

UL-AU CERTIFICATE

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Certificate Holder Hilti (Aust.) Pty. Ltd
1G Homebush Bay Drive
PO Box 3217
Rhodes NSW 2138, Australia

Manufacturer Hilti AG,
Feldkircherstrasse 100
FL-9494 Schaan
Liechtenstein
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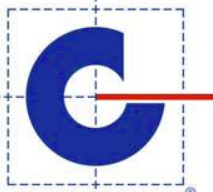
Production Sites (Factory) Hilti Plant 5a
Hilti Plant 5b

Certified Product Description Firestopping Collar
Model(s) Hilti Firestop Collar CFS-C P
Trade Name or Trademark Hilti Firestop Collar CFS-C P
Rating Information Refer to Appendix A
Standard tested to AS 1530.4:2014 and AS 4072.1:2005
Test Report References See page 53 to 55
Listing Category and File Ref AUEC.RS5417
Additional Information and Conditions See page 2
Expiry date 2033-11-01



Stuart Foster
Certification Officer

JAS-ANZ



www.jas-anz.org/register

Certification Body

This is to certify that representative samples of the Product described herein ("Certified Product") have been investigated and found in compliance with the Standard(s) indicated on this Certificate, in accordance with the UL-AU Mark Scheme requirements and JAS-ANZ accreditation requirements. The designated Certificate Holder is entitled to use the UL-AU Mark for the Certified Product manufactured at the production site(s) identified above, in accordance with the UL-AU Mark Scheme Service Agreement. Only those Products bearing the UL-AU Mark for Australia should be considered as being covered by UL's UL-AU Mark Service. This certificate shall remain valid through to the expiration date, unless terminated earlier in accordance with the Service Agreement including without limitation if the Standard identified on this Certificate is amended or withdrawn prior to the expiration date.

This Certificate remains the property of UL International New Zealand Ltd.

If the client provides copies of the certification documents to others, the documents shall be reproduced in their entirety.

All dates are in Year-Month-Day format (YYYY-MM-DD).

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Additional Information:

This certificate is evidence that prototypes of the nominated products and their configurations as detailed in Appendix A conform to the following parameters:

1. Have been tested to AS 1530.4:2014 and AS 4072.1:2005 or an equivalent or more severe test and the Fire Resistance Level (FRL) nominated in Appendix A was achieved by the prototype for each nominated assembly of service penetration, building element and protection method configuration, without the assistance of an active fire suppression system.
2. Test results are detailed in a confidential test report that may be available from the certificate holder upon request. The information regarding the test parameters is included in the confidential technical file.
 - (i) the method and conditions of the test;
 - (ii) form of construction of the tested prototype; and
 - (iii) that restraint complied with AS 1530.4.
3. Testing was conducted at multiple locations by suitably accredited laboratories that are accredited by a signatory to the International Accreditation Cooperation Mutual Recognition Arrangement (ILAC-MRA) as recognised by NATA who is also a signatory body to this Agreement. The data has been reviewed by UL against the relevant to accreditation schedules.

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The UL Enhanced Mark shall appear on certified products only and shall be used only in accordance with the UL-AU Mark Scheme Service Terms Minimum size is not specified, as long as the Mark is legible. The following are **examples** of the format.



The file number that replaces E123456 and NC12345 in the above examples is; **RS5417**

The following Supplementary Information shall be placed adjacent to the Certification Mark;
**Firestopping - Fire Collars and Cassettes
AS 1530.4**

The UL Enhanced Mark may appear on a label, nameplate, or may be cast, stamped or molded into the product. When appearing on a label or nameplate, the Manufacturer's name or trademark along with a model number are also required on that same label or nameplate. If cast, stamped or molded, the Manufacturer's name or trademark and model number shall also appear elsewhere on the product.

All content shall be in accordance with the details provided on this Certificate.

PROCUREMENT

The Production site may reproduce the Mark or obtain it from a UL authorized supplier. The list of UL authorized suppliers can be found on UL's online directory at www.ul.com.

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Appendix A

Conforming product configurations to achieve nominated FRL's

A.1 Specific Parts for Hilti Firestop CFS-CID:

Technical description of product:

This certificate refers to the Hilti Firestop Collar for use in Penetration Seals with the designation Hilti Firestop Collar CFS-C P.

Hilti Firestop Collar CFS-C P 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 - collar. Hilti Firestop Collar CFS-C P consists of a steel housing, an intumescent inlay and fastening hooks.

Hilti Firestop Collar CFS-C P is supplied in several sizes – see table below. The collar is installed underneath floors or on both sides of a wall and fixed by hooks and metal anchors.

Collar size	For pipes with nominal outside diameters (mm)	Recommended opening size (mm)	Required number of fastening hooks
CFS-C P 50/1.5"	50	62	2
CFS-C P 63/2"	63	77	2
CFS-C P 75/2.5"	75	82	3
CFS-C P 90/3"	90	112	3
CFS-C P 110/4"	110	122	4
CFS-C P 125/5"	125	142	4
CFS-C P 160/6"	160	182	6
CFS-C P 180/7"	180	210	8
CFS-C P 200/8"	200	230	8
CFS-C P 225/9"	227	260	10
CFS-C P 250/10"	250	280	12

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Intended use:

The Hilti Firestop Collar CFS-C P is intended to form a part of a penetration seal, which is used to maintain the fire resistance of a separating element (flexible wall, rigid wall or rigid floor) when and where services pass through.

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

Hilti Firestop Collar CFS-C P may be used to provide a penetration seal with plastic and composite pipes as single penetrations. For details on diameters, wall thicknesses, pipe materials and pipe standards see Annex 2.

Pipes shall be perpendicular to the seal surface. The pipe penetration seal is intended for plastic pipes in piping systems for non-combustible liquids and fluids, for pneumatic dispatch systems and for pipes in centralised vacuum-cleaning systems.

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

A.1.1 DESCRIPTION OF THE PRODUCT AND ANCILLARY PRODUCT(S)

Hilti Firestop Collar CFS-C P

The housing of the collar consists of electrolytic galvanized steel, the inlay consists of one or more intumescent strips.

Technical product literature:

Technical Data Sheet Hilti Firestop Collar CFS-C P (including the use of ancillary products according to Annex 1.2).

A.1.2 Ancillary products

Gypsum plaster

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

Cementitious mortar

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

Mineral wool

Loose mineral wool products suitable for being used as backfilling material of Hilti Firestop Acrylic Sealant CP 606 / CFS-S ACR

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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

Suitable insulation product

Combustible insulation (closed cell flexible elastomeric foam, e.g. AF/Armaflex)
 Combustible insulation for sound decoupling (elastomeric foam, e.g. PE)

A.1.1.1 Abbreviations used in drawings

Abbreviation	Description
A ₁	Hilti Firestop Collar CFS-C P
A ₂	Annular gap seal with Hilti Firestop Acrylic Sealant CFS-S ACR
A ₃	Annular gap seal with gypsum plaster or cementitious mortar
B	Backfilling material (mineral wool)
C	Plastic Pipe
C ₁	Sound decoupling
D	Pipe insulation
dc	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 _D	Insulation thickness
t _E	Thickness of the building element
L _D	Length of Insulation

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A.2 RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF HILTI FIRESTOP COLLAR CFS-C P

A.2.1 Flexible and rigid walls, minimum wall thickness 100 mm

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 13 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 in the cavity between stud and seal.

Rigid walls:

The wall must have a minimum thickness of 100 mm and minimum density of 450 kg/m³ and comprise concrete, aerated concrete or solid and hollow masonry.

Proprietary walls:

Proprietary wall system includes Hebel, minimum 75 mm in wall thickness

Proprietary wall system includes Dincel, minimum 155 mm in wall thickness

Proprietary wall system includes Speed panel wall, minimum 78 mm in wall thickness

- Service configurations specified in section 2.4 using the same installation configuration through 78mm Speedpanel can achieve the specified FRL given that:
 - 78mm Speedpanel has at least one layer of 13 mm or 16 mm fire rated plasterboard build up each side
 - The edge of plasterboard build up is minimum 100 mm to the service core hole in all directions
 - All grooves between the Speedpanel and fire rated plasterboard is filled with Hilti Firestop Acrylic Sealant CP606

Penetration seal:

Single penetration;

Hilti Firestop Collar CFS-C P (A₁) on both sides.

Annular gap filled with:

Flexible walls:

Gypsum plaster (A₃) over the entire thickness of the wall or

Hilti Firestop Acrylic Sealant CFS-S ACR (A₂) on both sides with a depth of minimum 25 mm from the surface of the wall.

Rigid walls:

Gypsum plaster (A₃) or cementitious mortar over the entire thickness of the wall or

Hilti Firestop Acrylic Sealant CFS-S ACR (A₂) on both sides with a depth of minimum 15 mm from the surface of the wall. The sealant may be backfilled with mineral wool.

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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.

Distance between penetrations:

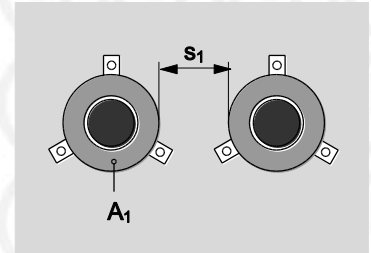
Minimum distance between collars / annular gap (s_1):

Non-insulated pipes: 0 mm

Insulated pipes: 0 mm

Collars to be fixed with hooks (F).

Pipes shall be supported at maximum 300 mm away from both faces of wall constructions.



Hilti Anchor Types for Hilti Retrofit Firestop Collar CFS-C P/CP 644 sizes smaller or equal to 90/3"

Anchoring Solution		Minimum Size	Flexible Walls (Plasterboard lined)	Solid Concrete Walls/Floors*	
Screw anchors	HUS	M6		X	
	HSA			X	
Expansion anchors	HST			X	
	DBZ 6/45			X	
Internally threaded anchor	HKD			X	
Hollow core	HTB-S			X	
	HHD-S			X	
Other	Threaded steel rods with nuts and washers			X	X
	Laminated/ Drywall/ Plasterboard screws, at least 38mm in length, with steel washers of at least 19mm in diameter	10g	X		

*Minimum embedded depth 40 mm for fixing into solid wall/floor

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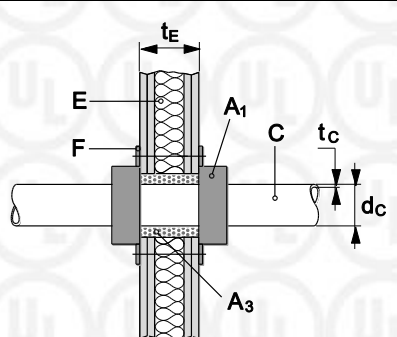
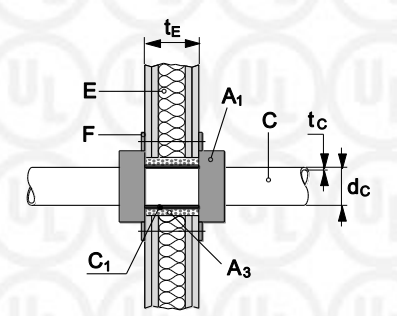
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Anchoring Solution		Minimum Size	Flexible Walls (Plasterboard lined)	Solid Concrete Walls/Floors
Screw anchors	HUS	M8		x
	HSA			x
Expansion anchors	HST			x
	DBZ 6/45			x
Internally threaded anchor	HKD			x
Hollow core	HTB-S			x
	HHD-S			x
Other	Threaded rods with nuts and washers			x

Sound decoupling: Sound decoupling strips (C_1) based on combustible insulation (elastomeric foam, e.g. PE), used in combination with gypsum plaster or mortar as gap filler. Sound decoupling installed around the pipe within the wall. For maximum thickness see tables below.

Pipe insulation: Combustible insulation (closed cell flexible elastomeric foam, e.g. AF/Armaflex), installed in wall application. For maximum thickness see tables below.

Annular gap seal (drawings show non-insulated pipes as example)	
Gypsum plaster (A_3)	
Gypsum plaster (A_3) together with sound decoupling (C_1)	

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<p>Hilti Firestop Acrylic Sealant CFS-S ACR (A₂)</p>	
<p>Gypsum plaster or cementitious mortar (A₃)</p>	
<p>Gypsum plaster or cementitious mortar (A₃) together with sound decoupling (C₁)</p>	
<p>Hilti Firestop Acrylic Sealant CFS-S ACR (A₂)</p>	

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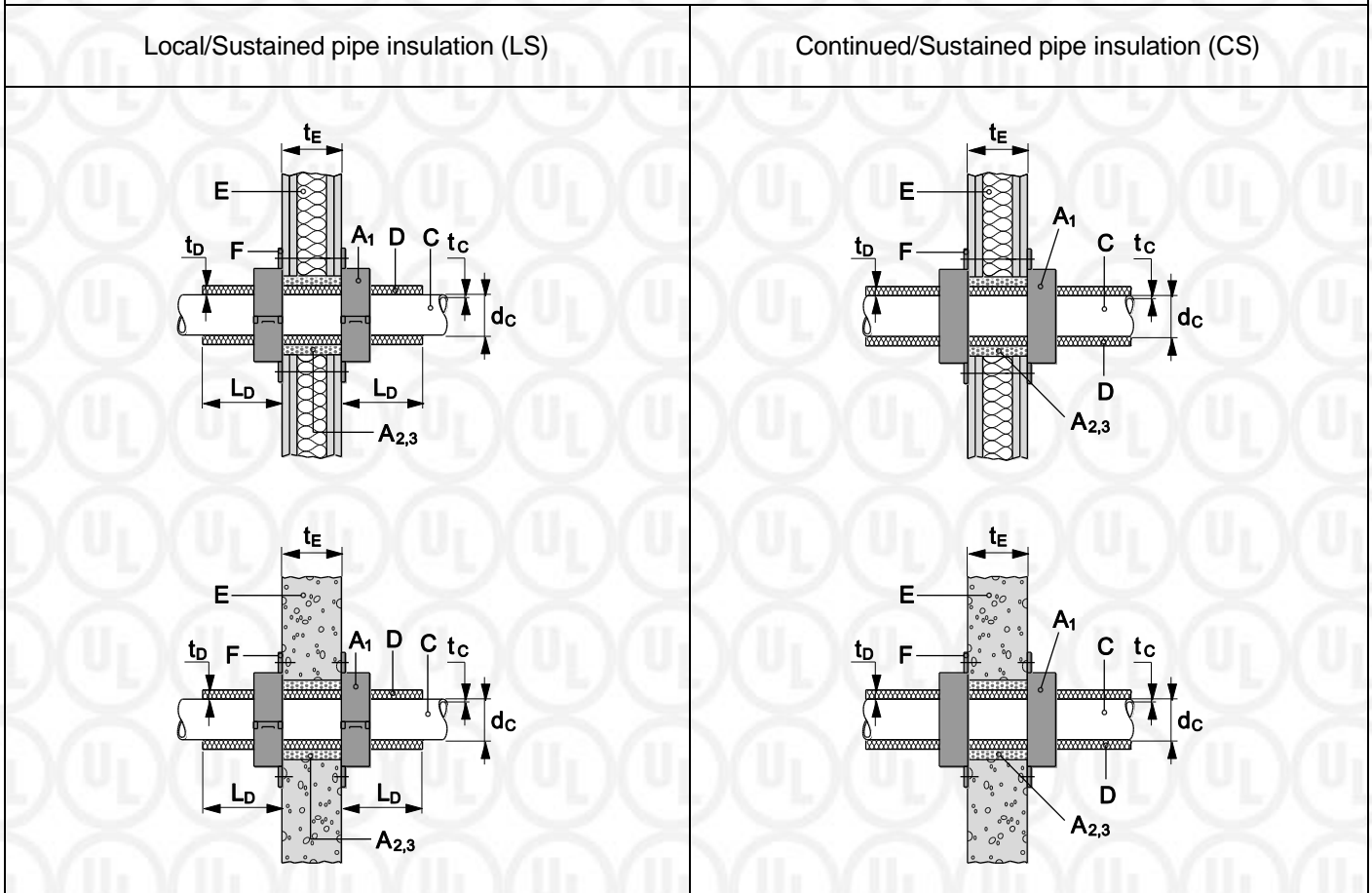
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Pipe insulation
 (drawings show mortar as an example for the annular gap seal)



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Penetrating services					
A.2.1.1 ABS pipes +GF+ "COOL-FIT" (ABS/PUR insulation/PE-HD)					
Pipe diameter d _c (mm)	Inner pipe diameter (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)		
90	32	CFS-C P 90/3"	-/120/120		
110	40	CFS-C P 110/4"	-/120/120		
110	50	CFS-C P 110/4"	-/120/120		
160	90	CFS-C P 160/6"	-/120/120		
180	110	CFS-C P 180/7"	-/120/120		
225	140	CFS-C P 225/9"	-/120/120		
250	160	CFS-C P 250/10"	-/60/60		
<p>COOL-FIT 2.0 products feature a 3-layer structure. COOL-FIT 2.0 has a PE100 inner pipe, GF HE insulation and a HDPE outer jacket. The single components are firmly connected with each other. It has a dimension range from d32/D75 mm up to d140/D200 mm and the nominal insulation is 22 mm.</p>					
A.2.1.2 George Fischer COOL-FIT 2.0 in rigid aerated concrete wall or flexible wall*. Pipes protected with Hilti Firestop Collars and CP 606 sealant with a gap width of 0-20 mm and a sealant thickness/depth of 15 mm.					
OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing	Mineral wool backfilling
75 x 3.0	32 x 2.9	CFS-C P 75/2.5"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M8 threaded rod FRL: -/120/120	Mandatory with both fixing types
90 x 3.0	40 x 3.7	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M8 threaded rod FRL: -/120/120	Optional
90 x 3.0	50 x 4.6	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M8 threaded rod FRL: -/120/120	Optional
110 x 4.0	63 x 5.8	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M8 threaded rod FRL: -/120/120	Optional
125 x 4.0	75 x 6.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/90/90	4 x M8 threaded rod FRL: -/120/120	Mandatory with HUS3-H6 fixing
140 x 4.0	90 x 8.2	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/90/90	-	Mandatory with both fixing types
160 x 4.0	110 x 10.0	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/90/90	-	Mandatory with both fixing types
<p>*Rigid aerated concrete wall (100 mm thickness) with density of 550 kg/m³ Or Flexible wall with two layers of 13 mm thick fire-rated plasterboard on each side (116 mm thickness).</p> <p>Note: Only the FRLs given for threaded rod type fixings are applicable for flexible walls. The fixings in flexible walls must be threaded rod type going through the entire thickness of the wall and tightened on the other side</p>					

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A.2.1.3 George Fischer COOL-FIT 2.0 in rigid aerated concrete wall or flexible wall*. Pipes protected with Hilti Firestop Collars and Hilti Firestop Mortar CP 633 or equivalent cementitious mortar with a gap width of 0-20 mm and mortar thickness/depth of the entire thickness of the supporting element (100 mm for walls).

OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing
75 x 3.0	32 x 2.9	CFS-C P 75/2.5"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M6 threaded rod FRL: -/120/120
90 x 3.0	40 x 3.7	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M6 threaded rod FRL: -/120/120
90 x 3.0	50 x 4.6	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M6 threaded rod FRL: -/120/120
110 x 4.0	63 x 5.8	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120
125 x 4.0	75 x 6.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/120/120	6 x M6 threaded rod FRL: -/120/120
140 x 4.0	90 x 8.2	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	6 x M6 threaded rod FRL: -/120/120
160 x 4.0	110 x 10.0	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	-
200 x 5.0	140 x 12.7	CFS-C P 200/8"	8 x Hilti HUS3-H6 FRL: -/120/120	-

*Rigid aerated concrete wall (100 mm thickness) with density of 550 kg/m³

Or

Flexible wall with two layers of 13 mm thick fire-rated plasterboard on each side (116 mm thickness).

Note: Only the FRLs given for threaded rod type fixings are applicable for flexible walls. The fixings in flexible walls must be threaded rod type going through the entire thickness of the wall and tightened on the other side

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COOL-FIT 4.0 products feature a 3-layer structure. COOL-FIT 4.0 has a PE100 inner pipe, GF HE insulation and a HDPE weather resistant outer jacket. The single components are firmly connected with each other. It has a dimension range from d32/D90 mm up to d450/D630 mm and the nominal insulation is 40 mm.

A.2.1.4 George Fischer COOL-FIT 4.0 in rigid aerated concrete wall or flexible wall*. Pipes protected with Hilti Firestop Collars and CP 606 sealant with a gap width of 0-20 mm and a sealant thickness/depth of 15 mm.

OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing	Mineral wool backfilling
90 x 3.0	32 x 2.9	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M6 threaded rod FRL: -/120/120	Optional
110 x 3.4	40 x 3.7	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120	Optional
110 x 3.4	50 x 4.6	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120	Optional
125 x 3.8	63 x 5.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120	Optional
140 x 4.0	75 x 6.8	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	-	Optional
160 x 4.0	90 x 8.2	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/90/90	-	Optional
180 x 4.0	110 x 10.0	CFS-C P 200/8"	8 x Hilti HUS3-H6-80 FRL: -/90/90	-	Optional

*Rigid aerated concrete wall (100 mm thickness) with density of 550 kg/m³

Or

Flexible wall with two layers of 13 mm thick fire-rated plasterboard on each side (116 mm thickness).

Note: Only the FRLs given for threaded rod type fixings are applicable for flexible walls. The fixings in flexible walls must be threaded rod type going through the entire thickness of the wall and tightened on the other side

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A.2.1.5 George Fischer COOL-FIT 4.0 in rigid aerated concrete wall or flexible wall*. Pipes protected with Hilti Firestop Collars and Hilti Firestop Mortar CP 633 or equivalent cementitious mortar with a gap width of 0-20 mm and mortar thickness/depth of the entire thickness of the supporting element (100 mm for walls).

OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing
90 x 3.0	32 x 2.9	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M6 threaded rod FRL: -/120/120
110 x 3.4	40 x 3.7	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120
110 x 3.4	50 x 4.6	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120
125 x 3.8	63 x 5.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120
140 x 4.0	75 x 6.8	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	6 x M6 threaded rod FRL: -/120/120
160 x 4.0	90 x 8.2	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	6 x M6 threaded rod FRL: -/120/120
180 x 4.0	110 x 10.0	CFS-C P 200/8"	-	8 x M6 threaded rod FRL: -/120/120
250 x 7.0	160 x 16.6	CFS-C P 250/10"	-	12 x M6 threaded rod FRL: -/120/120

*Rigid aerated concrete wall (100 mm thickness) with density of 550 kg/m³

Or

Flexible wall with two layers of 13 mm thick fire-rated plasterboard on each side (116 mm thickness).

Note: Only the FRLs given for threaded rod type fixings are applicable for flexible walls. The fixings in flexible walls must be threaded rod type going through the entire thickness of the wall and tightened on the other side

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A.2.1.6 Al-composite pipes				
A.2.1.6.1 Geberit "Mepla" pipes (PE-Xb/Al/PE-HD)				
Combustible insulation (D) - arrangement CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
16	2.0	11,5	CFS-C P 50/1.5"	-/120/120
20	2.5	11.5 - 13	CFS-C P 63/2"	-/120/120
26	3.0	11.5 - 13	CFS-C P 63/2"	-/120/120
32	3.0	13	CFS-C P 63/2"	-/120/120
40	3.5	9	CFS-C P 63/2"	-/120/120
50	4.0	9	CFS-C P 63/2"	-/120/120
63	4.5	10	CFS-C P 75/2.5"	-/60/60
75	4.7	10	CFS-C P 90/3"	-/90/90
A.2.1.6.2 KeKelit "KELOX KM 110" pipes (PE-X/Al/PE-X)				
Combustible insulation (D) - arrangement CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
16	2.0	11.5	CFS-C P 50/1.5"	-/120/120
20	2.25	11.5 - 13	CFS-C P 63/2"	-/120/120
25	2.5	11.5 - 13	CFS-C P 63/2"	-/120/120
32	3.0	13	CFS-C P 63/2"	-/120/120
32	3.0	9	CFS-C P 50/1.5"	-/90/90
40	4.0	9	CFS-C P 50/1.5"	-/90/90
50	4.5	9	CFS-C P 63/2"	-/90/90
63	6.0	10	CFS-C P 75/2.5"	-/90/90
A.2.1.6.3 Rehau "Rautitan stabil" pipes (PE-Xb/Al/PE-HD)				
Combustible insulation (D) - arrangement CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
16	2.6	11.5	CFS-C P 50/1.5"	-/120/120
20	2.9	11.5 - 13	CFS-C P 63/2"	-/120/120
25	3.7	11.5 - 13	CFS-C P 63/2"	-/120/120
32	4.7	13	CFS-C P 63/2"	-/120/120
40	6.0	9	CFS-C P 63/2"	-/120/120

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A.2.1.7.1 PE pipes, including MDPE, PE-100 and HDPE				
A.2.1.7.1 PE pipes, including MDPE, PE-100 and HDPE				
2.1.7.1.1 Without insulation				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)		Collar size (A_1)	FRL (Fire Resistance Level)
50	3.0		CFS-C P 50/1.5"	-/120/120
63	3.0		CFS-C P 63/2"	-/120/120
75	3.0		CFS-C P 75/2.5"	-/120/120
90	3.5		CFS-C P 90/3"	-/120/120
110	4.2		CFS-C P 110/4"	-/120/120
125	4.8		CFS-C P 125/5"	-/120/120
160	6.2		CFS-C P 160/6"	-/120/120
Maximum thickness of sound decoupling: 5 mm				
The results of 2.1.3.2 are also valid for PE pipes, including MDPE, PE-100 and HDPE according to AS/NZS 4130 or EN12201				
A.2.1.7.1.2 Insulation (D): Foamed elastomeric insulation – arrangement CI				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
110	4.2	10	CFS-C P 125/5"	-/90/90
A.2.1.7.1.3 Insulation (D): Foamed elastomeric insulation – arrangement CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
110	4.2	25	CFS-C P 160/6"	-/90/90

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A.2.1.7.2 PE pipes, including MDPE, PE-100 and HDPE			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
50	2.9 – 4.6	CFS-C P 50/1.5"	-/120/120
63	1.8 – 5.8	CFS-C P 63/2"	-/90/90
63	3.6 – 5.8	CFS-C P 63/2"	-/120/120
75	1.9 – 6.8	CFS-C P 75/2.5"	-/120/120
90	2.2 – 8.2	CFS-C P 90/3"	-/120/120
110	2.7 – 10.0	CFS-C P 110/4"	-/120/120
125	3.1 – 7.1	CFS-C P 125/5"	-/120/120
160	4.0 – 9.1	CFS-C P 160/6"	-/120/120
Maximum thickness of sound decoupling: 5 mm			
A.2.1.7.3 Geberit "Silent dB20" pipes (PE-S2)			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
56	3.2	CFS-C P 63/2"	-/120/120
63	3.2	CFS-C P 63/2"	-/120/120
75	3.6	CFS-C P 75/2.5"	-/120/120
90	5.6	CFS-C P 90/3"	-/120/120
110	6.0	CFS-C P 110/4"	-/120/120
Maximum thickness of sound decoupling: 9 mm			
A.2.1.7.3.1			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
135	6.0	CFS-C P 160/6"	-/120/120
160	7.0	CFS-C P 160/6"	-/120/120
Maximum thickness of sound decoupling: 9 mm			
A.2.1.7.4 Wavin "TS" pipes (PE-HD 100 RC)			
A.2.1.7.4.1 Without insulation			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
50	4.6	CFS-C P 50/1.5"	-/90/90
75	6.8	CFS-C P 75/2.5"	-/120/120
90	8.2	CFS-C P 90/3"	-/120/120
110	10.0	CFS-C P 110/4"	-/120/120
Maximum thickness of sound decoupling: 9 mm			

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A.2.1.7.4.2 Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
50	4.6	9	CFS-C P 63/2"	-/120/120
63	5.8	10	CFS-C P 75/2.5"	-/120/120
75	6.8	10	CFS-C P 90/3"	-/120/120
90	8.2	10	CFS-C P 110/4"	-/120/120
110	10.0	10	CFS-C P 125/5"	-/120/120
A.2.1.7.5 PE-X pipes				
A.2.1.7.5.1 Rehau "Rautitan flex" pipes (PE-Xa)				
Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	5.5	9	CFS-C P 63/2"	-/120/120
50	6.9	9	CFS-C P 63/2"	-/120/120
63	8.6	10	CFS-C P 75/2.5"	-/120/120
A.2.1.8 PP pipes				
A.2.1.8.1 PP pipes (e.g. Aquatherm blue , Aquatherm blue Faserverbundrohr, Aquatherm red , Aquatherm green , Aquatherm green Faserverbundrohr, +GF+ PROGEF Standard pipe, +GF+ Dekaprop Industry pipe)				
A.2.1.8.1.1 Without insulation				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)		Collar size (A_1)	FRL (Fire Resistance Level)
50	1.8 – 2.9		CFS-C P 50/1.5"	-/90/90
63	1.8 – 5.8		CFS-C P 63/2"	-/60/60
75	1.9 – 6.8		CFS-C P 75/2,5"	-/60/60
75	6.8 – 12.5		CFS-C P 75/2.5"	-/120/120
90	8.2 – 15.0		CFS-C P 90/3"	-/120/120
110	2.7		CFS-C P 110/4"	-/120/120
A.2.1.8.1.2 Without insulation				
50	4.6 – 8.3		CFS-C P 50/1.5"	-/90/90
63	5.8 – 10.5		CFS-C P 63/2"	-/60/60
63	10.5		CFS-C P 63/2"	-/120/120
75	1.9- 6.8		CFS-C P 75/2.5"	-/60/60
75	6.8 – 12.5		CFS-C P 75/2.5"	-/120/120
Maximum thickness of sound decoupling: 9 mm				

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A.2.1.8.1.3 Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	3.7 – 5.5	9	CFS-C P 50/1.5"	-/120/120
50	4.6 – 6.9	9	CFS-C P 63/2"	-/120/120
75	6.8 – 10.3	10	CFS-C P 90/3"	-/120/120
90	10.0 – 15.1	22.5	CFS-C P 125/5"	-/120/120

A.2.1.8.3 Aquatherm "green" pipes with insulation

Pipe series SDR 11; Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	3.7	9	CFS-C P 50/1.5"	-/120/120
50	4.6	9	CFS-C P 63/2"	-/120/120
75	6.8	10	CFS-C P 90/3"	-/120/120
110	10.0	10	CFS-C P 125/5"	-/120/120

A.2.1.8.4 Aquatherm "green Faserverbundrohr" pipes with insulation

Combustible insulation (D) – arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	5.5	9	CFS-C P 50/1.5"	-/120/120
50	6.9	9	CFS-C P 63/2"	-/120/120
75	10.3	10	CFS-C P 90/3"	-/120/120
110	15.1	10	CFS-C P 125/5"	-/120/120

A.2.1.8.5 PP pipes (e.g. Ostendorf "Skolan-dB", "Phonex AS", Pipelife "Master 3", POLOPLAST "Polo Kal NG", POLOPLAST "Polo Kal 3S", Rehau "Raupiano Plus", Wavin "AS" /KeKelit "Phonex AS", Wavin "SiTech", Cloes "Blue Power", Cloes "PhoNoFire", Valsire "Triplus", Valsire "Silere", Marley "Silent", "Geberit Silent PP")

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	1.8	CFS-C P 50/1.5"	-/120/120
40	1.8	CFS-C P 50/1.5"	-/120/120
50	1.8 – 2.0	CFS-C P 50/1.5"	-/120/120
56	4.0	CFS-C P 63/2"	-/90/90
70	4.5	CFS-C P 75/2.5"	-/120/120
75	1.8 – 3.8	CFS-C P 75/2.5"	-/120/120
90	2.8 – 4.5	CFS-C P 90/3"	-/120/120
110	2.7 – 5.3	CFS-C P 110/4"	-/120/120

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A.2.1.8.6. PPR pipes					
Outside Diameter (mm)	Pipe Wall thickness (mm)	Min. Aperture Diameter (mm)	Max. Aperture Diameter (mm)	Hilti Retrofit Firestop Collar CFS-C P/ CP 644 Size	No. of Fixings
40	6.0	45	50	50/1.5"	2
50	6.9	55	60	50/1.5"	2
65	8.6	70	75	75/2.5"	3
80	10.3	85	90	90/3"	3
100	12.3	105	110	110/4"	4
110	15.0	115	120	110/4"	4
125	19.0	130	135	125/5"	4
Outside Diameter (mm)	Pipe Wall thickness (mm)	Collar Size	FRL 2 x 13mm thick walls	FRL 2 x 16mm thick walls	FRL Minimum 155mm thick Dincel walls
40	6.0	50/1.5"	-/120/120	-/120/120	-/120/120
50	6.9	50/1.5"	-/120/120	-/120/120	-/120/120
65	8.6	75/2.5"	-/120/90	-/120/90	-/120/120
80	10.3	90/3"	-/120/90	-/120/90	-/120/120
100	12.3	110/4"	-/120/120	-/120/120	-/120/120
110	15.0	110/4"	-/120/120	-/120/120	-/120/120
125	19.0	125/5"	-/120/120	-/120/120	-/120/120

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A.2.1.9 PVC pipes				
A.2.1.9.1 PVC-U pipes and PVC-C pipes*				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)	
50	2.4 – 5.6	CFS-C P 50/1.5"	-/120/120	
63	3.0 – 4.7	CFS-C P 63/2"	-/120/120	
75	2.2 – 3.6	CFS-C P 75/2.5"	-/120/120	
90	2.7 – 4.3	CFS-C P 90/3"	-/120/120	
110	2.2 – 8.1	CFS-C P 110/4"	-/120/120	
125	3.7 – 6.0	CFS-C P 125/5"	-/120/120	
160	2.5 – 11.8	CFS-C P 160/6"	-/120/120	
Maximum thickness of sound decoupling: 5 mm				
A.2.1.9.2 Friatec Friatherm-starr pipes (PVC-C)				
Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 200$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	3.6	9	CFS-C P 50/1.5"	-/120/120
40	4.5	9	CFS-C P 63/2"	-/120/120
50	5.6	9	CFS-C P 75/2.5"	-/120/120
63	7.1	10	CFS-C P 90/3"	-/120/120
* 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 1.2				

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A.2.2 Rigid walls, minimum wall thickness 150 mm

The wall must have a minimum thickness of 150 mm and a minimum density of 650 kg/m³ and comprise concrete, aerated concrete or masonry.

Penetration seal:

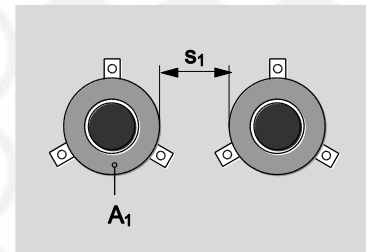
Single penetration;
 Hilti Firestop Collar CFS-C P (A₁) on both sides.

Annular gap filled either with gypsum plaster or 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.

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 table below.

Distance between penetrations:

Minimum distance between collars / annular gap edge (s₁):
 Non insulated pipes: 0 mm
 Insulated pipes: 0 mm



Collars to be fixed with hooks (F) and M8 metal anchors. In high density rigid walls alternatively metal anchors with minimum Ø 8 mm may be used. For further details, refer to Section A.2.1.

Sound decoupling: Sound decoupling strips (C₁) based on combustible insulation (elastomeric foam, e.g. PE), used in combination with gypsum plaster or mortar as gap filler. Sound decoupling installed around the pipe within the wall. For maximum thickness see tables below.

Penetrating services

A.2.2.1 PE pipes, including MDPE, PE-100 and HDPE

Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
200	6.2	CFS-C P 200/8"	-/120/120
250	7.8	CFS-C P 250/10"	-/120/120

Maximum thickness of sound decoupling: 5 mm

The results of 2.2.1 are also valid for PE pipes, including MDPE, PE-100 and HDPE.

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A.2.2.2 PE pipes, including MDPE, PE-100 and HDPE			
Distance between pipe and seal edge in wall (width of annular gap): ≤ 17.5 mm			
A.2.2.2.1			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
180	4.4 – 16.4	CFS-C P 180/7"	-/120/120
200	4.9 – 11.4	CFS-C P 200/8"	-/120/120
200	11.4	CFS-C P 200/8"	-/180/180
225	5.5 – 12.8	CFS-C P 225/9"	-/180/180
250	6.2 – 14.2	CFS-C P 250/10"	-/180/180
A.2.2.2.2			
50	2.9	CFS-C P 50/1.5"	-/180/180
250	7.8	CFS-C P 250/10"	-/180/180
250	7.8 – 22.7	CFS-C P 250/10"	-/120/120
Maximum thickness of sound decoupling: 5 mm			
A.2.2.3 PVC-U and PVC-C Pipes			
Distance between pipe and seal edge in wall (width of annular gap): ≤ 17.5 mm			
A.2.2.3.1			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
180	3.6 – 8.6	CFS-C P 180/7"	-/180/180
200	4.0 – 9.6	CFS-C P 200/8"	-/180/180
225	4.5 – 10.8	CFS-C P 225/9"	-/180/180
250	4.9 – 11.9	CFS-C P 250/10"	-/180/180
A.2.2.3.2 Pipe end configuration C/U			
50	1.8	CFS-C P 50/1.5"	-/180/180
250	4.9 – 11.9	CFS-C P 250/10"	-/180/180
A.2.2.4 PP pipes			
(e.g. Ostendorf "Skolan-dB", "Phonex AS", Pipelife "Master 3", POLOPLAST "Polo Kal NG", POLOPLAST "Polo Kal 3S", Rehau "Raupiano Plus", Wavin "AS" /KeKelit "Phonex AS", Wavin "SiTech", Cloes "Blue Power", Cloes "PhoNoFire", Valsire "Triplus", Valsire "Silere", Marley "Silent", "Geberit Silent PP")			
Distance between pipe and seal edge in wall (width of annular gap): ≤ 30 mm			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
200	6.2 – 6.8	CFS-C P 200/8"	-/120/120
250	8.6	CFS-C P 250/10"	-/120/120
Maximum thickness of sound decoupling: 9 mm			

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A.2.3 Rigid floor, minimum density of 2400 kg/m³

The floor must have a minimum thickness of 150 mm and comprise concrete with a minimum density of 2400 kg/m³.

Penetration seal:

Single penetration;
 Hilti Firestop Collar CFS-C P (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 mineral wool of minimum density 60 kg/m³ covered by Hilti Firestop Acrylic Sealant CFS-S ACR (A₂) on top side (or on both sides) with a depth of minimum 10 mm.

Width of annular gap:

FRL (Fire Resistance Level) – 120/120 and lower (opening diameter up to 300 mm), FRL (Fire Resistance Level) – 180/180 (opening diameter up to 260 mm): The opening diameter should not be larger than the collar outside diameter to allow a safe fixing of the collar to the floor.

FRL (Fire Resistance Level) – 180/180 (opening diameter > 260 mm): see in tables below.

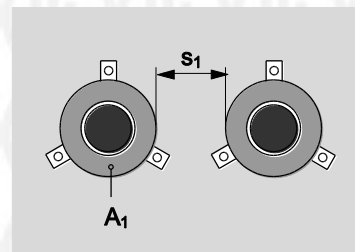
Distance between penetrations:

Minimum distance between collars / annular gap edge (s₁):

Non-insulated pipes: 0 mm

Insulated pipes: 0 mm

Collars to be fixed with hooks and metal anchors with minimum Ø 6 mm (up to collar size 110/4") and minimum Ø 10 mm (from collar size 125/5" to 250/10").



Pipes shall be supported at maximum 200 mm (pipes according to 2.3.1), at maximum 300 mm (all others) away from the upper face of the floor construction.

Sound decoupling: Sound decoupling strips (C₁) based on combustible insulation (elastomeric foam, e.g. PE), used in combination with gypsum plaster or mortar as gap filler. Sound decoupling installed around the pipe within the floor. For maximum thickness see tables below.

Pipe insulation: Combustible insulation (closed cell flexible elastomeric foam, e.g. AF/Armaflex), installed in floor application. For maximum thickness see table below.

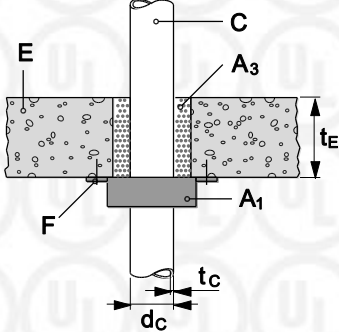
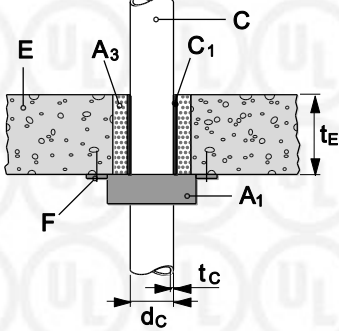
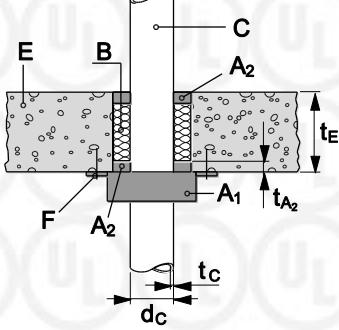
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Annular gap seal (drawings show non-insulated pipes as example)	
Gypsum plaster or cementitious mortar (A ₃)	
Cementitious mortar (A ₃) together with sound decoupling (C ₁)	
Hilti Firestop Acrylic Sealant CFS-S ACR (A ₂)	

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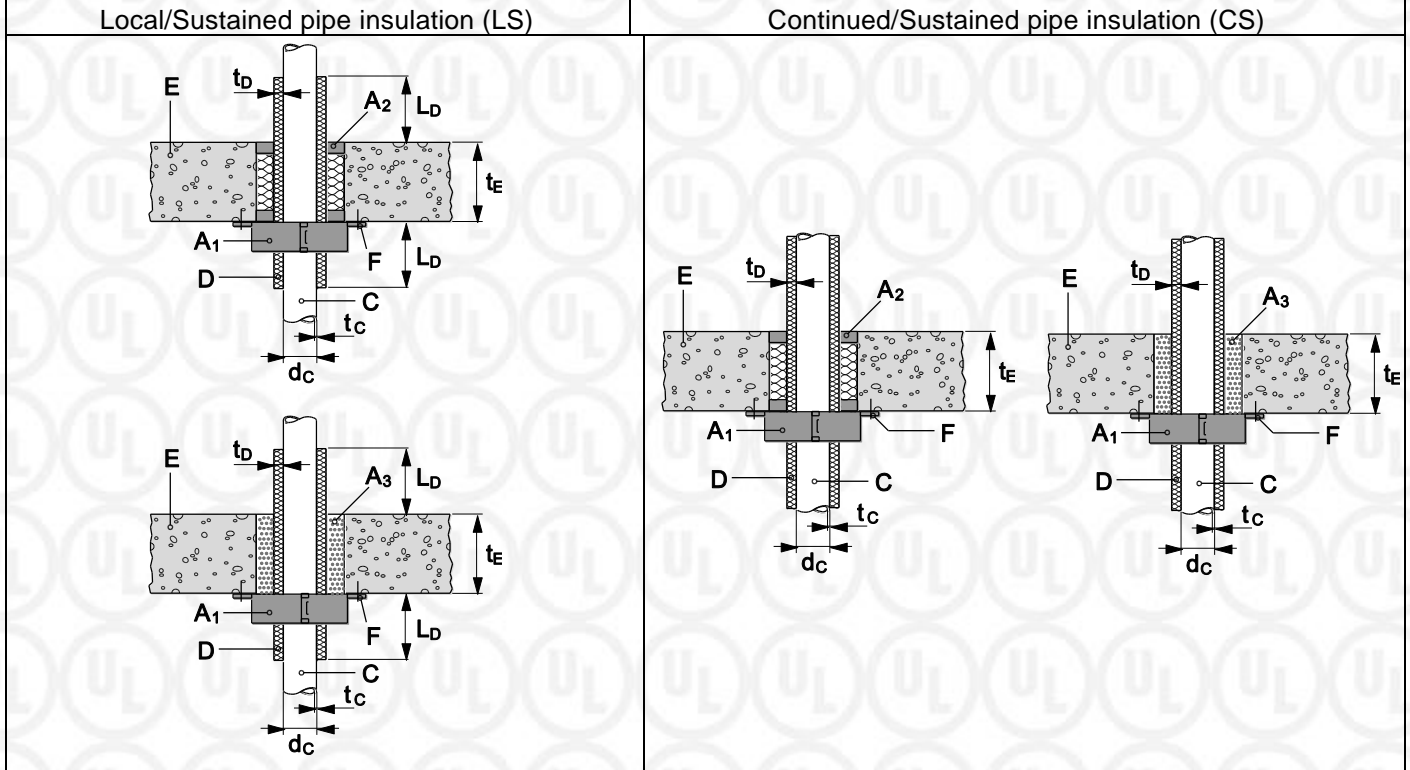


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Pipe insulation

(drawings show mortar as an example for the annular gap seal)



Penetrating services

A.2.3.1 ABS pipes +GF+ "COOL-FIT" (ABS/PUR insulation/PE-HD)

Pipe diameter d_c (mm)	Inner pipe diameter (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
90	32	CFS-C P 90/3"	-/120/120
110	40	CFS-C P 110/4"	-/120/120
110	50	CFS-C P 110/4"	-/120/120
160	90	CFS-C P 160/6"	-/120/120
180	110	CFS-C P 180/7"	-/60/60
225	140	CFS-C P 225/9"	-/120/120
250	160	CFS-C P 250/10"	-/120/120

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COOL-FIT 2.0 products feature a 3-layer structure. COOL-FIT 2.0 has a PE100 inner pipe, GF HE insulation and a HDPE outer jacket. The single components are firmly connected with each other. It has a dimension range from d32/D75 mm up to d140/D200 mm and the nominal insulation is 22 mm.

A.2.3.2 George Fischer COOL-FIT 2.0 in rigid aerated concrete floor*. Pipes protected with Hilti Firestop Collars and CP 606 sealant with a gap width of 0-20 mm and a sealant thickness/depth of 15 mm.

OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing	Mineral wool backfilling
75 x 3.0	32 x 2.9	CFS-C P 75/2.5"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M8 threaded rod FRL: -/120/90	Mandatory with both fixing types
90 x 3.0	40 x 3.7	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M8 threaded rod FRL: -/120/90	Optional
90 x 3.0	50 x 4.6	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M8 threaded rod FRL: -/120/90	Optional
110 x 4.0	63 x 5.8	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M8 threaded rod FRL: -/120/90	Optional
125 x 4.0	75 x 6.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M8 threaded rod FRL: -/120/90	Mandatory with both fixing types
140 x 4.0	90 x 8.2	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	-	Mandatory with both fixing types
160 x 4.0	110 x 10.0	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	-	Mandatory with both fixing types

*Rigid aerated concrete floor (150 mm thickness) with density of 550 kg/m³

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A.2.3.3 George Fischer COOL-FIT 2.0 in rigid aerated concrete floor*. Pipes protected with Hilti Firestop Collars and Hilti Firestop Mortar CP 633 or equivalent cementitious mortar with a gap width of 0-20 mm and mortar thickness/depth of the entire thickness of the supporting element (150 mm for floors).

OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing
75 x 3.0	32 x 2.9	CFS-C P 75/2.5"	3 x Hilti HUS3-H6 FRL: -/60/60	3 x M6 threaded rod FRL: -/120/120
90 x 3.0	40 x 3.7	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/60/60	3 x M6 threaded rod FRL: -/120/120
90 x 3.0	50 x 4.6	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/60/60	3 x M6 threaded rod FRL: -/120/120
110 x 4.0	63 x 5.8	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/60/60	4 x M6 threaded rod FRL: -/120/120
125 x 4.0	75 x 6.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/60/60	4 x M6 threaded rod FRL: -/120/120
140 x 4.0	90 x 8.2	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/60/60	3 x M6 threaded rod FRL: -/120/120
160 x 4.0	110 x 10.0	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/60/60	6 x M6 threaded rod FRL: -/120/120
200 x 3.4	140 x 9.5	CFS-C P 200/8"	8 x Hilti HUS3-H6 FRL: -/60/60	8 x M6 threaded rod FRL: -/120/120
200 x 5.0	140 x 12.7	CFS-C P 200/8"	8 x Hilti HUS3-H6 FRL: -/60/60	-

*Rigid aerated concrete floor (150 mm thickness) with density of 550 kg/m³

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COOL-FIT 4.0 products feature a 3-layer structure. COOL-FIT 4.0 has a PE100 inner pipe, GF HE insulation and a HDPE weather resistant outer jacket. The single components are firmly connected with each other. It has a dimension range from d32/D90 mm up to d450/D630 mm and the nominal insulation is 40 mm.

A.2.3.4 George Fischer COOL-FIT 4.0 in rigid aerated concrete floor*. Pipes protected with Hilti Firestop Collars and CP 606 sealant with a gap width of 0-20 mm and a sealant thickness/depth of 15 mm.

OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing	Mineral wool backfilling
90 x 3.0	32 x 2.9	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M6 threaded rod FRL: -/120/120	Mandatory with both fixing types
110 x 3.4	40 x 3.7	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120	Optional
110 x 2.7	50 x 4.6	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120	Optional
125 x 3.8	63 x 5.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/90/90	Mandatory with both fixing types
140 x 4.0	75 x 6.8	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/120/120	6 x M6 threaded rod FRL: -/90/90	Mandatory with both fixing types
160 x 4.0	90 x 8.2	CFS-C P 160/6"	-	6 x M6 threaded rod FRL: -/90/90	Mandatory with both fixing types

*Rigid aerated concrete floor (150 mm thickness) with density of 550 kg/m³

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A.2.3.5 George Fischer COOL-FIT 4.0 in rigid aerated concrete floor*. Pipes protected with Hilti Firestop Collars and Hilti Firestop Mortar CP 633 or equivalent cementitious mortar with a gap width of 0-20 mm and mortar thickness/depth of the entire thickness of the supporting element (150 mm for floors).

OD x wall thickness (mm)	ID x wall thickness (mm)	Collar size	FRL with Hilti HUS3-H6 fixing	FRL with threaded rod fixing
90 x 3.0	32 x 2.9	CFS-C P 90/3"	3 x Hilti HUS3-H6 FRL: -/120/120	3 x M6 threaded rod FRL: -/120/120
110 x 3.4	40 x 3.7	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/120/120	4 x M6 threaded rod FRL: -/120/120
110 x 2.7	50 x 4.6	CFS-C P 110/4"	4 x Hilti HUS3-H6 FRL: -/90/60	4 x M6 threaded rod FRL: -/120/120
125 x 3.8	63 x 5.8	CFS-C P 125/5"	4 x Hilti HUS3-H6 FRL: -/90/60	4 x M6 threaded rod FRL: -/120/120
140 x 4.0	75 x 6.8	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/90/60	6 x M6 threaded rod FRL: -/90/90
160 x 4.0	90 x 8.2	CFS-C P 160/6"	6 x Hilti HUS3-H6 FRL: -/90/60	6 x M6 threaded rod FRL: -/90/90
180 x 4.0	110 x 10.0	CFS-C P 200/8"	8 x Hilti HUS3-H6 FRL: -/90/60	8 x M6 threaded rod FRL: -/90/90
250 x 5.0	160 x 9.5	CFS-C P 250/10"	12 x Hilti HUS3-H6 FRL: -/45/45	12 x M6 threaded rod FRL: -/90/90
250 x 4.0	160 x 9.5	CFS-C P 250/10"	-	12 x M6 threaded rod FRL: -/90/90
250 x 7.4	160 x 16.6	CFS-C P 250/10"	-	12 x M6 threaded rod FRL: -/90/90

*Rigid aerated concrete floor (150 mm thickness) with density of 550 kg/m³

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A.2.3.6 Al-composite pipes				
A.2.3.6.1 Geberit "Mepla" pipes (PE-Xb/Al/PE-HD)				
A.2.3.6.1.1 Without insulation				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)	
40	3.5	CFS-C P 50/1.5"	-/90/90	
50	4.0	CFS-C P 50/1.5"	-/120/120	
63	4.5	CFS-C P 63/2"	-/60/60	
75	4.7	CFS-C P 75/2.5"	-/30/30	
110	6.0	CFS-C P 110/4"	-/180/180	
Maximum thickness of sound decoupling: 9 mm				
A.2.3.6.1.2 Combustible insulation (D) - arrangement LS (length of insulation $LD \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	3.5	9	CFS-C P 63/2"	-/180/180
50	4.0	9	CFS-C P 63/2"	-/180/180
63	4.5	9	CFS-C P 75/2.5"	-/180/180
75	4.7	10	CFS-C P 90/3"	-/180/180
40	3.5	9 - 20,5	CFS-C P 63/2" - 75/2.5"	-/120/120
50	4.0	9 - 21	CFS-C P 63/2" - 90/3"	-/120/120
63	4.5	9 - 21,5	CFS-C P 75/2.5" - 110/4"	-/120/120
75	4.7	10 - 22	CFS-C P 90/3" - 125/5"	-/120/120

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A.2.3.6.1.3 KeKelit "KELOX KM 110" pipes (PE-X/Al/PE-X)				
Combustible insulation (D) - arrangement CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	3.0	9	CFS-C P 50/1.5"	-/180/180
40	4.0	9	CFS-C P 50/1.5"	-/180/180
50	4.5	9	CFS-C P 63/2"	-/180/180
63	6.0	10	CFS-C P 75/2.5"	-/120/120
Combustible insulation (D) - arrangement CS				
32	3.0	9 – 19,5	CFS-C P 50/1.5" - 75/2.5"	-/120/120
40	4.0	9 – 20.5	CFS-C P 50/1.5" - 75/2.5"	-/120/120
50	4.5	9 - 21	CFS-C P 63/2" - 90/3"	-/120/120
63	6.0	10 – 21.5	CFS-C P 75/2.5" - 110/4"	-/120/120
Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm)				
32	3.0	19.5	CFS-C P 75/2.5"	-/120/120
40	4.0	20.5	CFS-C P 75/2.5"	-/120/120
50	4.5	21	CFS-C P 90/3"	-/120/120
63	6.0	21.5	CFS-C P 110/4"	-/120/120
A.2.3.6.2 Rehau "Rautitan stabil" pipes (PE-Xb/Al/PE-HD)				
Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	6.0	9	CFS-C P 63/2"	-/180/180
40	6.0	9 – 20.5	CFS-C P 63/2" - 75/2.5"	-/120/120

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A.2.3.7 PE pipes, including MDPE, PE-100 and HDPE			
A.2.3.7.1 PE pipes, including MDPE, PE-100 and HDPE			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
50	3.0	CFS-C P 50/1.5"	-/120/120
63	3.0	CFS-C P 63/2"	-/120/120
75	3.0	CFS-C P 75/2.5"	-/120/120
90	3.5	CFS-C P 90/3"	-/120/120
110	4.2	CFS-C P 110/4"	-/120/120
125	4.8	CFS-C P 125/5"	-/120/120
160	6.2	CFS-C P 160/6"	-/120/120
200	6.2	CFS-C P 200/8"	-/120/120
250	7.7	CFS-C P 250/10"	-/120/120

Maximum thickness of sound decoupling: 5 mm

The results of 2.3.7.1 are also valid for PE pipes, including MDPE, PE-100 and HDPE.

A.2.3.7.2 PE pipes, including MDPE, PE-100 and HDPE			
A.2.3.7.2.1			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
20 *)	1.9 – 2.8	CFS-C P 50/1.5"	-/90/90
20 - 50	1.9 / 2.9 – 2.8 / 4.6 ⁹	CFS-C P 50/1.5"	-/90/90
50	2.9 – 4.6	CFS-C P 50/1.5"	-/120/120
63	1.8 – 5.8	CFS-C P 63/2"	-/120/120
75	1.9 – 6.8	CFS-C P 75/2.5"	-/120/120
90	2.2 – 8.2	CFS-C P 90/3"	-/120/120
110	2.7 – 10.0	CFS-C P 110/4"	-/120/120
125	3.1 – 7.1	CFS-C P 125/5"	-/120/120
160	4.0 – 9.1	CFS-C P 160/6"	-/120/120

A.2.3.7.2.2 Pipe end configuration C/U			
180	4.4 – 16.4	CFS-C P 180/7"	-/120/120
200	4.9 – 11.4	CFS-C P 200/8"	-/120/120
225	5.5 – 12.8	CFS-C P 225/9"	-/120/120
250	6.2 – 22.7	CFS-C P 250/10"	-/120/120
50	2.9	CFS-C P 50/1.5"	-/180/180
250	7.8	CFS-C P 250/10"	-/180/180

Maximum thickness of sound decoupling: 5 mm, for pipes indicated with *): 9 mm

⁹ Interpolation of minimum wall thickness between 1.9 mm for diameter 20 mm and 2.9 mm for diameter 50 mm, interpolation of maximum wall thickness between 2.8 mm for diameter 20 mm and 4.6 mm for diameter 50 mm for pipe diameters in between.

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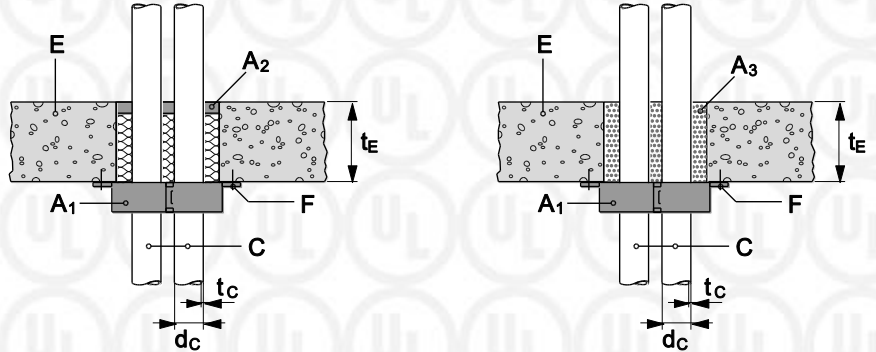
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A.2.3.7.2.3 PE Pipes in 1 collar



20	1.9	CFS-C P 50/1.5"	-/90/90
20	2.8		

A.2.3.7.3 Geberit "Silent dB20" pipes (PE-S2)

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
75	3.6	CFS-C P 75/2.5"	-/180/180
90	5.5	CFS-C P 90/3"	-/180/180
110	6.0	CFS-C P 110/4"	-/180/180
135	6.0	CFS-C P 160/6"	-/120/120
160	7.0	CFS-C P 160/6"	-/180/180 C

Maximum thickness of sound decoupling: 9 mm

A.2.3.7.4 Wavin "TS" pipes (PE-HD 100 RC)

A.2.3.3.4.1 Without insulation

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
50	4.6	CFS-C P 50/1.5"	-/90/90
63	5.8	CFS-C P 63/2"	-/120/120
75	6.8	CFS-C P 75/2.5"	-/120/120
90	8.2	CFS-C P 90/3"	-/120/120
110	10.0	CFS-C P 110/4"	-/120/120

Maximum thickness of sound decoupling: 9 mm

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A.2.3.7.4.2 Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
50	4.6	9	CFS-C P 63/2" or 75/2.5"	-/180/180
63	5.8	10	CFS-C P 75/2.5"	-/180/180
75	6.8	10	CFS-C P 90/3"	-/180/180
90	8.2	9.5	CFS-C P 110/4"	-/180/180
110	10.0	9.5	CFS-C P 125/5"	-/180/180

A.2.3.7.5 PE-X pipes

A.2.3.7.5.1 Rehau "Rautitan flex" pipes (PE-Xa)

Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 250$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	6.0	9	CFS-C P 63/2"	-/180/180
50	6.9	9	CFS-C P 75/2.5"	-/180/180
63	8.6	9	CFS-C P 90/3"	-/180/180
40	6.0	9 – 20.5	CFS-C P 63/2" - 75/2.5"	-/120/120
50	6.9	9 - 21	CFS-C P 75/2.5" - 90/3"	-/120/120
63	8.6	9 – 21.5	CFS-C P 90/3" - 110/4"	-/120/120

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A.2.3.8 PP pipes				
A.2.3.8.1 PP pipes (e.g. Aquatherm blue , Aquatherm blue Faserverbundrohr, Aquatherm red , Aquathermgreen , Aquatherm green Faserverbundrohr, +GF+ PROGEF Standard pipe, +GF+ Dekaprop Industry pipe)				
A.2.3.8.1.1 Without insulation				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)	
20	1.9 – 3.4	CFS-C P 50/1.5"	-/120/120	
50	1.8 – 2.9	CFS-C P 50/1.5"	-/180/180	
63	1.8 – 5.8	CFS-C P 63/2"	-/180/180	
75	1.9 – 6.8	CFS-C P 75/2.5"	-/180/180	
90	2.2 – 8.2	CFS-C P 90/3"	-/180/180	
110	2.7	CFS-C P 110/4"	-/180/180	
125	3.1	CFS-C P 125/5"	-/180/180	
A.2.3.8.1.2 Without insulation				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)	
40	3.7 – 5.5	CFS-C P 50/1.5"	-/120/120	
50	4.6 – 8.3	CFS-C P 50/1.5"	-/180/180	
63	5.8 – 10.5	CFS-C P 63/2"	-/180/180	
75	6.8	CFS-C P 75/2.5"	-/180/180	
75	6.8 – 12.5	CFS-C P 75/2.5"	-/120/120	
90	8.2	CFS-C P 90/3"	-/180/180	
90	8.2 – 15.0	CFS-C P 90/3"	-/120/120	
110	10.0 – 15.1	CFS-C P 110/4"	-/120/120	
Maximum thickness of sound decoupling: 9 mm				
A.2.3.8.1.3 Combustible insulation (D) – arrangement LS (length of insulation LD ≥ 250 mm) or CS				
Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Insulation thickness t _D (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
40	3.7 – 5.5	9	CFS-C P 63/2"	-/180/180
50	4.6 – 6.9	9	CFS-C P 75/2.5"	-/180/180
75	6.8 – 10.3	10	CFS-C P 90/3"	-/180/180
90	12.3	22.5	CFS-C P 160/6"	-/120/120
110	10.0 – 15.1	10	CFS-C P 125/5"	-/180/180

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A.2.3.8.2 PP pipes (e.g. Magnaplast “Skolan-dB”, “Phonex AS”, Pipelife “Master 3”, POLOPLAST “Polo Kal NG”, POLOPLAST “Polo Kal 3S”, Rehau “Raupiano Plus”, Wavin “AS”/KeKelit “Phonex AS”, Wavin “SiTech”) Cloes “Blue Power”, Cloes “PhoNoFire”, Valsire “Triplus”, Valsire “Silere”, “Geberit Silent PP”)

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	1.2 – 1.8	CFS-C P 50/1.5”	-/90/90
40	1.8	CFS-C P 50/1.5”	-/90/90
50	1.8 – 2.0	CFS-C P 50/1.5”	-/90/90
58	4.0	CFS-C P 63/2”	-/90/90
75	1.9 – 4.5	CFS-C P 75/2.5”	-/90/90
78	4.5	CFS-C P 75/2.5”	-/90/90
90	2.8 – 4.5	CFS-C P 90/3”	-/90/90
110	2.7 – 5.3	CFS-C P 110/4”	-/90/90
125	3.9 – 5.3	CFS-C P 125/5”	-/90/90
135	5.3	CFS-C P 160/6”	-/90/90
160	4.9 – 5.3	CFS-C P 160/6”	-/90/90

Maximum thickness of sound decoupling: 9 mm

A.2.3.8.3. PPR pipes

Outside Diameter (mm)	Pipe Wall thickness (mm)	Min. Aperture Diameter (mm)	Max. Aperture Diameter (mm)	Hilti Retrofit Firestop Collar CFS-C P/ CP 644 Size	No. of Fixings
40	6.0	45	50	50/1.5”	2
50	6.9	55	60	50/1.5”	2
65	8.6	70	75	75/2.5”	3
80	10.3	85	90	90/3”	3
100	12.3	105	110	110/4”	4
110	15.0	115	120	110/4”	4
125	19.0	130	135	125/5”	4

Outside Diameter (mm)	Pipe Wall thickness (mm)	Collar Size	Refer figure
40	6.0	50/1.5”	-/180/120
50	6.9	50/1.5”	-/120/120
65	8.6	75/2.5”	-/120/120
80	10.3	90/3”	-/120/120
100	12.3	110/4”	-/120/120
110	15.0	110/4”	-/120/120
125	19.0	125/5”	-/240/120

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A.2.3.8.4 Magnaplast "Skolan-dB" pipes			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
58	4.0	CFS-C P 90/3"	-/180/180
78	4.5	CFS-C P 75/2.5"	-/180/180
90	4.5	CFS-C P 90/3"	-/180/180
110	5.3	CFS-C P 110/4"	-/180/180
135	5.3	CFS-C P 160/6"	-/180/180
160	5.3	CFS-C P 160/6"	-/180/180
Maximum thickness of sound decoupling: 9 mm			
A.2.3.8.5 Rehau "Raupiano Plus" pipes (PP/PP-MV/PP)			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
50	1.8	CFS-C P 50/1.5"	-/180/180
75	1.9	CFS-C P 75/2.5"	-/180/180
110	2.7	CFS-C P 110/4"	-/180/180
Maximum thickness of sound decoupling: 9 mm			
A.2.3.8.6 Wavin "AS" /KeKelit "Phonex AS" pipes			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
70	4.5	CFS-C P 75/2.5"	-/180/180
90	4.5	CFS-C P 90/3"	-/180/180
125	5.3	CFS-C P 125/5"	-/180/180
160	5.3	CFS-C P 160/6"	-/180/180
Maximum thickness of sound decoupling: 9 mm			
A.2.3.8.7 Wavin "SiTech" pipes			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
75	2.3	CFS-C P 75/2.5"	-/180/180
90	2.8	CFS-C P 90/3"	-/180/180
125	3.9	CFS-C P 125/5"	-/180/180
160	4.9	CFS-C P 160/6"	-/180/180
Maximum thickness of sound decoupling: 9 mm			

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A.2.3.9 PVC pipes				
A.2.3.9.1 PVC-U pipes				
A.2.3.9.1.1				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)	
20 *	1.5 – 2.2	CFS-C P 50/1.5"	-/120/120	
20 - 50	1.5/2.4 – 2.2/5.6 ¹¹	CFS-C P 50/1.5"	-/120/120	
50	2.4 – 5.6	CFS-C P 50/1.5"	-/120/120	
63	3.0 – 4.7	CFS-C P 63/2"	-/120/120	
75	2.2 – 3.6	CFS-C P 75/2.5"	-/120/120	
90	2.7 – 4.3	CFS-C P 90/3"	-/120/120	
110	1.8 – 8.1	CFS-C P 110/4"	-/120/120	
125	3.7 – 6.0	CFS-C P 125/5"	-/120/120	
160	2.5 – 11.8	CFS-C P 160/6"	-/120/120	
180	3.6 – 8.6	CFS-C P 180/7"	-/120/120	
200	4.0 – 9.6	CFS-C P 200/8"	-/120/120	
225	4.5 – 10.8	CFS-C P 225/9"	-/120/120	
250	4.9 – 11.9	CFS-C P 250/10"	-/120/120	
Maximum thickness of sound decoupling: 5 mm, for pipes indicated with *): 9 mm				
A.2.3.9.1.2				
50	1.8	CFS-C P 50/1.5"	-/180/180	
250	4.0 – 11.9	CFS-C P 250/10"	-/180/180	
The results of 2.3.9.1 are also valid for PVC-C pipes ⁶ and PVC-U pipes.				
A.2.3.9.2 PVC-C pipes				
See A.2.3.9.1				
A.2.3.9.3 Friatec Friatherm-starr pipes (PVC-C)				
Combustible insulation (D) - arrangement LS (length of insulation $L_D \geq 200$ mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	3.6	9	CFS-C P 50/1.5"	-/180/180
40	4.5	9	CFS-C P 63/2"	-/180/180
50	5.6	9	CFS-C P 75/2.5"	-/180/180
63	7.1	10	CFS-C P 90/3"	-/180/180

¹¹ Interpolation of minimum wall thickness between 1.5 mm for diameter 20 mm and 2.4 mm for diameter 50 mm, interpolation of maximum wall thickness between 2.2 mm for diameter 20 mm and 5.6 mm for diameter 50 mm for pipe diameters in between.

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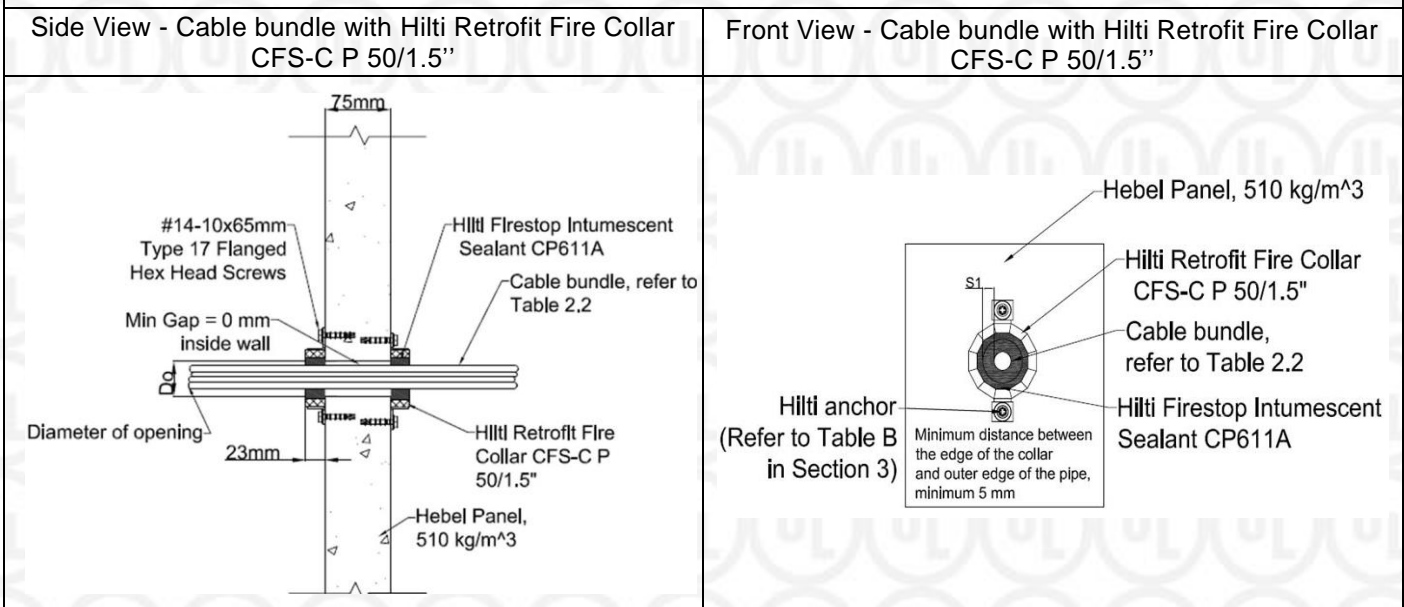
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A.2.4 Proprietary wall system, in particular Hebel and Walsc wall system

The wall must have a minimum thickness of 75 mm and comprise Hebel wall with a minimum dry density of 510 kg/m³ or rigid wall which must have a minimum thickness of 75 mm and comprise concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m³. Alternatively, the wall can have a minimum thickness on 75 mm thick Walsc wall with a minimum dry density of 525 kg/m³ with tongue and groove joints at the edges.

A.2.4.1 Rigid walls (including minimum 155mm thick Dincel walls) with cable bundles protected with Hilti Intumescent sealant CP611A and Hilti Retrofit Fire Collar CFS-C P 50/1.5" (2/5)



Service	Max. Cable Bundle Diameter (mm)	Min. Diameter of Opening (mm)	Max. Diameter of Opening (mm)	Hilti Retrofit Firestop Collar CFS-CP Size and Sealant	Depth of Sealant (mm)	FRL
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and others inclusive)	21	25	38	CFS-CP 50/1.5" & CP611A	23	-/120/30
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and others inclusive)	36	38	50	CFS-CP 50/1.5" & CP611A	23	

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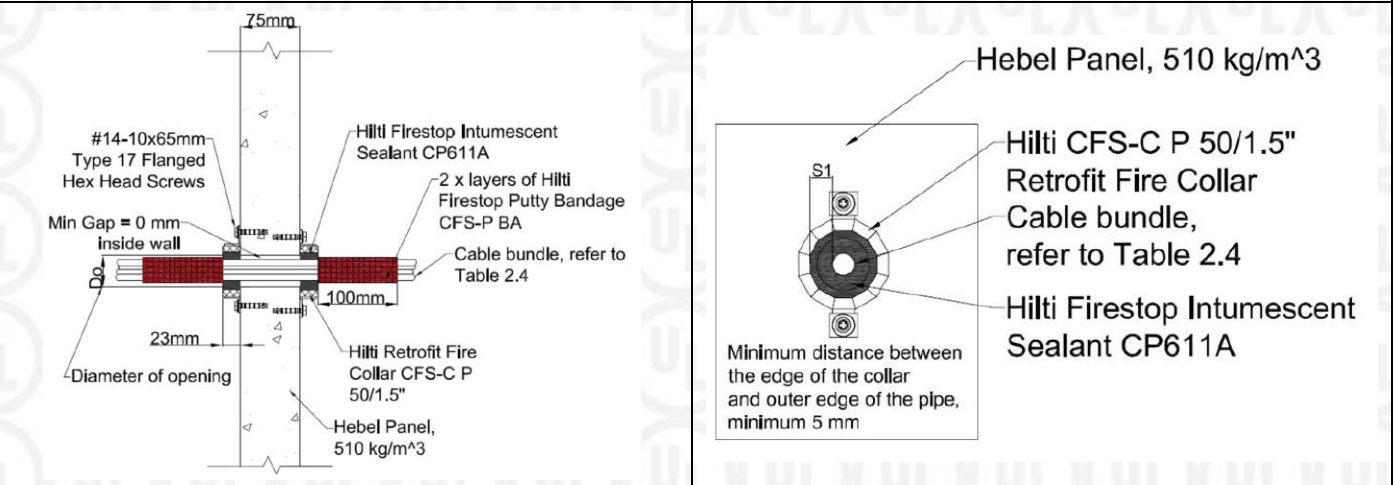
A.2.4.2 Rigid walls (including minimum 155mm thick Dincel walls) with cable bundles protected with Hilti Intumescent sealant CP611A, Hilti Retrofit Fire Collar CFS-C P 50/1.5" and 2 layers of Hilti Firestop Putty Bandage CFS-P BA (5/5)

The wall must have a minimum thickness of 75 mm and comprise Hebel wall with a minimum dry density of 510 kg/m³ or rigid wall which must have a minimum thickness of 75 mm and comprise concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m³. Alternatively, the wall can have a minimum thickness on 75 mm thick Walsc wall with a minimum dry density of 525 kg/m³ with tongue and groove joints at the edges. Additional protection details are as for a 75 mm Hebel wall.

The Hilti Firestop Putty Bandage CFS-P BA must be installed, such that the white mesh is visible from outside. For Dincel walls, an additional single layer of Hilti Firestop Putty Bandage, CFS-P BA shall be provided next to the two layers of putty bandage placed adjacent to the wall, on either side, externally, such that the total length of the putty bandage is 200 mm.

Side View - Cable bundle protected by Hilti Retrofit Fire Collar CFS-C P and two layers of Hilti Firestop Putty Bandage CFS-P BA

Front View - Cable bundle with Hilti Retrofit Fire Collar CFS-C P and two layers of Hilti Firestop Putty Bandage CFS-P BA



Service	Max. Cable Bundle Diameter (mm)	Min. Diameter of Opening (mm)	Max. Diameter of Opening (mm)	Hilti Retrofit Firestop Collar CFS-CP Size and Sealant	Depth of Sealant (mm)	Additional Protection	FRL
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and others inclusive)	21	25	38	CFS-CP 50/1.5" & CP611A	23	Two layers of 100mm wide Hilti Firestop Putty Bandage CFS-P BA on both sides of the wall	-/120/30
	36	38	50		23		

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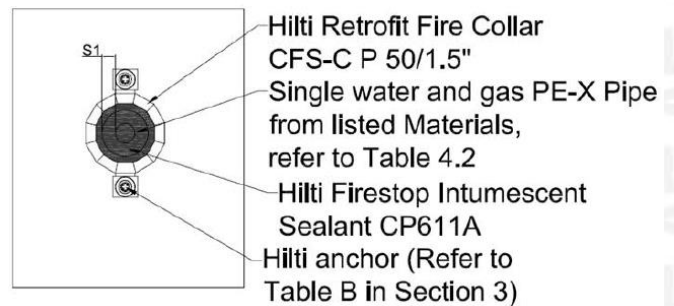
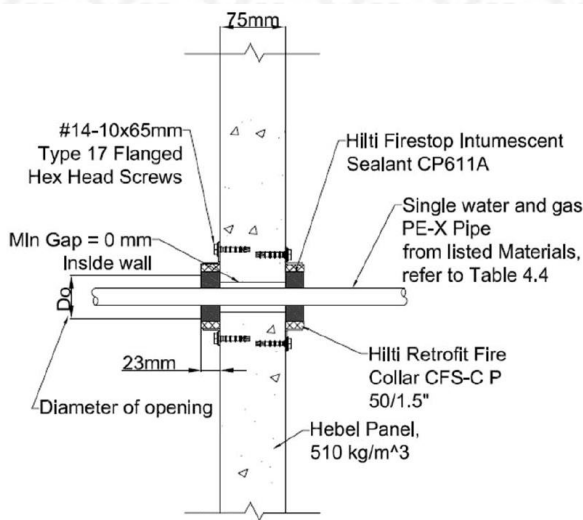
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A.2.4.3 Rigid walls (including minimum 155mm thick Dincel walls) with various water and gas PE-X pipes protected with Hilti Intumescent sealant CP611A and Hilti Retrofit Fire Collar CFS-C P 50/1.5" (3/4)

The wall must have a minimum thickness of 75 mm and comprise Hebel wall with a minimum dry density of 510 kg/m³ or rigid wall which must have a minimum thickness of 75 mm and comprise concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m³. Alternatively, the wall can have a minimum thickness on 75 mm thick Walsc wall with a minimum dry density of 525 kg/m³ with tongue and groove joints at the edges.

Side View – Water and gas PE-X pipe protected by Hilti Retrofit Fire Collar CFS-C P 50/1.5

Front View - Water and gas PE-X pipe protected by Hilti Retrofit Fire Collar CFS-C P



Service	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Min. Diameter of Opening (mm)	Max. Diameter of Opening (mm)	Depth of Sealant (mm)	Additional Protection)	FRL (Hebel/Walsc Walls)	FRL (Dincel Walls)
PE-Xa	16	1.2 – 2.4	16	25	23	CFS-C P 50/1.5" + CP611A Intumescent Sealant filling the inside of the collar to the collar's full depth.	-/120/120	-/120/120
	20	2.3 – 3.4	20	32	23		-/120/120	-/120/120
	25	2.8 – 3.9	25	38	23		-/120/120	-/120/120
PE-Xb	16	1.2 – 2.4	16	25	23		-/120/120	-/120/120
	20	1.9 – 2.4	20	32	23		-/120/120	-/120/120
	25	2.3 – 3.9	25	38	23		-/120/120	-/120/120
PE-X/AL/PE	16	2.0 – 2.6	16	25	23		-/120/120	-/120/120
	20	2.3 – 2.9	20	32	23		-/120/120	-/120/120
	25	3.5 – 3.7	25	38	23		-/120/90	-/120/120
PE-Xb/AL/PE-Xb	16	2.0 – 2.6	16	25	23		-/120/120	-/120/120
	20	2.0 – 2.9	20	32	23		-/120/120	-/120/120
	25	2.4 – 3.7	25	38	23		-/120/90	-/120/120
PE/AL/PE	16	2.0 – 2.6	16	25	23	-/120/120	-/120/120	
	20	2.3 – 2.9	20	32	23	-/120/120	-/120/120	
	25	3.5 – 3.7	25	38	23	-/120/120	-/120/120	

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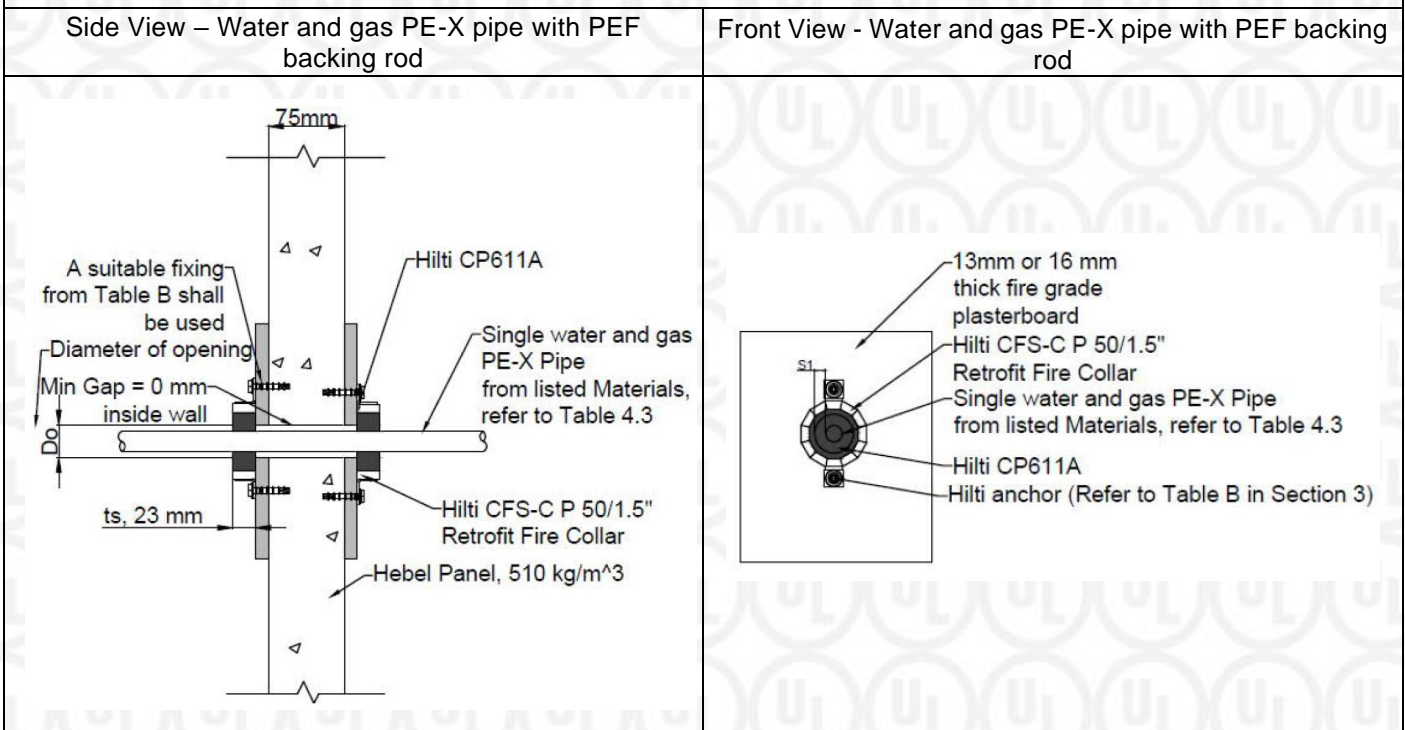


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A.2.4.4 Rigid walls (including minimum 155mm thick Dincel walls) with various water and gas PE-X pipes protected with Hilti Intumescent sealant CP611A and Hilti Retrofit Fire Collar CFS-C P 50/1.5" (4/4)

The wall must have a minimum thickness of 75 mm and comprise Hebel wall with a minimum dry density of 510 kg/m³ or rigid wall which must have a minimum thickness of 75 mm and comprise concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m³. Alternatively, the wall can have a minimum thickness on 75 mm thick Walsc wall with a minimum dry density of 525 kg/m³ with tongue and groove joints at the edges. Additional protection details such as build-up details are as for a 75 mm Hebel wall.



Service	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Min. Diameter of Opening (mm)	Max. Diameter of Opening (mm)	Depth of Sealant (mm)	Hilti Retrofit Collar CFS-C P Size and Sealant	FRL
PE-X/ AL/PE	25	3.5 – 3.7	35	50	23	CFS-C P 50/1.5" + CP611A Intumescent Sealant filling the inside of the collar to the collar's full depth.	-/120/120
PE-Xb/ AL/PE -Xb	25	2.4 – 3.7	35	50	23		-/120/120

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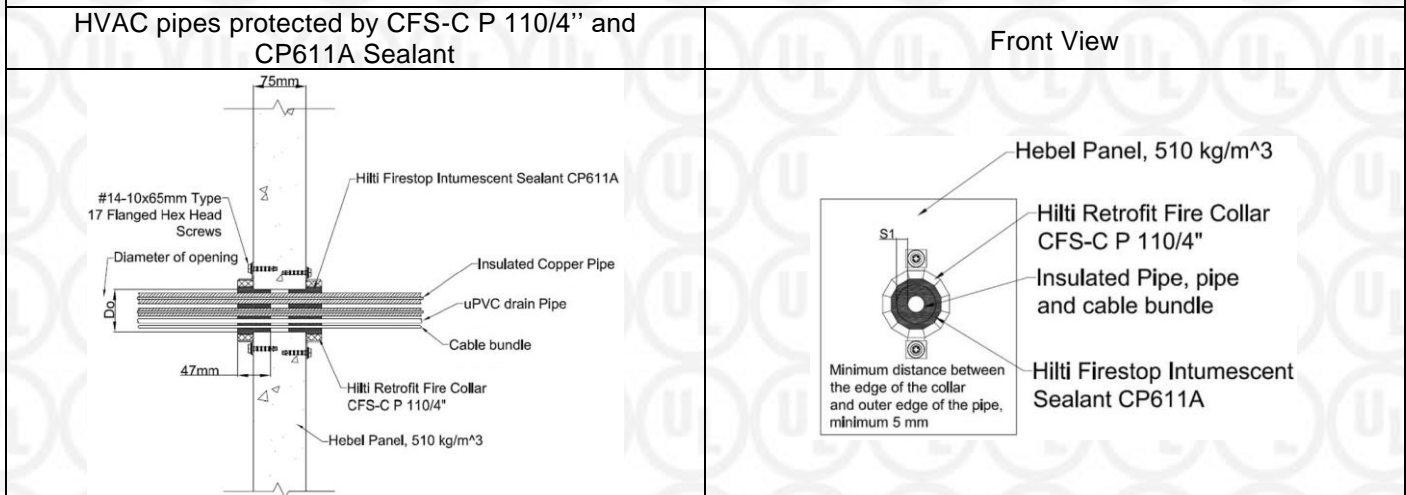
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A.2.4.5 Rigid walls (minimum 75mm thick Hebel and Walsc walls) with HVAC copper pipes protected with Hilti Intumescent Sealant CP611A and Hilti Retrofit Fire Collar CFS-C P 110/4"



Service	Number of Service	Diameter of Opening (mm)		Hilti Retrofit Firestop Collar CFS-CP Size and Sealant	Depth of Sealant (mm)	FRL		
		Min.	Max.					
3/8" copper, insulated 19mm	1	90	127	CFS-C P 110/4" + CP 611A intumescent sealant filling the inside of the collar to the collar's full depth	47	-/120/120		
5/8" copper, insulated 25mm	1							
20mm-25mm uPVC pipe	1							
1-4mm ² 2C+E Flat TPS Cables	3							
1/2" copper, insulated 19mm	1	90	127		CFS-C P 110/4" + CP 611A intumescent sealant filling the inside of the collar to the collar's full depth	47	-/120/120	
1/4" copper, insulated 19mm	1							
20mm-25mm uPVC pipe	1							
1-4mm ² 3C+E Circular TPS Cables	3							
3/8" copper, insulated 19mm	1	90	127			CFS-C P 110/4" + CP 611A intumescent sealant filling the inside of the collar to the collar's full depth	47	-/120/120
1/2" copper, insulated 19mm	1							
20mm-25mm uPVC pipe	1							
4mm ² 3C+E Flat TPS Cables	3							
3/8" copper, insulated 19mm	1	90	127	CFS-C P 110/4" + CP 611A intumescent sealant filling the inside of the collar to the collar's full depth			47	-/120/120
1/4" copper, insulated 19mm	1							
20mm-25mm uPVC pipe	1							
1-4mm ² 2C+E Circular TPS Cables	3							

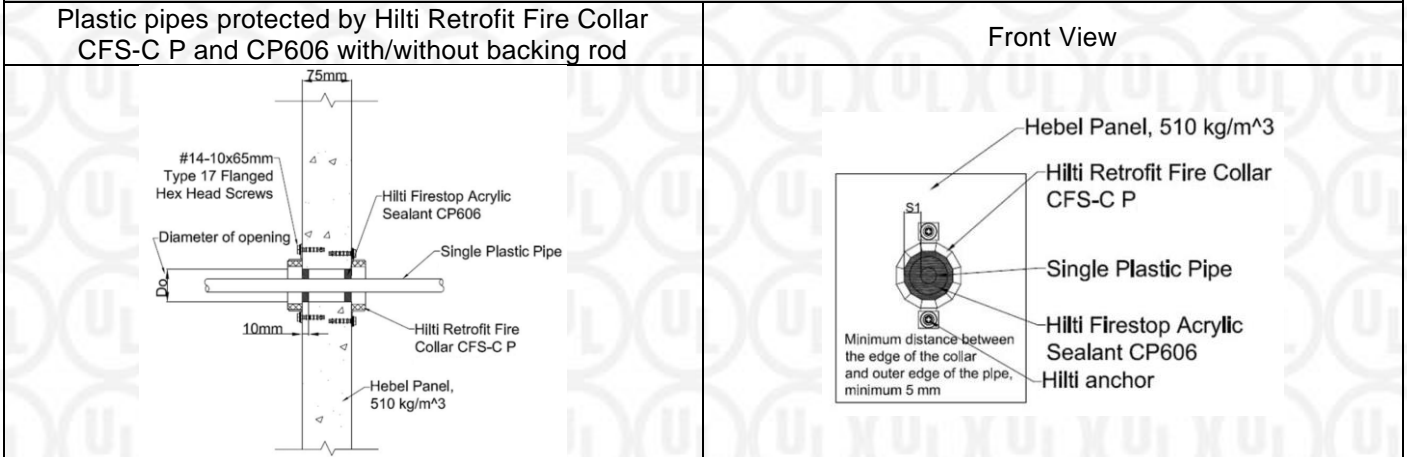
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A.2.4.6 Rigid walls (including minimum 155mm thick Dincel walls) with uPVC pipes protected with Hilti Firestop Acrylic Sealant CP606 and Hilti Retrofit Fire Collar CFS-C P



Service	Pipe Min. Outer Diameter (mm)	Pipe Wall Thickness (mm)	Diameter of Opening (mm)	Hilti Retrofit Firestop Collar CFS-CP Size and Sealant	Depth of Sealant (mm)	FRL (Hebel/Walsc Walls)	FRL (Dincel Walls)
40 mm uPVC DWV	42.8	2	50	50/1.5" & CP606	10	-/120/120	-/180/120
50 mm uPVC DWV	55.7	2.2	68	63/2" & CP606	10	-/120/120	-/180/120
65 mm uPVC DWV	68.7	2.7	75	75/2.5" & CP606	10	-/120/120	-/180/120
80 mm uPVC DWV	82.3	2.9	92	90/3.5" & CP606	10	-/120/120	-/180/120
100 mm uPVC DWV	110	3.2	127	110/4" & CP606	10	-/120/120	-/180/180
150 mm uPVC DWV	160	4.5	162	160/6" & CP606	10	-/120/120	-/240/180
100 mm uPVC SC DWV	110	3.2	127	110/4" & CP606	10	-/120/120	-/120/180
150 mm uPVC SC DWV	160	4.5	162	160/6" & CP606	10	-/120/120	-/120/180

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A.2.5 Rigid floors with a minimum density of 550 kg/m³

The floor must have a minimum thickness of 150 mm and comprise concrete or aerated concrete with a minimum density of 550 kg/m³.

For details of the penetration seal design see 2.3.

Pipes shall be supported at maximum 200 mm (pipes according to 2.4.1), at maximum 250 mm (all others) away from the upper face of the floor construction.

Penetrating services

A.2.5.1 ABS pipes +GF+ "COOL-FIT" (ABS/PUR insulation/PE-HD)

Pipe diameter d _c (mm)	Inner pipe diameter (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
90	32	CFS-C P 90/3"	-/120/120
110	40	CFS-C P 110/4"	-/120/120
110	50	CFS-C P 110/4"	-/120/120
160	90	CFS-C P 160/6"	-/120/120
180	110	CFS-C P 180/7"	-/60/60
225	140	CFS-C P 225/9"	-/120/120
250	160	CFS-C P 250/10"	-/120/120

A.2.5.2 Al-composite pipes

A.2.5.2.1 Geberit "Mepla" pipes (PE-Xb/Al/PE-HD)

A.2.5.2.1.1 Without insulation

Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
40	3.5	CFS-C P 50/1.5"	-/90/90
50	4.0	CFS-C P 50/1.5"	-/120/120
63	4.5	CFS-C P 63/2"	-/60/60
75	4.7	CFS-C P 75/2.5"	-/30/30

Maximum thickness of sound decoupling: 9 mm

A.2.5.2.1.2 Combustible insulation (D) - arrangement LS (length of insulation ≥ 250 mm) or CS

Pipe diameter d _c (mm)	Pipe wall thickness t _c (mm)	Insulation thickness t _D (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
40	3.5	20.5	CFS-C P 63/2" - 75/2.5"	-/120/120
50	4.0	21	CFS-C P 63/2" - 90/3"	-/120/120
63	4.5	21.5	CFS-C P 75/2.5" - 110/4"	-/120/120
75	4.7	22	CFS-C P 90/3" - 125/5"	-/120/120

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A.2.5.2.2 KeKelit "KELOX KM 110" pipes (PE-X/Al/PE-X)				
Combustible insulation (D) - Insulation arrangement LS (length of insulation \geq 250 mm)				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	3.0	19.5	CFS-C P 75/2.5"	-/120/120
40	4.0	20.5	CFS-C P 75/2.5"	-/120/120
50	4.5	21	CFS-C P 90/3"	-/120/120
63	6.0	21.5	CFS-C P 110/4"	-/120/120
A.2.5.2.3 Rehau "Rautitan stabil" pipes (PE-Xb/Al/PE-HD)				
Combustible insulation (D) - arrangement LS (length of insulation \geq 250 mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	6.0	20.5	CFS-C P 63/2" - 75/2.5"	-/120/120
A.2.5.3 PE pipes, including MDPE, PE-100 and HDPE				
A.2.5.3.1 PE pipes, including MDPE, PE-100 and HDPE				
A.2.5.3.1.1 Pipe end configuration C/U				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)	
20 *)	1.9 – 2.8	CFS-C P 50/1.5"	-/90/90	
20 - 50	1.9 / 2.9 – 2.8 / 4.6 ¹²	CFS-C P 50/1.5"	-/90/90	
A.2.5.3.1.2 2 Pipes in 1 collar				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)	
20	1.9	CFS-C P 50/1.5"	-/90/90	
20	2.8			
The results of 2.4.3.1 are also valid for PE pipes, including MDPE, PE-100 and HDPE				
A.2.5.3.2 "Wavin TS" pipes (PE-HD 100 RC)				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)	
50	4.6	CFS-C P 50/1.5"	-/90/90	
63	5.8	CFS-C P 63/2"	-/120/120	
75	6.8	CFS-C P 75/2.5"	-/120/120	
90	8.2	CFS-C P 90/3"	-/120/120	
110	10.0	CFS-C P 110/4"	-/120/120	
Maximum thickness of sound decoupling: 9 mm				

¹² Interpolation of minimum wall thickness between 1.9 mm for diameter 20 mm and 2.9 mm for diameter 50 mm, interpolation of maximum wall thickness between 2.8 mm for diameter 20 mm and 4.6 mm for diameter 50 mm for pipe diameters in between.

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A.2.5.3.3 PE-X pipes				
A.2.5.3.3.1 Rehau "Rautitan flex" pipes (PE-Xa)				
Combustible insulation (D) - arrangement LS (length of insulation \geq 250 mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
40	6.0	20.5	CFS-C P 63/2" - 75/2.5"	-/120/120
50	6.9	21	CFS-C P 75/2.5" - 90/3"	-/120/120
63	8.6	21.5	CFS-C P 110/4"	-/120/120
A.2.5.4 PP pipes				
A.2.5.4.1 PP pipes				
(e.g. Aquatherm blue, Aquatherm blue Faserverbundrohr, Aquatherm red, Aquatherm green, Aquatherm green Faserverbundrohr, +GF+ PROGEF Standard pipe, +GF+ Dekaprop Industry pipe)				
A.2.5.4.1.1 Without insulation				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)		Collar size (A_1)	FRL (Fire Resistance Level)
20	1.9 – 3.4		CFS-C P 50/1.5"	-/120/120
A.2.5.4.1.2 Without insulation				
40	3.7 – 5.5		CFS-C P 50/1.5"	-/120/120
50	4.6 – 6.9		CFS-C P 50/1.5"	-/120/120
75	6.8		CFS-C P 75/2.5"	-/120/120
90	12.3		CFS-C P 90/3"	-/120/120
110	10.0 – 15.1		CFS-C P 110/4"	-/120/120
Maximum thickness of sound decoupling: 9 mm				
A.2.5.4.1.3 Combustible insulation (D) – arrangement LS (length of insulation $L_D \geq$ 250 mm) or CS				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Insulation thickness t_D (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
90	12.3	22.5	CFS-C P 160/6"	-/120/120
110	15.1	10	CFS-C P 125/5"	-/120/120

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A.2.5.4.2 Pipelife "Master 3" pipes (PP-CO/PP-MV/PP-CO)			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	1.2	CFS-C P 50/1.5"	-/90/90
40	1.8	CFS-C P 50/1.5"	-/90/90
50	1.8	CFS-C P 50/1.5"	-/90/90
75	1.8	CFS-C P 75/2.5"	-/90/90
110	1.8	CFS-C P 110/4"	-/90/90
Maximum thickness of sound decoupling: 9 mm			
A.2.5.4.3 POLOPLAST "Polo Kal NG" pipes (PP-CO/PP-MV/PP-CO)			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
32	1.8	CFS-C P 50/1.5"	-/90/90
40	1.8	CFS-C P 50/1.5"	-/90/90
50	2.0	CFS-C P 50/1.5"	-/90/90
75	2.6	CFS-C P 75/2.5"	-/90/90
90	3.0	CFS-C P 90/3"	-/90/90
110	3.6	CFS-C P 110/4"	-/90/90
Maximum thickness of sound decoupling: 9 mm			
A.2.5.4.3.1 Without insulation			
200	6.8	CFS-C P 200/8"	-/180/180
250	8.6	CFS-C P 250/10"	-/180/180
Maximum thickness of sound decoupling: 9 mm			
A.2.5.4.4 POLOPLAST "Polo Kal 3S" pipes (PP/PP-MV/PP)			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
75	3.8	CFS-C P 75/2.5"	-/90/90
90	4.5	CFS-C P 90/3"	-/90/90
110	4.8	CFS-C P 110/4"	-/90/90
Maximum thickness of sound decoupling: 9 mm			
A.2.5.4.5 Geberit "Silent dB20" pipes (PE-S2)			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	FRL (Fire Resistance Level)
56	3.2	CFS-C P 63/2"	-/180/180
63	3.2	CFS-C P 63/2"	-/180/180
110	6.0	CFS-C P 110/4"	-/180/180
Maximum thickness of sound decoupling: 9 mm			

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A.2.5.5 PVC pipes			
2.4.5.1 PVC-U pipes			
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A ₁)	FRL (Fire Resistance Level)
20 *)	1.5 – 2.2	CFS-C P 50/1.5"	-/120/120
20 - 50	1.5/2.4 – 2.2/5.6 ¹³	CFS-C P 50/1.5"	-/120/120

The results of 2.4.5.1 are also valid for PVC-C pipes⁶ and PVC-U pipes.

¹³ Interpolation of minimum wall thickness between 1,5 mm for diameter 20 mm and 2,4 mm for diameter 50 mm, interpolation of maximum wall thickness between 2,2 mm for diameter 20 mm and 5,6 mm for diameter 50 mm for pipe diameters in between.

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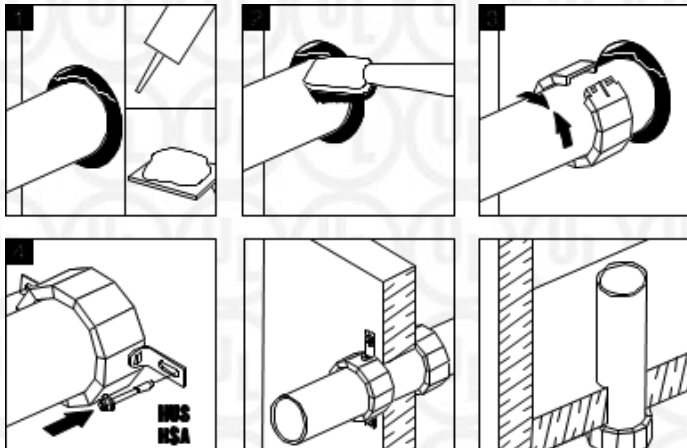


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ANNEX 3 INSTALLATION OF THE PRODUCT AND ANCILLARY PRODUCT(S)

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



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Appendix B**Test report details – report reference.**

Name of Test Institute	Owner	Number of Report	Date of Test	Test standard
Warringtonfire Australia Pty Ltd	HILTI (Aust.) Pty Ltd 1G Homebush Bay Drive Rhodes NSW 2138 Australia	2626600.4, date 30.01.2012	21.10.2011	AS1530.4-2014
Warringtonfire Australia Pty Ltd	HILTI (Aust.) Pty Ltd 1G Homebush Bay Drive Rhodes NSW 2138 Australia	FRT 180051.1, date 17.01.2019	10.10.2018	AS1530.4-2014
Warringtonfire Australia Pty Ltd	HILTI (Aust.) Pty Ltd 1G Homebush Bay Drive Rhodes NSW 2138 Australia	FR180052.2, date 22.01.2019	11.10.2018	AS1530.4-2014
Afiti Licof	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	0956T06, date 06.02.2007	16.09.2006	EN 1366-3: 2005
MPA Braunschweig	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	3342/939/11, date 24/10/2011	30.03.2011	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	15641B, date 09.10.2012	27.08.2012	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	15796A, date 08.02.2013	05.12.2012	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	16438A, date 13.03.2014	20.02.2014	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	18666A, date 06.03.2018	04.12.2017	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	18667A, date 06.03.2018	04.12.2017	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	19175A, date 04.10.2018	23.07.2018	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	19177A, date 04.10.2018	25.07.2018	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	19178A, date 04.10.2018	24.07.2018	EN 1366-3: 2009

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Name of Test Institute	Owner	Number of Report	Date of Test	Test standard
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	19692A, date 24.04.2020	28.05.2019	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	19928A, date 10.04.2020	16.10.2019	EN 1366-3: 2009
WFRGENT nv	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	19930A, date 10.04.2020	15.10.2019	EN 1366-3: 2009
IBS – Institut für Brandschutztechnik und Sicherheitsforschung Gesellschaft m.b.H.	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	320040703-6-en, date 21.04.2021	09.12.2020	EN 1366-3: 2009
MFPA Leipzig GmbH	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	PB 3.2/16-135-1, date 07.09.2016	09.08.2016	EN 1366-3
MFPA Leipzig GmbH	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	PB 3.2/16-135-2, date 07.09.2016	09.08.2016	EN 1366-3
MPA NRW	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	232000488-01-K1, date 15.06.2021	27.10.2020	EN 1366-3: 2009
MPA NRW	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	232000488-02-K1, date 22.06.2021	28.10.2020	EN 1366-3: 2009
PAVUS a.s.	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	Pr-14-2.038-En, date 03.04.2014	10.03.2014	EN 1366-3: 2009
PAVUS a.s.	HILTI AG Feldkircher Str. 100 LI-9494 Schaan	Pr-14-2.039-En, date 03.04.2014	12.03.2014	EN 1366-3: 2009
MPA Braunschweig	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	3343/940/11, date 11/11/2011	06.04.2011	EN 1366-3: 2009

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Name of Test Institute	Owner	Number of Report	Date of Test	Test standard
Instituto Giordano	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	264511/3164FR, date 12.01.2010	18.12.2010	EN 1366-3: 2009
Instituto Giordano	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	283512/3312FR, date 16.06.2011	16.05.2011	EN 1366-3: 2009
Instituto Giordano	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	284059/3317FR, date 29.06.2011	06.06.2011	EN 1366-3: 2009
Instituto Giordano	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	285773/3333FR, date 29.08.2011	20.07.2011	EN 1366-3: 2009
Instituto Giordano	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	287889/3347FR, date 03.11.2011	14.09.2011	EN 1366-3: 2009
Instituto Giordano	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	288934/3356FR, date 01.12.2011	18.10.2011	EN 1366-3: 2009
Instituto Giordano	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	288935/3357FR, date 01.12.2011	19.10.2011	EN 1366-3: 2009
MPA NRW	Hilti Entwicklungsgesellschaft GmbH Hiltistraße 6, 86916 Kaufering, Germany	210005615, date 29.03.2010	14.10.2009	EN 1366-3: 2009

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