Penetration seal - Single penetration:

- Hilti Firestop Wrap CFS-W (A_1) on the underside of the floor;
- Annular gap filled either with cementitious mortar (A_3) over the entire thickness of the floor or;
- with Hilti Firestop Acrylic Sealant CFS-S ACR (A_2) with a depth (t_{A2}) of minimum 15 mm from the surface of the floor. The gap behind the sealant is to be backfilled with mineral wool compressed to achieve minimum 60 kg/m^3 density. The maximum annular gap width is given in the tables below;
- Minimum distance between single penetration seals (s_1): 200 mm (see figure in Annex C.1 of the ETA).

Construction details:



Application in a rigid floor (with Hilti Firestop Acrylic Sealant CFS-S ACR - A_2)



Application in a rigid floor (with cementitious mortar - A_3)

C.3.1 Rigid floor type A according to clause 2.1 of the ETA (density $\geq 2400 \text{ kg/m}^3$), minimum floor thickness 150 mm

Penetrating services

C.3.1.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Distance between wrap and penetration seal edge in floor (width of annular gap): $\leq 9,5 \text{ mm}$ ($\varnothing 90 - 125 \text{ mm}$)

Distance between wrap and penetration seal edge in floor (width of annular gap): $\leq 1,5 \text{ mm}$ ($\varnothing > 125 \text{ mm}$)

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
90	3,7 – 6,0	CFS-W SG	90/3"	EI 120-U/C
110	3,7 – 6,0	CFS-W SG	110/4"	EI 120-U/C
125	3,7 – 6,0	CFS-W SG	125/5"	EI 120-U/C
$> 75 \leq 125$	3,7 – 6,0	CFS-W EL	2	EI 120-U/C
160	3,2 – 4,0	CFS-W SG	160/6"	EI 120-U/C
$> 125 \leq 160$	3,2 – 4,0	CFS-W EL	3	EI 120-U/C

The results are also valid for PVC-C pipes according to EN 1566-1³ and PVC-U pipes according EN 1329-1⁴ and EN 1453-1⁴.

C.3.1.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Distance between wrap and seal edge in floor (width of annular gap): $\leq 9,5 \text{ mm}$

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
90	7,1	CFS-W SG	90/3"	EI 120-U/C
110	7,1	CFS-W SG	110/4"	EI 120-U/C
125	7,1	CFS-W SG	125/5"	EI 120-U/C
$> 75 \leq 125$	7,1	CFS-W EL	2	EI 120-U/C

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C.3.1.3 PE pipes according to EN 1519-1⁵				
Distance between wrap and penetration seal edge in floor (width of annular gap): ≤ 3,5 mm				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Type of CFS-W (A ₁)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
50	3,0	CFS-W SG	50/1.5"	EI 120-U/C
63	3,0	CFS-W SG	63/2"	EI 120-U/C
75	3,0	CFS-W SG	75/2.5"	EI 120-U/C
≤ 75	3,0	CFS-W EL	1	EI 120-U/C
90	4,8	CFS-W SG	90/3"	EI 120-U/C
110	4,8	CFS-W SG	110/4"	EI 120-U/C
125	4,8	CFS-W SG	125/5"	EI 120-U/C
> 75 ≤ 125	4,8	CFS-W EL	2	EI 120-U/C
160	6,2	CFS-W SG	160/6"	EI 120-U/C
> 125 ≤ 160	6,2	CFS-W EL	3	EI 120-U/C

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

C.3.2 Rigid floor type A according to clause 2.1 of the ETA (density ≥ 2400 kg/m³), minimum floor thickness 200 mm

Penetrating services

C.3.2.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062				
Distance between wrap and seal edge in floor (width of annular gap): ≤ 7,5 mm				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Type of CFS-W (A ₁)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 240-U/C
50	2,2 – 3,6	CFS-W SG	50/1.5"	EI 180-U/C
63	2,2 – 3,6	CFS-W SG	63/2"	EI 180-U/C
75	2,2 – 3,6	CFS-W SG	75/2.5"	EI 180-U/C
≤ 75	2,2 – 3,6	CFS-W EL	1	EI 180-U/C
90	3,2	CFS-W SG	90/3"	EI 240-U/C
90	3,2 – 6,0	CFS-W SG	90/3"	EI 180-U/C
110	3,2	CFS-W SG	110/4"	EI 240-U/C
110	3,2 – 6,0	CFS-W SG	110/4"	EI 180-U/C
> 75 ≤ 110	3,2	CFS-W EL	2	EI 240-U/C
125	3,7 – 6,0	CFS-W SG	125/5"	EI 180-U/C
> 75 ≤ 125	3,7 – 6,0	CFS-W EL	2	EI 180-U/C
160	2,5 – 3,2	CFS-W SG	160/6"	EI 60-U/C
> 125 ≤ 160	2,5 – 3,2	CFS-W EL	3	EI 60-U/C
160	3,2 – 11,8	CFS-W SG	160/6"	EI 120-U/C
> 125 ≤ 160	3,2 – 11,8	CFS-W EL	3	EI 120-U/C

160	11,8	CFS-W SG	160/6"	EI 180-U/C
> 125 ≤ 160	11,8	CFS-W EL	3	EI 180-U/C
160	11,8 – 13,0	CFS-W SG	160/6"	EI 120-U/C
> 125 ≤ 160	11,8 – 13,0	CFS-W EL	3	EI 120-U/C

The results are also valid for PVC-C pipes according to EN 1566-1³ and PVC-U pipes according to EN 1329-1⁴ and EN 1453-1⁴.

C.3.2.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Distance between wrap and seal edge in floor (width of annular gap): ≤ 7,5 mm

Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Type of CFS-W (A ₁)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 240-U/C
50	1,9 – 6,8	CFS-W SG	50/1.5"	EI 180-U/C
63	1,9 – 6,8	CFS-W SG	63/2"	EI 180-U/C
75	1,9 – 6,8	CFS-W SG	75/2.5"	EI 180-U/C
≤ 75	1,9 – 6,8	CFS-W EL	1	EI 180-U/C
90	2,7	CFS-W SG	90/3"	EI 240-U/C
90	2,7 – 7,1	CFS-W SG	90/3"	EI 180-U/C
110	2,7	CFS-W SG	110/4"	EI 240-U/C
> 75 ≤ 110	2,7	CFS-W EL	2	EI 240-U/C
110	2,7 – 7,1	CFS-W SG	110/4"	EI 180-U/C
125	3,2 – 7,1	CFS-W SG	125/5"	EI 180-U/C
> 75 ≤ 125	3,2 – 7,1	CFS-W EL	2	EI 180-U/C
125	7,1	CFS-W SG	125/5"	EI 180-U/C
125	7,1	CFS-W EL	2	EI 180-U/C
160	4,0 – 14,6	CFS-W SG	160/6"	EI 180-U/C
> 125 ≤ 160	4,0 – 14,6	CFS-W EL	3	EI 180-U/C
160	14,6	CFS-W SG	160/6"	EI 240-U/C
> 125 ≤ 160	14,6	CFS-W EL	3	EI 240-U/C

C.3.3 Rigid floor type B according to clause 2.1 of the ETA (density ≥ 550 kg/m³), minimum floor thickness 150 mm

Penetrating services

C.3.3.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062

Distance between wrap and seal edge in floor (width of annular gap): ≤ 9,5 mm

Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Type of CFS-W (A ₁)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
90	3,7 – 6,0	CFS-W SG	90/3"	EI 120-U/C
110	3,7 – 6,0	CFS-W SG	110/4"	EI 120-U/C
125	3,7 – 6,0	CFS-W SG	125/5"	EI 120-U/C
>75 ≤ 125	3,7 – 6,0	CFS-W EL	2	EI 120-U/C

160	4,0	CFS-W SG	160/6"	EI 120-U/C
>125 ≤ 160	4,0	CFS-W EL	3	EI 120-U/C

The results are also valid for PVC-C pipes according to EN 1566-1³ and PVC-U pipes according to EN 1329-1⁴ and EN 1453-1⁴.

C.3.3.2 PE pipes according to EN ISO 15494 and DIN 8074/8075

Distance between wrap and penetration seal edge in floor (width of annular gap): ≤ 9,5 mm

Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Type of CFS-W (A ₁)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
90	7,1	CFS-W SG	90/3"	EI 120-U/C
110	7,1	CFS-W SG	110/4"	EI 120-U/C
125	7,1	CFS-W SG	125/5"	EI 120-U/C
> 75 ≤ 125	7,1	CFS-W EL	2	EI 120-U/C