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Authorised and notified according to Article 10 of the Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products

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European technical approval ETA-10/0405

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

Handelsbezeichnung: *Trade name:*	**Hilti Firestop Wrap CFS-W**
Zulassungsinhaber: *Holder of approval:*	**Hilti AG** **Feldkircherstrasse 100** **9494 Schaan** **Liechtenstein**
Zulassungsgegenstand und Verwendungszweck: *Generic type and use of construction product:*	**Abschottungen** **Penetration seals**
Geltungsdauer vom: *Validity from:* bis: *to:*	**22.02.2011** **21.02.2016**
Herstellwerk: *Manufacturing plant:*	**Hilti Werk 5a**
Diese Europäische technische Zulassung umfasst: *This European technical approval contains:*	**23** Seiten inklusive **3** Anhängen ***23** pages including **3** Annexes*

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I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Österreichisches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1] modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- Bauproduktegesetz. LGBl. V Nr. 33/1994;
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[4];
- Guideline for European technical approval of Fire Stopping and Fire Sealing Products: Part 2: Penetration Seals.

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 English. This version corresponds fully to the version circulated in EOTA. Translations into other languages have to be designated as such.

1 Official Journal of the European Communities N° L 40, 11.2.1989, p. 12
2 Official Journal of the European Communities N° L 220, 30.8.1993, p. 1
3 Official Journal of the European Union N° L 284, 31.10.2003, p.1
4 Official Journal of the European Communities N° L 17, 20.1.1994, p. 34

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II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product(s) and intended use

1.1 Definition of the construction product

Hilti Firestop Wrap CFS-W is a pipe closure device installed around plastic pipes to form a penetration seal to reinstate the fire resistance performance of wall and floor constructions, where they have been provided with apertures for the penetration of services.

Type of penetration seal system: Pipe closure device - wrap (see ETAG 026-2, clause 1.1, table 1-1). Hilti Firestop Wrap CFS-W consists of an intumescent strip.

Hilti Firestop Wrap CFS-W is available as single wrap (CFS-W SG) or as endless wrap (CFS-W EL).

The single wrap CFS-W SG is delivered in 3 thicknesses and pre-cut to fit particular pipe diameters – see table below. The Firestop Wrap CFS-W SG is generally used in one layer.

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

The endless wrap CFS-W EL is delivered in only 1 thickness (4.5 mm) in rolls of 10 metres and is cut to size for any particular pipe diameter. Depending on the pipe diameter several layers may be necessary – for details see Annex C.

The Hilti Firestop Wrap CFS-W is installed inside the annular gap between pipe and aperture edge so that the outer edge of the wrap is flush with the wall/floor surface. In walls the wrap is installed on both sides, in floors only one wrap on the underside of the floor.

For the purpose of smoke and draft stop, air or water tightness and airborne sound insulation, the gap between opening edge and pipe or collar has to be sealed off by cementitious mortar or a construction sealant, the latter optionally in combination with mineral wool as backfilling material, considering the detailed prescriptions given in Annexes B and C.

In case sound decoupling between the pipe and the wall/floor is required, but sound decoupling means around the pipe are missing it is recommended to use Hilti Firestop Acrylic Sealant CFS-ACR as annular gap seal. If gypsum plaster or cementitious mortar is intended to be used it is recommended to install a PE foam strip around the pipe over the entire wall or floor thickness for sound decoupling of the pipe. For further details see Annex B.

For a description of the installation procedure see 4.2.

1.2 Intended Use and Use Category

1.2.1 Intended Use

The intended use of Hilti Firestop Wrap CFS-W is to reinstate the fire resistance performance of flexible wall constructions, rigid wall constructions and rigid floor constructions where they are penetrated by plastic pipes.

(1) The specific elements of construction that Hilti Firestop Wrap CFS-W may be used to provide a penetration seal in, are as follows:

Flexible walls: The wall must have a minimum thickness of 100 mm and comprise timber or steel studs lined on both faces with minimum 2 layers of 12,5 mm thick boards. 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 minimum 100 mm insulation of Class A1 or A2 (in accordance with EN 13501-1) in the cavity between stud and seal.

Rigid walls: The wall must have a minimum thickness as given in Annex C and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m^3 (wall type A) or comprise concrete or masonry, with a minimum density of 1100 kg/m^3 (wall type B).

Rigid floors: The floor must have a minimum thickness as given in Annex C and comprise concrete with a minimum density of 2400 kg/m^3 (floor type A) or 550 kg/m^3 (floor type B), respectively.

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

This ETA does not cover use of this product as a penetration seal in sandwich panel constructions.

(2) Hilti Firestop Wrap CFS-W 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.

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

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

(4) Pipes shall be supported at maximum 300 mm away from both faces of flexible wall constructions and rigid wall constructions of Type A, maximum 230 mm away from both faces of rigid wall constructions of Type B and maximum 200 mm from the upper face of floor constructions.

The provisions made in this European technical approval are based on an assumed working life of the Hilti Firestop Wrap CFS-W 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 regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

1.2.2 Use Category

The use category of Hilti Firestop Wrap CFS-W is Type $Y_{2, (-20/+70)°C}$.

Type Y_2: Products intended for use at temperatures between -5 °C and + 70°C, but with no exposure to rain nor UV.

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Since the requirements for type Y_2 are met, also the requirements for type Z_1 and Z_2 are fulfilled.

Type Z_1: Products intended for use at internal conditions with high humidity, excluding temperatures below 0°C.[5]

Type Z_2: Products intended for uses at internal conditions with humidity classes other than Z_1, excluding temperatures below 0°C.

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 – edition January 2008 (called ETAG 026-2 in this ETA).

ETAG clause No.	ETA clause No.	Characteristic	Assessment of characteristic
		Mechanical resistance and stability	Not relevant
		Safety in case of fire	
2.4.1	2.1	Reaction to fire	Class E according to EN 13501-1:2007
2.4.2	2.2	Resistance to fire	See clause 2.2
		Hygiene, Health and the Environment	
2.4.3	2.3	Air permeability	No performance determined
2.4.4	2.4	Water permeability	No performance determined
2.4.5	2.5	Dangerous substances	No performance determined
		Safety in use	
2.4.6	2.6	Mechanical resistance and stability	No performance determined
2.4.7	2.7	Resistance to impact/movement	No performance determined
2.4.8	2.8	Adhesion	No performance determined
		Protection against noise	
2.4.9	2.9	Airborne sound insulation	No performance determined
		Energy, Economy and Heat Retention	
2.4.10	2.10	Thermal properties	No performance determined
2.4.11	2.11	Water vapour permeability	No performance determined
		General aspects relating to fitness for use	
2.4.12	2.12	Durability and serviceability	$Y_{2,\ (-20/+70)°C}$

[5] These uses apply for internal humidity class 5 in accordance with EN ISO 13788

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2.1 Reaction to fire

Hilti Firestop Wrap CFS-W is classified 'E' in accordance with EN 13501-1.

2.2 Resistance to fire

Hilti Firestop Wrap CFS-W has been tested in accordance with EN 1366-3:2004 and EN 1366-3:2009, installed within apertures in flexible walls (drywalls), rigid walls (aerated concrete blocks) and high density and low density concrete floors.

For details of classification and plastic pipes covered see Annex C.

The seals may only be penetrated by the services listed in Annex C. Other parts or support constructions must not penetrate the seal.

For details of suitable wall and floor constructions see 1.2.1 and Annex C.

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

General: The following conditions apply to seals within any of the above constructions:

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, pressurised 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 U/C (capped outside the furnace/uncapped inside). For further information refer to national regulations.

2.3 Air permeability

No performance determined.

2.4 Water permeability

No performance 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.

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.

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2.6 Mechanical resistance and stability

No performance determined.

2.7 Resistance to impact/movement

No performance determined.

2.8 Adhesion

The stiffness of the wrap and/or an annular gap sealing with Hilti Firestop Acrylic Sealant CFS-S ACR or a mortar prevent the wrap from slipping out of the aperture.

2.9 Airborne sound insulation

No performance determined.

2.10 Thermal properties

No performance determined.

2.11 Water vapour permeability

No performance determined.

2.12 Durability

Hilti Firestop Wrap CFS-W has been tested in accordance with ETAG 026-2 for the Y_2 use category specified in ETAG 026-2 and the results of the tests have demonstrated suitability for penetration seals intended for use at temperatures between -20°C and +70°C but with no exposure to rain nor UV ($Y_{2,\ (-20/+70)°C}$).

3 Evaluation of Conformity and CE marking

3.1 Attestation of Conformity system

According to the decision 1999/454/EC of the European Commission[6] 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.

[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

3.2.1.1 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 insure that the product is in conformity with this European technical approval.

The manufacturer shall draw up and keep up-to-date documents defining the factory production control that applies. The documentation to be carried out by the manufacturer and the applicable procedures shall be appropriate to the product and manufacturing process. The factory production control shall ensure the conformity of the product to an appropriate level. This involves:

a) the preparation of documented procedures and instructions relating to factory production control operations.
b) the effective implementation of these procedures and instructions.
c) the recording of these procedures and their results.
d) the use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the factory production control to rectify the cause of non-conformity.
e) a procedure to ensure that both the approval Body and the Notified (Certification) Bodies are advised before any significant change to the product, its components or manufacturing process, is made.
f) a procedure to ensure that personnel involved in the production processes and the quality control procedures are qualified and adequately trained to carry out their required tasks.
g) that all testing and measuring equipment is maintained and up to date calibration records are documented.
h) maintenance of records to ensure every batch produced is clearly labelled with the batch number, which allows traceability to its production to be identified.

The manufacturer may only use components stated in the technical documentation of this European technical approval.

For the components which the ETA-holder does not manufacture by himself, he shall make sure that factory production control carried out by the other manufacturers gives the guaranty of the components compliance with the European technical approval.

The factory production control of the ETA holder and the provisions taken by the ETA-holder for components not produced by himself shall be in accordance with the control plan[7] 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.

[7] The control plan is a confidential part of the European Technical Approval and only handed over to the Notified Body or Bodies involved in the procedure of conformity.

Additional information

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

technical data sheet:

- Field of application:
  - Building elements for which the penetration seal is suitable, type and properties of the building elements like minimum thickness, density, and - in case of lightweight constructions – the construction requirements.
  - Services for which the penetration seal is suitable, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings
  - Limits in size, minimum dimensions etc. of the penetration seal
- Construction of the penetration seal including the necessary components and additional products (e.g. backfilling material) with clear indication whether they are generic or specific.

Installation instruction:

- Steps to be followed
- Procedure in case of retrofitting.

3.2.1.2 Other tasks of manufacturer

The manufacturer shall, on the basis of a contract, involve a body (bodies) which is (are) approved for the tasks referred to in section 3.1 in the field of penetration seals in order 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 approved 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 Notified Bodies

The Notified Body (Bodies) shall perform the

- initial type-testing of the product (for system1),
  The results of the tests performed as part of the assessment for the European technical approval may be used unless there are changes in the production line or plant. In such cases, the necessary initial type testing has to be agreed between the Österreichisches Institut für Bautechnik and the Notified Bodies involved.
- initial inspection of factory and of factory production control,
  The Notified Body (Bodies) shall ascertain that, in accordance with the control plan, the factory (in particular the employees and the equipment) and the factory production control are suitable to ensure continuous and orderly manufacturing of the components according to the specifications mentioned in clause 2 of this ETA.
- continuous surveillance, assessment and approval of factory production control,
  The Notified Body (Bodies) shall visit the factory at least once a year for surveillance of this manufacturer having a FPC system complying with a quality management system covering the manufacturing of the approval product components. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking into account the control plan.

These tasks shall be performed in accordance with the provisions laid down in the control plan of this European technical approval.

The Notified Body (Bodies) 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 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 or identifying mark and address of the ETA holder,
- 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 ETAG (ETAG N° 026 part 2)
- the designation of the product (trade name)
- the use category in accordance with the ETA section 1 and 2
- “see ETA-10/0406 for other relevant characteristics (e.g. resistance to fire)”

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

4.1 Manufacturing

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.

4.2 Installation

The ETA is issued under the assumption that the installation of the approval product will be done in accordance with the manufacturer’s technical literature.

1. Clean the plastic pipe in the area where the Hilti Firestop Wrap CFS-W is to be installed.
2. Installation of the wrap
   - Hilti Firestop Wrap CFS-W SG:

     Use the Hilti Firestop Wrap CFS-W SG corresponding to the diameter of the pipe. Wrap the Hilti Firestop Wrap CFS-W SG around the pipe and fasten its end to each other tightly using the integrated adhesive strip. Push the Hilti Firestop Wrap CFS-W into the annular gap until its outer edge is flush with the surface of the wall or floor.

- Hilti Firestop Wrap CFS-W EL:

  Cut the Hilti Firestop Wrap CFS-W EL to length according to the outer diameter of the pipe, taking the required number of layers into consideration. If sound decoupling means are installed around the pipe this has to be considered when cutting the wrap to length. Wrap the Hilti Firestop Wrap CFS-W EL around the pipe and secure it with a short strip of adhesive tape. Push the Hilti Firestop Wrap CFS-W into the annular gap until its outer edge is flush with the surface of the wall or floor.

Do not install Hilti Firestop Wrap CFS-W in the centre of the wall/floor or using single layers of CFS-W EL one behind the other.

3. Seal the remaining gap with Hilti Firestop Acrylic Sealant CFS-S ACR or a cementitious mortar. Use minimum 25 mm Hilti Firestop Acrylic Sealant CFS-S ACR in case of flexible wall constructions, minimum 15 mm in rigid wall constructions and minimum 10 mm, backfilled with mineral wool, in case of rigid floor constructions. In case of use of mortar the gap is to be filled completely over the entire thickness of the wall or floor.

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: -5° up to max. +50°C

5.2 Use, maintenance, repair

The Hilti Firestop Wrap CFS-W should be installed and used as described earlier in this document.

The assessment of the fitness for use is based on the assumption that damage, for example caused by accidental impact, is repaired. The relevant manufacturer instructions shall be followed.

On behalf of Österreichisches Institut für Bautechnik

Rainer Mikulits
Managing Director

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ANNEX A

REFERENCE DOCUMENTS and LIST OF ABBREVIATIONS

A.1 References to standards mentioned in the ETA:

EN 1366-3	Fire resistance tests for service installations - Part 3: Penetration seals
EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests
EN 13501-2	Fire classification of construction products and building elements – Part 2: Classification using test data from fire resistance tests

A.2 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

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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 approval ETA-10/0405 - Hilti Firestop Wrap CFS-W” which is a non-public part of this ETA

Technical product literature:

- Technical data sheet and instructions for use Hilti Firestop Wrap CFS-W (including additional components as below)

B.2 Hilti Firestop Acrylic Sealant CFS-S ACR

A detailed specification of the product 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 this ETA.

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.

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-Stopfwolle	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 decupling means based on PE (foam) may be used with a maximum thickness of 5 mm.

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ANNEX C

RESISTANCE TO FIRE CLASSIFICATION OF PENETRATIN SEALS MADE FROM HILTI FIRESTOP WRAP CFS-W

C.1 Flexible walls and rigid walls type A according to 1.2.1, minimum wall thickness 100 mm

Penetration seal:

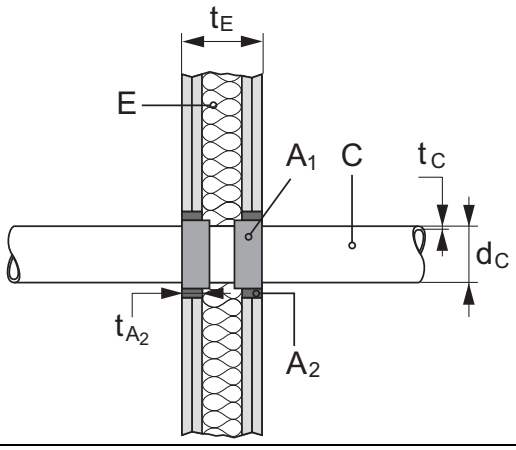
Single penetration;

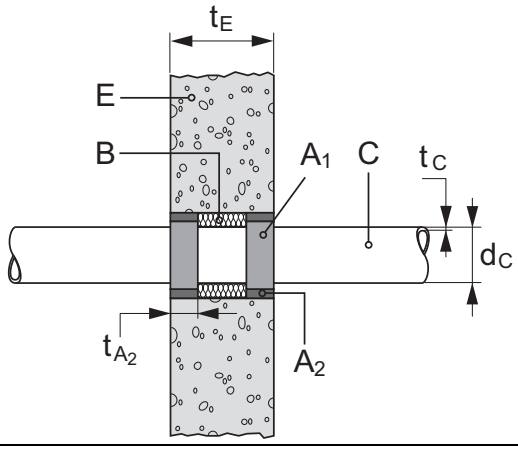
Hilti Firestop Wrap CFS-W on both sides (A_1), outer edge of the wrap flush with the surface of the wall.

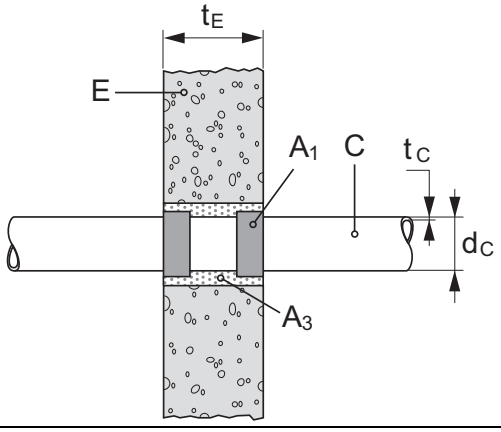
Annular gap filled with:
Flexible walls:
Hilti Firestop Acrylic Sealant CFS-S ACR (A_2) on both sides with a depth (t_{A2}) of minimum 25 mm from the surface of the wall supported by mineral wool of minimum 100 kg/m^3 density in the gap between the wall lining around the opening with a depth of minimum 100 mm;
Rigid walls:
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).
The maximum annular gap width is given in the tables below;

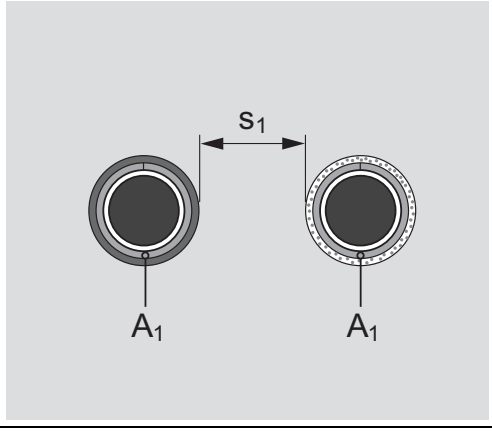
Minimum distance between collars / annular gap (s_1): 200 mm.

Construction details:









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Penetrating services				
C.1.1 PVC-U pipes according to EN ISO 15493, EN ISO 1452 and DIN 8061/8062 Distance between wrap and seal edge in wall (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
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 ≤ 125	3,7 – 6,0	CFS-W EL	2	EI 90-U/C
90	3,7	CFS- W SG	90/3”	EI 120-U/C
110	3,7	CFS- W SG	110/4”	EI 120-U/C
125	3,7	CFS- W SG	125/5”	EI 120-U/C
>75 ≤ 125	3,7	CFS-W EL	2	EI 120-U/C
160	2,5 – 11,8	CFS- W SG	160/6”	EI 60-U/C
> 125 ≤ 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 1566-1[8] and PVC-U pipes according EN 1329-1[9] and EN 1453-1[9].				

[8] 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 B.5

[9] In Germany the pipes have additionally to comply with DIN 19531-10

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C.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): ≤ 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 ≤ 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 ≤ 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

C.1.3 PE pipes according to EN 1519-1[10]

Distance between wrap and 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	4,8	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

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

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

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C.2 Rigid walls according to 1.2.1

Penetration seal:

Single penetration;

Hilti Firestop Wrap CFS-W on both sides (A_1)

Annular gap filled either with cementitious mortar (A_3) over the entire thickness of the wall or with Hilti Firestop Acrylic Sealant CFS-S ACR (A_2) 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). The maximum annular gap width is given in the tables below;

Minimum distance between collars / annular gap (s_1): 200 mm;

For further construction details see C.1.

C.2.1 Rigid walls type A according to 1.2.1 (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 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[8] and PVC-U pipes according EN 1329-1[9] and EN 1453-1[9].

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): ≤ 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 ≤ 160	4,0 – 9,1	CFS-W EL	3	EI 180-U/C

C.2.1.3 PE pipes according to EN 1519-1[10]

Distance between wrap and 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	6,2	CFS- W SG	160/6”	EI 180-U/C
> 125 ≤ 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.

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C.2.2 Rigid walls type B according to 1.2.1 (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 seal edge in wall (width of annular gap): ≤ 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 ≤ 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 ≤ 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 1566-1[8] and PVC-U pipes according EN 1329-1[9] and EN 1453-1[9].

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

Distance between wrap and seal edge in wall (width of annular gap): ≤ 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 ≤ 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 ≤ 160	4,0 – 14,6	CFS-W EL	3	EI 240-U/C

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C.3 Rigid floor according to 1.2.1

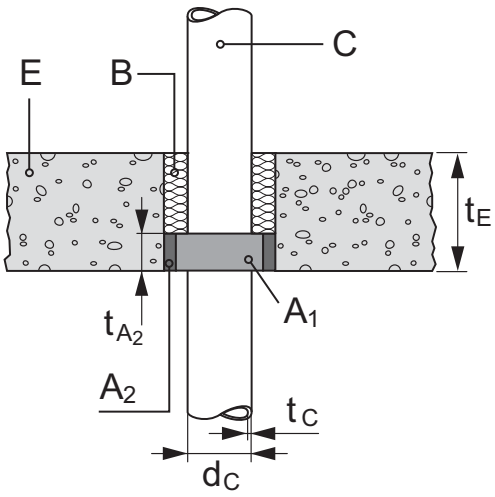
Penetration seal:

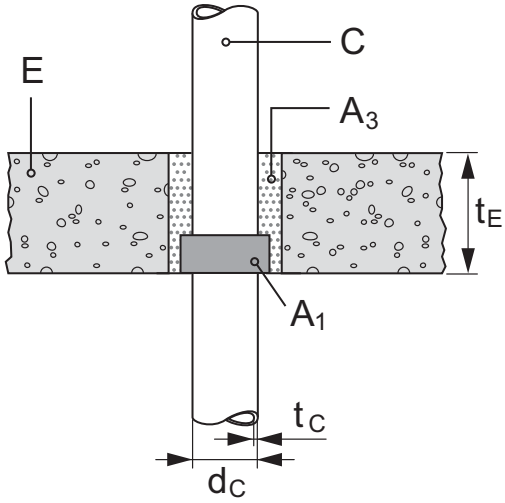
Single penetration;

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 collars / annular gap (s_1): 200 mm (see Figure in C.1).

Construction details:





C.3.1 Rigid floor type A according to 1.2.1 (density ≥ 2400 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 seal edge in floor (width of annular gap): ≤ 9,5 mm (Ø 90 – 125 mm)

Distance between wrap and seal edge in floor (width of annular gap): ≤ 1,5 mm (Ø > 125 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	3,2 – 4,0	CFS- W SG	160/6”	EI 120-U/C
>125 ≤ 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 1566-1[8] and PVC-U pipes according EN 1329-1[9] and EN 1453-1[9].

Member of EOTA

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): ≤ 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

C.3.1.3 PE pipes according to EN 1519-1[10]

Distance between wrap and 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.

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C.3.2 Rigid floor type A according to 1.2.1 (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 1566-1[8] and PVC-U pipes according EN 1329-1[9] and EN 1453-1[9].

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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

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C.3.3 Rigid floor type B according to 1.2.1 (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 1566-1[8] and PVC-U pipes according EN 1329-1[9] and EN 1453-1[9].

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

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	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

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