



Regulatory information report

Services penetrating various rigid walls to AS 1530.4:2014 and AS 4072.1:2005

Client: Hilti Aust Pty Limited & Hilti New Zealand Limited

Job number: FAS180439 Issuing consultant: Yomal Dias

Date: 26 March 2021 Revision: RIR3.0

Quality management

Version	Date	Information relating to report			
RIR1.0	Issue: 13/03/2019	Reason for issue	Report issued to the client – first issue.		
			Prepared by	Reviewed by	Authorised by
		Name	Mahmoud Akl	Omar Saad	Omar Saad
RIR1.1	Issue: 25/03/2019	Reason for issue	Report issued for typographical amendment		
			Prepared by	Reviewed by	Authorised by
		Name	Mahmoud Akl	Omar Saad	Omar Saad
RIR1.2	Issue: 11/09/2019	Reason for issue	Revised to include additional scope		
		Name	Prepared by	Reviewed by	Authorised by
			Mahmoud Akl	Omar Saad	Omar Saad
RIR1.3	Issue: 06/11/2019	Reason for issue	Revised for typographical amendment		
			Prepared by	Reviewed by	Authorised by
		Name	Mahmoud Akl	Omar Saad	Omar Saad
RIR1.4	Issue: 25/02/2020	Reason for issue	Revised to give applicability to Dincel walls as wall separating elements		
			Prepared by	Reviewed by	Authorised by
		Name	Yomal Dias	Omar Saad	Omar Saad
RIR1.5	Issue: 18/05/2020	Reason for issue	Revised to expand applicability to Dincel walls.		
			Prepared by	Reviewed by	Authorised by
		Name	Yomal Dias	Omar Saad	Omar Saad
RIR2.0	Issue: 27/01/2021	Reason for issue	Updated to include Walsc wall systems.		
			Prepared by	Reviewed by	Authorised by
		Name	Yomal Dias	Mahmoud Akl	Omar Saad
RIR2.1	Issue: 29/01/2021	Reason for issue	Minor typographical and format amendments.		
			Prepared by	Reviewed by	Authorised by
		Name	Yomal Dias	Omar Saad	Omar Saad
RIR2.2	Issue: 09/02/2021	Reason for issue	Minor typographical and format amendments.		
			Prepared by	Reviewed by	Authorised by
		Name	Dugald Watson	Yomal Dias	Mahmoud Akl
RIR3.0	Issue: 26/03/2021	Reason for issue	Allow 0 mm annular gap on one side only for various PE-X pipes protected with Hilti CP611A Firestop intumescent sealant.		
			Prepared by	Reviewed by	Authorised by
	Expiry: 31/03/2024	Name	Yomal Dias	Mahmoud Akl	Omar Saad

		Signature			
--	--	-----------	-----------------------------------------------------------------------------------	------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------

Contact Information

Warringtonfire Aus Pty Ltd - ABN 81 050 241 524

NATA Registered Laboratory
Unit 2, 409-411 Hammond Road
Dandenong Victoria 3175
Australia
T: +61 (0)3 9767 1000

General conditions of use

Warringtonfire is not at liberty to discuss the contents of this report with third parties without the consent of the report sponsor(s).

All work and services carried out by Warringtonfire Australia Pty Ltd are subject to, and conducted in accordance with, the Standard Terms and Conditions of Warringtonfire Australia Pty Ltd, which are available at <https://www.element.com/terms/terms-and-conditions> or upon request.

This report may only be reproduced in full without modifications by the report sponsor. Copies, extracts or abridgments of this report in any form shall not be published by other organisations or individuals without the permission of Warringtonfire Aus Pty Ltd.

Contents

Quality management	2
Contents	4
1. Introduction	5
2. Tested prototypes.....	5
3. Variation to tested prototypes.....	5
4. Referenced test standard	8
5. Formal assessment summary	9
6. Direct field of application	39
7. Requirements	39
8. Validity	39
9. Authority	40
9.1 Applicant undertakings and conditions of use.....	40

1. Introduction

This report contains the minimum information sufficient for regulatory compliance and refers to assessment report FAS180439 R2.2 and FAS190067B R1.1.

The referenced report FAS180439 R2.2 presents an assessment on the fire-resistant performance of various services penetrating a 75mm Hebel wall when tested in accordance with AS 1530.4:2014 and assessed in accordance with AS 4072.1:2005.

Furthermore, the referenced report FAS190067B R1.1 presents an assessment of the fire resistance performance of various pipe and cable services through a 155mm thick Dintel wall with polymer skins, filled with normal-weight concrete, protected by various Hilti fire protection systems including Fire resistance block CFS-BL, fire resistant 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.

The tested prototypes described in section 2 of this report, when subjected to the proposed variations described in section 3 and tested in accordance with the relevant standards described in section 4, are assessed to achieve performance as summarised in section 5.

The validity of this assessment is conditional on compliance with sections 6, 7, 8 and 9 of this report.

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

2. Tested prototypes

The referenced assessment FAS180439 R2.2 is based on reference tests FRT180049.3, FRT180051.2 & FRT180052.2 being tests on 75 mm Hebel wall in accordance with AS 1530.4:2014 and AS 4072.1:2005. The tests were sponsored by Hilti Aust Pty Limited & Hilti New Zealand Limited and were conducted by Warringtonfire Aus Pty Ltd.

Test Reports No. 14244A, Nr 8686/12 & Nr8717/12 are also referenced to assist in the assessment of the insulation performance of cable conduits and single cables if two layers of Hilti Firestop Putty bandage CFS-P BA were added on either side.

Test Report No. EWFA 53366600.2 is also referenced to include the required evidence to include PE-AL-PE pipes in this assessment report.

Test Report No. 2683500 is also referenced to assess the performance of metal pipes when insulated with 50 mm Fibertex 450 Rockwool on each side.

Furthermore, the referenced assessment report FAS190067B R1.1 refers to FRT190130 R2.0 which describes a fire resistance test of various pipe and cable services through a 155 mm thick Dintel 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 Dintel construction system and Hilti Australia Pty Ltd, and the testing was undertaken by Warringtonfire Australia Pty Ltd.

Test report FSV 1784, FSV 2119 and assessment report FAS200367 R1.0 are referenced to assess the fire resistance performance of the proposed services when penetrating 75 mm thick Walsc walls – with tongue and groove joints at the edges.

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

3. Variation to tested prototypes

The proposed construction shall be as tested in FRT180049.3, FRT180051.2 & FRT180052.2 with consideration of following variations:

- Assess performance of various types of single cables protected with Hilti Intumescent sealant CP611a.

- Assess performance of various types of single cables protected with Hilti Intumescent sealant CP611a and with Hilti Firestop Putty bandage CFS-P BA.
- Assess performance of various single cables protected with Hilti Intumescent sealant CP611a in a coning configuration
- Assess performance of various sizes and types of cable bundles protected with Hilti Intumescent sealant CP611a with and without Hilti Firestop Putty bandage CFS-P BA.
- Assess performance of various sizes and types of cable bundles protected with Hilti Intumescent sealant CP611a with coning configuration.
- Assess performance of various PE-X pipes installed with backing rods, protected by various sealant depths (25 mm, 60 mm & 75 mm) of Hilti Intumescent CP611a and/or a combination of Intumescent CP611a and Hilti Retrofit Fire Collars CFS-C P.
- Assess performance of various PE-X pipes installed in 75mm Hebel wall with Beading arrangement.
- Assess performance of various configurations of HVAC pipes protected with Hilti Intumescent Sealant CP611a and Hilti Retrofit Fire Collars CFS-C P.
- Assessment of various uPVC pipes protected with Hilti Retrofit Fire Collars CFS-C P and Hilti Firestop Acrylic Sealant CP606.
- Assessment of the integrity performance of various sizes and types of metal pipes without lagging (uninsulated) and protected by Hilti Firestop Acrylic sealant CP606.
- Assess the insulation performance of metal pipes with size $\leq 150\text{mm} \times 1.6\text{mm}$ installed in 75mm Hebel wall with beading and with 600 mm of 50 mm Fibertex 450 Rockwool.
- Assessment of various control joints and gap seals protected with Hilti Firestop Acrylic sealant CP606.
- Assess performance of services with variation to the diameter of the opening.
- The separating element can be 75 mm Hebel wall with minimum dry density of 510 kg/m^3 which has been tested to achieve FRL -/120/120 or **Rigid wall** which must have a minimum thickness of 75 mm and comprise of concrete, aerated concrete, solid or Hollow masonry with a minimum density of 510 kg/m^3 and has been tested to achieve FRL -/120/120 or FRL 120/120/120.
- Minimum 155 mm thick Dincel walls, filled with normal-weight concrete, may also be used as the wall separating element.
- 75 mm thick Walsc walls with a stated dry density of 525 kg/m^3 – with tongue and groove joints at the edges – assessed to achieve an FRL of -/120/120 may also be used as the wall separating element.
- Service configurations specified in Section 5 using the same installation configuration through 78 mm Speedpanel can achieve the specified FRL given that:
 - 78 mm 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
- For control joints, Hilti Firestop Acrylic sealant CP606 backed with mineral wool products as backfilling material shall be used within or between rigid wall constructions. The mineral wool products shall be mineral wool insulation with a density of 100 kg/m^3 and with no aluminium facing. Moreover, Hilti Firestop Acrylic sealant CP606 backed with open or closed cell polyethylene backing rod shall be used within or between rigid wall constructions.
- PEF backing rod can be either open cell or closed cell.

- Multiple penetration option for cable services (single, bundle, conduit) and PEX pipes.
- Maximum size opening for multiple penetration, 150 mm in diameter, 150 mm(w) × 150 mm(h) rectangular opening or equivalent surface area of 0.023 m². Spacing requirement shall be provided as per figure A.
- In multiple penetration application using CP611A, due to the thickness of separating wall element, the overall FRL shall be derated to 60 minutes only.

Distance requirements:

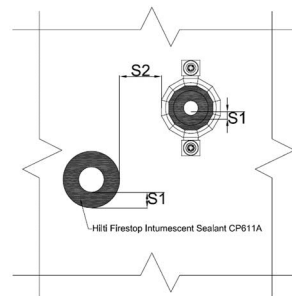


Figure A Distance Requirements for Penetrations

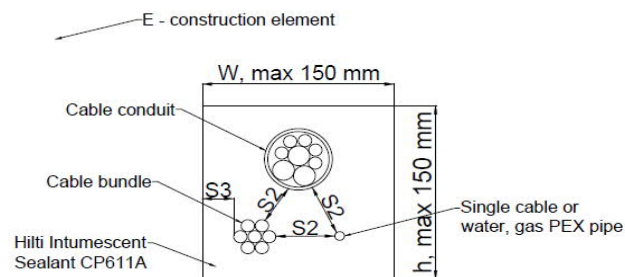


Figure B Distance Requirements for Multiple Penetrations

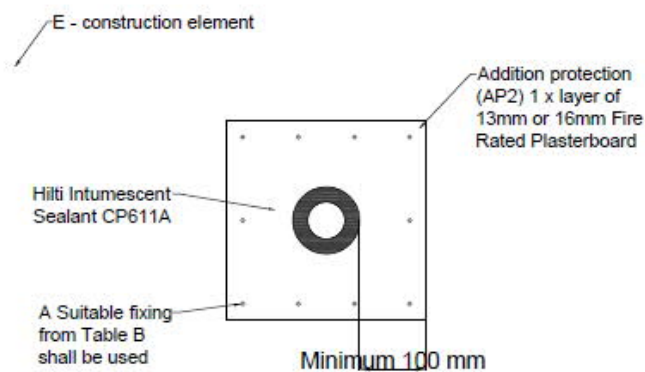


Figure C Build up details

Table A Distance requirement in walls

Minimum distance valid for installation of services	Wall (mm)
Distance between pipe and seal edge	S ₁ =5
Distance between pipe and seal edge (only where specifically allowed in section 5)	S ₁ =0
Clear distance between penetrations	S ₂ =40
Distance between pipe and edge of Hilti CFS-C P 50/1.5" Retrofit fire collar	S ₁ =5
Distance between cable and seal edge	S ₃ =10

Table B Anchor Fixing types for plasterboard build up/beading and Hilti retrofit fire collar CFS-CP

Anchoring System		Minimum Size	Aerated Concrete Wall (Hebel)	Solid Concrete Walls
Hilti Screw Anchor	HUS3-P	M6	✓*	✓
	HUS3-H		✓*	✓
	HUS		✓*	✓
Hilti Expansion Anchor	HSA			✓
	HST			✓
	DBZ 6/45			✓
Others	#14/10x65mm Hex Head Type 17 screw	14g	✓	
	Threaded Rod with Nut & Washer	M6	✓	✓

*Minimum length of Hilti HUS screw required for Aerated Concrete (Hebel) is 60mm

4. Referenced test standard

The referenced assessment report is prepared with reference to the requirements of AS 1530.4:2014 and AS 4072.1:2005 for service penetrations and control joints.

5. Formal assessment summary

On the basis of the discussion presented in the referenced assessment reports, it is the opinion of this testing authority that if the tested prototype described in section 2 had been varied as in section 3, it will achieve the fire resistance performance as stated below if tested in accordance with the test method referenced in section 4 when subject to the requirements of section 7.

Table C Table of content in section 5

Penetration type	Installation	FRL (Hebel / Walsc# / rigid wall)	FRL (Dincel wall)	Page
Single cable*	CP611A, with or without backing rod	Varies	-/120/120	10
Single cable*	CP611A, coning with or without backing rod	-/120/120	-/120/120	11
Single cable*	CP611A and CFS-BA with or without backing rod	-/120/120	-/120/120	12
Cable Bundle*	CP611A with or without backing rod	-/120/30	-/120/30	14
Cable Bundle*	CFS-C P retrofit fire collar and CP611A	-/120/30	-/120/30	15
Cable Bundle*	CP611A, coning with or without backing rod	-/120/120	-/120/120	16
Cable Bundle*	CP611A and CFS-BA with or without backing rod	-/120/120	-/120/120	17
Cable Bundle*	CFS-C P retrofit fire collar, CP 611A and CFS-BA	-/120/120	-/120/120	19
Cable Conduit*	CP611A with or without backing rod	-/120/120	-/120/120	20
Water and Gas PEX*	CP611A (25mm/60mm/75mm)	Varies	Varies	21
Water and Gas PEX*	Built up with CP611A with backing rod	-/120/120	-/120/120	23
Water and Gas PEX*	CFS-C P retrofit fire collar and CP 611A	Varies	-/120/120	24
Water and Gas PEX*	Built up with CFS-C P retrofit fire collar and CP 611A	-/120/120	-/120/120	26
HVAC Air-conditioning	CFS-C P retrofit fire collar and CP 611A	-/120/120		27
uPVC Pipe*	CFS-C P retrofit fire collar and CP 606	-/120/120	Varies	29
Copper Pipe	CP 606 with backing rod without pipe insulation	-/120/-	-/120/-	31
Copper Pipe	CP 606 with pipe insulation in 75mm Hebel wall	-/120/60		33
Copper Pipe*	CP 606 with pipe insulation in build-up wall	-/120/120	-/120/120	35
Joint Seal	CP606 with backing rod, 15 mm depth	-/120/90	+	37
Joint Seal	CP606 with backing rod, 25 mm depth	-/120/120	+	38

*Assessment extended to cover services installed within minimum 155 mm thick Dincel wall separating elements. In cases where the FRLs of the assessed services within Dincel walls vary from those of within the regular -/120/120 or 120/120/120 rigid walls, they have been specified separately.

*Fire resistance performance of various gaps and joints within Dincel walls protected with Hilti fire stopping products has been assessed in FAS190067 R1.2.

#75 mm thick Walsc walls with a stated dry density of 525 kg/m³ must have tongue and groove joints at the edges.

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

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

Single Cable protected with Hilti Intumescent Sealant CP611a (1/3)

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

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

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 $S1 = 5$ mm as specified in Table A.

System can either be installed as per figure and table or alternatively, a core hole of 20 mm larger than the service diameter is allowed given the S1 value as described.

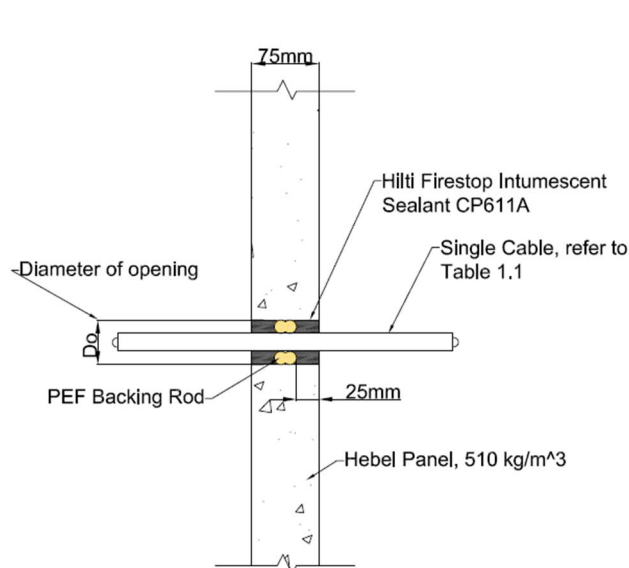


Figure 1.1a Side view- single cable with PEF backing rod

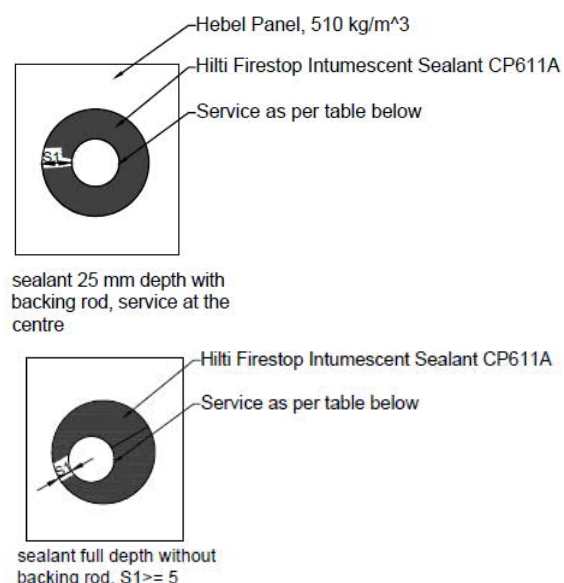


Figure 1.1b Front View- single cable

Table 1.1 Assessment summary of Single cables configurations as per Figure 1.1

Service	Cable diameter (mm)	Diameter of the opening, D ₀ (mm)	Backing Material	Depth of sealant, t _s	FRL (Hebel / Walsc wall)	FRL (Dincel wall)
Single Cable, Circular Sub-Mains 1.5mm ² - 16mm ² 2C+E	Up to 21	38	With PEF Backing rod or sealant at full depth	25	-/120/60	-/120/120
Single Cable, Flat TPS 1.0mm ² - 16mm ² 2C+E	9.3x4.6 - 14.5x6.5	38		25	- /120/120	-/120/120
RG6 Quad shield coax cables	8.9	22		25	- /120/120	-/120/120
Cat6, Data Cable	5.8	20		25	-/120/60	-/120/120

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

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

Single Cable protected with Hilti Intumescent Sealant CP611a in coning configuration (2/3)

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

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

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 $S1 = 5$ mm as specified in Table A.

System can either be installed as per figure and table or alternatively, a core hole of 20 mm larger than the service diameter is allowed given the S1 value as described.

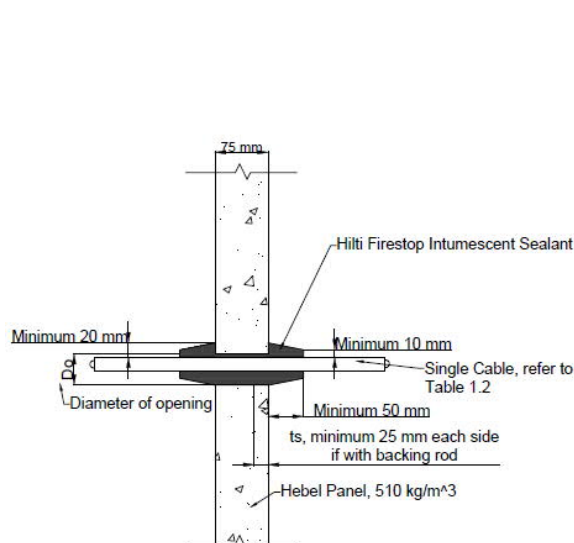


Figure 1.2a Side view- single cable with PEF backing rod

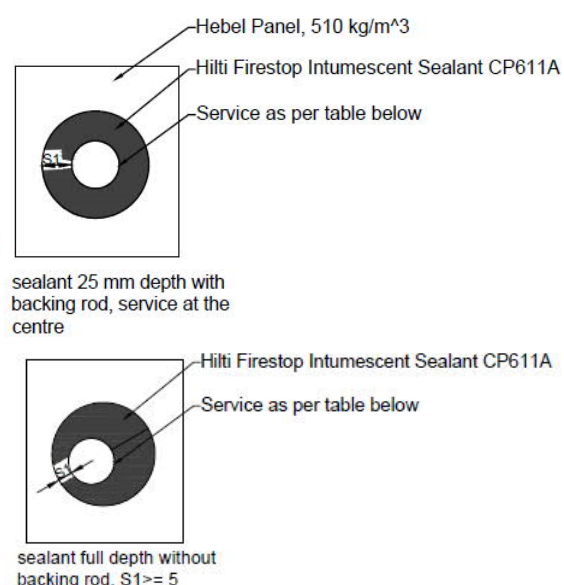


Figure 1.2b Front View- single cable

Table 1.2 Assessment summary of single cables configurations as per Figure 1.2

Service	Cable diameter (mm)	Diameter of the opening, D ₀ (mm)	Additional protection	Depth of sealant, t _s	FRL
Single Cable, Circular Sub-Mains 1.5 mm ² - 16 mm ² 2C+E	Up to 21	38	Coning detail please refer to Figure 1.2a. With PEF backing rod or sealant at full depth	25	-/120/120
Single Cable, Flat TPS 1.0 mm ² - 16 mm ² 2C+E	9.3x4.6 - 14.5x6.5	38		25	-/120/120
RG6 Quad shield coax cables	8.9	22		25	-/120/120
Cat6, Data Cable	5.8	20		25	-/120/120

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

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

Single Cable protected with Hilti Intumescent Sealant CP611a, 2 layers of Hilti Firestop Putty Bandage CFS-P BA (3/3)

The bare wall can be 75 mm Hebel wall with dry density of 510 kg/m^3 or rigid wall which must have a minimum thickness of 75 mm and comprise of concrete, aerated concrete, solid or hollow masonry with a minimum density of 510 kg/m^3 .

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m^3 – with tongue and groove joints at the edges. Additional protection details are as for a 75 mm Hebel wall.

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 $S1 = 5 \text{ mm}$ as specified in Table A.

System can either be installed as per figure and table or alternatively, a core hole of 20 mm larger than the service diameter is allowed given the $S1$ value as described.

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 shall be provided next to the 2 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.

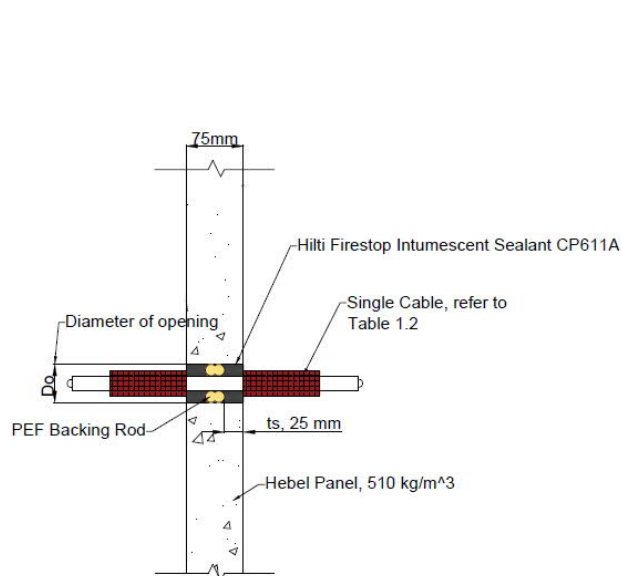


Figure 1.3a Side view- single cable with PEF backing rod

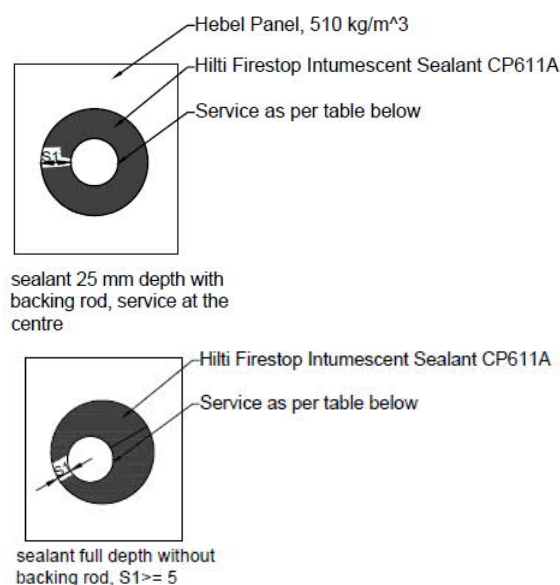


Figure 1.3b Front View- single cable

Table 1.3 Assessment summary of Single cables configurations as per Figure 1.3

Service	Cable diameter (mm)	Diameter of the opening, D ₀ (mm)	Additional protection	Depth of sealant, t _s	FRL
Single Cable, Circular Sub-Mains 1.5 mm ² - 16 mm ² 2C+E	Up to 21	38	Additional two layers of 100 mm wide Hilti Firestop Putty Bandage CFS-P BA on both sides of the wall	25	-/120/120
Single Cable, Flat TPS 1.0 mm ² - 16 mm ² 2C+E	9.3x4.6 -14.5x6.5	38		25	-/120/120
RG6 Quad shield coax cables	8.9	22		25	-/120/120
Cat6, Data Cable	5.8	20		25	-/120/120

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

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

Cable Bundle protected with Hilti Intumescent Sealant CP611a (1/5)

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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

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 $S_1 = 5\text{mm}$ as specified in Table A.

System can either be installed as per figure and table or alternatively, a core hole of 20 mm larger than the service diameter is allowed given the S_1 value as described.

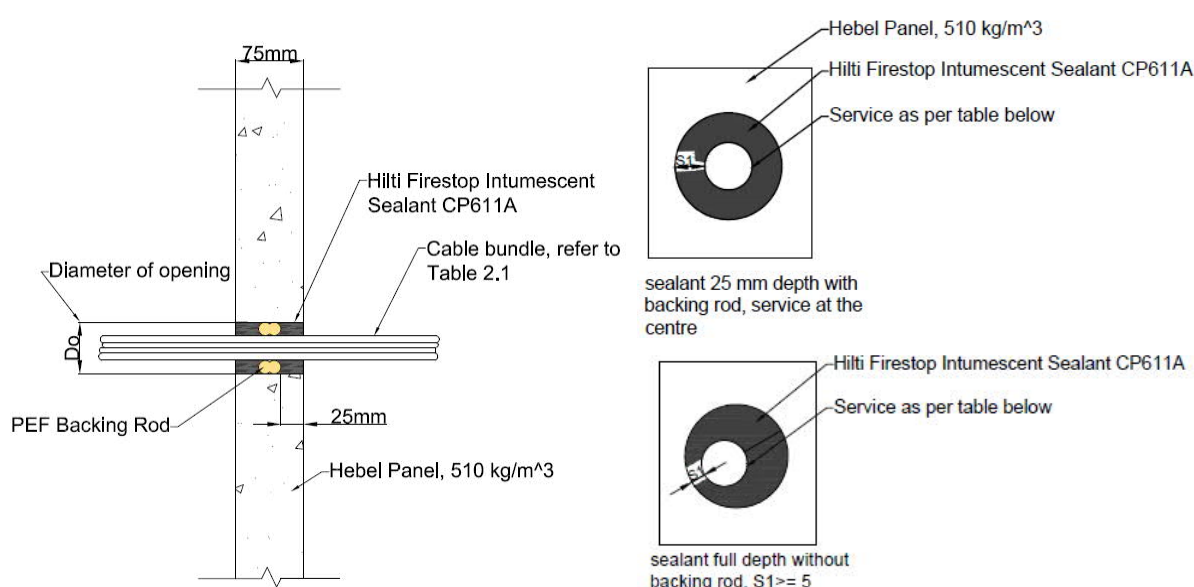


Figure 2.1a Side View- Cable Bundle with PEF backing rod

Figure 2.1b Front View-Cable bundle

Table 2.1 Assessment table of cable bundle configuration as per figure 2.1

Service	Maximum Cable Bundle (mm)	Diameter of the Opening, D_0 (mm)	Depth of sealant, t_s (mm)	Backing Rod	FRL
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and other electrical communication cables)	21	38	25	With PEF Backing rod or sealant at full depth	- /120/30
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and other electrical and communication cables)	36	50	25		- /120/30

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

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

Cable Bundles protected with Hilti Intumescent Sealant CP611a and Hilti Retrofit Fire Collar CFS-C P 50/1.5" (2/5)

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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

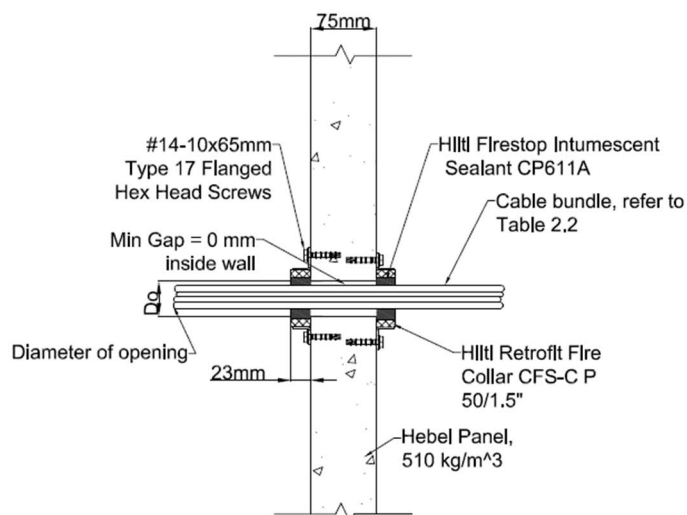


Figure 2.2a Side View- cable bundle with Hilti Retrofit Fire Collar CFS-C P 50/1.5"

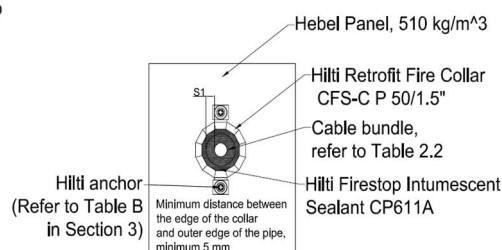


Figure 2.2b Front View-cable bundle with Hilti retrofit fire collar CFS-C P 50/1.5"

Table 2.2 Assessment table of cable bundle configuration as per figure 2.2

Service	Maximum Cable Bundle diameter (mm)	Minimum Diameter of the Opening, D ₀ (mm)	Maximum Diameter of the Opening, D ₀ (mm)	Hilti Retrofit Firestop Collar CFS-CP Size and Sealant	Depth of sealant, t _s (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	

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

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

Cable bundles protected with Hilti Intumescent Sealant CP611a in coning configuration (3/5)

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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

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 $S_1 = 5\text{mm}$ as specified in Table A.

System can either be installed as per figure and table or alternatively, a core hole of 20 mm larger than the service diameter is allowed given the S_1 value as described.

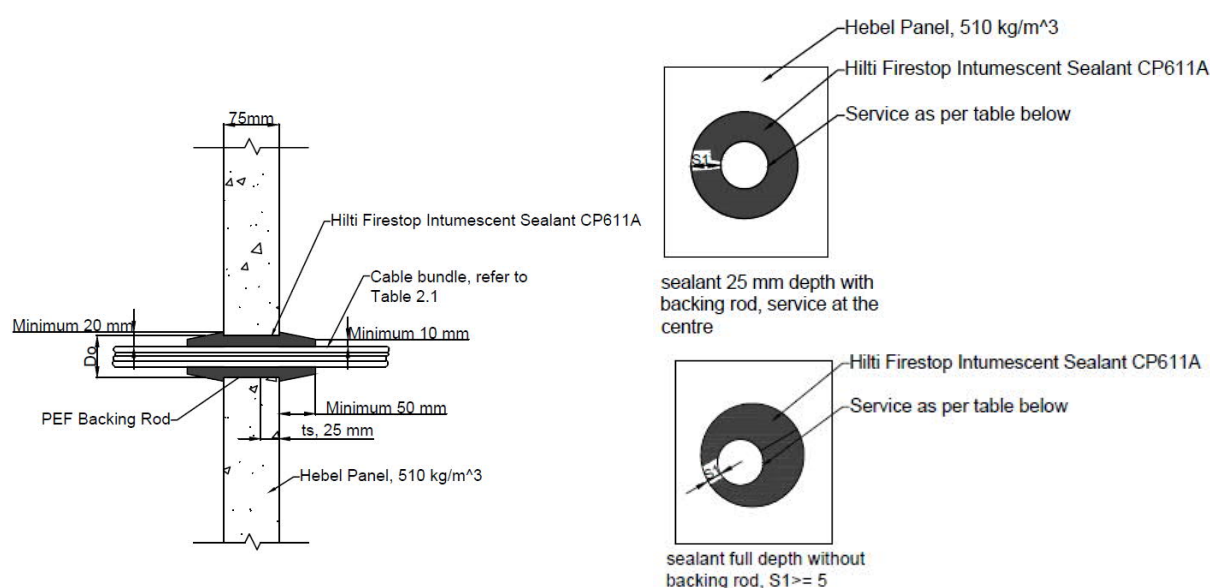


Figure 2.3a Side view- Cable bundle with coning

Figure 2.3b Front view- Cable bundle protected with coning

Table 2.3 Assessment table of Cable bundle configuration as per figure 2.3

Service	Maximum Cable bundle diameter (mm)	Diameter of the opening, D_0 (mm)	Depth of sealant, t_s (mm)	Additional Protection	Depth of sealant, t_s (mm)	FRL
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and others inclusive)	21	38	25	Coning detail please refer to Figure 2.3a.	25	-/120/120
	35	50	25	With PEF backing rod or sealant at full depth		

**2hr 75mm Hebel and Walsc Wall FRL -/120/120 &
Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dincel walls)
Cable bundles protected with Hilti Intumescent Sealant CP611a, 2 layers of Hilti Firestop Putty Bandage CFS-P BA (4/5)**

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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated 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.

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 A.

System can either be installed as per figure and table or alternatively, a core hole of 20 mm larger than the service diameter is allowed given the S1 value as described.

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 shall be provided next to the 2 layers of putty bandage placed adjacent to the wall, on either side, externally, such that the total length of the putty bandage is 200mm.

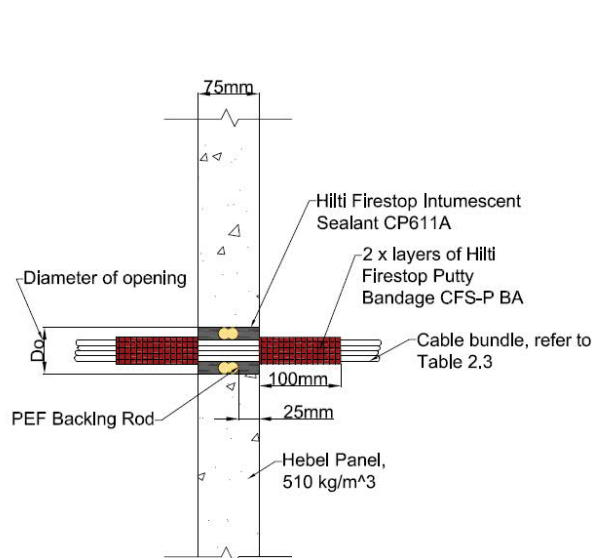


Figure 2.4a Side view- Cable bundle protected
protected with Hilti Firestop Putty Bandage CFS-P BA and CP611a
Bandage CFS-P BA and CP611a

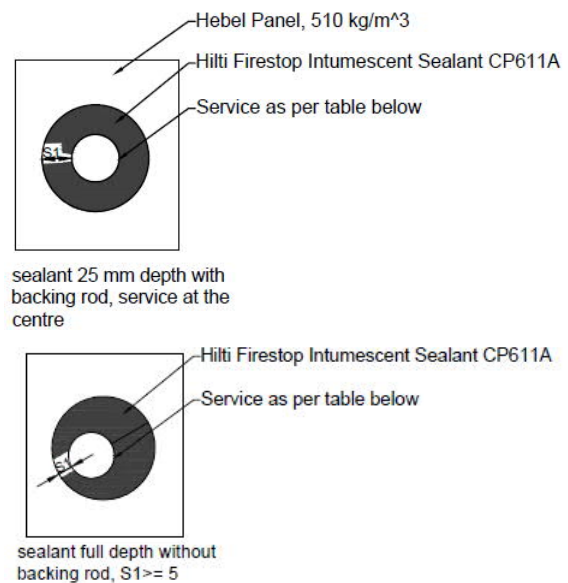


Figure 2.4b Front view- Cable bundle
protected with Hilti Firestop Putty

Table 2.4 Assessment table of Cable bundle configuration as per figure 2.4

Service	Maximum Cable bundle diameter (mm)	Diameter of the opening, D ₀ (mm)	Depth of sealant, t _s (mm)	Additional Protection	Backing Option	FRL
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and others inclusive)	21	38	25	Additional two layers of 100 mm wide Hilti Firestop Putty Bandage CFS-P BA on both sides of the wall	With PEF Backing rod or sealant at full depth	-/120/120
	35	50	25			

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

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

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

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated 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 shall be provided next to the 2 layers of putty bandage placed adjacent to the wall, on either side, externally, such that the total length of the putty bandage is 200mm.

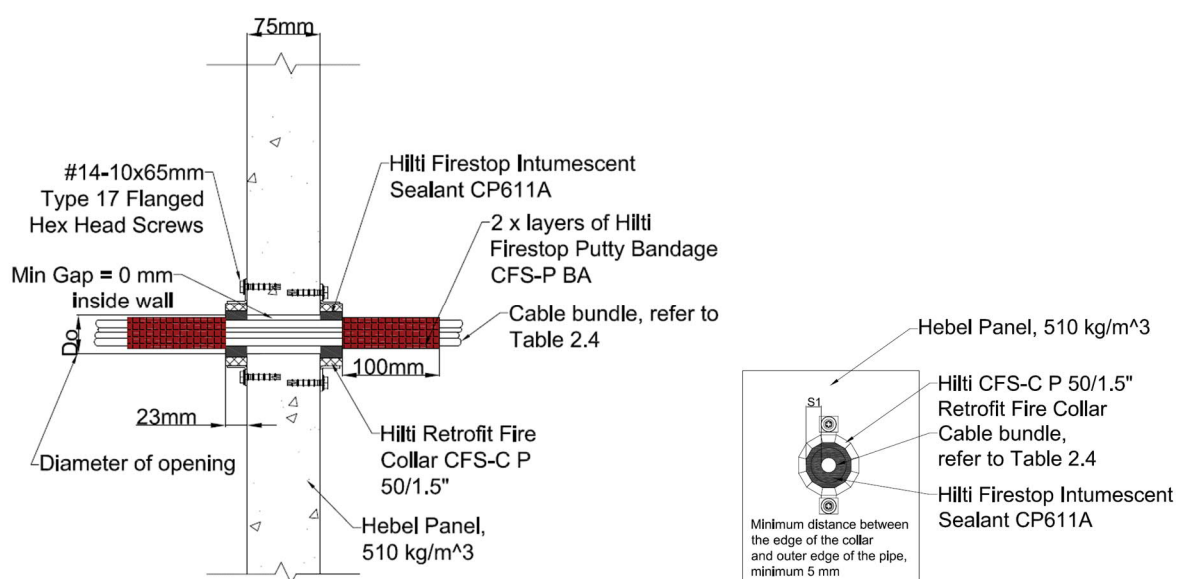


Figure 2.5a Side view- Cable Bundle protected by Hilti Retrofit Collar CFS-C P and 2 layers of Hilti Firestop Putty Bandage CFS-P BA

Figure 2.5b Front View- Cable bundle with Hilti Retrofit Fire Collar CFS-C P and 2 layers of Hilti Firestop Putty

Bandage CFS-P BA

Table 2.5 Assessment table of Cable Bundle configuration as per figure 2.5

Service	Maximum Cable Bundle Diameter (mm)	Minimum Diameter of the Opening, D ₀ (mm)	Maximum Diameter of the Opening, D ₀ (mm)	Hilti Firestop Collar CFS-CP Size and sealant	Depth of sealant, t _s (mm)	Additional Protection	FRL
Cable bundle (fire rated cable, submain, TPS, RG6, CAT6 and others inclusive)	21	25	38	CFS-CP 50/1.5" & CP 611A	23	Two layers of 100mm wide Hilti Firestop Putty Bandage CFS-P BA on both sides of the wall	-/120/120
	36	38	50		23		-/120/120

**2hr 75 mm Hebel and Walsc Wall FRL -/120/120 &
Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155 mm thick Dintel walls)
Cable Conduits protected with Hilti Intumescent Sealant CP611a (1/1)**

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

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

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 $S_1 = 5$ mm as specified in Table A.

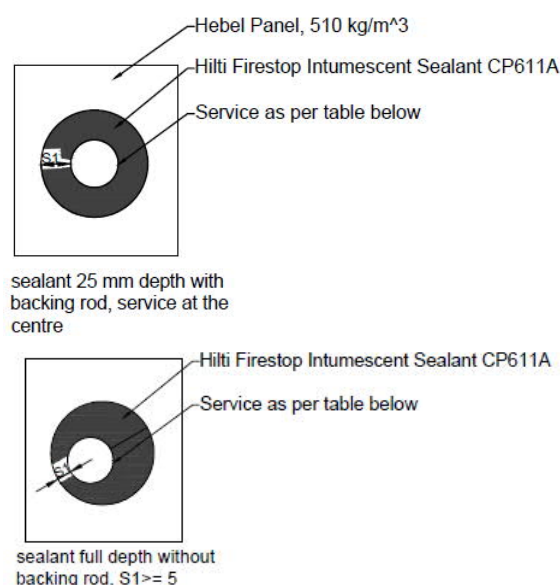
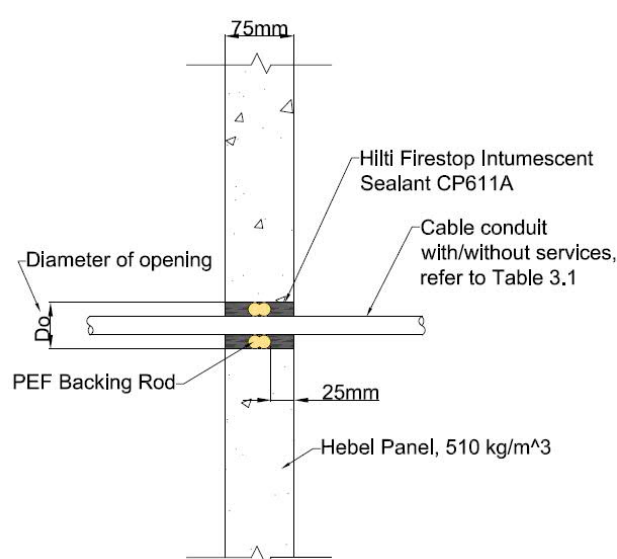


Figure 3.1a Side view- Cable conduit with PEF backing rod

Figure 3.1b Front view-Cable conduit

Table 3.1 Assessment table of Cable conduits configuration as per figure 3.1

Service	Minimum Diameter of the Opening, D_0 (mm)	Maximum Diameter of the Opening, D_0 (mm)	Depth of sealant, t_s (mm)	Backing Option	FRL
Single uPVC, NBN conduit 16 mm filled with cables, optic fibres, or mixtures of cable and fibre optic cable or empty	35	42	25	With PEF Backing rod or sealant at full depth	-/120/120
Single uPVC, NBN conduit 20 mm filled with cables, optic fibres, or mixtures of cable and fibre optic cable or empty	38	45	25		-/120/120
Single uPVC, NBN conduit 25 mm filled with cables, optic fibres, or mixtures of cable and fibre optic cable or empty	45	50	25		-/120/120
Single uPVC, NBN conduit 32 mm filled with cables, optic fibres, or mixtures of cable and fibre optic cable or empty	50	54	25		-/120/120

* For NBN conduit, the diameter refers to the pipe internal diameter

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

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

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

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

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

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 $S_1 = 0$ mm as specified in Table A.

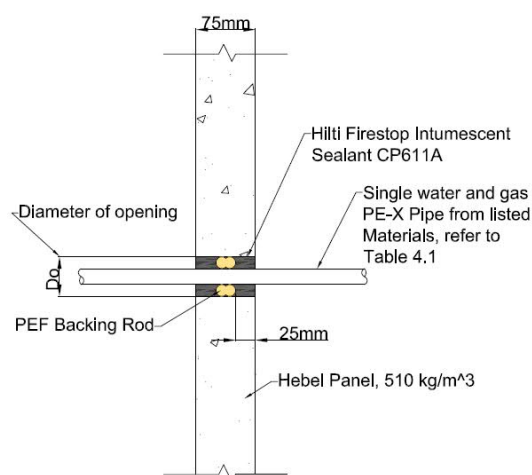


Figure 4.1a Side view- Water and gas PE-X pipe PEF backing rod.

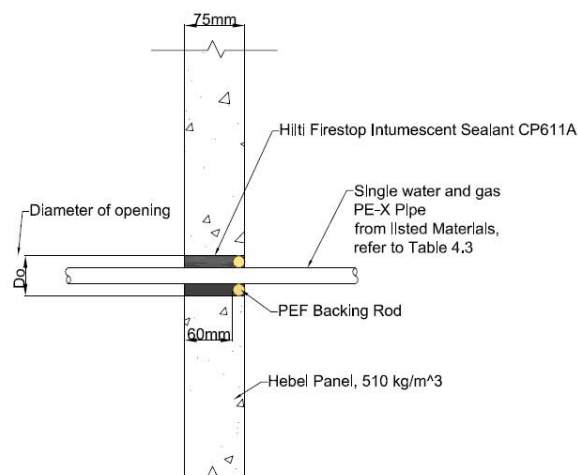


Figure 4.1b Side view- water and gas PE-X pipe with 60 mm sealant depth

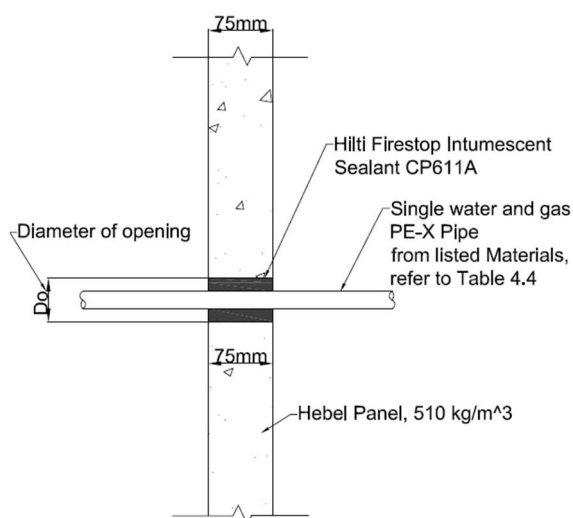


Figure 4.1c Side view- water and gas PE-X pipe with

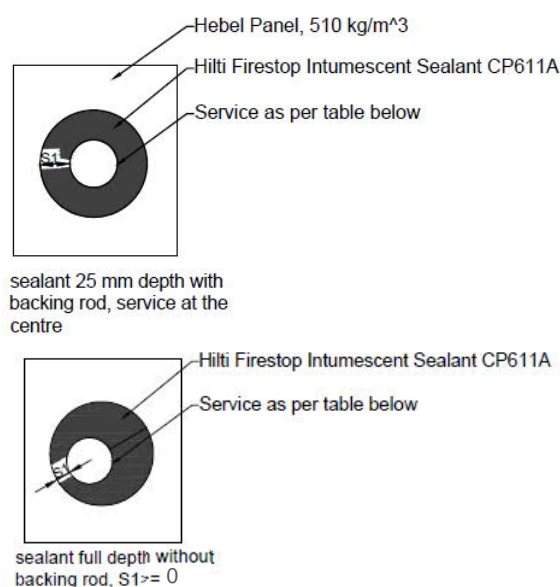


Figure 4.1d Front view- water and gas PE-X

75 mm sealant depth

Table 4.1 Assessment table of PE-X water and gas pipes configuration as per figure 4.1

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 / Walsc 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 and Walsc Wall FRL -/120/120 &

Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dintel 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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated 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.

No build-up is required for Dintel 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 $S_1 = 0$ mm as specified in Table A.

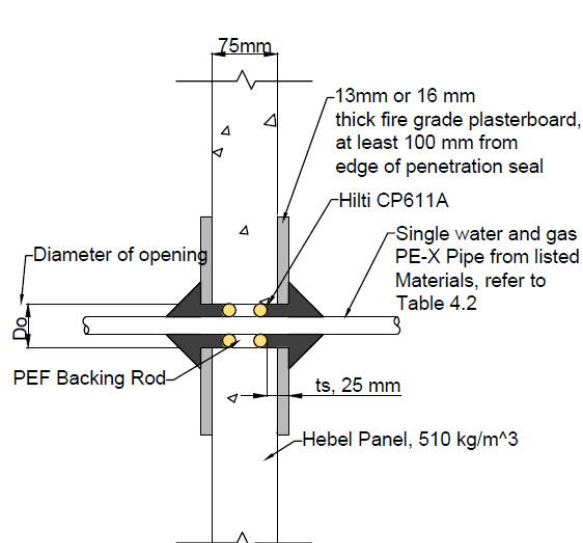


Figure 4.2a Side view- Water and gas PE-X pipe with PEF backing rod.

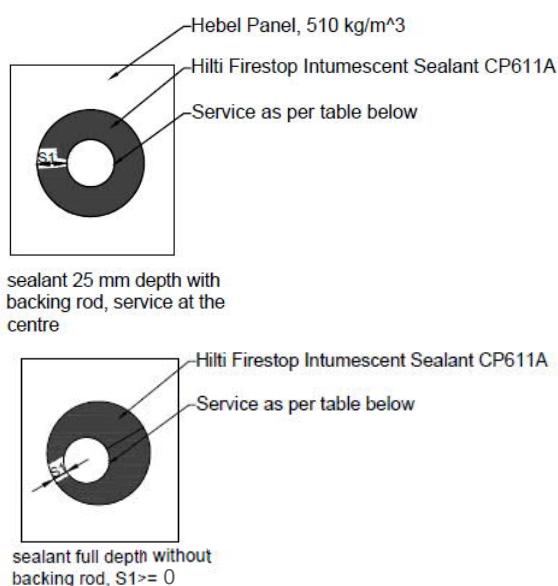


Figure 4.2b- Front View-Water and gas PE-X pipe with PEF backing rod

Table 4.2 Assessment table of PE-X water and gas pipes configuration as per figure 4.2

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 and Walsc 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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

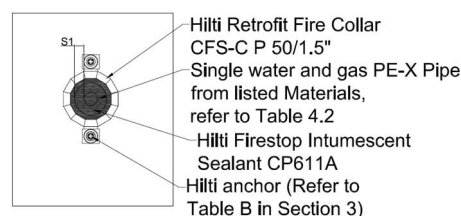
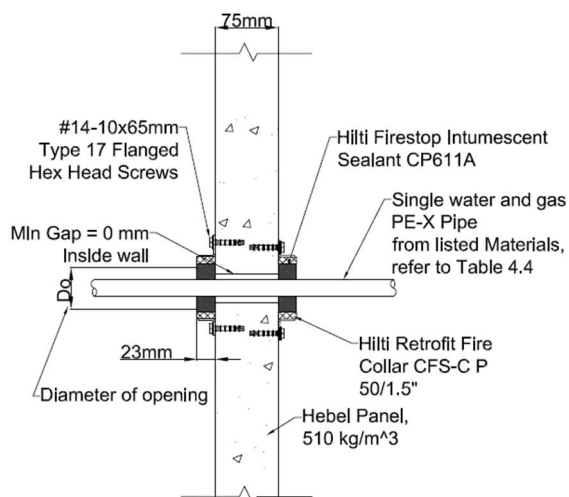


Figure 4.3a Side view-water and gas PE-X pipe Hilti Retrofit Fire Collar CFS-C P 50/1.5 50/1.5"

Figure 4.3b Front view- water and gas PE-X pipe with Hilti Retrofit Fire Collar CFS-C P

Table 4.3 Assessment table of PE-X water and gas pipe configuration as per figure 4.3

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 / 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

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 / Walsc walls)	FRL (Dincel walls)
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 and Walsc 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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated 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.

No build up is required for Dincel walls.

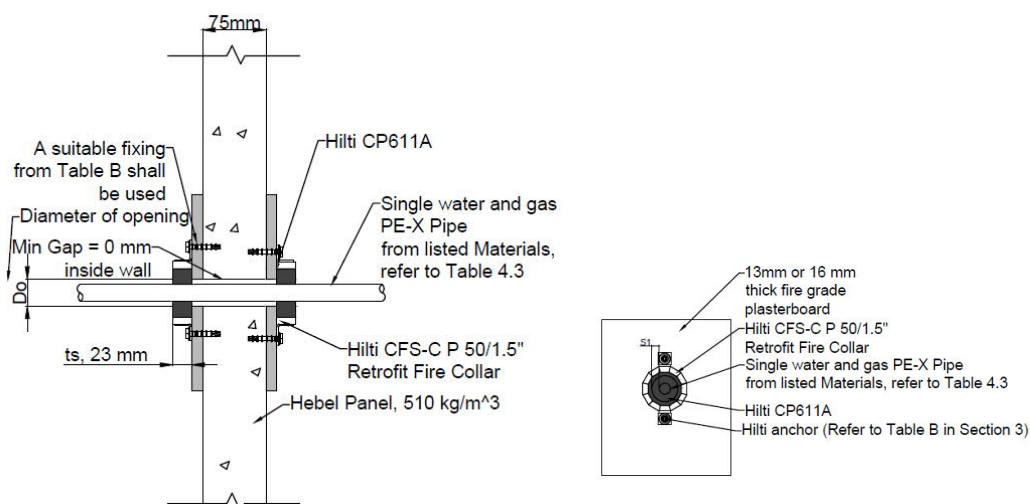


Figure 4.4a Side view- Water and gas PE-X pipe with PEF backing rod.

Figure 4.4b- Front View-Water and gas PE-X pipe with PEF backing rod

Table 4.4 Assessment table of PE-X water and gas pipes configuration as per figure 4.4

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	CFS-C P 50/1.5" + CP 611A intumescent sealant filling the inside of the collar to the collar's full depth	- /120/120

**2hr 75mm Hebel and Walsc 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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

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

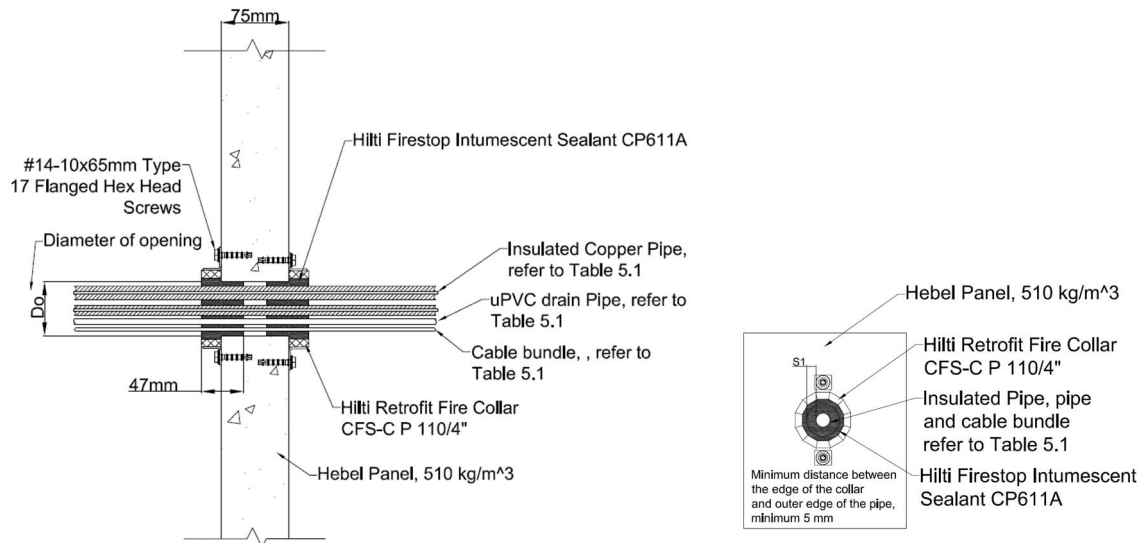


Figure 5.1a HVAC pipes protected by CFS-C P 110/4" & CP611A sealant

Figure 5.1b Front View

Table 5.1 Assessment of HVAC pipes protected with Hilti Intumescent Sealant CP611a and Hilti Retrofit Fire Collar CFS-C P 110/4" as per figure 5.1

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					

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

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

uPVC pipes protected with Hilti Firestop Acrylic Sealant CP606 and Hilti Retrofit Fire Collar CFS-C P (1/1)

The bare wall can be 75mm Hebel wall with dry density of 510kg/m^3 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/m^3 .

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m^3 – with tongue and groove joints at the edges.

CP606 is only required to be filled 10 mm deep in the annular gap between the pipe and the wall separating element.

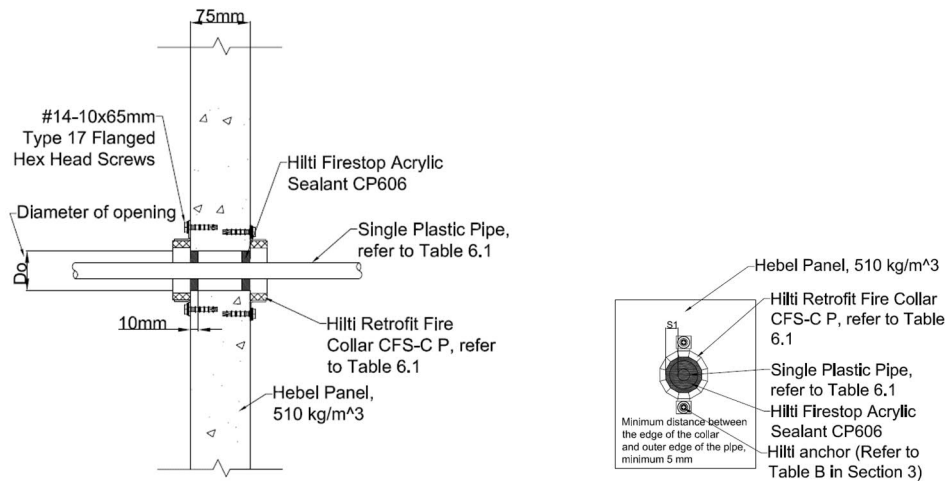


Figure 6.1a Plastic pipes protected by Hilti Retrofit Fire Collar CFS-C P and CP606 with/without backing rod **Figure 6.1b** Front View

Table 6.1 Assessment of various uPVC pipes protected with Hilti Firestop Acrylic Sealant CP606 and Hilti Retrofit Fire Collar CFS-C P as per Figure 6.1

Service	Pipe minimum outer diameter (mm)	Pipe Wall thickness (mm)	Diameter of the Opening, D ₀ (mm)	Hilti Retrofit Firestop Collar CFS-CP Size and Sealant	Depth of sealant, t _s (mm)	FRL (Hebel / Walsc walls)	FRL (Dincel walls)
40mm uPVC DWV	42.8	2	50	50/1.5" & CP606	10	-/120/120	-/180/120
50mm uPVC DWV	55.7	2.2	68	63/2" & CP606	10	-/120/120	-/180/120
65mm uPVC DWV	68.7	2.7	75	75/2.5" & CP606	10	-/120/120	-/180/120
80mm uPVC DWV	82.3	2.9	92	90/3.5" & CP606	10	-/120/120	-/180/120
100mm uPVC DWV	110	3.2	127	110/4" & CP606	10	-/120/120	-/180/180
150mm uPVC DWV	160	4.5	162	160/6" & CP606	10	-/120/120	-/240/180
100mm uPVC SC DWV	110	3.2	127	110/4" & CP606	10	-/120/120	-/120/180
150mm uPVC SC DWV	160	4.5	162	160/6" & CP606	10	-/120/120	-/120/180

**2hr 75mm Hebel and Walsc Wall FRL -/120/120 &
Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dintel walls)**

Uninsulated metal pipes protected with Hilti Firestop Acrylic Sealant CP606 (1/3)

The bare wall can be 75mm Hebel wall with dry density of 510kg/m^3 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/m^3 .

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m^3 – with tongue and groove joints at the edges.

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 606 sealant can be installed without backing rod at full depth of the wall with coning. The service can be installed **off centre** with a minimum edge distance $S_1 = 5\text{mm}$ as specified in Table A.

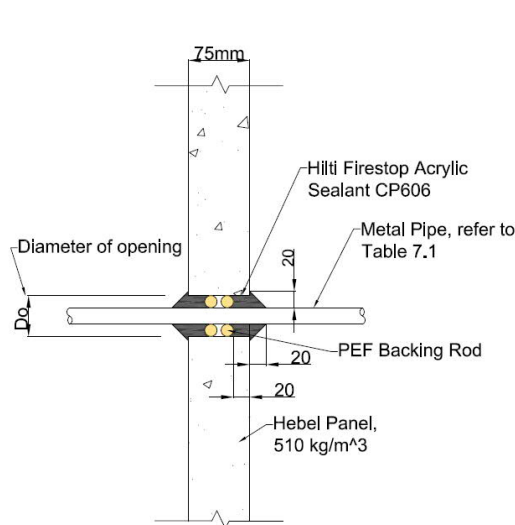


Figure 7.1a Metal Pipe protected with Hilti Firestop Acrylic Sealant CP606

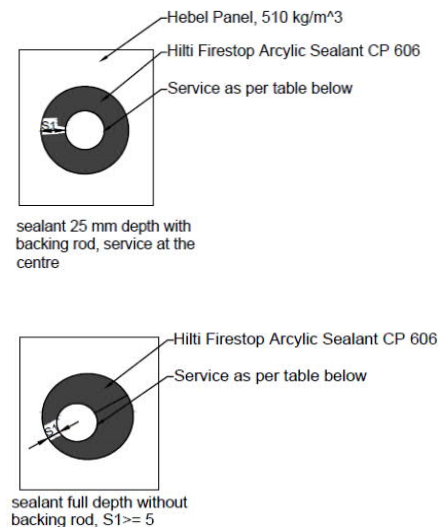


Figure 7.1b Front View

Table 7.1 Assessment table of various metal pipes protected with Hilti CP606 Firestop Acrylic Sealant as per figure 7.1

Service	Pipe minimum nominal diameter (mm)	Pipe maximum nominal diameter (mm)	Pipe wall thickness (mm)	Minimum edge seal, S1 (mm)	Maximum edge spacing (mm)	Depth of sealant, t _s (mm)	Backing Rod	FRL
Copper, Ferrous or Brass pipes	16	32	1.02	5	20	20 & 20x20mm fillet	With backing rod	-/120/-
	32	65	0.91			20 & 20x20mm fillet		-/120/-
	80	100	1.22			20 & 20x20mm fillet		-/120/-
Copper or Ferrous (steel and iron) pipes	125		1.42			20 & 20x20mm fillet		-/120/-
	150		1.63			20 & 20x20mm fillet		-/120/-
	200		1.63			20 & 20x20mm fillet		-/120/-

**2hr 75mm Hebel and Walsc Wall FRL -/120/120 &
Rigid Walls FRL -/120/120 & FRL 120/120/120**

Uninsulated metal pipes protected with Hilti Firestop Acrylic Sealant CP606 and mineral wool insulation section (2/3)

The bare wall can be 75mm Hebel wall with dry density of 510kg/m^3 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/m^3 .

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m^3 – with tongue and groove joints at the edges. Additional protection details are as for a 75 mm Hebel wall.

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 606 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 $S1 = 5\text{mm}$ as specified in Table A. The metal pipes shall be wrapped with 50mm thick Fibertex 450 or equivalent insulation with same thickness and density for lengths specified in Table 7.2 on each side.

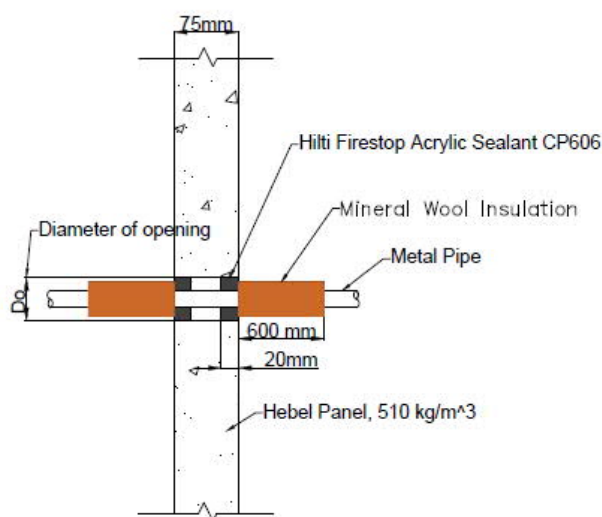


Figure 7.2a Metal Pipe protected with Hilti Firestop Acrylic Sealant CP606

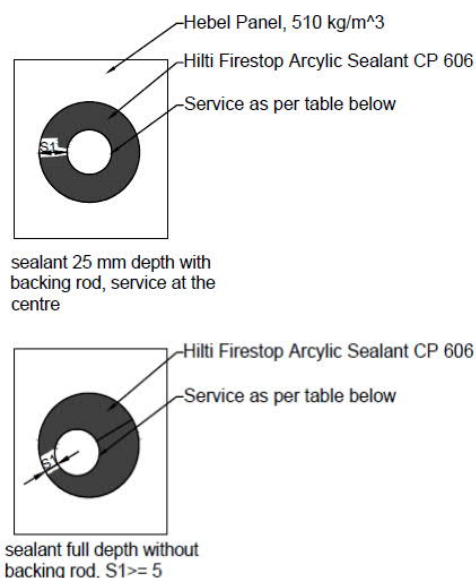


Figure 7.2b Front View

Table 7.2 Assessment table of various metal pipes protected with Hilti CP606 Firestop Acrylic Sealant as per figure 7.2

Service	Pipe minimum nominal diameter (mm)	Pipe maximum nominal diameter (mm)	Pipe wall thickness (mm)	Minimum edge seal, S1 (mm)	Maximum edge spacing (mm)	Depth of sealant, t _s (mm)	Backing Rod	Mineral wool insulation wrap length each side (mm)	FRL
Copper, Ferrous or Brass pipes		Up to 16	0.91	5	20	20	With backing rod	200	- /120/60
	16	32	0.91			20		300	- /120/60
	32	65	0.91			20		400	- /120/60
	80	100	1.22			20		500	- /120/60
Copper or Ferrous (steel and iron) pipes	125		1.42			20		600	- /120/60
	150		1.63			20			- /120/60

**2hr 75mm Hebel and Walsc Wall FRL -/120/120 &
Rigid Walls FRL -/120/120 & FRL 120/120/120 (including minimum 155mm thick Dincel walls)
Uninsulated metal pipes protected with Hilti Firestop Acrylic Sealant CP606 and mineral wool
insulation section (3/3)**

The bare wall can be 75mm Hebel wall with dry density of 510kg/m^3 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/m^3 .

For Insulation performance of 120 minutes, build up is required around the aperture for 75mm Hebel walls. Build up shall consist of 1 layer of minimum 13mm plasterboard on each side.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m^3 – with tongue and groove joints at the edges. Additional protection details are as for a 75 mm Hebel wall.

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 606 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 $S1 = 5\text{mm}$ as specified in Table A.

The metal pipes shall be wrapped with 50mm thick Fibertex 450 or equivalent insulation with same thickness and density for lengths specified in Table 7.3 on each side.

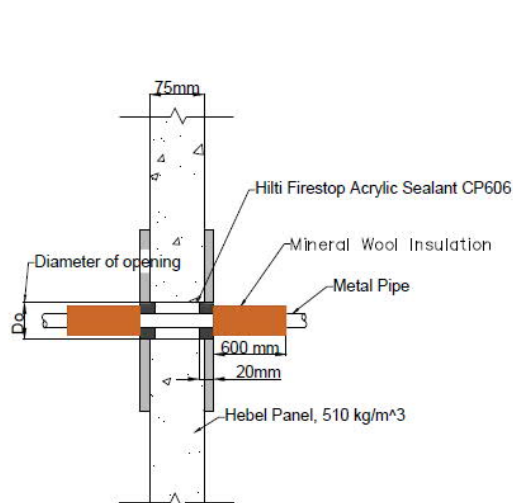


Figure 7.3a Metal Pipe protected with Hilti Firestop Acrylic Sealant CP606

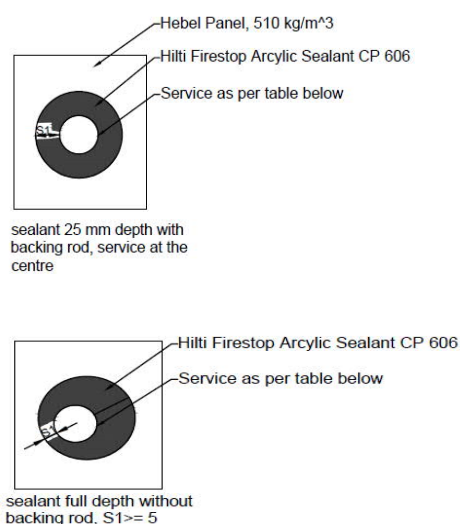


Figure 7.3b Front View

Table 7.3 Assessment table of various metal pipes protected with Hilti CP606 Firestop Acrylic Sealant as per figure 7.3

Service	Pipe minimum nominal diameter (mm)	Pipe maximum nominal diameter (mm)	Pipe wall thickness (mm)	Minimum edge seal, S1 (mm)	Maximum edge spacing (mm)	Depth of sealant, t _s (mm)	Backing Rod	Mineral wool insulation wrap length each side (mm)	FRL
Copper, Ferrous or Brass pipes		Up to 16	0.91	5	20	20	With backing rod	200	- /120/120
	16	32	0.91			20		300	- /120/120
	32	65	0.91			20		400	- /120/120
	80	100	1.22			20		500	- /120/120
Copper or Ferrous (steel and iron) pipes	125		1.42			20		600	- /120/120
	150		1.63			20			- /120/120

2hr 75mm Hebel and Walsc Wall FRL -/120/120 & Rigid Walls FRL -/120/120 & FRL 120/120/120

Control Joints and Joint seals protected with Hilti Firestop Acrylic Sealant CP606 (1/2)

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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

Backing rod is recommended to control the sealant depth. Alternatively, CP 606 sealant can be installed without backing rod at full depth of the wall.

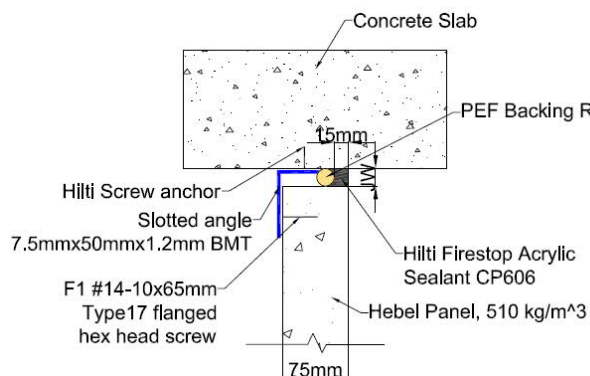


Figure 8.1a Details of horizontal deflection head joint

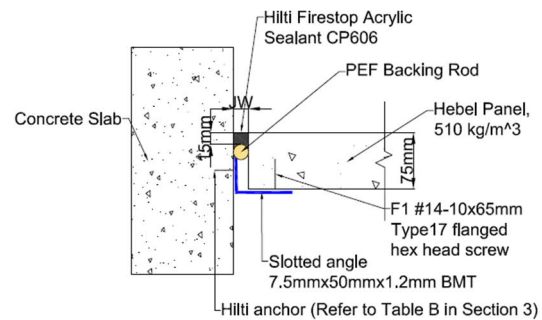


Figure 8.1b Details of vertical edge joint between Hebel and other substrates

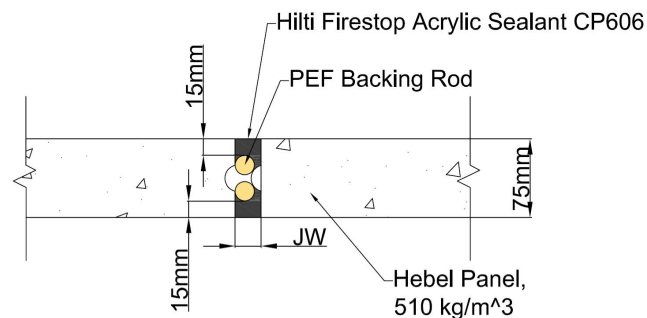


Figure 8.1c Details of Vertical Expansion Joint

Table 8.1 Assessment table of various configuration of control joints protected with Hilti Firestop Acrylic sealant CP606 as per figure 8.

Seal Type	Nominal Joint Width (mm)	Nominal Joint Width (mm)	Depth of sealant, t _s (mm)	Protection Application Side	Backing Rod	FRL
Horizontal deflection head joint	5	10	15	Sealant opposite to L angle	With PEF backing rod	-/120/90
Vertical expansion joint	5	10	15	Both sides		-/120/90
Vertical edge joint between Hebel and other substrates	5	10	15	Sealant opposite to L angle		-/120/90

2hr 75mm Hebel and Walsc Wall FRL -/120/120 & Rigid Walls FRL -/120/120 & FRL 120/120/120

Control Joints and joint seals protected with Hilti Firestop Acrylic Sealant CP606 (2/2)

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.

Alternatively, the bare wall can be a 75 mm thick Walsc wall with a stated dry density of 525 kg/m³ – with tongue and groove joints at the edges.

Backing rod is recommended to control the sealant depth. Alternatively, CP 606 sealant can be installed without backing rod at full depth of the wall.

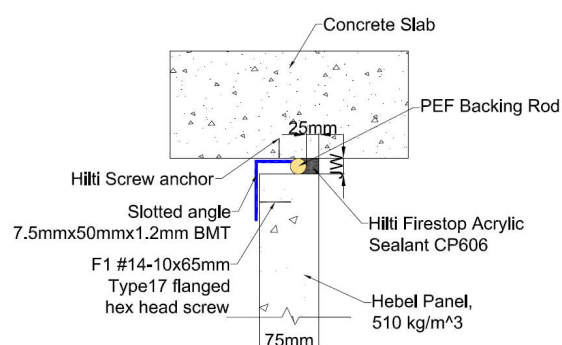


Figure 8.2a Details of horizontal deflection head joint

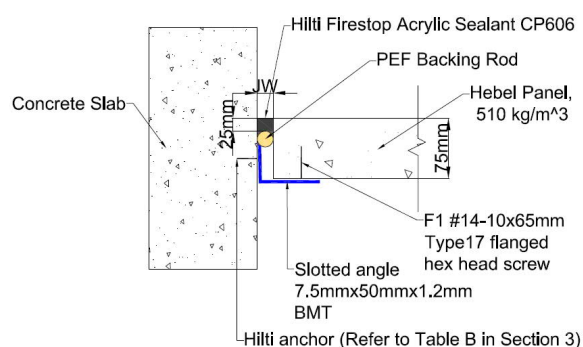


Figure 8.2b Details of vertical edge joint between Hebel and other substrates

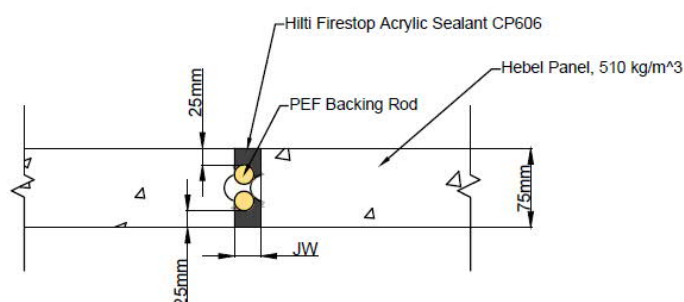


Figure 8.2c Details of Vertical Expansion Joint

Table 8.2 Assessment of various configuration of control joints protected with Hilti Firestop Acrylic Sealant CP606

Seal Type	Nominal Joint Width (mm)	Nominal Joint Width (mm)	Depth of sealant, t_s (mm)	Protection Application Side	Backing Rod	FRL
Horizontal deflection head joint	5	20	25	Sealant opposite to L angle	With PEF backing rod	-/120/90
Vertical expansion joint	5	20	25	Both sides		-/120/120
Vertical edge joint between Hebel and other substrates	5	20	25	Both sides		-/120/120

6. Direct field of application

The referenced assessment applies to penetrations in walls when exposed to fire from either side at a single time.

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 1530.4:2014.

All services shall be supported in the manner in which they are assessed as described in section 3 and 5. 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.

The other electrical and communication cable bundles listed in Table 2.1, 2.2, 2.3 & 2.4 are considered made up from cables with similar insulation and sheathing materials, ratio of the conductors to insulation plus sheathing and or equal or small cable diameter to the tested cables and cable bundles. Moreover, the proposed electrical and communications cables shouldn't include any additional conductor materials more than the tested cables. Most of all, the distribution of the conductors within a cable cross section shall be equivalent to that tested. Equal to less ratio of conductor to similar to the tested cable bundle.

8. Validity

The referenced assessment report does not provide an endorsement by Warringtonfire Aus Pty Ltd of the actual products supplied.

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

Because of the nature of fire 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 referenced 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 referenced 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. Authority

9.1 Applicant undertakings and conditions of use

By using this report as evidence of compliance or performance, the applicant(s) confirms 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, and
- They agree to withdraw this assessment from circulation should the component or element of structure be 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, and

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, agree to ask the assessing authority to withdraw the assessment.