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Regulatory information report

The fire resistance performance of PE-X, PP-R and PE-RT pipes protected by Hilti Firestop Intumescent Sealant CP 611A and Hilti Retrofit Collars CFS-C P if tested in accordance with AS 1530.4:2014 and assessed in accordance with AS 4072.1:2005

Client: Hilti (Aust.) Pty Ltd and Hilti New Zealand Limited

Report number: 33136700 Revision: RIR7.1 Reference number: FAS210368

Issue date: 23 February 2022 Expiry date: 31 December 2023

Amendment schedule

Version	Date	Information relating to report			
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			Prepared by	Reviewed by	
		Name	S. Hu	K. Nicholls	
33136700.1	Issue: 20/03/2015	Reason for issue	Revised PE-X pipe wall thickness		
			Prepared by	Reviewed by	
		Name	S. Hu	K. Nicholls	
33136700.2	Issue: 29/06/2015	Reason for issue	Revised to include large aperture size in 100mm or thicker 2hr support walls		
			Prepared by	Reviewed by	
		Name	S. Hu	K. Nicholls	
33136700.3	Issue: 1/02/2016	Reason for issue	Revised to include additional construction details		
			Prepared by	Reviewed by	
		Name	S. Hu	K. Nicholls	
33136700.4	Issue: 17/02/2016	Reason for issue	Revised product reference and beading clarification		
			Prepared by	Reviewed by	
		Name	S. Hu	K. Nicholls	
33136700.5	Issue: 30/11/2018	Reason for issue	Revised to include additional test data, extend validity and update to AS 1530.4:2014		
			Prepared by	Reviewed by	
		Name	Imran Ahmed	Mahmoud Akl	
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			Prepared by	Reviewed by	
		Name	Imran Ahmed	Mahmoud Akl	
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			Prepared by	Reviewed by	Approved by
		Name	Yomal Dias	Omar Saad	Omar Saad
33136700 RIR7.1	Issue: 23/02/2022	Reason for issue	Revised to include additional services including condensation pipes and pair coils. Included AlphaPanel wall systems		
			Prepared by	Reviewed by	Approved by
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General conditions of use

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1. Introduction

This report contains the minimum information sufficient for regulatory compliance in accordance with AS 1530.4:2014 and refers to Assessment reports 33136700 R7.1, FAS190067B R1.0 and FAS210067 R1.2.

The referenced assessment report 33136700 R7.1 presents an assessment of the fire resistance performance of Hilti Firestop Intumescent Sealant CFS-IS/CP 611A protecting various types of plumbing and HVAC services in flexible walls and rigid walls if tested in accordance with AS 1530.4:2014 and assessed in accordance with AS 4072.1:2005.

The referenced assessment report FAS190067B R1.0 contains an assessment of the fire resistance performance of various pipe and cable services through a 155mm thick Dincel wall with polymer skins, filled with normal-weight concrete, protected by various Hilti fire protection systems including Firestop block CFS-BL, Firestop plug CFS-PL, intumescent sealant CP 611A, acrylic sealant CP 606 and Hilti Firestop Putty Bandage CFS-P BA, in general accordance with AS 1530.4:2014.

The referenced assessment report FAS210067 R1.2 contains an assessment of the fire resistance performance of various AlphaPanel wall systems if tested in accordance with AS 1530.4:2014.

The tested prototypes described in Section 2 of this report, when subject to the proposed variations described in Section 3 and tested in accordance with the referenced test method described in Section 4 are assessed to achieve the performance summarised in section 5.

The validity of this assessment is conditional on compliance with Sections 7, 8 and 9 of this report.

Summaries of the test data on which this assessment is based are provided in the referenced assessment reports. A summary of the critical issues leading to the assessment conclusions including the main points of argument is also discussed in the referenced assessment reports.

2. Tested prototypes

The referenced assessment report 33136700 R7.1 refers to the test report FR 3317 describing test of PE-Xa pipe protected with various Hilti products penetrating plasterboard lined wall construction and tested in accordance with AS 1530.4:1997. The test was sponsored by Hilti (New Zealand) Limited and was conducted by BRANZ.

The referenced assessment report 33136700 R7.1 also refers to test No. 14244A tested in accordance with EN1366-3:2009 conducted by EFFECTIS France and sponsored by Hilti (New Zealand) Limited.

The referenced assessment report 33136700 R7.1 also refers to Test Reports No. EWFA 2626600.4 tested in accordance with AS 1530.4:2005 and EWFA 53391100.3 and EWFA 53366600.2 tested in accordance with AS 1530.4:2014. The tests were sponsored by Hilti and were conducted by Exova Warringtonfire Aus Pty Ltd.

The referenced assessment FAS180439 R1.3 is based on reference tests FRT180049.4, FRT180051.2 & FRT180052.2 being tests on 75mm Hebel wall in accordance with AS 1530.4:2014 and AS 4072.1:2005. The tests were sponsored by Hilti (Aust.) Pty Ltd and Hilti New Zealand Limited and were conducted by Warringtonfire Aus Pty Ltd.

Furthermore, the referenced assessment report FAS190067B R1.0 refers to FRT190130 R2.0 which describes a fire resistance test of various pipe and cable services through a 155mm thick Dincel wall with polymer skins, filled with normal-weight concrete, protected by various Hilti fire protection systems including Firestop block CFS-BL, Firestop plug CFS-PL, intumescent sealant CP 611A, acrylic sealant CP 606 and Hilti Firestop Putty Bandage CFS-P BA, in accordance with AS 1530.4:2014. FRT190130 R2.0 was sponsored by Dincel construction system and Hilti Australia Pty Ltd, and the testing was undertaken by Warringtonfire Australia Pty Ltd.

Refer to Appendix A of the referenced assessment reports for a full summary of the test data.

3. Variations to the tested protypes

The proposed construction is for various types of PE-X pipes penetrations protected with Hilti Firestop Intumescent Sealant CFS-IS/CP 611A in walls shall be as tested in test FR 3317 as specimen 10, and other test specimens in test repots EWFRA 53366600.2 and EWFRA 53391100.3 subject to the following variations:

- Hilti Firestop Intumescent Sealant CP 611A is stated by the manufacturer to be identical to Hilti Firestop Intumescent Sealant CFS-IS and the only difference is the trade name. For the purpose of this assessment the product will be referred to as CP 611A.
- The proposed plumbing pipes shall have nominal outside diameters of 16mm, 20mm, 25mm & 32mm
- For pipe and aperture sizes listed in Table 2, the gap between the pipe and plasterboard shall be filled with Hilti Firestop Intumescent sealant CP 611A on each side.
- For pipe and aperture sizes listed in Table 3, the gap between the pipe and plasterboard shall be filled with Hilti Firestop Intumescent sealant CP 611A on each side and the cavity shall be filled with mineral wool insulation.
- Mineral wool/stone wool used as a backing material must have a minimum density of 100kg/m^3 and be tested to AS 1530.1 or AS 1530.4
- Specimen 10 shall optionally include Hilti Firestop Collar CP 644/CFS-C P as tested in EWFA 2626600 and be fixed on each side of wall replacing the plasterboard beading (build up detail). The collar shall be fully filled with Hilti Firestop Intumescent sealant CP 611A.
- 1-hour plasterboard wall systems shall be constructed from minimum 1 layer of 13mm or 1 layer of 16mm fire rated plasterboard on each side of timber or steel frame, with a minimum wall thickness of 90mm and be designed to achieve FRL -/60/60 or FRL 60/60/60
- 2-hour plasterboard wall systems shall be constructed from minimum 2×layers of 13mm or 2×layers of 16mm fire rated plasterboard on each side of a steel frame, with minimum thickness of 116mm and be designed to achieve FRL -/120/120 or FRL 120/120/120
- For -/60/60 applications, AlphaPanel wall system must consist of minimum 35 mm thick AlphaPanel and at least a single layer of 13 mm thick fire rated plasterboard with an adequate wall cavity supported by framing (studs or furring channels) such that the overall wall thickness is not less than 88 mm – as shown in Figure 2.
- For -/90/90 applications, AlphaPanel wall system must consist of minimum 35 mm thick AlphaPanel and at least a single layer of 16 mm thick fire rated plasterboard with an adequate wall cavity supported by framing (studs or furring channels) such that the overall wall thickness is not less than 96 mm – as shown in Figure 3.
- For -/120/120 applications, AlphaPanel wall system must consist of minimum 35 mm thick AlphaPanels on each side of the wall with an adequate wall cavity such that the overall wall thickness is not less than 120 mm – as shown in Figure 4.
- The wall construction shall optionally be concrete, AAC, solid or hollow masonry wall or Speedpanel wall. Where the minimum wall thickness of 90mm for 1 hr walls and 100mm for 2hour walls.
- Plasterboard used in the construction shall include but not be limited to USG Boral Firestop, CSF Fyrecheck, Knauf Fireshield & GIB Fyreline® and include other types and brands of fire resistant grade plasterboards verified by manufacturer.
- Reference to Test Report 53366600.2, assess insulation performance of various plumbing plastic pipes to achieve insulation performance of 60 minutes.
- Minimum 155mm thick Dincel walls, filled with normal-weight concrete, may also be used as the wall separating element.
- The assessed construction is summarised in sections 3.1, 3.2 and 3.3.

3.1 Distance Requirements

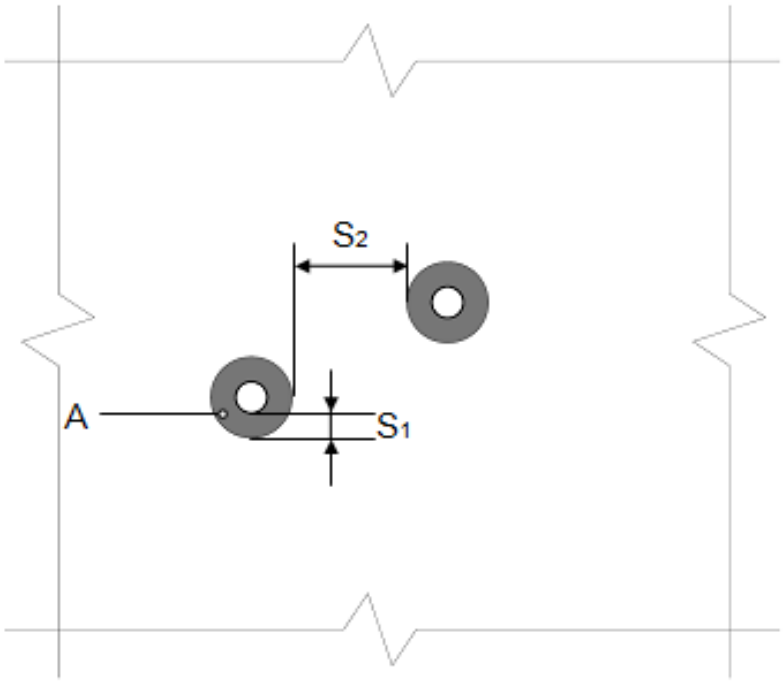


Figure 1 Distance Requirements of Penetrations

Table 1 Distance Requirements in Walls

Minimum distances valid for installation of services	Wall (mm)
Distance between pipe and seal edge (1hr Applications)	S1 = 5
Distance between pipe and seal edge (2hr Applications)	S1 = 0
Distance between penetrations	S2 = 40
Distance between pipe and edge if Hilti CFS-C P 50/1.5" Retrofit fire collar	S3 = 5

Note 1: Distance between pipe and edge seal varies between applications

Table 2 Aperture Sizes for Sealant CP 611A (A) without Backfilling Material

Pipe Outside Diameter	Min. Aperture Diameter	Max. Aperture Diameter
Ø16mm	Ø26mm	Ø36mm
Ø20mm	Ø30mm	Ø40mm
Ø25mm	Ø35mm	Ø48mm

Table 3 Aperture Sizes for Sealant CP 611A (A) with Backfilling Material (B)

Pipe Outside Diameter	Min. Aperture Diameter	Max. Aperture Diameter
Ø16mm	Ø36mm	Ø150mm
Ø20mm	Ø40mm	Ø150mm
Ø25mm	Ø48mm	Ø150mm

Note 2: The dimensions in Table 3 refer to the applications shown in Figure 11b, Figure 12b and Figure 13b

Sealant backed with Backing Rod

In situations where backing material (B) is optional or cavity insulation (E2) is not used, a Closed-Cell or Open-Cell polyethylene foam backing rod may optionally be used to control the depth of Hilti Firestop Intumescent CP611a (A) within or between flexible or rigid walls.

Table 4 Size of Polyethylene Backing Rod

Max. gap width around Pipes (S_1) (mm)	Size of PE rod (mm)
8	10
12	15
16	20
20	25
30	40

Aperture Beading Details for walls

For walls with a wall thickness (t_E) of less than that stated in Section 3.2 and 3.3, beading shall be used.

Beading

13mm or 16mm thick fire rated plasterboard strips at least 100mm wide are installed around the opening with the necessary number of layers to form frames (or a frame if only on one side) with sufficient thickness, so that the total thickness of wall is greater than or equal to t_E.

Penetration Seal

For aperture hole sizes listed in Table 2, Hilti Firestop Intumescent Sealant CP 611A (A) shall be installed For aperture hole sizes listed in Table 3, Hilti Firestop Intumescent Sealant CP 611A (A) shall be installed on each side to a thickness of 25mm and mineral wool/stone wool insulation (B) shall be tightly compressed as backfilling material. (Gap filled completely).

Additional Protection for Penetrations

Additional protection material (AP) is utilised for some applications and comprises the following:

AP1: Hilti Firestop Collar CP 644/CFS-C P that are installed on each side of the wall and fixed with Hilti anchors as outlined in the Hilti Anchor table below. The gap between Hilti Firestop collars (AP1) and pipe material (C) shall be fully filled with Hilti Firestop Intumescent Sealant CP 611A (A) to the full depth of collar.

AP2: Additional layers of 13mm or 16mm fire rated plasterboard strip, at least 100mm wide added to both sides of the wall and fixed in place with a suitable fixings.

Table 5 Pipe material size and Hilti firestop collar size

Pipe Outside Diameter	Collar Code
Ø16mm	Hilti CP644 / CFS-CP 50/1.5"
Ø20mm	
Ø25mm	
Ø32mm	

Table 6 Hilti anchor types for Hilti retrofit firestop collar

Anchoring System		Minimum Size	Flexible Wall (Plasterboard lined)	Aerated Concrete Wall (Hebel)	Solid Concrete Walls & Floors
Hilti Screw Anchor	HUS3-P	M6		✓*	✓
	HUS3-H			✓*	✓
	HUS			✓*	✓
Hilti Expansion Anchor	HSA				✓
	HST				✓
	DBZ 6/45				✓
Hilti Cavity Anchor	HTB-S		✓		
	HHD-S		✓		
Others	#14/10x65mm Hex Head Type 17 Screw	14g		✓	
	Laminating / Drywall / Plasterboard Screws, with steel washers of at least 19mm in diameter, length as required.	10g	✓		
	Threaded Rod with Nuts & Washer	M6	✓	✓	✓

* Minimum length/embedment depth of fixing required for ACC Hebel walls is 60mm

3.2 Penetrations in Flexible Walls

-/60/60 or 60/60/60 Flexible Wall (E)

The wall shall have a minimum thickness of 90mm (tE) and comprise of steel or timber studs lined on both faces with a minimum of one layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve an FRL of -/60/60 or 60/60/60 with or without cavity insulation (E2).

Alphapanel wall systems with a minimum overall thickness of 88 mm and consisting of minimum 35 mm thick AlphaPanel with minimum 1 × 13 mm fire rated plasterboard that has been tested or assessed to achieve an FRL of -/60/60 as per FAS210067 R1.2 are also applicable. Ie the services assessed in section 5 for -/60/60 or 60/60/60 flexible walls are also applicable to the -/60/60 AlphaPanel wall system – shown in Figure 2.

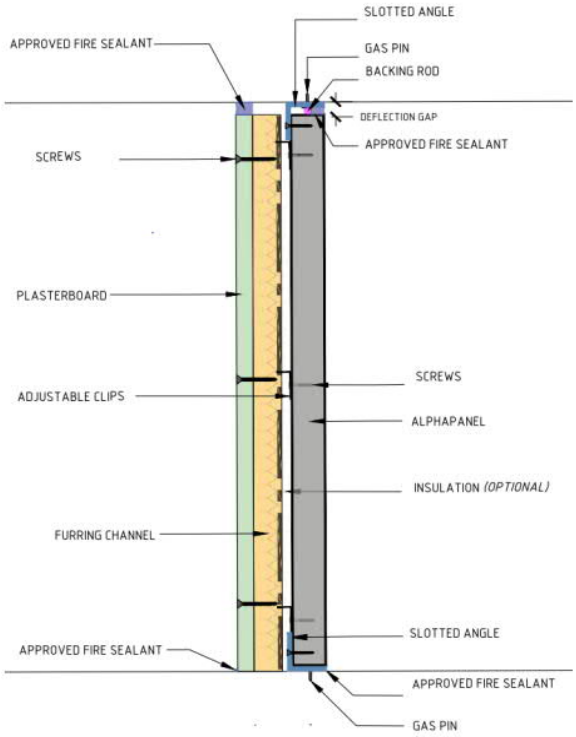


Figure 2 AlphaPanel wall for -/60/60 applications – minimum 35 mm thick AlphaPanel with minimum 1 × 13 mm fire rated plasterboard (minimum wall thickness 88 mm)

-/90/90 or 90/90/90 flexible wall (E)

The wall shall have a minimum thickness of 90mm (tE) and comprise of steel or timber studs lined on both faces with a minimum of one layer of 16 mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve an FRL of -/90/90 or 90/90/90 with or without cavity insulation (E2).

Alphapanel wall systems with a minimum overall thickness of 96 mm and consisting of minimum 35 mm thick AlphaPanel with minimum 1 × 16 mm fire rated plasterboard that has been tested or assessed to achieve an FRL of -/90/90 as per FAS210067 R1.2 are also applicable. Ie the services assessed in section 5 for -/90/90 or 90/90/90 flexible walls are also applicable to the -/90/90 AlphaPanel wall system – shown in Figure 3.

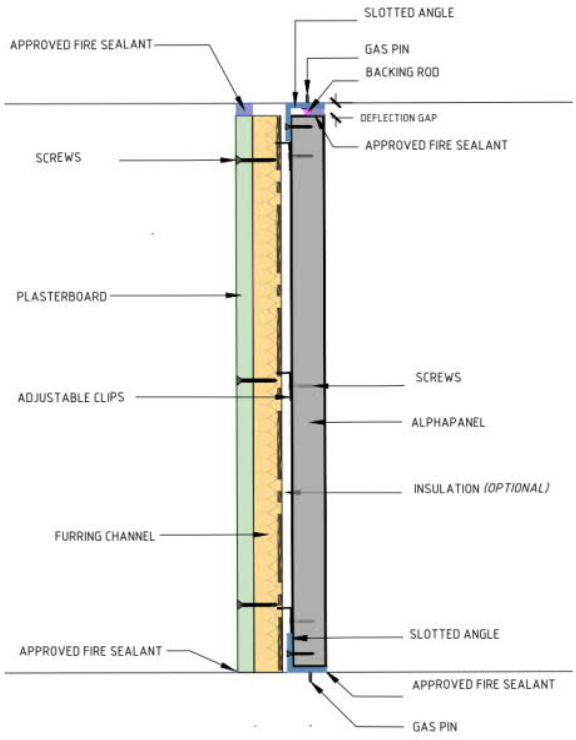


Figure 3 AlphaPanel wall for -/90/90 applications – minimum 35 mm thick AlphaPanel with minimum 16 mm fire rated plasterboard (minimum wall thickness 96 mm)

-/120/120 or 120/120/120 flexible wall (E)

The wall shall have a minimum thickness of 116mm (t_E) and comprise of steel studs lined on both faces with a minimum of two layers of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve an FRL of -/120/120 or 120/120/120 with or without cavity insulation (E_2).

Alphapanel wall systems with a minimum overall thickness of 120 mm and consisting of minimum 35 mm thick AlphaPanel with minimum 2 × 13 mm fire rated plasterboard that has been tested or assessed to achieve an FRL of -/120/120 as per FAS210067 R1.2 are also applicable. Ie the services assessed in section 5 for -/120/120 or 120/120/120 flexible walls are also applicable to the -/120/120 AlphaPanel wall system – shown in Figure 4.

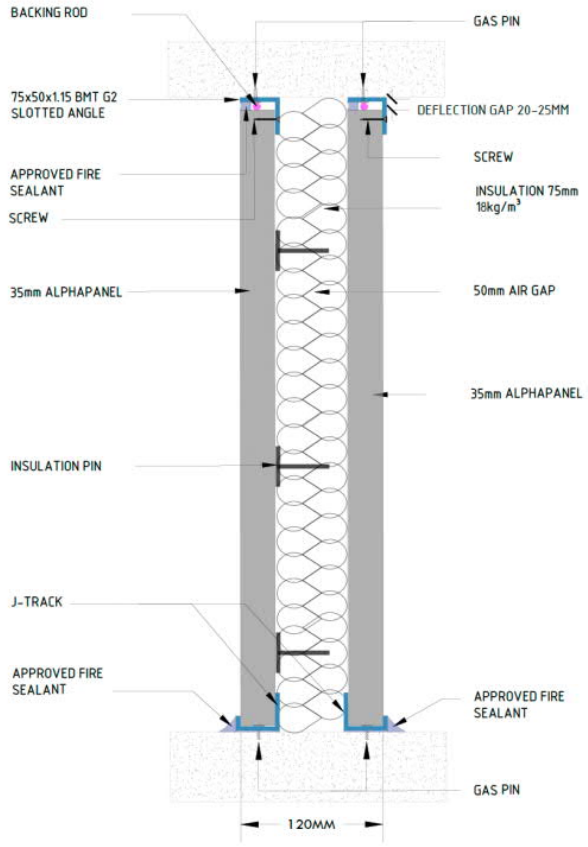


Figure 4 AlphaPanel wall for -/120/120 applications – minimum 35 mm thick AlphaPanel on each side of the wall (minimum wall thickness 120 mm)

3.3 Penetrations in Rigid Walls

75mm Rigid Walls with Beading (E)

The bare wall (E) must have a minimum thickness of 75mm and comprise of concrete, aerated concrete, Speedpanel panel, or solid or hollow masonry with a minimum density of 550kg/m^3. If the bare wall thickness is less than 100mm thick a beading (AP2) shall be applied to result in a total thickness $t_E \geq$ 100mm.

100mm Rigid Walls or Greater (E)

The bare wall (E) must have a minimum thickness of 100mm and comprise of concrete, aerated concrete or solid or hollow masonry with a minimum density of 550kg/m^3, $t_E \geq$ 100mm.

3.4 Rough in configurations

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations

S configuration: service enters from one side of the wall, travel in between the plasterboard sheets and exit at the other side of the wall

C configuration: service enters from one side of the wall, travel in between the plasterboard sheets and exit at the same side of the wall

L configuration: service penetrating from floor, travel in between the plasterboard sheets and exit at either side of the wall

4. Referenced test procedures

This report is prepared with reference to the requirements of AS 1530.4:2014 and AS 4072.1:2005.

5. Formal assessment summary

Based on the discussion presented in this report, it is the opinion of this testing authority that if the specimen described in section 1 had been modified within the scope of section 3, it will achieve the performance as stated below if tested in accordance with the test method referenced in Section 4 and subject to the requirements of Section 7.

Below from Table 7 to Table 20 are relevant to plumbing trade, mostly for water and gas supply systems, covering a variety of common plumbing services, wall types, installation configurations and FRL.

5.1 Plumbing services

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

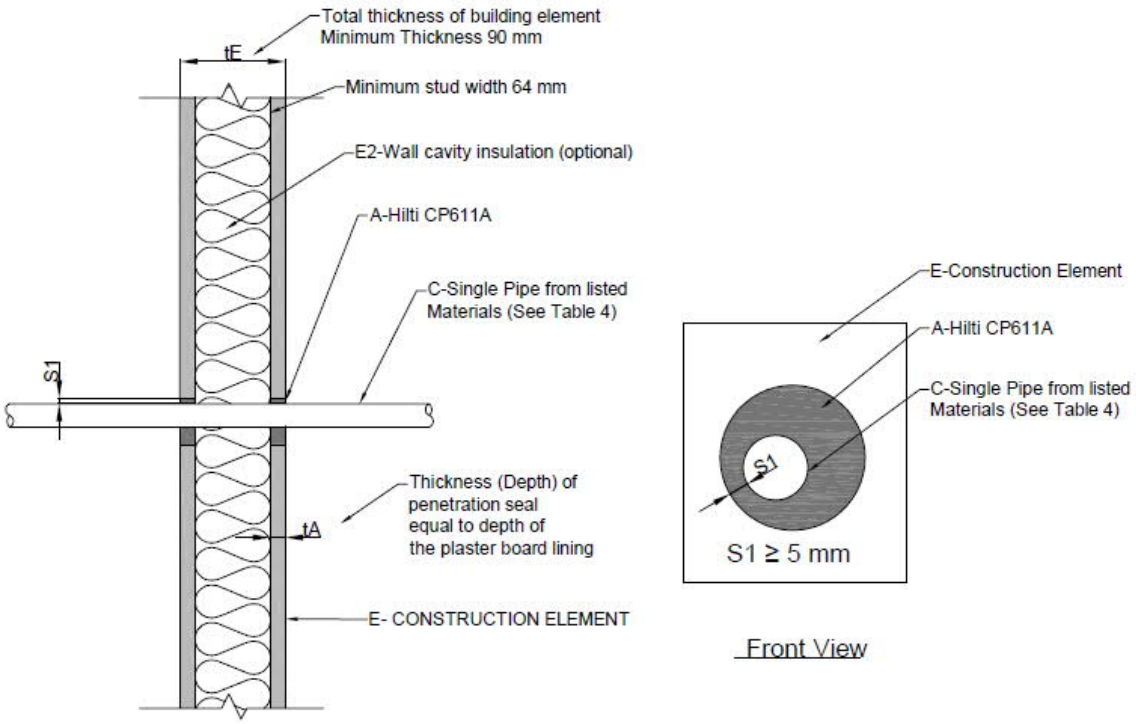


Figure 5 Pipe services penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Table 7 Pipe services penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Pipe Material C	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Hole Diameter Range (mm)*	Sealant Depth (mm) t_A	FRL
PE-Xa	16	1.2 – 2.4	26 - 38	Depth of Plasterboard 1×13mm=13mm 1×16mm=16mm	-/60/60
	20	2.3 – 3.4	30 - 40		
	25	2.8 – 3.9	35 - 48		
PE-Xb	16	1.2 – 2.4	26 - 38		-/60/60
	20	2.3 – 3.4	30 - 40		
	25	2.8 – 3.9	35 - 48		
PE-Xa/Al/PE	16	2.0 – 2.6	26 - 38		-/60/60
	20	2.3 – 2.9	30 - 40		
	25	3.5 - 3.7	35 - 48		
PE-Xb/AL/PE-Xb	16	2.0 – 2.6	26 - 38		-/60/60
	20	2.3 – 2.9	30 - 40		
	25	3.5 – 3.7	35 - 48		
PP-R	20	2.8	30 - 40		-/60/60
	25	3.5	35 - 48		
	32	3.6	48 - 54		
PP-R SDR 11	32	2.9	48 - 54		-/60/60
PE-RT/AL/PE-RT (KE KELIT KELOX KM110)	16	2	26 - 38		-/60/60
	20	2.25	30 - 40		-/60/60
	25	2.5	35 - 48		-/60/60**
	32	3	48 - 54		-/60/60**
PE-Xc	16	2.2	30 - 40		-/60/60
	20	3.3	30 - 40		-/60/60

* Back filling material is Not Required for all hole diameters noted in Table 7

** Sealant to be installed in a 25mm ×25mm fillet configuration

-/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

FRL 90/90/90& FRL -/90/90

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 96mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 90/90/90 or FRL -/90/90, with or without cavity insulation E_2.

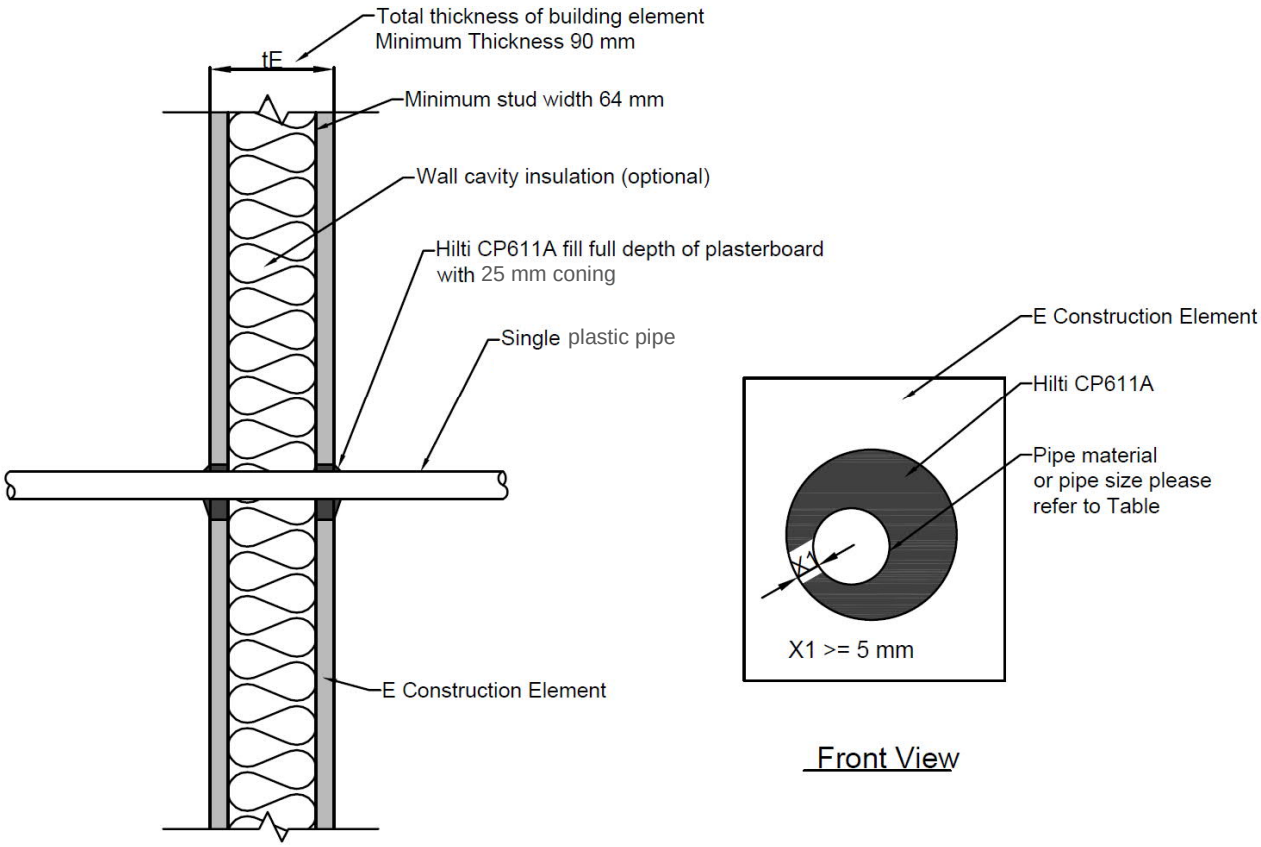


Figure 6 **PE-Xc pipe penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls**

Table 8 **Pipe services penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls**

Pipe Material C	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Hole Diameter Range (mm)*	Sealant Depth (mm) t_A	FRL
PE-Xc	16	2.2	30 - 40	Depth of Plasterboard 1×16mm=16mm + 25 mm coning	-/90/90
	20	3.3	30 - 40		-/90/90
* Back filling material is Not Required for all hole diameters noted in Table 8					

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant & AP1 (Hilti CFS-C P 50/1.5" Retrofit Fire Collar)

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layers of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

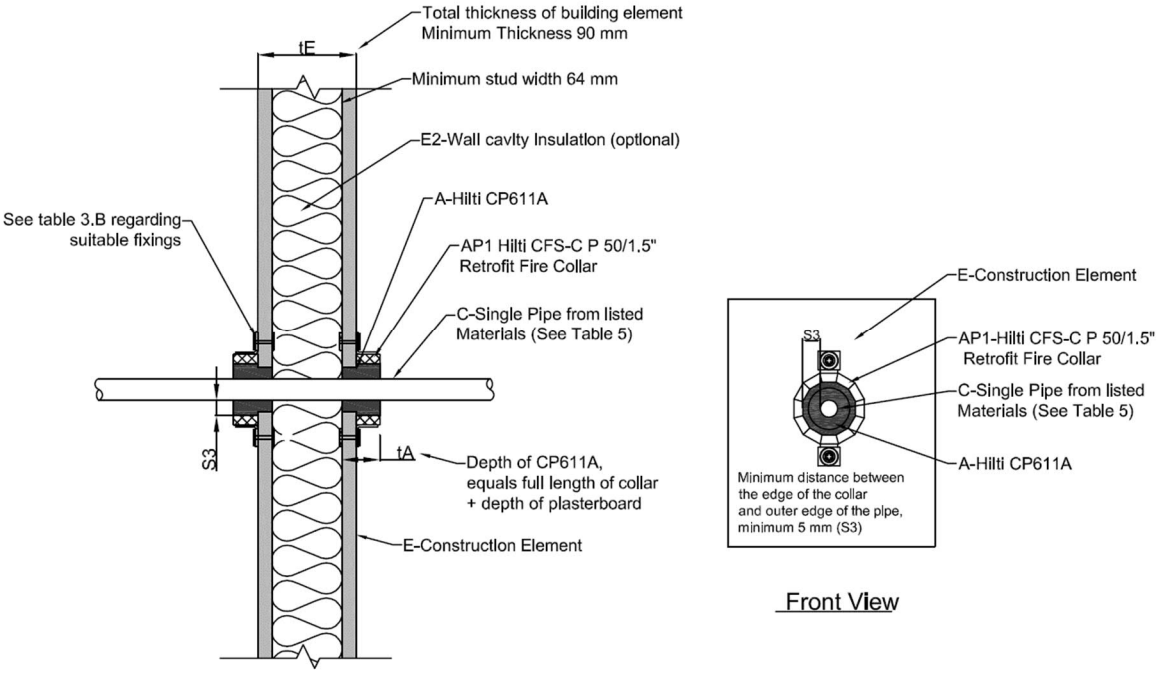


Figure 7 Pipe services penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls with AP1

Table 9 Pipe services penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls with AP1

Pipe Material C	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Hole Diameter Range (mm)	Sealant Depth (mm) t_A	FRL
PE-Xa	16	1.2 – 2.4	26 - 38	Depth of plasterboard 1 × 13mm = 13mm 1 × 16mm = 16mm	-/60/60
	20	2.3 – 3.4	30 - 40		
	25	2.8 – 3.9	35 - 48		
PE-Xb	16	1.2 – 2.4	26 - 38		-/60/60
	20	2.3 – 3.4	30 - 40		
	25	2.8 – 3.9	35 - 48		
PE-Xa/Al/PE	16	2.0 – 2.6	26 - 38		-/60/60
	20	2.3 – 2.9	30 - 40		
	25	3.5 – 3.7	35 - 48		
	32	3.5 – 4.7	48 - 54		
PE-Xb/AL/PE-Xb	16	2.0 – 2.6	26 - 38		-/60/60
	20	2.3 – 2.9	30 - 40		
	25	3.5 – 3.7	35 - 48		
	32	2.0 – 2.6	48 - 54		
PP-R	20	2.8	26 - 38		-/60/60
	25	3.5	30 - 40		
	32	3.6	35 - 48		
PP-R SDR 11	32	2.9	48 - 54		-/60/60
PE-RT/AL/PE-RT (KE KELIT KELOX KM110)	16	2	26 - 38		-/60/60
	20	2.25	30 - 40		
	25	2.5	35 - 48		
	32	3	48 - 54		

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant + AP2

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

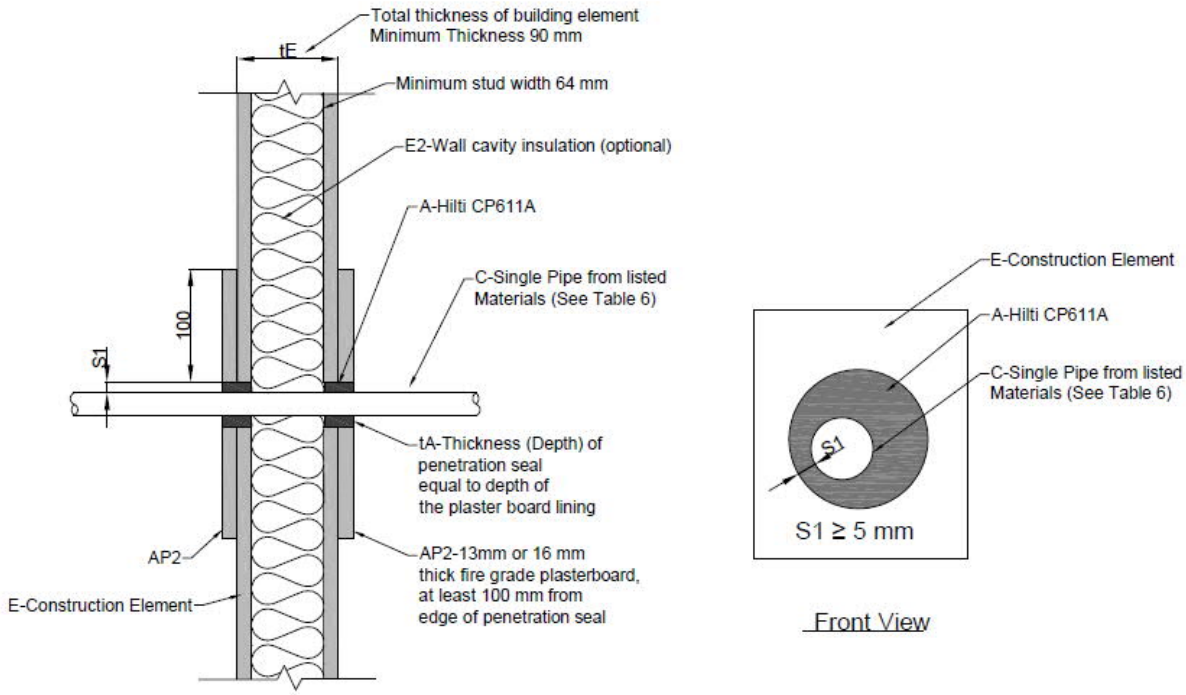


Figure 8 Pipe service in -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls with additional protection AP2

Table 10 Pipe service in -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls with additional protection AP2

Pipe Material C	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Hole Diameter Range (mm)	Sealant Depth (mm) t_A	FRL
PE-Xa	16	1.2 – 2.4	26 - 38	25mm depth on both sides of the wall	-/60/60
	20	2.3 – 3.4	30 - 40		
	25	2.8 – 3.9	35 - 48		
PE-Xa/Al/PE	16	2.0 – 2.6	26 - 38		-/60/60
	20	2.3 – 2.9	30 - 40		
	25	3.5 - 3.7	35 - 48		
	32	3.5 - 4.7	48 - 54		
PE-Xb	16	1.2 – 2.4	26 - 38		-/60/60
	20	2.3 – 3.4	30 - 40		
	25	2.8 – 3.9	35 - 48		
PE-Xb/AL/PE-Xb	16	2.0 – 2.6	26 - 38		-/60/60
	20	2.3 – 2.9	30 - 40		
	25	3.5 - 3.7	35 - 48		
	32	2.0 – 2.6	48 - 54		
PP-R	20	2.8	26 - 38		-/60/60
	25	3.5	30 - 40		
	32	3.6	35 - 48		
PP-R SDR 11	32	2.9	54		-/60/60
PE-RT/AL/PE-RT (KE KELIT KELOX KM110)	16	2	26 - 38		-/60/60
	20	2.25	30 - 40		
	25	2.5	35 - 48		
	32	3	48 - 54		

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations in S, C, L configurations.

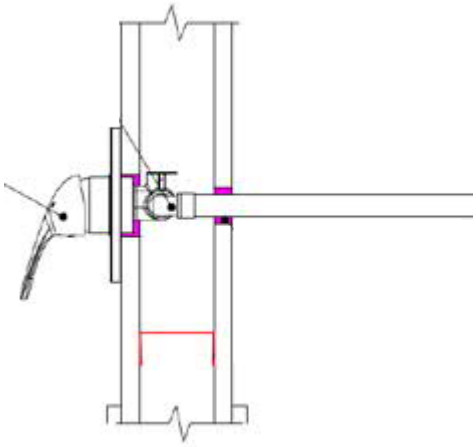


Figure 9 Shower mixer and pipe penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Table 11 Shower mixer and pipe penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Pipe type	Elbow	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
Up to 20 mm PEX-B pipe × 2 (two pipes – hot and cold water)	• 2 × up to 20 mm × up to 15 mm male elbows • 1 × Shower mixer	• 2 × 32 on PEX pipe side • 54 mm on the shower mixer side	The gap between the service and the separating element filled with sealant CP 611a to the full depth of the plasterboard, finishing flush – on both sides.	Straight, S, C and L	-/60/60 (two-way)

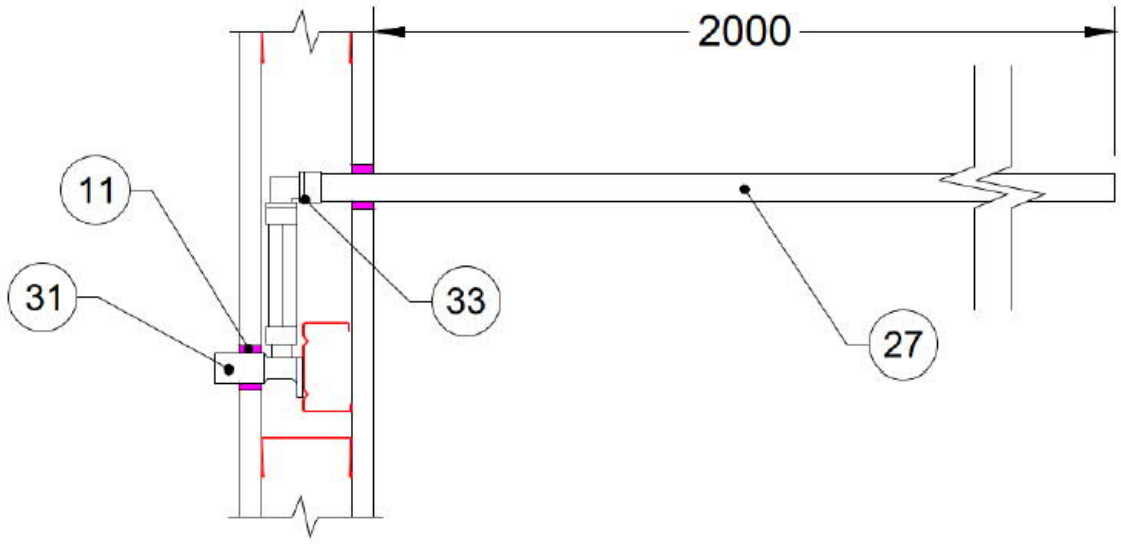


Figure 10 **Brass lugged elbow with PEX-A or PEX-B pipe -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls**

Table 12 **Brass lugged elbow with PEX-A or PEX-B pipe penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls – 1**

Pipe type	Elbow	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
• 1 × 20 mm PEX-A pipe; or • 1 × 20 mm PEX-B pipe	• 1 × extended brass lugged elbow 20 mm × ½" × 65 mm. • 1 × 90° brass elbow	32 – 40	The gap between the service and the separating element filled with sealant CP 611a to the full depth of the plasterboard, finishing flush – on both sides.	Straight, S, C and L	-/60/60 (two-way)*

Table 13 **Brass lugged elbow with PEX-A or PEX-B pipe penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls – 2**

Pipe type	Elbow	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
• 1 × 20 mm PEX-A pipe; or • 1 × 20 mm PEX-B pipe	• 1 × extended brass lugged elbow 20 mm × ½" × 65 mm. • 1 × 90° brass elbow	32 – 40	The gap between the service and the separating element filled with sealant CP 611a to the full depth of the plasterboard, finishing with a 30 mm fillet on each side of the wall.	Straight, S, C and L	-/90/90 (two-way)*
*The wall must contain minimum 1 × 16 mm plasterboard lining with minimum 64 mm deep steel studs, and it must have separately been either tested or assessed to achieve an FRL of -/90/90 by an ATL.					

1 hr Rigid Walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The bare wall must have a minimum thickness of 90mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 550kg/m^3, t_e ≥90mm

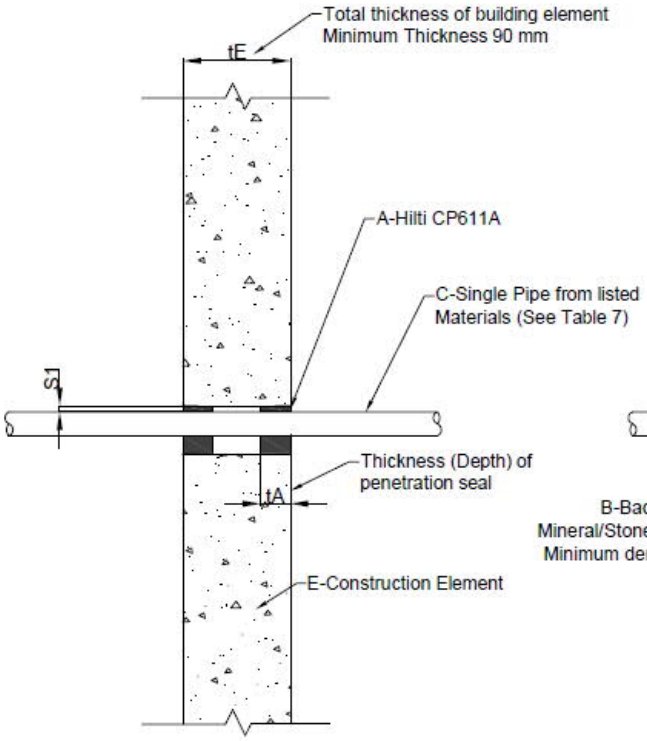


Figure 11a – Pipe service in rigid walls

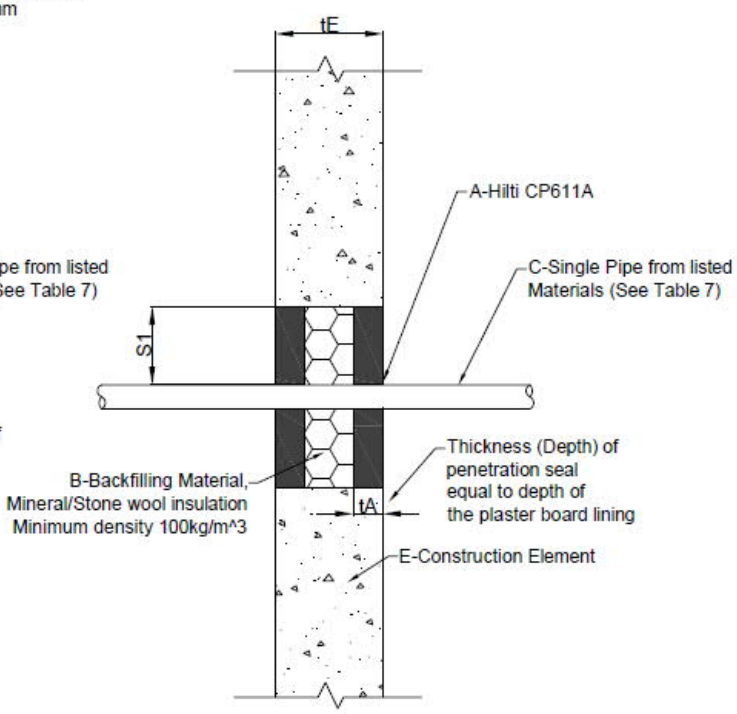
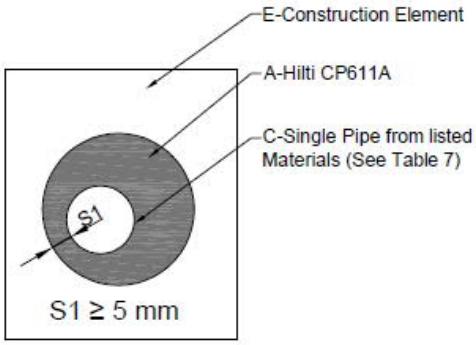


Figure 11b – Pipe service in rigid walls



Front view

Figure 11 PEX pipes penetrating rigid walls

Table 14 PEX pipes penetrating rigid walls

Pipe Material C	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Figure 11a Hole Diameter Range (mm)	Figure 11b Hole Diameter * Range (mm)	Sealant Depth (mm) t_A	FRL
PE-Xa	16	1.2 – 2.4	26 - 38	36 - 150	25mm depth on both sides of the wall	-/60/60
	20	2.3 – 3.4	30 - 40	40 - 150		
	25	2.8 – 3.9	35 - 48	45 - 150		
PE-Xa/Al/PE	16	2.0 – 2.6	26 - 38	36 - 150		-/60/60
	20	2.3 – 2.9	30 - 40	40 - 150		
	25	3.5 - 3.7	35 - 48	45 - 150		
	32	3.5 - 4.7	48 - 54	38 - 150		
PE-Xb	16	1.2 – 2.4	26 - 38	38 - 150		-/60/60
	20	2.3 – 3.4	30 - 40	40 - 150		
	25	2.8 – 3.9	35 - 45	48 - 150		
PE-Xb/AL/PE-Xb	16	2.0 – 2.6	26 - 38	38 - 150		-/60/60
	20	2.3 – 2.9	30 - 40	40 - 150		
	25	3.5 - 3.7	35 - 48	48 - 150		
	32	2.0 – 2.6	48 - 54	54 - 150		
PP-R	20	2.8	30 - 40	38 - 150		-/60/60
	25	3.5	35 - 48	40 - 150		
	32	3.6	48 - 54	48 - 150		
PP-R SDR 11	32	2.9	48 - 54	54 - 150		-/60/60
PE-RT/AL/PE-RT (KE KELIT KELOX KM110)	16	2	26 - 38	38 - 150		-/60/60
	20	2.25	30 - 40	40 - 150		
	25	2.5	35 - 48	48 - 150		
	32	3	48 - 54	54 - 150		
PE-Xc	16	2.2	30 - 40	40 - 150		-/60/60
	20	3.3	30 - 40	40 - 150		-/60/60

*For large aperture, sealant in annular gap shall consist of Hilti Firestop Intumescent CP611A and Mineral wool backfilling material

-/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 116mm (t_E) and comprise of steel stud lined on both faces with minimum 2 x layers of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 120/120/120 or FRL -/120/120, with or without cavity insulation E_2.

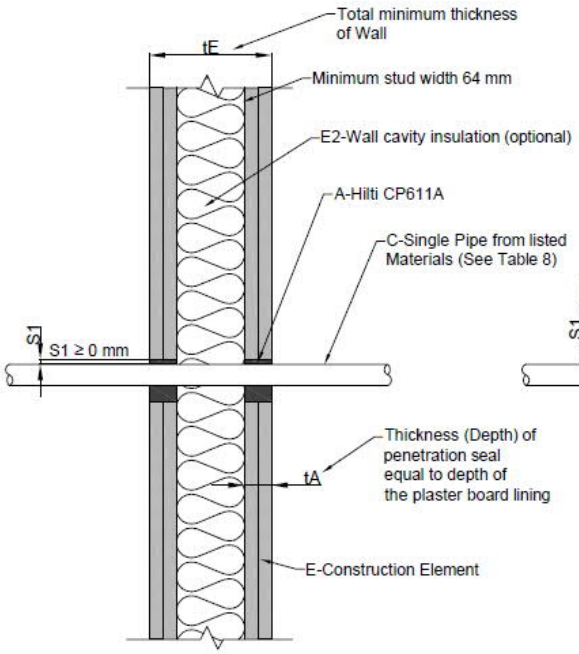


Figure 12a – Pipe service in small

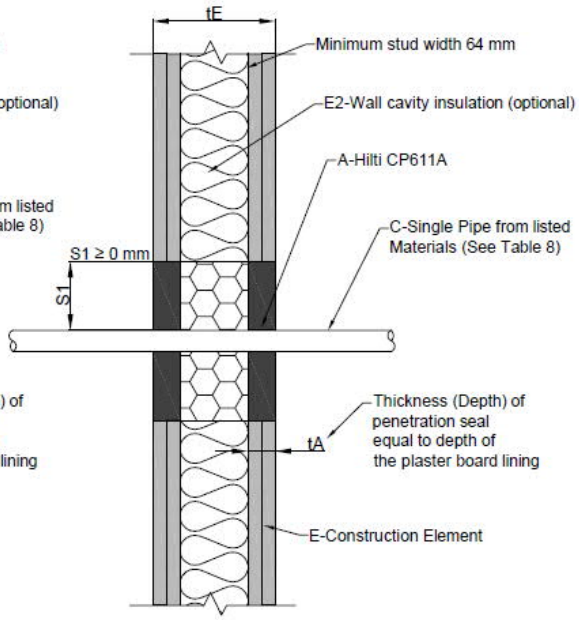


Figure 12b – Pipe service in large aperture

Figure 12 PEX pipes penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Table 15 PEX pipes penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Pipe Material C	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Figure 12a Hole Diameter Range (mm)	Figure 12b Hole Diameter Range (mm)*	Sealant Depth (mm) t_A	FRL
PE-Xa	16	1.2 – 2.4	26 - 38	36 - 150	Depth of Wall lining thickness. 2 × 13 = 26mm 2 × 16 = 32mm	-/120/120
	20	2.3 – 3.4	30 - 40	40 - 150		
	25	2.8 – 3.9	35 - 48	48 - 150		
PE-Xb	16	1.2 - 2.4	26 - 38	36 - 150		-/120/120
	20	2.3 - 3.4	30 - 40	40 - 150		
	25	2.8 - 3.9	35 - 48	48 - 150		
PE-Xa/Al/PE	16	2.0 – 2.6	26 - 38	36 - 150		-/120/120
	20	2.3 – 2.9	30 - 40	40 - 150		
	25	3.5 - 3.7	40 - 48	48 - 150		
	32	3.5 - 4.7	48 - 54	54 - 150		-/120/90

100mm Thick Rigid Walls or Greater

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The bare wall (E) must have a minimum thickness of 100mm and comprise of concrete, aerated concrete, solid of hollow masonry with a minimum density of 550 kg/m³, $t_E \geq 100$mm

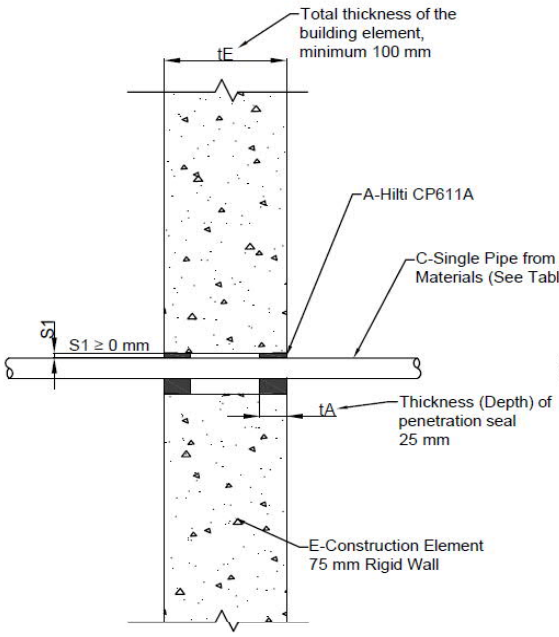


Figure 13a - Pipe service in rigid walls greater than 100mm thick with small

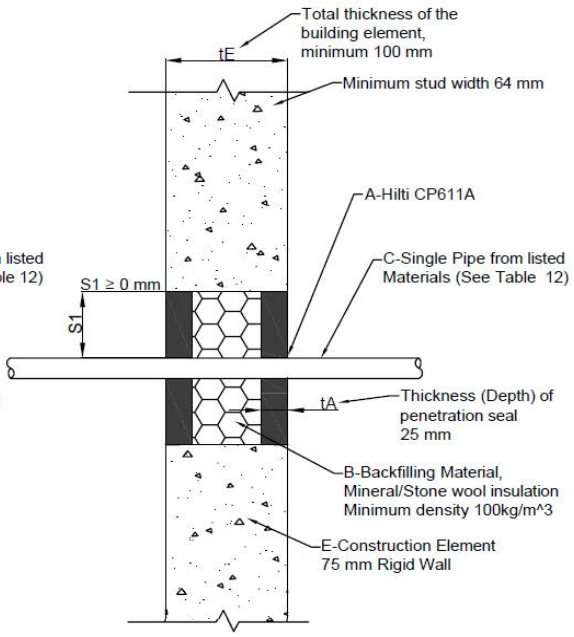


Figure 13b - Pipe service in rigid walls greater than 100mm thick with large

Figure 13 PEX pipes penetrating rigid walls

Table 16 PEX pipes penetrating rigid walls

Pipe Material C	Pipe Diameter (mm)	Pipe Wall Thickness Range (mm)	Figure 13a Hole Diameter Range (mm)	Figure 13 Hole Diameter Range (mm)*	Sealant Depth (mm) t_A	FRL
PE-Xa	16	1.2 – 2.4	26 - 38	36 - 150	25mm depth on both sides of the wall	-/120/120
	20	2.3 – 3.4	30 - 40	40 - 150		
	25	2.8 – 3.9	35 - 48	48 - 150		
PE-Xb	16	1.2-2.4	26 - 38	36 -150		-/120/120
	20	2.3-3.4	30 - 40	40 - 150		
	25	2.8-3.9	35 - 48	48 - 150		
PE-X/Al/PE	16	2.0 – 2.6	26 - 38	36 - 150		-/120/120
	20	2.3 – 2.9	30 - 40	40 - 150		
	25	3.5 - 3.7	40 - 48	48 - 150		
	32	3.5 - 4.7	48 - 54	54 - 150		-/120/90

*For large apertures, sealant in annular gap shall consist of CP611A and mineral wool backfilling material (B)

2hr 75mm Hebel Wall FRL -/120/120 &

Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dincel walls)

Various water and gas PE-X pipes protected with Hilti Intumescent Sealant CP611a (1/4)

The bare wall can be 75mm Hebel wall with dry density of 510 kg/m³ or rigid wall which must have a minimum thickness of 75mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m³.

Backing rod is recommended to position the service at the centre of the hole and to control the sealant depth of 25 mm each side. Alternatively, CP 611a sealant can be installed without backing rod at full depth of the wall. The service can be installed **off centre** with a minimum edge distance S1 = 5mm as specified in Table 1.

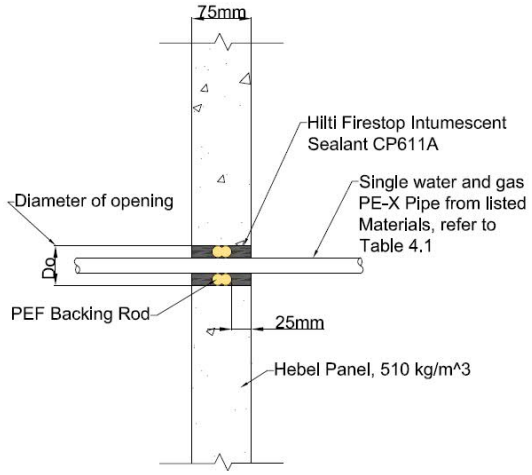


Figure 14a - Side view- Water and gas PE-X pipe with PEF backing rod

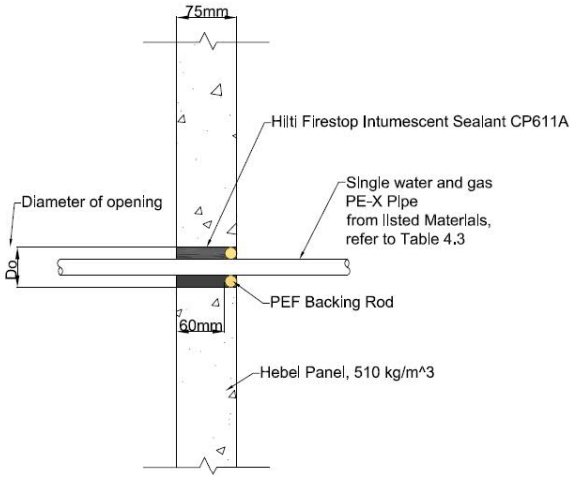


Figure 14b - Side view- Water and gas PE-X pipe with 60mm sealant depth

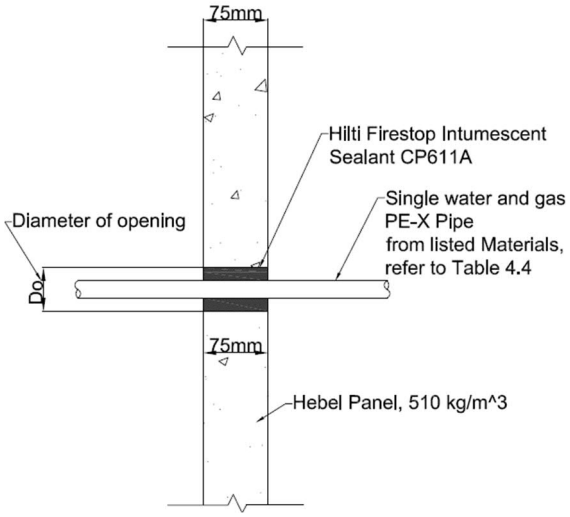


Figure 14c - Side view- Water and gas PE-X pipe with 75mm sealant depth

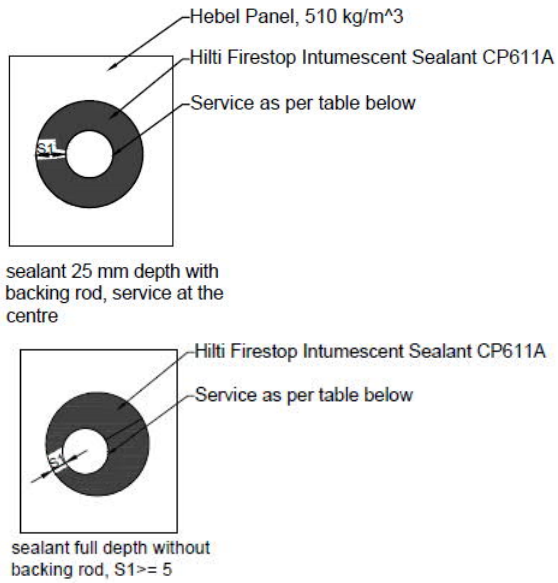


Figure 14d - Front view- water and gas PE-X

Figure 14 PE-X water and gas pipes penetrating 75 mm Hebel walls

Table 17 PE-X water and gas pipes penetrating 75 mm Hebel walls

Service	Pipe diameter (mm)	Pipe Wall thickness range (mm)	Minimum Diameter of the opening, D_0 (mm)	Maximum Diameter of the opening, D_0 (mm)	Depth of the sealant, t_s	Backing Option	FRL (Hebel walls)	FRL (Dincel walls)
PE-Xa	16	1.2-2.4	27	38	25/60/75	With PEF Backing rod or sealant at full depth	-/120/120	-/120/120
	20	2.3-3.4	32	38	25/60/75		-/120/120	-/120/120
	25	2.8-3.9	35	50	25/60/75		-/120/120	-/120/120
PE-Xb	16	1.2-2.4	27	38	25/60/75		-/120/120	-/120/120
	20	1.9-2.4	32	38	25/60/75		-/120/120	-/120/120
	25	2.3-3.9	35	50	25/60/75		-/120/120	-/120/120
PE-X/AL/PE	16	2.0-2.6	27	38	25/60/75		-/120/120	-/240/120
	20	2.3-2.9	32	38	25/60/75		-/120/120	-/240/120
	25	3.5-3.7	35	50	25/60/75		-/120/90	-/240/120
PE-Xb/AL/PE-Xb	16	2.0-2.6	27	38	25/60/75		-/120/120	-/240/180
	20	2.0-2.9	32	38	25/60/75		-/120/120	-/240/180
	25	2.4-3.7	35	50	25/60/75		-/120/90	-/240/180
PE/AL/PE	16	2.0-2.6	27	38	25/60/75		-/120/120	-/120/120
	20	2.3-2.9	32	38	25/60/75		-/120/120	-/120/120
	25	3.5-3.7	35	50	25/60/75		-/120/120	-/120/120

2hr 75mm Hebel Wall FRL -/120/120 &

Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dincel walls)

Various water and gas PE-X pipes protected with Hilti Intumescent Sealant CP611a (2/4)

The bare wall can be 75mm Hebel wall with dry density of 510 kg/m³ or rigid wall which must have a minimum thickness of 75mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m³. No build-up is required for Dincel walls.

Backing rod is recommended to position the service at the centre of the hole and to control the sealant depth of 25 mm each side. Alternatively, CP 611a sealant can be installed without backing rod at full depth of the wall. The service can be installed **off centre** with a minimum edge distance S1 = 5mm as specified in Table 1.

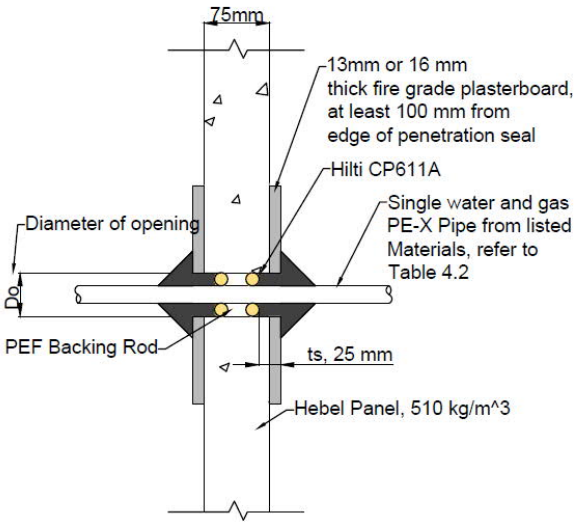


Figure 15a - Side view- Water and gas PE-X pipe with PEF backing rod

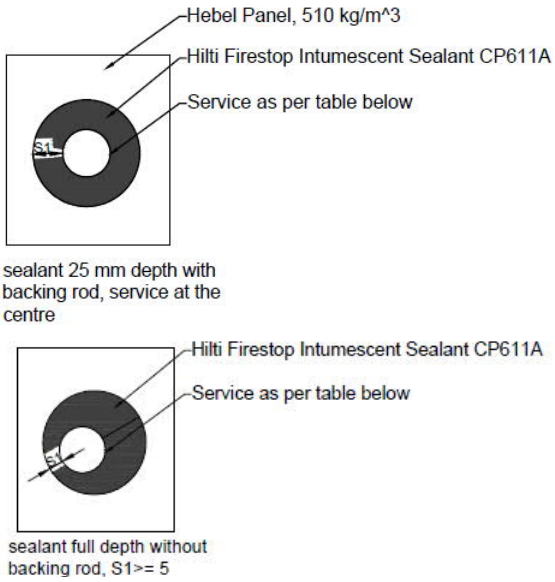


Figure 15b - Front view- Water and gas PE-X pipe with PEF backing rod

Figure 15 PE-X water and gas pipes penetrating 75 mm Hebel walls

Table 18 PE-X water and gas pipes penetrating 75 mm Hebel walls

Service	Pipe diameter (mm)	Pipe Wall thickness range (mm)	Minimum Diameter of the opening, D_0 (mm)	Maximum Diameter of the opening, D_0 (mm)	Depth of the sealant, t_s	Backing Option	FRL
PE-X/AL/PE	25	3.5-3.7	35	50	25	With PEF Backing rod or sealant at full depth	-/120/120
PE-Xb/AL/PE-Xb	25	2.4-3.7	35	50	25		-/120/120

2hr 75mm Hebel Wall FRL -/120/120 &

Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dincel walls)

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 bare wall can be 75mm Hebel wall with dry density of 510 kg/m³ or rigid wall which must have a minimum thickness of 75mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m³.

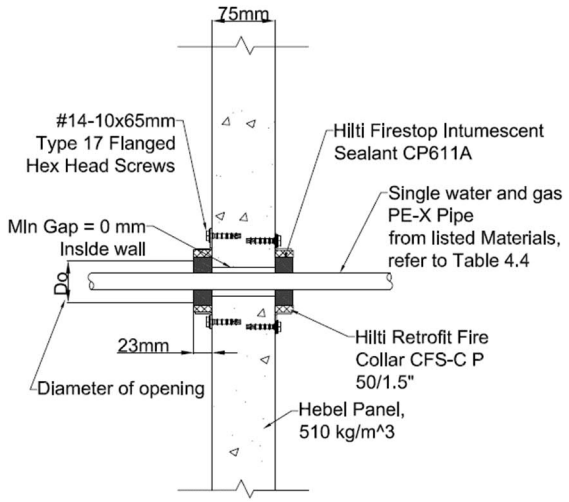


Figure 16a - Side view

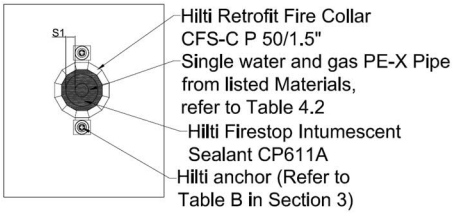


Figure 16b - Front view

Figure 16 Water and gas PE-X pipe with Hilti Retrofit Fire Collar CFS-C P 50/1.5"

Table 19 Water and gas PE-X pipe with Hilti Retrofit Fire Collar CFS-C P 50/1.5"

Service	Pipe diameter (mm)	Pipe Wall thickness range (mm)	Minimum Diameter of the opening, D_0 (mm)	Maximum Diameter of the opening, D_0 (mm)	Depth of the sealant, t_s	Additional Protection	FRL (Hebel 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

2hr 75mm Hebel Wall FRL -/120/120 &

Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dincel walls)

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 bare wall can be 75mm Hebel wall with dry density of 510kg/m³ or rigid wall which must have a minimum thickness of 75mm and comprise of concrete, aerated concrete, solid or Hollow masonry with a minimum density of 510 kg/m³. No build up is required for Dincel walls.

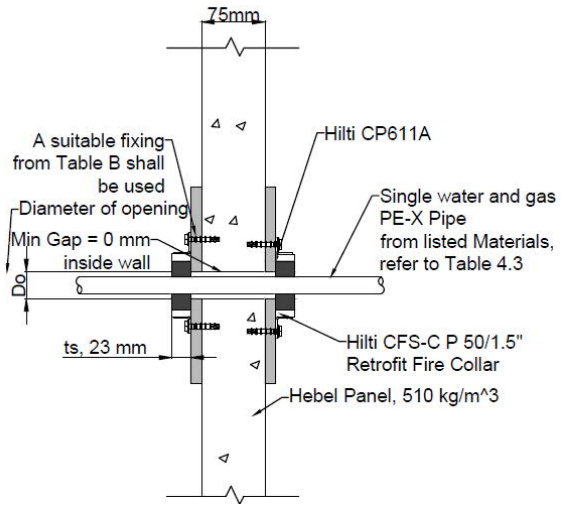


Figure 17a - Side view

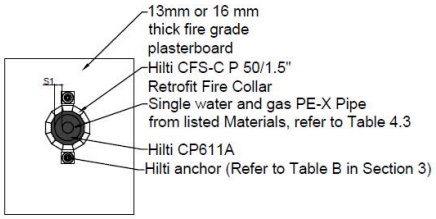


Figure 17b - Front view

Figure 17 Water and gas PE-X pipe with Hilti Retrofit Fire Collar CFS-C P 50/1.5"

Table 20 Water and gas PE-X pipe with Hilti Retrofit Fire Collar CFS-C P 50/1.5"

Service	Pipe diameter (mm)	Pipe Wall thickness range (mm)	Minimum Diameter of the opening, D_0 (mm)	Maximum Diameter of the opening, D_0 (mm)	Depth of the sealant, t_s	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" + CP 611A 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

Below from Table 21 to Table 41 are relevant to HVAC trade, mostly for air conditioning systems, covering a variety of common air conditioning services, wall types, installation configurations and FRL.

5.2 HVAC services

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations in S, C, L configurations.

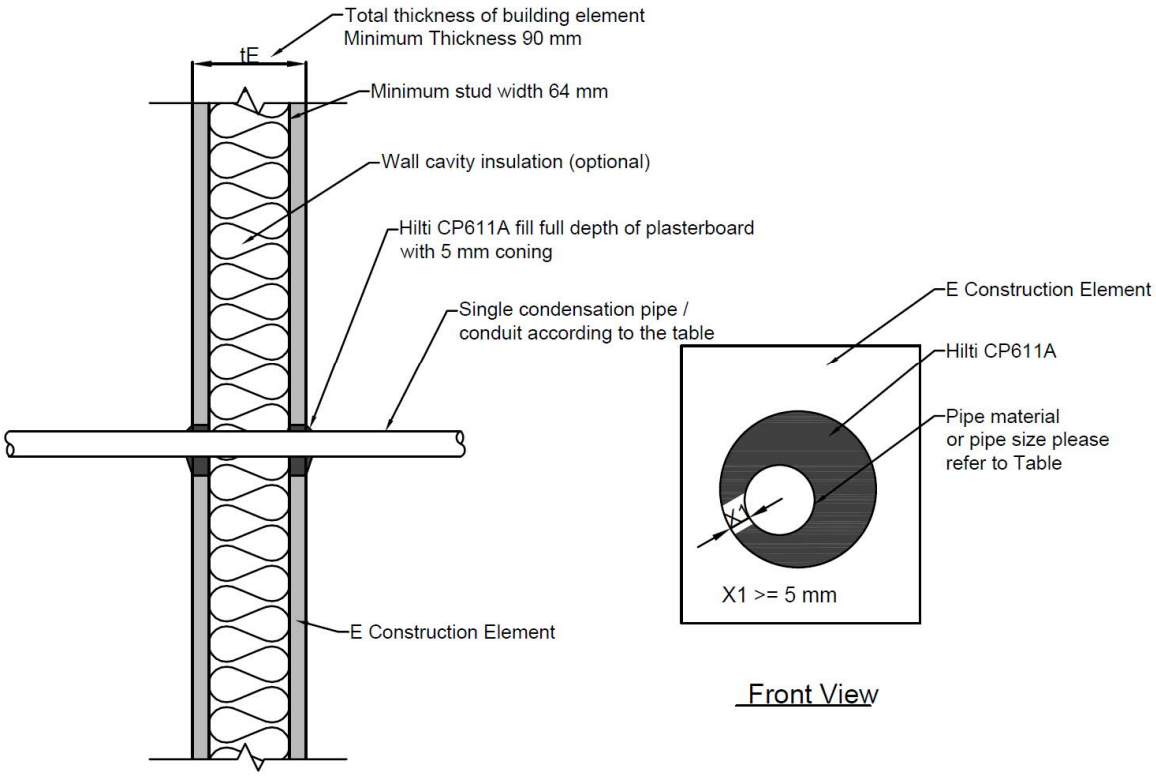


Figure 18 Condensation pipe penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Table 21 Condensation pipe penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Pipe type	Pipe outer diameter (mm)	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
1 × up to 25 mm uPVC condensation pipe	Up to 33 mm	48 - 54	CP 611a filled to the full depth of the plasterboard and finished with a 5 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/60/60
1 × up to 25 mm uPVC corrugated conduit	Up to 25 mm	38 - 46		Straight, S, C and L	-/60/60

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations.

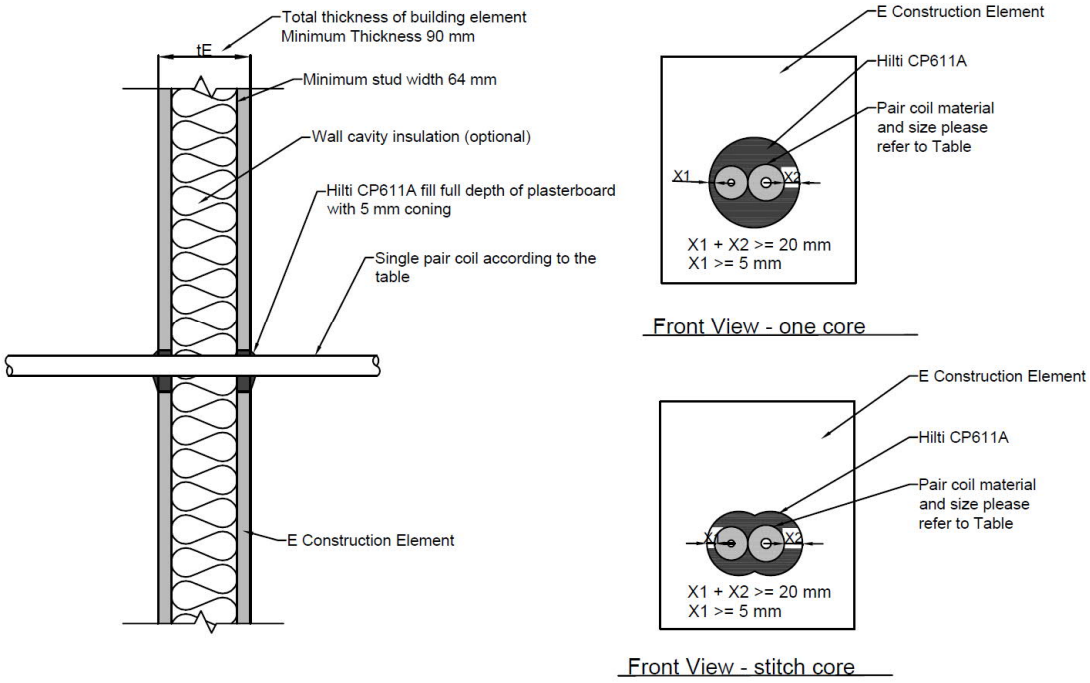


Figure 19 Single pair coil penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Table 22 Single pair coils penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Pair coil tube size		Insulation thickness (mm)	Minimum aperture size (mm)	Maximum aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch						
6.35-9.52	1/4-3/8	13 or 19	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 5 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/60/60
6.35-12.7	1/4-1/2	13 or 19				Straight, S, C and L	-/60/60
6.35-15.88	1/4-5/8	13 or 19				Straight, S, C and L	-/60/60
9.5-15.99	3/8-5/8	13 or 19				Straight, S, C and L	-/60/60
9.5-19.05	3/8-3/4	13 or 19				Straight, S, C and L	-/60/60
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014 by an ATL. Stitch core is allowed.							

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations.

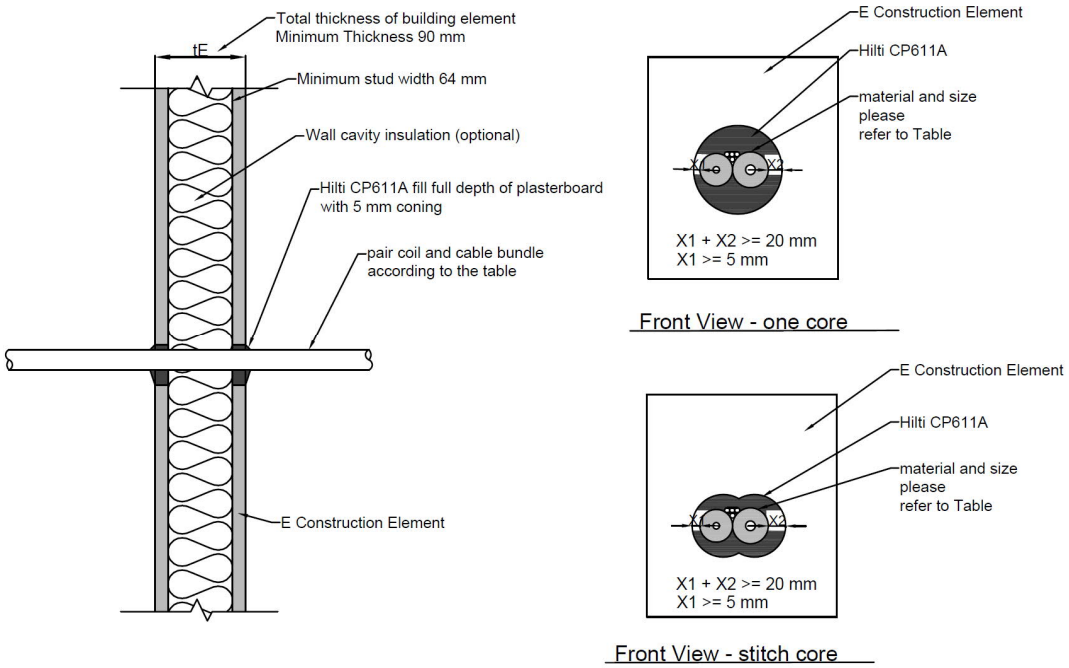


Figure 20 Single pair coil and cables penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Table 23 Single pair coil and cables penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Pair coil tube size		Insulation thickness (mm)	Cable type	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch							
6.35-9.52	1/4-3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 5 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/60/60
6.35-12.7	1/4-1/2	13 or 19					Straight, S, C and L	-/60/60
6.35-15.88	1/4-5/8	13 or 19					Straight, S, C and L	-/60/60
9.5-15.99	3/8-5/8	13 or 19					Straight, S, C and L	-/60/60
9.5-19.05	3/8-3/4	13 or 19					Straight, S, C and L	-/60/60
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014 by an ATL.								

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations.

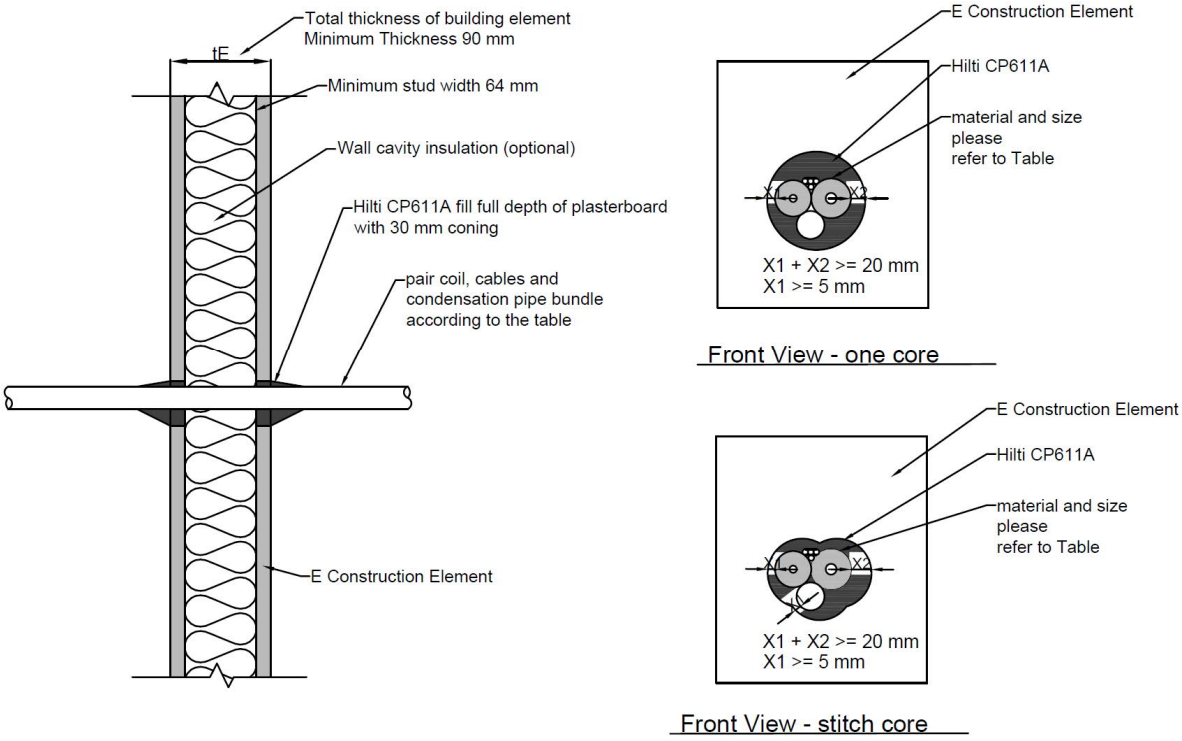


Figure 21 Single pair coil, cables and condensation pipes penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Table 24 Single pair coil, cables and condensation pipes penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Pair coil tube size		Insulation thickness (mm)	Cable type	Condensation pipe type	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch								
6.35 - 9.52	1/4-3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	1 × up to 25 mm uPVC condensation pipe	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 30 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/60/60
6.35 - 12.7	1/4-1/2	13 or 19						Straight, S, C and L	-/60/60
6.35 - 15.88	1/4-5/8	13 or 19						Straight, S, C and L	-/60/60
9.5-15.99	3/8-5/8	13 or 19						Straight, S, C and L	-/60/60
9.5-19.05	3/8-3/4	13 or 19						Straight, S, C and L	-/60/60
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014 by an ATL.									

-/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

FRL 60/60/60 & FRL -/60/60

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 90mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 x layer of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 60/60/60 or FRL -/60/60, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations.

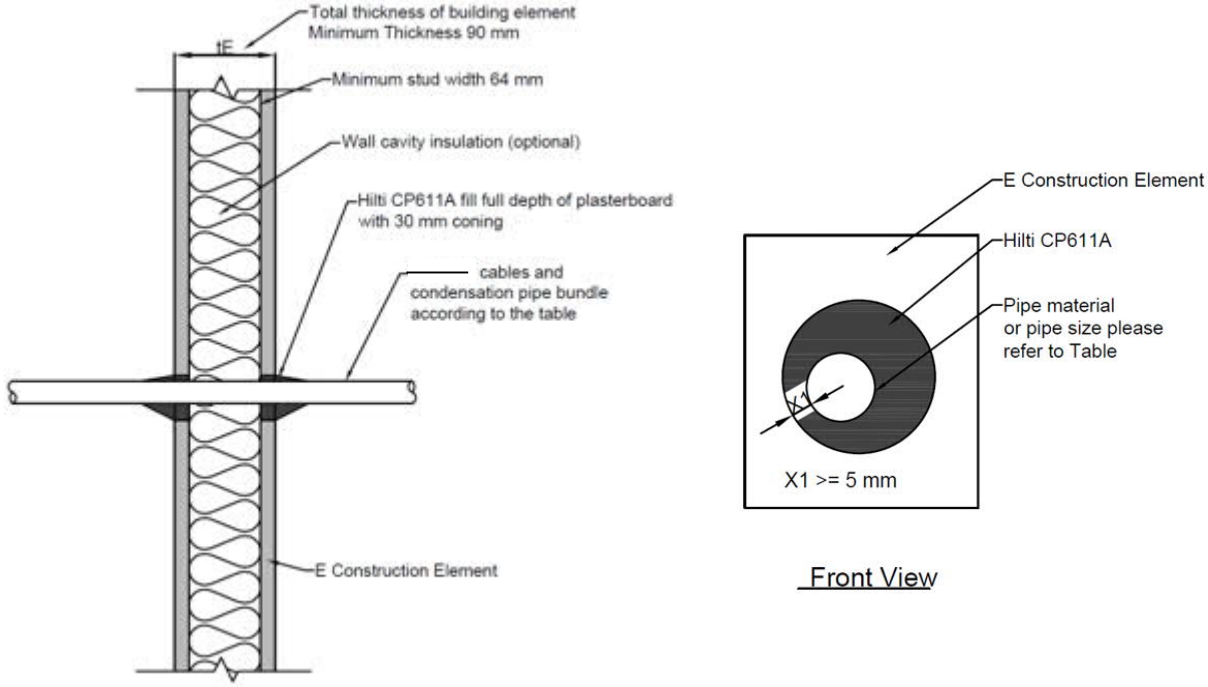


Figure 22 Cables and condensation pipes penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Table 25 Cables and condensation pipes penetrating -/60/60 or 60/60/60 Flexible Walls and -/60/60 AlphaPanel walls

Cable type	Condensation pipe type	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	1 × up to 25 mm uPVC condensation pipe	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 30 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/60/60

-/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

FRL 90/90/90 & FRL -/90/90

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 96mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 × 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 90/90/90 or FRL -/90/90, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations

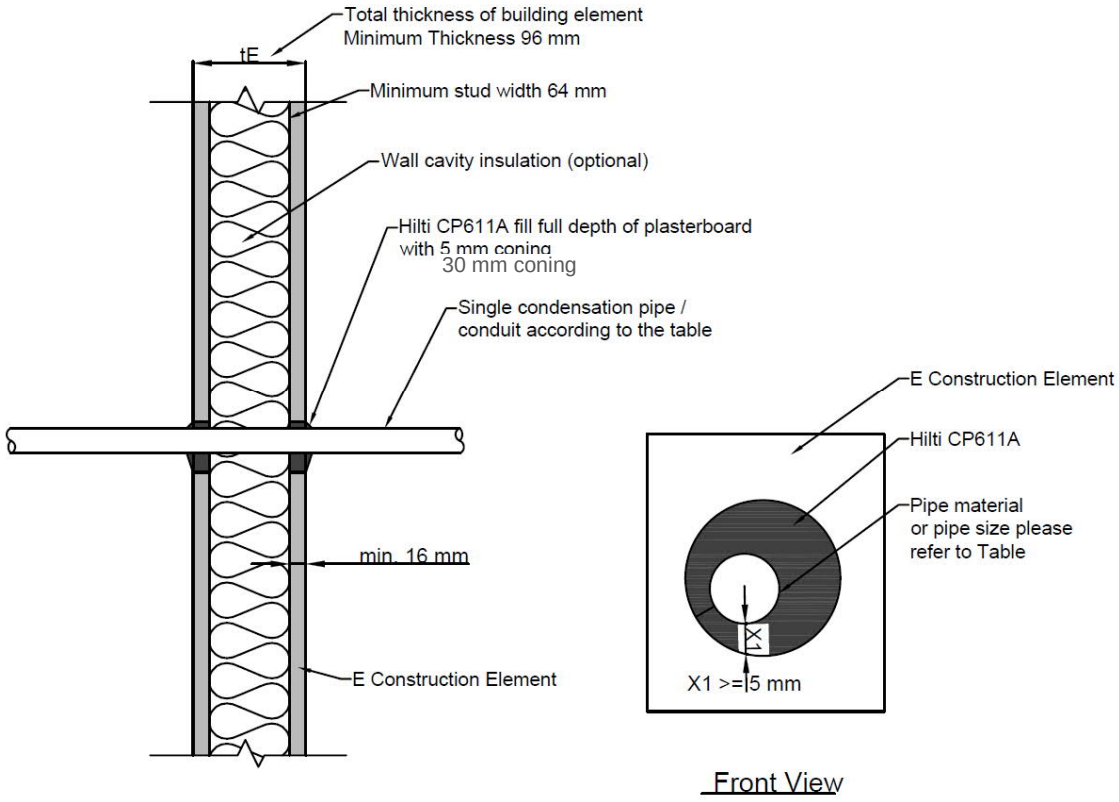


Figure 23 Condensation pipe penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Table 26 Condensation pipe penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Pipe type	Pipe outer diameter (mm)	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
1 × up to 25 mm uPVC condensation pipe	Up to 33 mm	48 - 54	CP 611a filled to the full depth of the plasterboard and finished with a 30 mm sealant fillet cone – on both the exposed and unexposed sides.	Straight, S, C and L	-/90/90
1 × up to 25 mm uPVC corrugated conduit	Up to 25 mm	38 - 46		Straight, S, C and L	-/90/90

-/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

FRL 90/90/90 & FRL -/90/90

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 96mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 × 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 90/90/90 or FRL -/90/90, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations

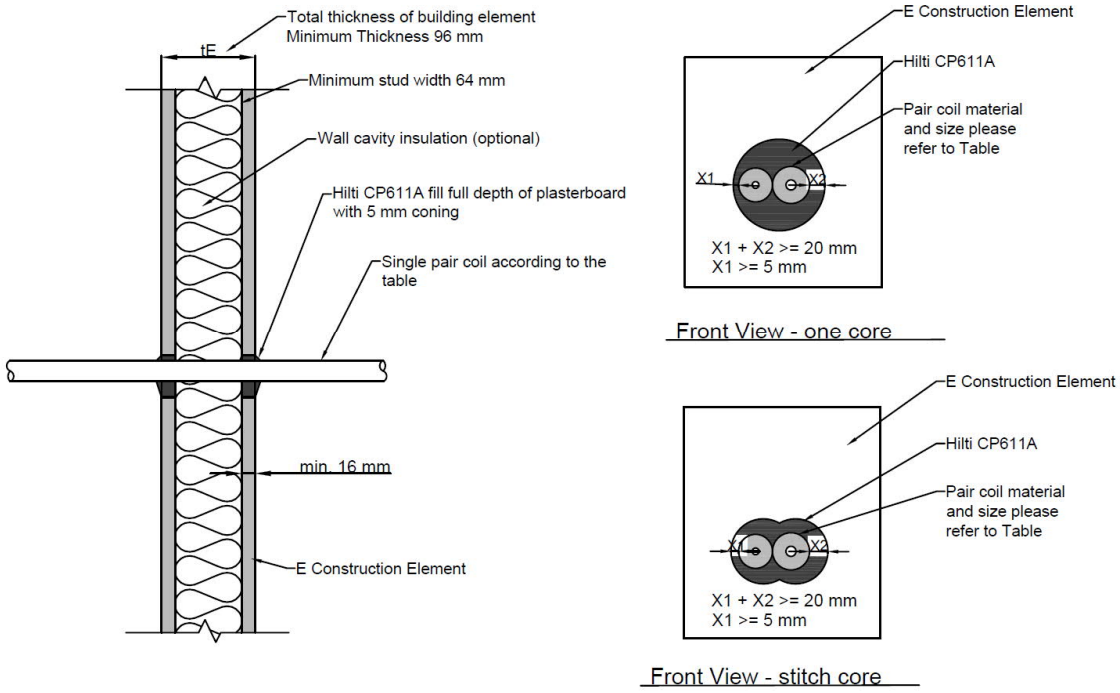


Figure 24 Single pair coil penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Table 27 Single pair coil penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Pair coil tube size mm	Pair coil tube size Inch	Insulation thickness (mm)	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
6.35-9.52	1/4-3/8	13 or 19	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 5 mm sealant fillet cone – on both the sides.	Straight, S, C and L	-/90/90
6.35-12.7	1/4-1/2	13 or 19				Straight, S, C and L	-/90/90
6.35-15.88	1/4-5/8	13 or 19				Straight, S, C and L	-/90/90
9.5-15.99	3/8-5/8	13 or 19				Straight, S, C and L	-/90/90
9.5-19.05	3/8-3/4	13 or 19				Straight, S, C and L	-/90/90
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/90/90 in accordance with AS 1530.4:2014 by an ATL.							

-/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

FRL 90/90/90 & FRL -/90/90

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 96mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 × 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 90/90/90 or FRL -/90/90, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations.

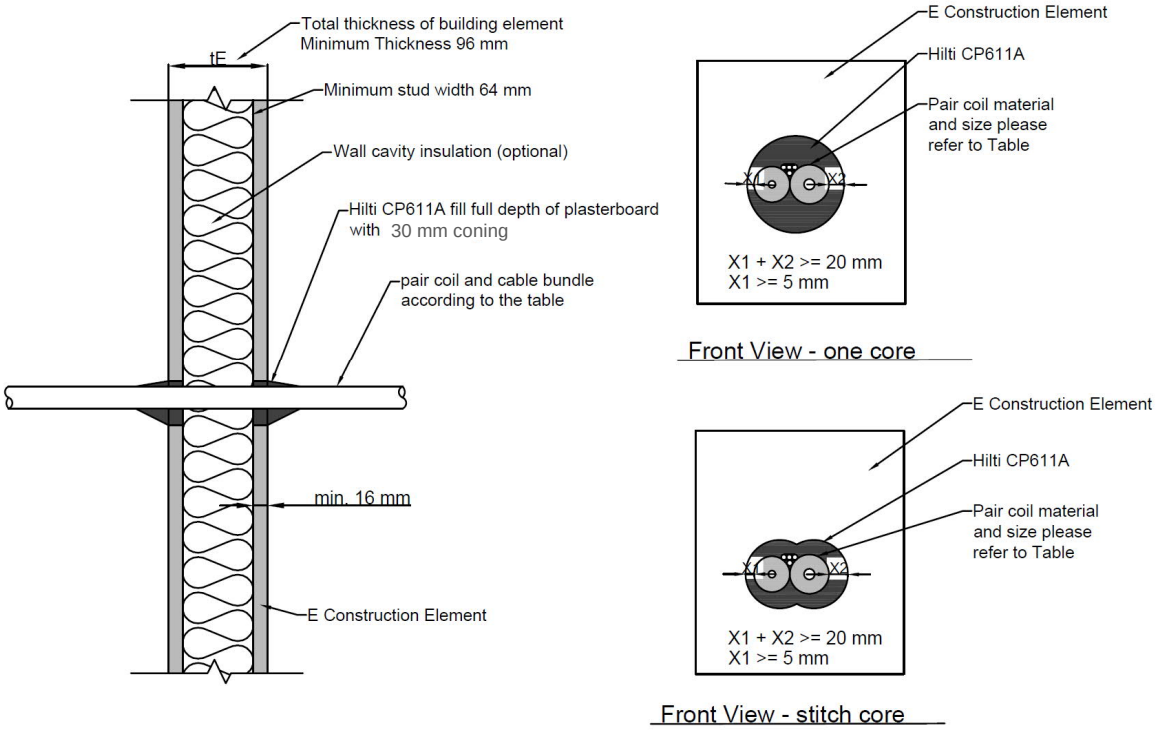


Figure 25 Single pair coil and cables penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Table 28 Single pair coil and cables penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Pair coil tube size		Insulation thickness (mm)	Cable type	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch							
6.35-9.52	1/4-3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 30 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/90/90
6.35-12.7	1/4-1/2	13 or 19					Straight, S, C and L	-/90/90
6.35-15.88	1/4-5/8	13 or 19					Straight, S, C and L	-/90/90
9.5-15.99	3/8-5/8	13 or 19					Straight, S, C and L	-/90/90
9.5-19.05	3/8-3/4	13 or 19					Straight, S, C and L	-/90/90
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/90/90 in accordance with AS 1530.4:2014 by an ATL.								

-/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

FRL 90/90/90 & FRL -/90/90

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 96mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 × 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 90/90/90 or FRL -/90/90, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations

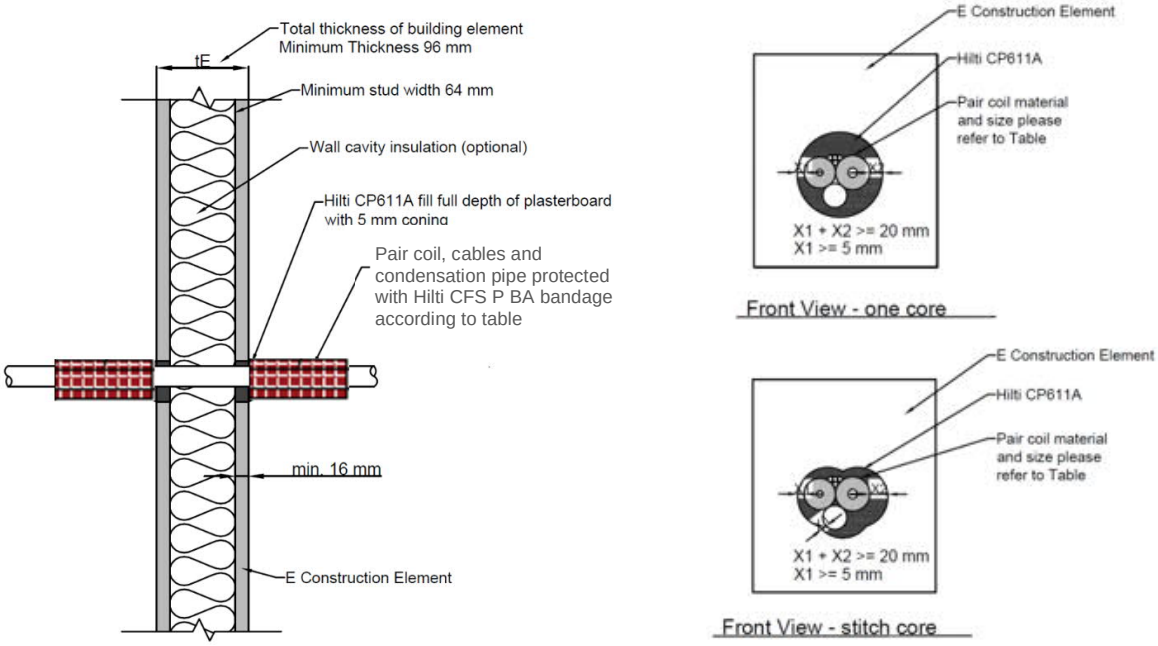


Figure 26 Single pair coil, cables and condensation pipes penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Table 29 Single pair coil, cables and condensation pipes penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Pair coil tube size		Insulation thickness (mm)	Cable type	Condensation pipe type	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch								
6.35-9.52	1/4-3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	1 × up to 25 mm uPVC condensation pipe	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	Hilti CP611a to full depth of plasterboard on both sides. Two layers of 100 mm wide Hilti Firestop Putty Bandage CFS-P BA must be installed on both sides.	Straight, S, C and L	-/90/90
6.35-12.7	1/4-1/2	13 or 19						Straight, S, C and L	-/90/90
6.35-15.88	1/4-5/8	13 or 19						Straight, S, C and L	-/90/90
9.5-15.99	3/8-5/8	13 or 19						Straight, S, C and L	-/90/90
9.5-19.05	3/8-3/4	13 or 19						Straight, S, C and L	-/90/90
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/90/90 in accordance with AS 1530.4:2014 by an ATL.									

-/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

FRL 90/90/90& FRL -/90/90

Hilti Intumescent Sealant CP611a

The wall shall have a minimum thickness of 96mm (t_E) and comprise of timber or steel stud lined on both faces with minimum 1 × 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 90/90/90 or FRL -/90/90, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations

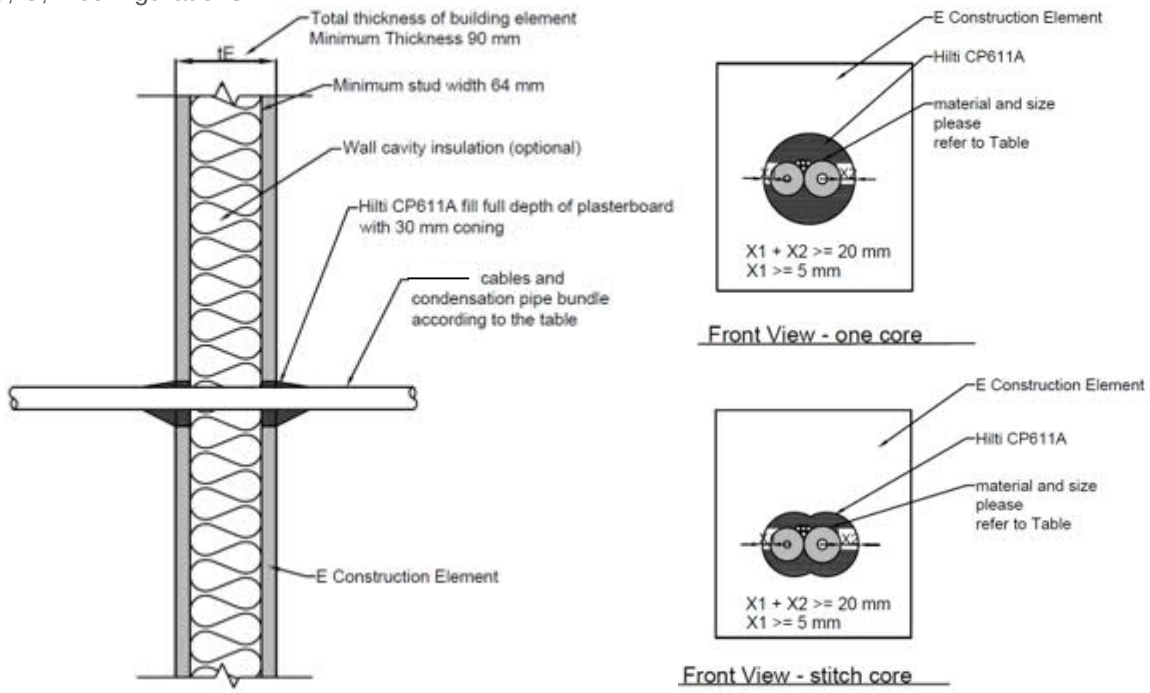


Figure 27 Cables and condensation pipes penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Table 30 Cables and condensation pipes penetrating -/90/90 or 90/90/90 Flexible Walls and -/90/90 AlphaPanel walls

Cable type	Condensation pipe type	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	1 × up to 25 mm uPVC condensation pipe	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 30 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/90/90

-/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 116mm (t_E) and comprise of steel stud lined on both faces with minimum 2 x layers of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 120/120/120 or FRL -/120/120, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations

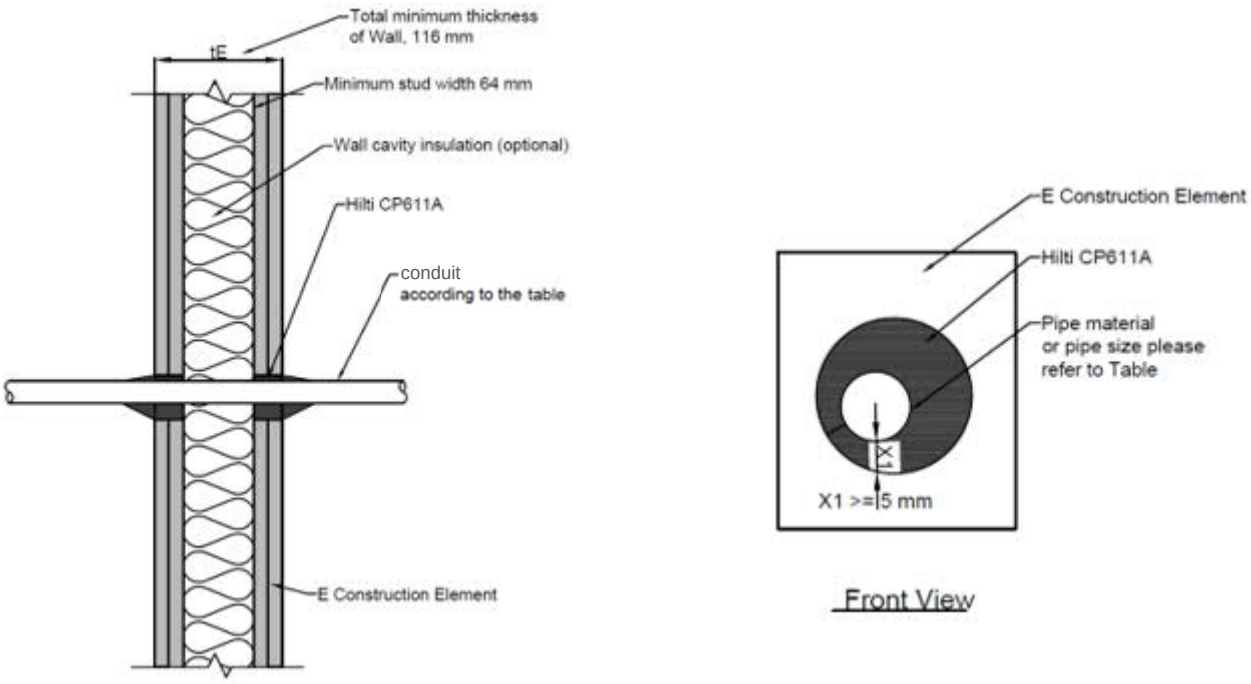


Figure 28 Corrugated conduit penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Table 31 Corrugated conduit penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Pipe type	Pipe outer diameter (mm)	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
1 × up to 25 mm uPVC corrugated conduit	Up to 25 mm	38 - 46	CP 611a filled to the full depth of the plasterboard and finished with a 30 mm sealant fillet cone – on both the exposed and unexposed sides.	Straight, S, C and L	-/120/120

-/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 116mm (t_E) and comprise of steel stud lined on both faces with minimum 2 x layers of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 120/120/120 or FRL -/120/120, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations

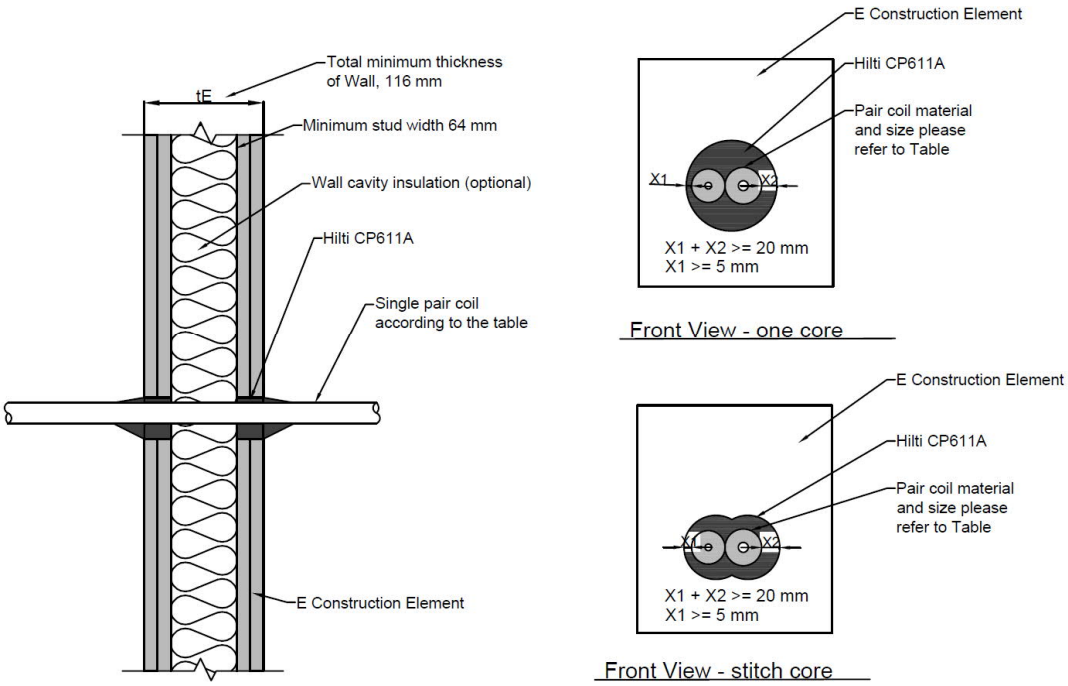


Figure 29 Single pair coil penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Table 32 Single pair coil penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Pair coil tube size mm	Pair coil tube size Inch	Insulation thickness (mm)	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
6.35-9.52	1/4-3/8	13 or 19	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to the full depth of the plasterboard and finished with a 30 mm sealant fillet cone – on both the sides.	Straight, S, C and L	-/120/120
6.35-12.7	1/4-1/2	13 or 19				Straight, S, C and L	-/120/120
6.35-15.88	1/4-5/8	13 or 19				Straight, S, C and L	-/120/120
9.5-15.99	3/8-5/8	13 or 19				Straight, S, C and L	-/120/120
9.5-19.05	3/8-3/4	13 or 19				Straight, S, C and L	-/120/120
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/120/120 in accordance with AS 1530.4:2014 by an ATL.							

-/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The wall shall have a minimum thickness of 116mm (t_E) and comprise of steel stud lined on both faces with minimum 2 x layers of 13mm or 16mm thick fire grade plasterboard and has been tested or otherwise assessed to achieve FRL 120/120/120 or FRL -/120/120, with or without cavity insulation E_2.

Service, single or bundled multiple services achieve the specified FRL as rough in configurations, in S, C, L configurations.

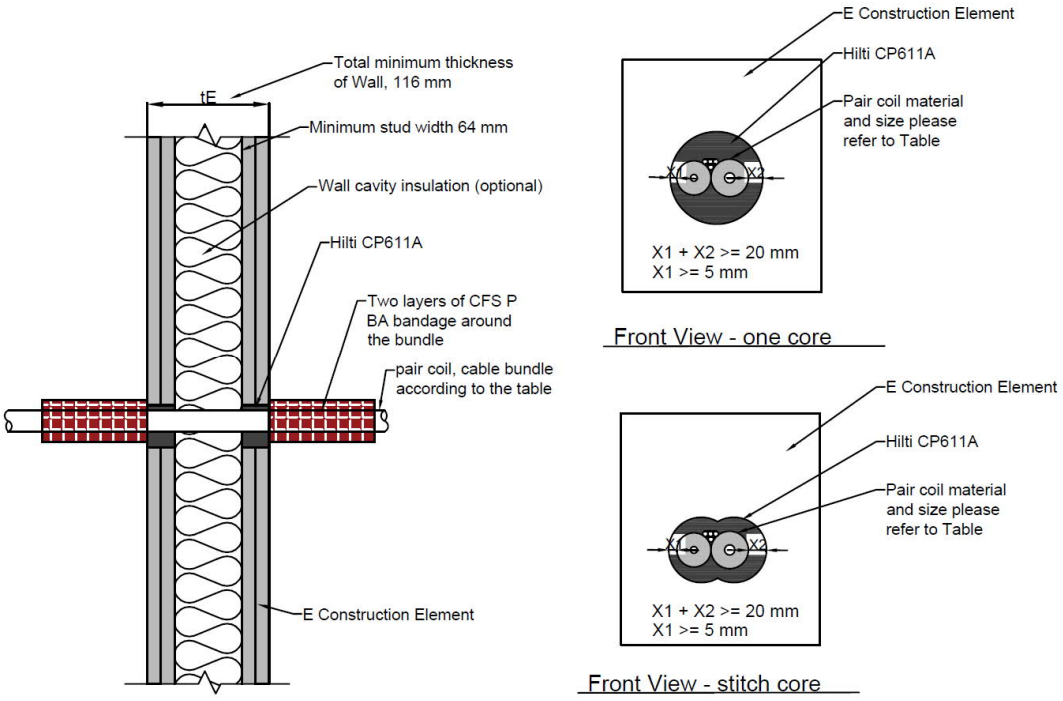


Figure 30 Single pair coil and cables penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Table 33 Single pair coil and cables penetrating -/120/120 or 120/120/120 Flexible Walls and -/120/120 AlphaPanel walls

Pair coil tube size		Insulation thickness (mm)	Cable type	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Additional protection	Configuration	FRL
mm	Inch								
6.35 - 9.52	1/4-3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to a depth of 25 mm each side and finished flush with plasterboard	Two layers of 100 mm wide Hilti Firestop Putty Bandage CFS-PBA must be installed on both sides.	Straight, S, C and L	-/120/120
6.35 - 12.7	1/4-1/2	13 or 19						Straight, S, C and L	-/120/120
6.35 - 15.88	1/4-5/8	13 or 19						Straight, S, C and L	-/120/120
9.5-15.99	3/8-5/8	13 or 19						Straight, S, C and L	-/120/120
9.5-19.05	3/8-3/4	13 or 19						Straight, S, C and L	-/120/120
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/120/120 in accordance with AS 1530.4:2014 by an ATL.									

1 hr Rigid Walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The bare wall must have a minimum thickness of 90mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 550kg/m³

The walls may optionally be minimum 75 mm thick Hebel walls that have been tested or otherwise assessed to achieve a minimum FRL of 90/90/90 or -/90/90.

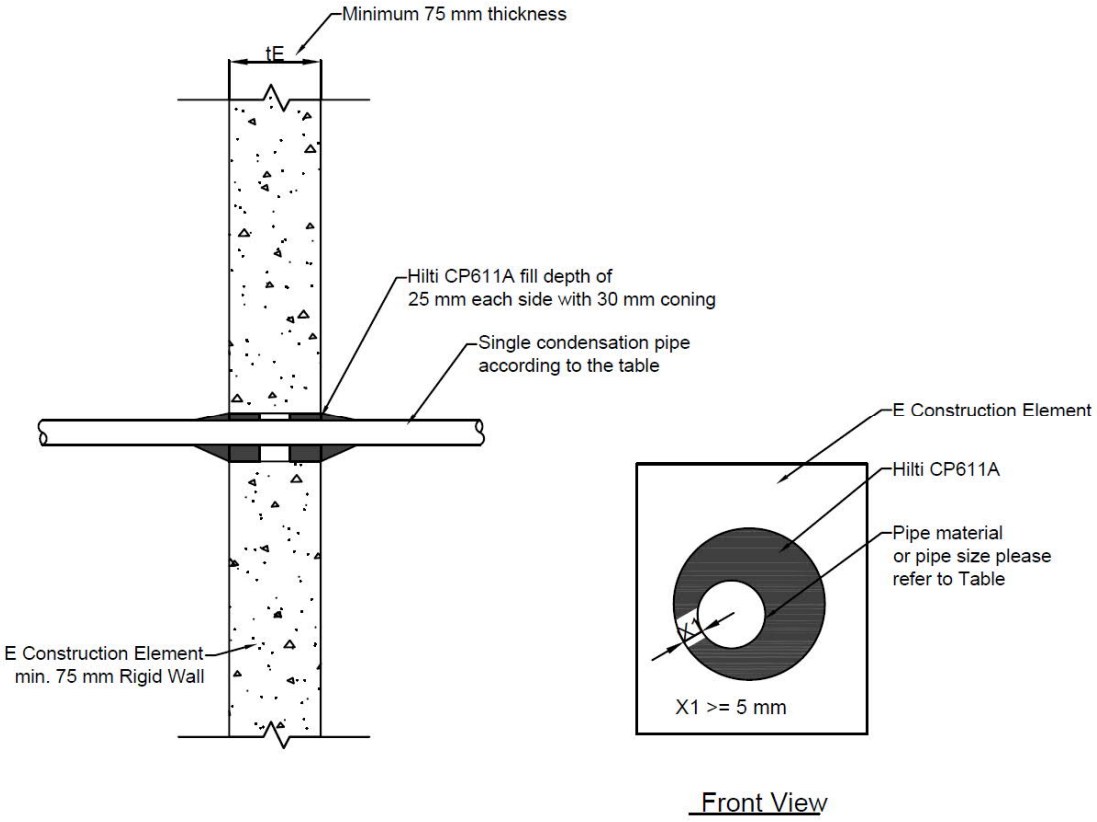


Figure 31 Condensation pipe penetrating rigid wall

Table 34 Condensation pipe penetrating rigid wall

Pipe type	Pipe outer diameter (mm)	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
1 × up to 25 mm uPVC condensation pipe	Up to 33 mm	48 - 54	CP 611a filled to a depth of 25 mm each side and finished with a 30 mm sealant fillet cone – on both the exposed and unexposed sides.	Straight, S, C and L	-/60/60
1 × up to 25 mm uPVC corrugated conduit	Up to 25 mm	38 - 46		Straight, S, C and L	-/60/60
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014 by an ATL.					

1 hr Rigid Walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The bare wall must have a minimum thickness of 90mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 550kg/m³

The walls may optionally be minimum 75 mm thick Hebel walls that have been tested or otherwise assessed to achieve a minimum FRL of 90/90/90 or -/90/90.

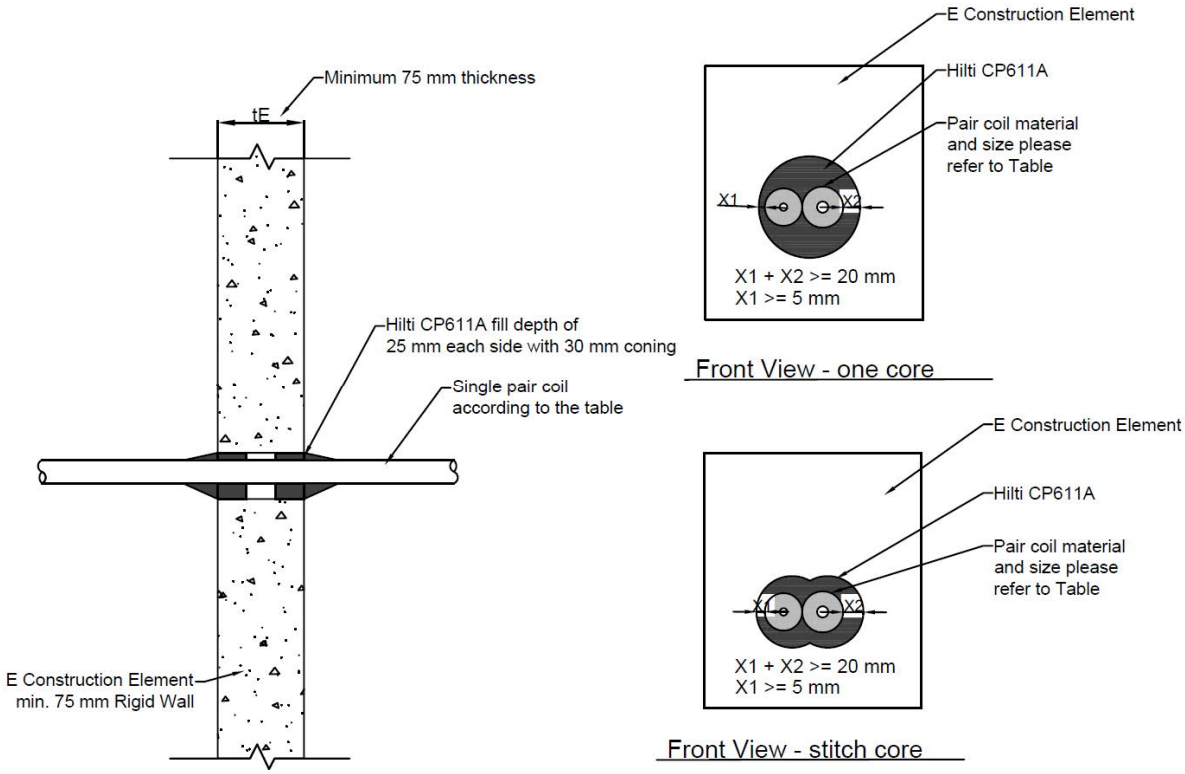


Figure 32 Single pair coil penetrating rigid wall

Table 35 Single pair coil penetrating rigid wall

Pair coil tube size mm	Pair coil tube size Inch	Insulation thickness (mm)	Min aperture size (mm)	Maxi aperture size (mm)	Local fire-stopping protection	Configuration	FRL
6.35-9.52	1/4-3/8	13 or 19	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to a depth of 25 mm each side and finished with a 30 mm sealant fillet cone – on both the sides.	Straight, S, C and L	-/60/60
6.35-12.7	1/4-1/2	13 or 19				Straight, S, C and L	-/60/60
6.35-15.88	1/4-5/8	13 or 19				Straight, S, C and L	-/60/60
9.5-15.99	3/8-5/8	13 or 19				Straight, S, C and L	-/60/60
9.5-19.05	3/8-3/4	13 or 19				Straight, S, C and L	-/60/60
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014 by an ATL.							

1 hr Rigid Walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The bare wall must have a minimum thickness of 90mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 550kg/m³

The walls may optionally be minimum 75 mm thick Hebel walls that have been tested or otherwise assessed to achieve a minimum FRL of 90/90/90 or -/90/90.

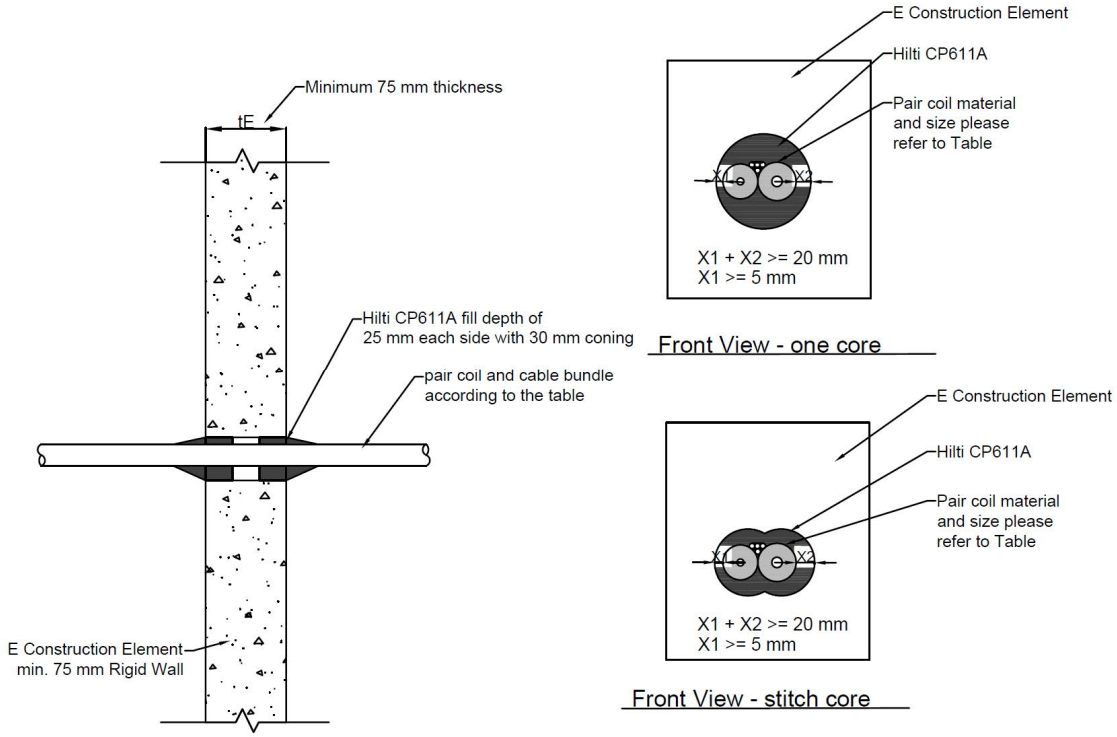


Figure 33 Single pair coil and cables penetrating rigid wall

Table 36 Single pair coil and cables penetrating minimum 75 mm thick rigid wall

Pair coil tube size		Insulation thickness (mm)	Cable type	Min aperture size (mm)	Max aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch							
6.35-9.52	1/4-3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to a depth of 25 mm each side and finished with a 30 mm sealant fillet cone – on both the exposed and unexposed sides.	Straight, S, C and L	-/60/60
6.35-12.7	1/4-1/2	13 or 19					Straight, S, C and L	-/60/60
6.35-15.88	1/4-5/8	13 or 19					Straight, S, C and L	-/60/60
9.5-15.99	3/8-5/8	13 or 19					Straight, S, C and L	-/60/60
9.5-19.05	3/8-3/4	13 or 19					Straight, S, C and L	-/60/60
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014 by an ATL.								

1 hr Rigid Walls

FRL 60/60/60 & FRL -/60/60

Hilti CP611a Intumescent Sealant

The bare wall must have a minimum thickness of 90mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 550kg/m³

The walls may optionally be minimum 75 mm thick Hebel walls that have been tested or otherwise assessed to achieve a minimum FRL of 90/90/90 or -/90/90.

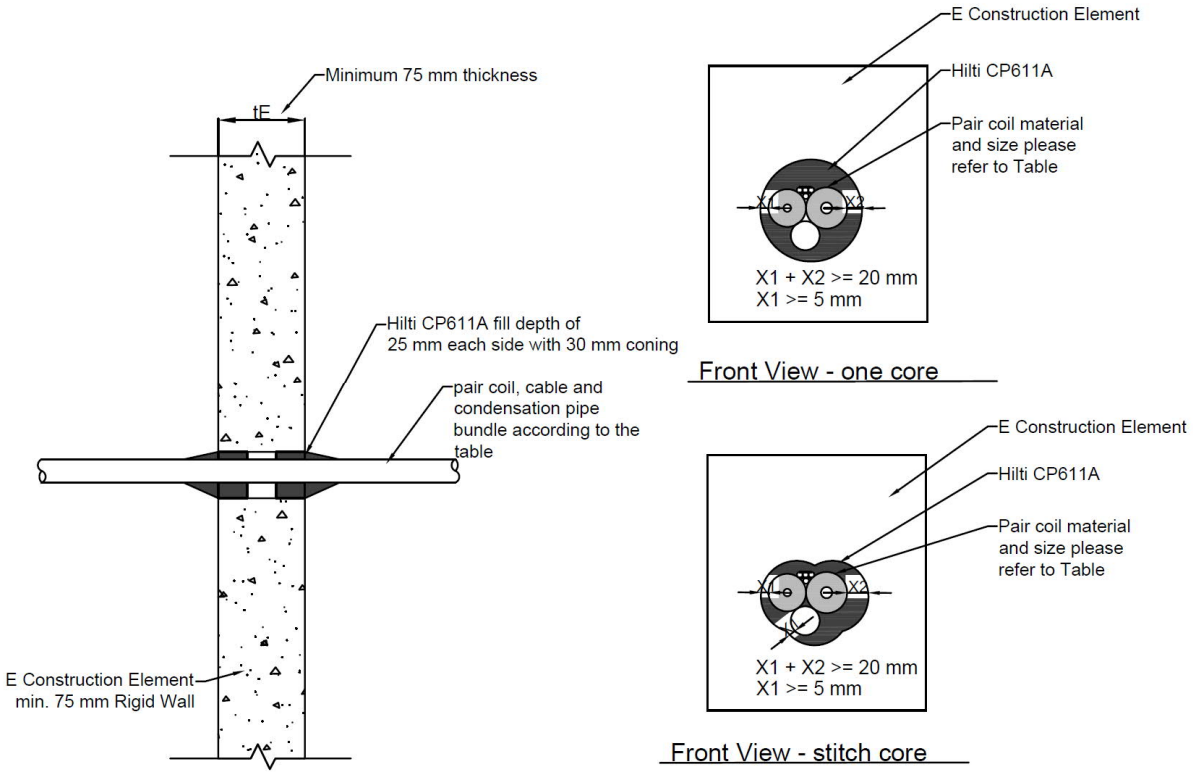


Figure 34 Single pair coil, cables and condensation pipes penetrating rigid wall

Table 37 Single pair coil, cables and condensation pipes penetrating rigid wall

Pair coil tube size		Insulation thickness (mm)	Cable type	Condensation pipe type	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch							
6.35-9.52	1/4-3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	1 × up to 25 mm uPVC condensation pipe	Ø 125	CP 611a filled to a depth of 25 mm each side and finished with a 30 mm sealant fillet cone – on both the exposed and unexposed sides.	Straight, S, C and L	-/60/60
6.35-12.7	1/4-1/2	13 or 19					Straight, S, C and L	-/60/60
6.35-15.88	1/4-5/8	13 or 19					Straight, S, C and L	-/60/60
9.5-15.99	3/8-5/8	13 or 19					Straight, S, C and L	-/60/60
9.5-19.05	3/8-3/4	13 or 19					Straight, S, C and L	-/60/60
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014 by an ATL.								

75mm Thick Rigid Walls or Greater

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The bare wall (E) must have a minimum thickness of 100mm and comprise of concrete, aerated concrete, solid of hollow masonry with a minimum density of 550 kg/m³, $t_E \geq 100$mm. These include AFS and Dincel walls.

For walls less than 100mm thick including Hebel walls, an aperture beading or build up (AP2) must be applied to achieve an overall system thickness (t_E)≥100mm

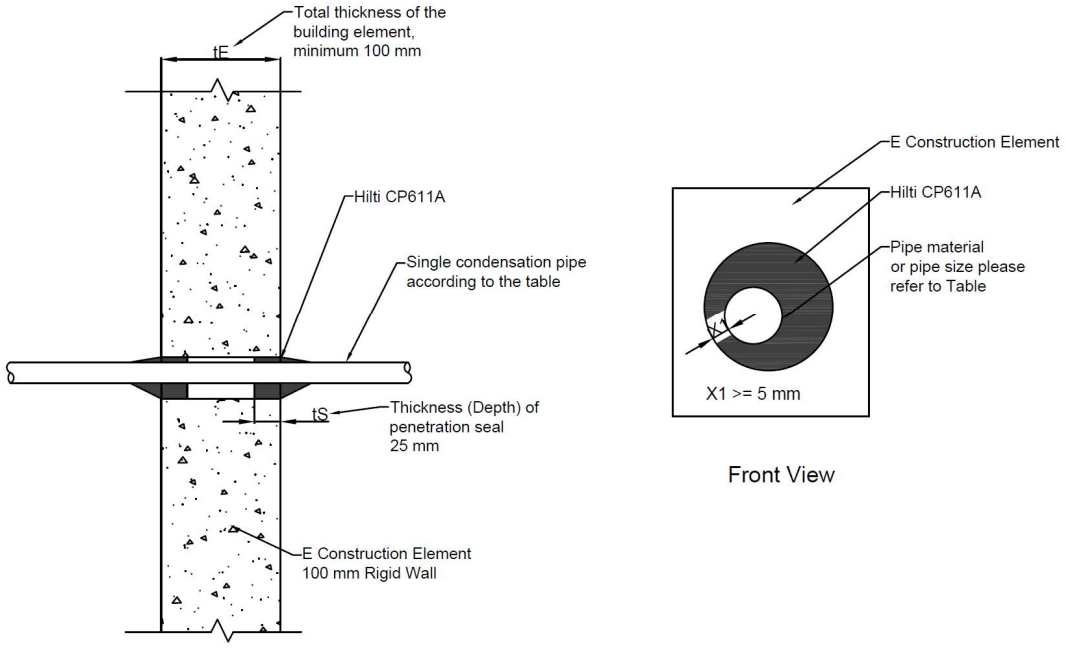


Figure 35 Condensation pipe penetrating minimum 100 mm thick rigid wall

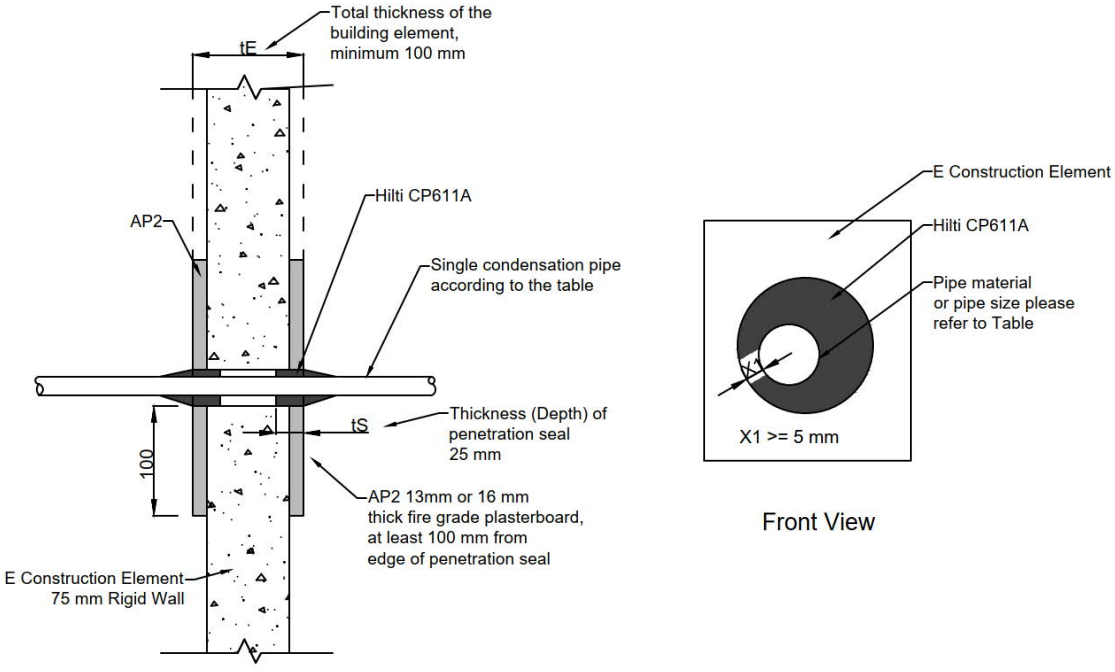


Figure 36 Condensation pipe penetrating minimum 75 mm thick rigid wall with build-up

Table 38 Condensation pipe penetrating minimum 100 mm thick rigid wall or minimum 75 mm thick rigid wall with plasterboard build-up AP2

Pipe type	Pipe outer diameter (mm)	Aperture size (mm)	Local fire-stopping protection	Configuration	FRL
1 × up to 25 mm uPVC condensation pipe	Up to 33 mm	48 - 54	CP 611a filled to a depth of 25 mm each side and finished with a 30 mm sealant fillet cone – on both sides.	Straight, S, C and L	-/120/120
1 × up to 25 mm uPVC corrugated conduit	Up to 25 mm	38 - 46		Straight, S, C and L	-/120/120

75mm Thick Rigid Walls or Greater

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The bare wall (E) must have a minimum thickness of 100mm and comprise of concrete, aerated concrete, solid of hollow masonry with a minimum density of 550 kg/m³, $t_E \geq 100$mm. These include AFS and Dincel walls.

For walls less than 100mm thick including Hebel walls, an aperture beading or build up (AP2) must be applied to achieve an overall system thickness (t_E)≥100mm

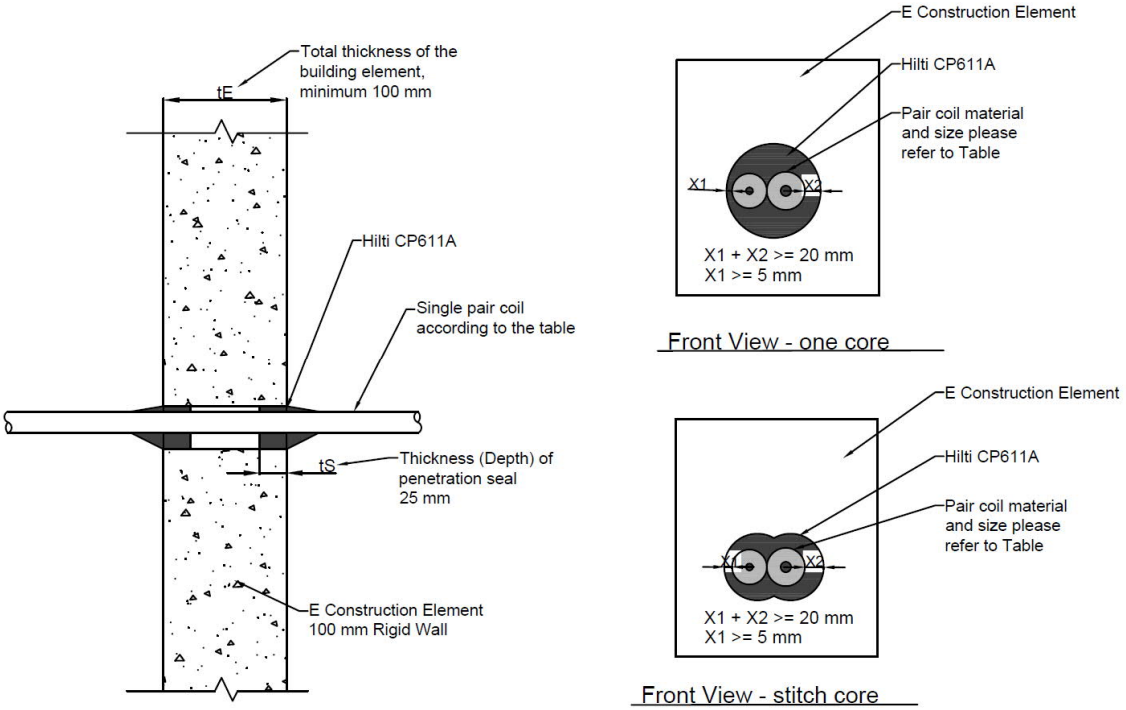


Figure 37 Single pair coil penetrating minimum 100 mm thick rigid wall

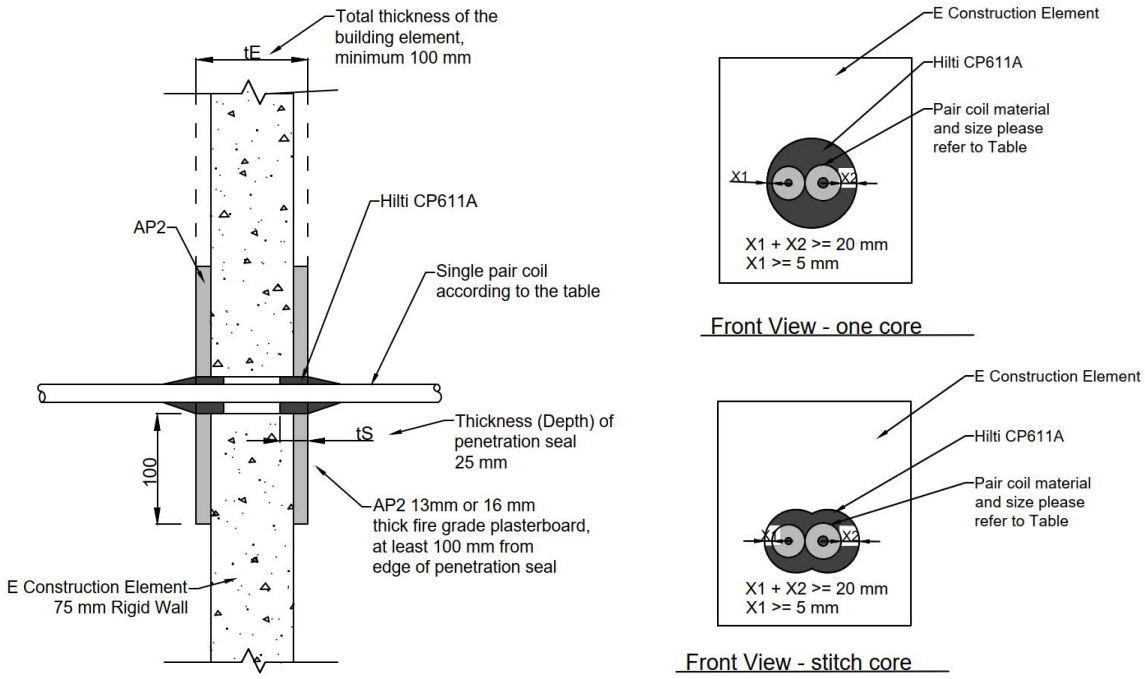


Figure 38 Single pair coil penetrating minimum 75 mm thick rigid wall with build-up

Table 39 Single pair coil penetrating minimum 100 mm thick rigid wall or minimum 75 mm thick rigid wall with plasterboard build-up AP2

Pair coil tube size		Insulation thickness (mm)	Min aperture size (mm)	Max aperture size (mm)	Local fire-stopping protection	Configuration	FRL
mm	Inch						
6.35-9.52	1/4-3/8	13 or 19	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to a depth of 25 mm each side and finished with a 30 mm sealant fillet cone – on both the exposed and unexposed sides.	Straight, S, C and L	-/120/120
6.35-12.7	1/4-1/2	13 or 19				Straight, S, C and L	-/120/120
6.35-15.88	1/4-5/8	13 or 19				Straight, S, C and L	-/120/120
9.5-15.99	3/8-5/8	13 or 19				Straight, S, C and L	-/120/120
9.5-19.05	3/8-3/4	13 or 19				Straight, S, C and L	-/120/120
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/120/120 in accordance with AS 1530.4:2014 by an ATL.							

75mm Thick Rigid Walls or Greater

FRL 120/120/120 & FRL -/120/120

Hilti CP611a Intumescent Sealant

The bare wall (E) must have a minimum thickness of 100mm and comprise of concrete, aerated concrete, solid of hollow masonry with a minimum density of 550 kg/m³, $t_E \geq 100$mm. These include AFS and Dincel walls.

For walls less than 100mm thick including Hebel walls, an aperture beading or build up (AP2) must be applied to achieve an overall system thickness (t_E)≥100mm

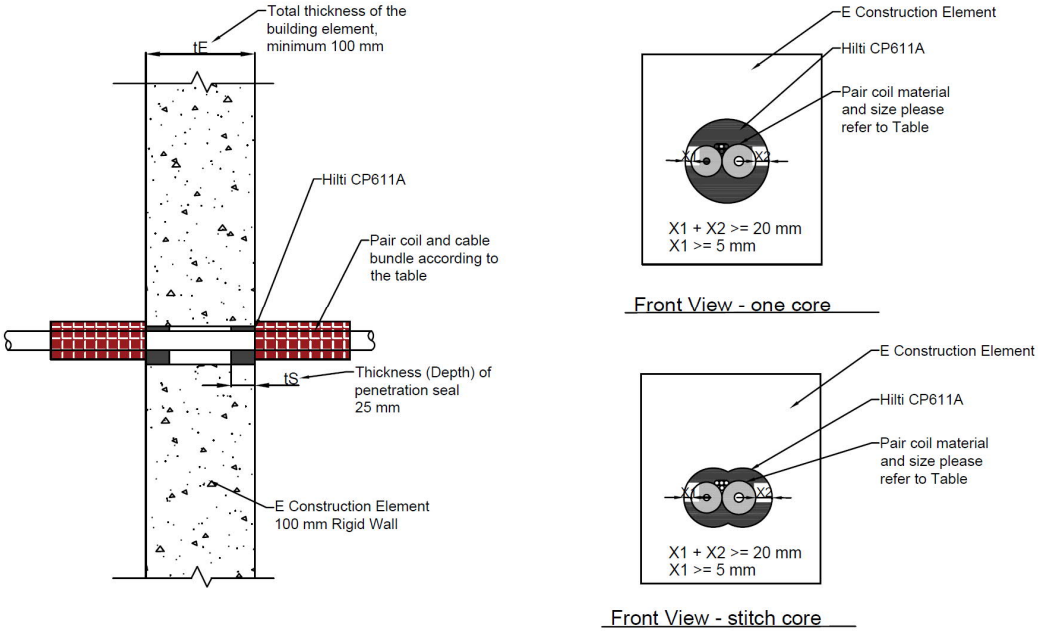


Figure 39 Single pair coil and cables penetrating 100 mm thick rigid wall

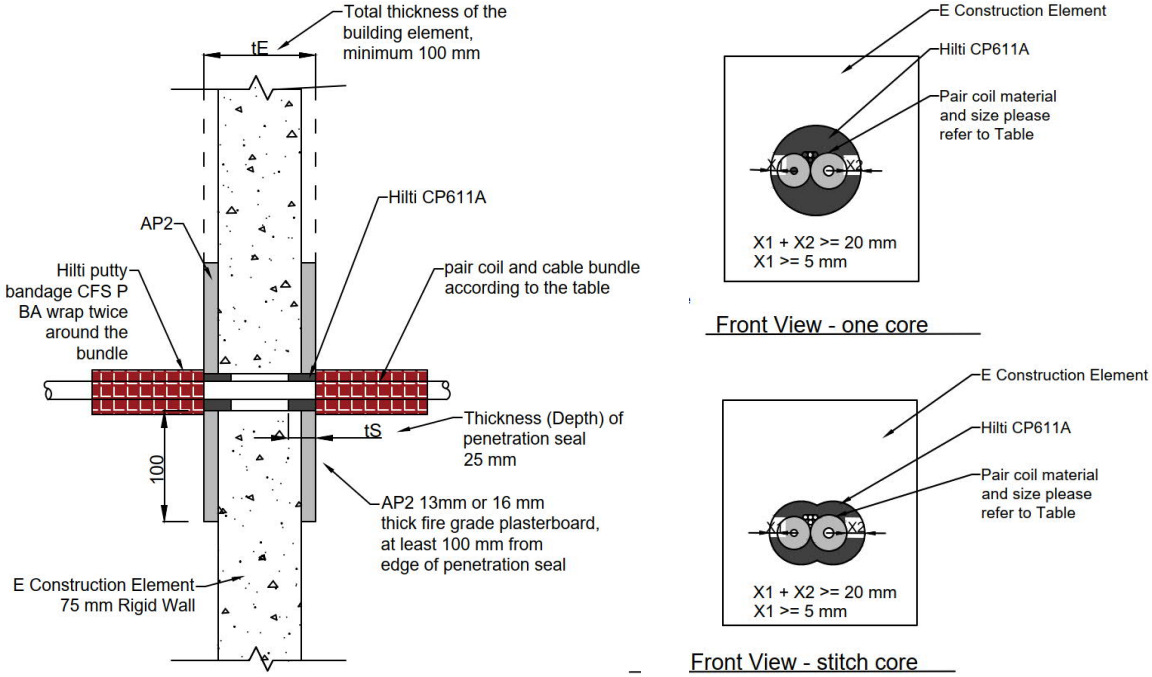


Figure 40 Single pair coil and cables penetrating 75 mm thick rigid wall with plasterboard build-up

Table 40 Single pair coil and cables penetrating 100 mm thick rigid wall or 75 mm thick rigid wall with plasterboard build-up

Pair coil tube size		Insulation thickness (mm)	Cable type	Min aperture size (mm)	Max aperture size (mm)	Local fire-stopping protection	Additional protection	Configuration	FRL
mm	Inch								
6.35 - 9.52	1/4 - 3/8	13 or 19	• 1 × power cable up to 2.5 mm² • 1 × data cable up to 1 mm²	Penetrant outer diameter + minimum 20 mm, stitch core allowed	125 mm diameter or equivalent area	CP 611a filled to a depth of 25 mm each side and finished flush.	Two layers of 100 mm wide Hilti Firestop Putty Bandage CFS-P BA must be installed on both sides.	Straight, S, C and L	-/120/120
6.35 - 12.7	1/4 - 1/2	13 or 19						Straight, S, C and L	-/120/120
6.35 - 15.88	1/4 - 5/8	13 or 19						Straight, S, C and L	-/120/120
9.5-15.99	3/8 - 5/8	13 or 19						Straight, S, C and L	-/120/120
9.5-19.05	3/8 - 3/4	13 or 19						Straight, S, C and L	-/120/120
The separating wall element must have been tested or assessed by an ATL to achieve an FRL of -/120/120 in accordance with AS 1530.4:2014 by an ATL.									

2hr 75mm Hebel Wall FRL -/120/120 &

Rigid Walls FRL -/120/120 & FRL 120/120/120

HVAC copper pipes protected with Hilti Intumescent Sealant CP611a and Hilti Retrofit Fire Collar CFS-C P 110/4" (1/1)

The bare wall can be 75mm Hebel wall with dry density of 510kg/m³ or rigid wall which must have a minimum thickness of 75mm and comprise of concrete, aerated concrete, solid or Hollow masonry with a minimum density of 510 kg/m³

Copper pipe is insulated with Nitrile Rubber Insulation (Armaflex/K-Flex)

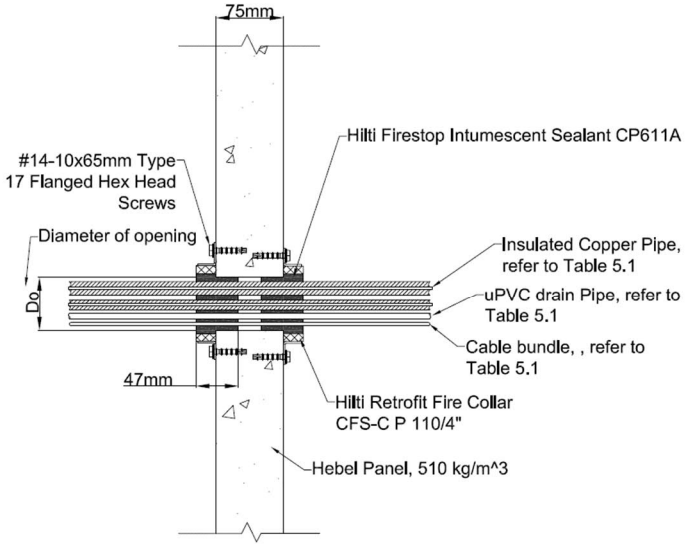


Figure 41a - Side view

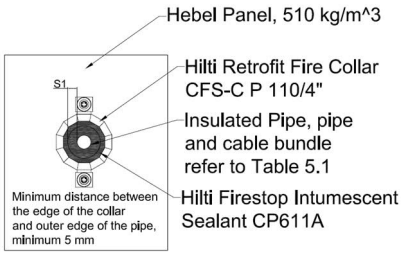


Figure 41b - Front view

Figure 41 HVAC pipes protected with Hilti Intumescent Sealant CP611a and Hilti Retrofit Fire Collar CFS-C P 110/4"

Table 41 **HVAC pipes protected with Hilti Intumescent Sealant CP611a and Hilti Retrofit Fire Collar CFS-C P 110/4”**

Service	Number of Service	Diameter of Opening, D_0 (mm)		Hilti Retrofit Firestop Collar CFS-C P size and sealant	Depth of Sealant, t_s (mm)	FRL
		Min	Max			
3/8” Copper pipe, 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 pipe, insulated 25mm	1					
20mm-25mm uPVC pipe	1					
1-4mm² 2C+E Flat TPS Cables	3					
1/2” Copper pipe, insulated 19mm	1	90	127		47	-/120/120
1/4” Copper pipe, insulated 19mm	1					
20mm-25mm uPVC pipe	1					
1mm²-4mm² 3C+E Circular TPS Cables	3					
3/8" Copper Pipe, Insulated 19mm	1	90	127		47	-/120/120
1/2" Copper Pipe, Insulated 19mm	1					
20mm-25mm uPVC pipe	1					
4mm² 3C+E Flat TPS Cables	3					
3/8" Copper Pipe, Insulated 19mm	1	90	127		47	-/120/120
1/4" Copper Pipe, Insulated 19mm	1					
20-25mm uPVC pipe	1					
1mm²-4mm² 2C+E Circular TPS Cables	3					

6. Direct field of application

This assessment applies to penetrations in walls exposed to fire from either side.

7. Requirements

This report details the methods of construction, test conditions and assessed results that would have been expected had the specific elements of construction described herein been tested in accordance with AS 1530.4.

Any further variations with respect to size, constructional details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the conclusions drawn in this report.

It is required that the supporting construction be otherwise tested or assessed to achieve the required FRL of the penetration seal in accordance with AS 1530.4:2014.

8. Validity

This assessment report does not provide an endorsement by Warringtonfire Australia Pty Ltd of the actual products supplied.

The conclusions of this assessment may be used to directly assess the fire resistance performance under such conditions, but it should be recognised that a single test method will not provide a full assessment of the fire hazard under all fire conditions.

Because of the nature of fire resistance testing, and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.

The assessment can therefore only relate only to the actual prototype test specimens, testing conditions and methodology described in the supporting data, and does not imply any performance abilities of constructions of subsequent manufacture.

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are the subject of constant review and improvement and it is recommended that this report be reviewed on or, before, the stated expiry date.

The information contained in this report shall not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

9. Declaration

The guide to undertaking assessments in lieu of fire tests prepared by the PFPF in the UK requires a declaration from the client. By accepting our fee proposal dated 28 January 2020, Hilti (Aust.) Pty Ltd and Hilti New Zealand Limited confirmed that

- To their knowledge the component or element of structure, which is the subject of this assessment, has not been subjected to a fire test to the standard against which this assessment is being made.
- They agree to withdraw this assessment from circulation if the component or element of structure is the subject of a fire test by a test authority in accordance with the standard against which this assessment is being made and the results are not in agreement with this assessment.

They are not aware of any information that could adversely affect the conclusions of this assessment and – if they subsequently become aware of any such information, they agree to ask the assessing authority to withdraw the assessment.