



# Regulatory information report




The fire resistance performance of Hilti Firestop Plug  
CFS-PL or CP 658 protecting cable penetrations in  
walls and concrete floors

Client: Hilti Australia Pty Ltd and Hilti New Zealand Limited

Report number: RIR 27937400 Revision: R1.1

Issue date: 25 February 2020 Expiry date: 31 May 2024

## Amendment schedule

Version	Date	Information relating to report			
RIR 27937400	Issue: 09/05/2014	Reason for issue	Initial issue.		
			Prepared by	Reviewed by	
	Expiry: 31/05/2019	Name	S. Hu	K. Nicholls	
RIR 27937400 R1.0	Issue: 31/05/2019	Reason for issue	Revalidation and update to AS 1530.4:2014.		
			Prepared by	Reviewed by	
	Expiry: 31/05/2024	Name	Mahmoud Akl	Omar Saad	
RIR 27937400 R1.1	Issue: 25/02/2020	Reason for issue	Revised to give applicability to Dintel walls as wall separating elements		
			Prepared by	Reviewed by	Approved by
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Exova Warringtonfire rebranded to Warringtonfire on 1 December 2018. Apart from the change to our brand name, no other changes have occurred. The introduction of our new brand name does not affect the validity of existing documents previously issued by us.

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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 27937400.1 and FAS190067B R1.0.

The referenced assessment report 27937400.1 presents an assessment on the fire resistance performance of Hilti Firestop Plug CFS-PL or CP 658 protecting cable penetrations in walls and concrete floors 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 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 general accordance with AS 1530.4:2014.

The tested prototypes described in Section 3.1 of this report, when subjected to the proposed variations described in Section 3.2 and tested in accordance with the relevant standards described in Section 4, are assessed to achieve performance as summarised in Section 6.

The validity of this assessment is conditional on compliance with Sections 2, 5 and 7 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.

This assessment was carried out at the request of Hilti Australia Pty Ltd and Hilti New Zealand Limited. The sponsor details are included in Table 1.

**Table 1 Sponsor details**

Client	Address
Hilti Australia Pty Ltd	1G Homebush Bay Dr Rhodes NSW 2138
Hilti New Zealand Ltd	Hilti (New Zealand) Ltd P.O. Box 112030 Penrose, Auckland 1642, New Zealand

## 2. Framework for the assessment

An assessment is an opinion about the likely performance of a component or element of structure if it were subject to a standard fire test.

No specific framework, methodology, standard or guidance documents exists in Australia for doing these assessments. Therefore, we have followed the Guide to Undertaking Assessments In Lieu of Fire Tests prepared by the Passive Fire Protection Federation (PFPF) in the UK<sup>1</sup>.

This guide provides a framework to undertake assessments in the absence of specific fire test results. *'Some areas where assessments may be offered are:*

- Where a modification is made to a construction which has already been tested*
- Interpolation or extrapolation of results of a series of fire resistance tests, or utilisation of a series of fire test results to evaluate a range of variables in a construction design or a product*
- Where, for various reasons – eg size or configuration – it is not possible to subject a construction or a product to a fire test.'*

<sup>1</sup> Guide to Undertaking Assessments In Lieu of Fire Test - The Passive Fire Protection Federation (PFPF), June 2000, UK.

Assessments will vary from relatively simple judgements on small changes to a product or construction through to detailed and often complex engineering assessments of large or sophisticated constructions.

## 2.1 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 10 September 2019, Hilti Australia 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.

### 3. Description of the specimen and variations

#### 3.1 Referenced test data

The referenced assessment report 27937400.1 is based on reference tests N° 08-E-079-F and N° 07-E-317 describing tests on AS 1530.4 Appendix D1 and D2 standard configuration cables and EN1366 configuration cables in a floor construction and sealed with Hilti Intumescent foam CP 660 tested in accordance with EN 1363-1 and EN 1366-3:2006. The tests were sponsored by Hilti and were conducted by EFECTIS France.

The referenced assessment report 27937400.1 also refers to test reports Nr 8730/12, Nr 8809/12-2, Nr 8718/12 and Nr 8688/12 describing tests on EN standard cables in wall and floor construction tested in accordance with EN 1366-3: 2009. The tests were sponsored by Hilti AG and were conducted by AFITI LICOF Centre for Fire Testing and Research.

The reference is also made to test report FSV 0917 which was sponsored by Hilti (Aust.) Pty Ltd and conducted by CSIRO.

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.

The referenced assessment reports contain a full summary of the test data.

#### 3.2 Variations to tested systems

The proposed construction for penetration seals in walls and floors shall be as tested in Nr 8730/12, Nr8718/12 and Nr8688/12 with consideration of the following variations:

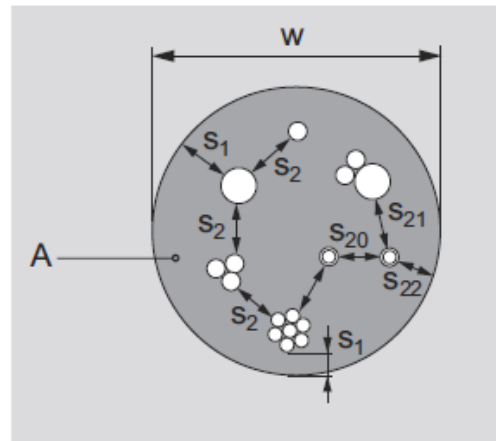
- Confirm the performance of the AS 1530.4:2014 Appendix D1 and D2 configuration cables if substituted with the tested cables.
- The tested sealant Hilti Firestop Filler CFS-FIL shall be varied to the following,
  - Hilti Intumescent Sealant CP 611A
- Confirm the spacing of services from each other and from edges of aperture.
- Conduits shall be filled with cables, optic fibres or empty.
- Thickness of floor slabs reduced to a minimum of 120mm.
- Confirmation of performance for services tested uncapped/uncapped.
- For walls the support construction shall optionally be AAC, concrete, solid or hollow masonry wall, Speed panel wall with minimum density of 550 kg/m<sup>3</sup> and minimum wall thickness of 75mm or plasterboard lined wall.
- Minimum 155mm thick Dincel walls, filled with normal-weight concrete, may also be used as the wall separation element.
- The plasterboard lined wall shall comprise of steel studs lined on both faces with a minimum of 2 layers of at least 13mm or 16 mm thick fire grade plasterboard and be otherwise tested to achieve an FRL of -/120/120 or 120/120/120.
- The PVC conduit or pipe sleeve can be left in the wall or floor for all proposed solutions under Section 6. The PVC conduit or pipe sleeve can protrude beyond the slab, as long as the Hilti Firestop Plugs CFS-PL are pushed into the opening such that their entirety is within the slab thickness. The same is also applicable in the case of Hilti cast in collars without any services which are blocked with Hilti Firestop Plugs CFS-PL.



- The product can be cut to be fitted into the core hole for different core hole size. However, the maximum penetration shall be less than 60% percentage in Table 1 needs to be complied with.

The assessed construction is summarised in Sections 3.3, 0, 3.5 and 3.6 for floors and walls.

### 3.3 Distance requirements



**Figure 1** Distance Requirements of Penetrations

**Table 2** Distance Requirements

Distance valid for installations of services in wall and floor	Minimum distance in mm
Distance between single, or bundled cables and seal edge	$s_1 = 0$
Distance between cables	$s_2 = 40$
Distance between single or bundled conduits and other services	$s_{20, 21} = 40$
Distance between single or bundled conduits and seal edge	$s_{22} = 0$
Distance between CFS-PL	40
Maximum % of the seal can be penetrated	60%
Maximum Conduit Bundle Size	Ø100mm
Maximum Cable Bundle Size	Ø90mm

**Table 3** Product Sizes for Openings

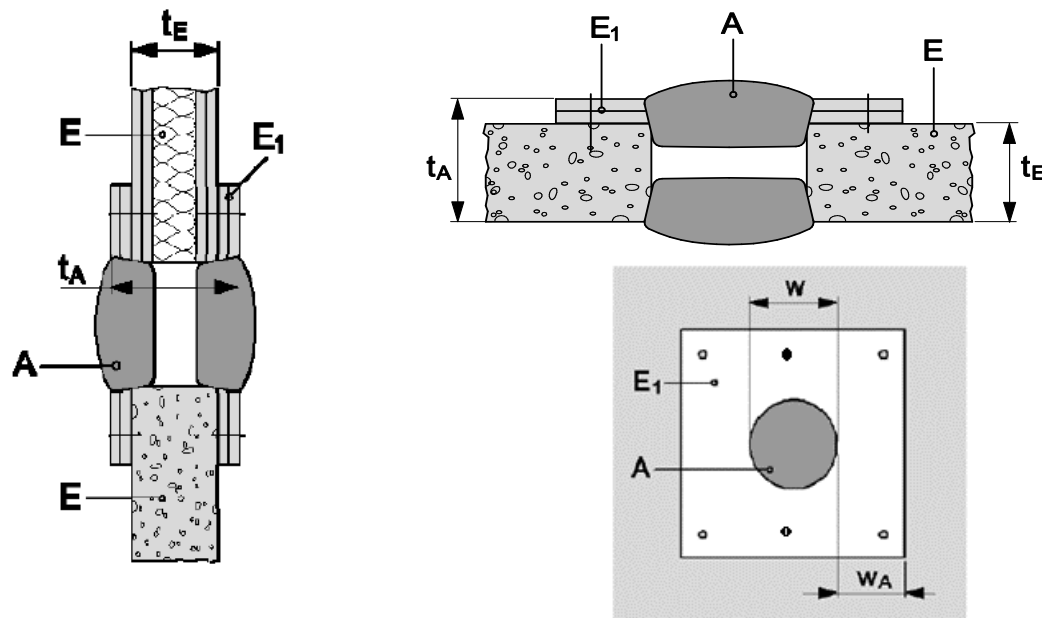
Product	Max. Opening Diameter (Ø)
Firestop plug CFS-PL 107	Ø 107mm
Firestop plug CFS-PL 132	Ø 132mm
Firestop plug CFS-PL 158	Ø 158mm
Firestop plug CFS-PL 202	Ø 202mm



### 3.4 Beading details for walls and floors

The minimum penetration seal depth is 150mm ( $t_A$ ) independent of the thickness of the wall or floor. In case of walls or floors with a thickness of less than 150mm, a beading must be used ( $E_1$ )

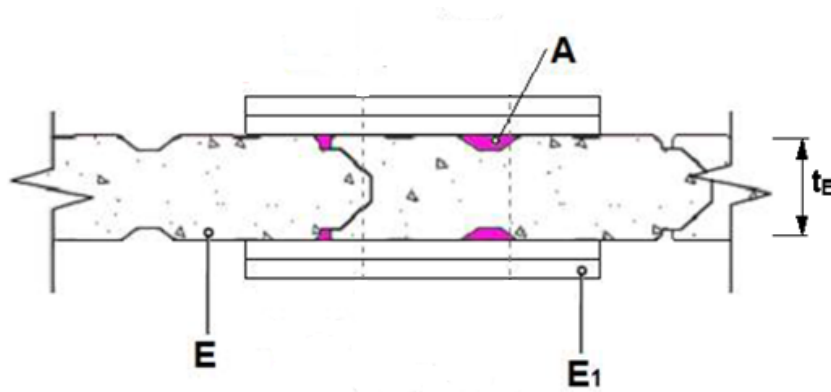
**Beading:** square plate made of fire rated plasterboard board with a size of  $2 \times W_A$  (Figure 2, minimum 100mm wide) plus  $W$  (Figure 2, diameter of plug) is installed around the opening in the necessary number of layers. Two frames of the same height on both sides of the wall have to be built. Alternatively, a 75mm thick Hebel panel, from one side only, may be used on 75mm thick walls, to make the seal thickness ( $t_A$ )  $\geq 150$ mm. Maximum spacing fixing is 150mm



**Figure 2** Aperture framing / beading and position of the seal in walls / floors

Item	Description	Item	Description
A	Hilti Firestop Plug CFS-PL Hilti Firestop Plug CP 658	$t_E$	Thickness of the building element
E	Building element (rigid or flexible wall construction, floor)	$\varnothing$	Diameter of the seal
$E_1$	Aperture beading, 13mm or 16mm fire grade plasterboard	$w_A$	Width of the frame
$E_2$	Aperture beading, 75mm Hebel panel from one side only	$t_A$	Thickness of the seal, min. 150mm

Where beading is applied to Speedpanel/Speedwall, all gaps in the profiled face of the panel shall be filled with CP 606 sealant. Aperture Framing/Beading shall be constructed from fire rated plasterboard as per figure below.



**Figure 3** Horizontal cross section for build-up and sealant in Speedpanel/Speedwall Refer to below table for item descriptions

Item	Description	Item	Description
A	Hilti CP 606 to a depth of 20mm (as shown above)	$t_E$	Thickness of the building element
E	Building element (Speedpanel)	$E_1$	Aperture beading, 13mm or 16mm fire grade plasterboard

**Table 3 Anchor Fixing types**

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	#14/10×65mm Hex Head Type 17 screw	14g	✓	
	Threaded Rod with Nut & Washer	M6	✓	✓

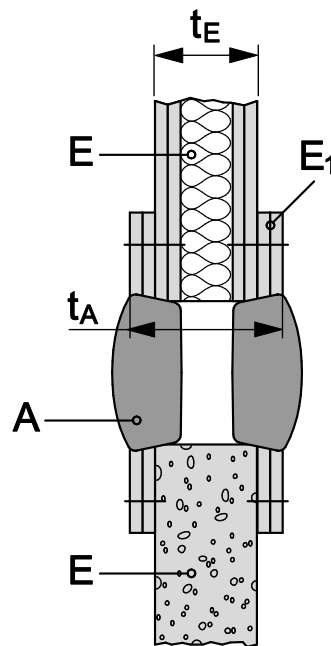
\*Minimum length of Hilti HUS screw required for Aerated Concrete (Hebel) is 60mm

### 3.5 Wall penetrations

The walls must be tested in accordance with AS 1530.4:2014 for the required fire resistance period

#### Blank wall seal, no services, Figure 4

Maximum opening size 202mm, and 60% of the seal area can be penetrated. Seal thickness ( $t_A$ )  $\geq$  150 mm



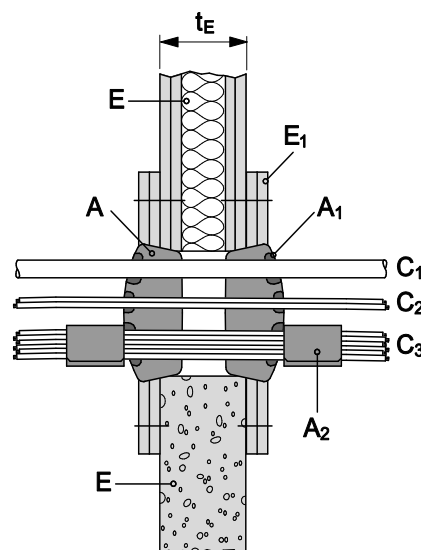
**Figure 4** Blank wall seal, no service

#### Flexible wall, Figure 5, top section (E)

The wall must have a minimum thickness of 100 mm ( $t_E$ ) and comprise of steel studs lined on both faces with a minimum of 2 layers of at least 13mm or 16mm thick fire grade plasterboard and be tested to achieve an FRL of -/120/120 or 120/120/120. In addition, the plasterboard wall construction shall include minimum 50mm thick mineral wool with density of 100kg/m<sup>3</sup> as wall cavity insulation shown in Figure 4 or the aperture of the penetration in the wall shall be lined with plasterboard to the same specification as required on each side of the wall. Beading ( $E_1$ ) must be used on each side of the wall to make the seal thickness ( $t_A$ )  $\geq$  150mm.

#### Rigid wall, Figure 5, bottom section (E)

The wall must have a minimum thickness of 75 mm ( $t_E$ ) and comprise of concrete, autoclaved aerated concrete, solid or hollow masonry wall, Speed panel wall with a minimum density of 550 kg/m<sup>3</sup>. Beading ( $E_1$ ) must be used on the each side of the wall to make the seal thickness ( $t_A$ )  $\geq$  150mm. Alternatively, a 75mm thick Hebel panel ( $E_2$ ), from one side only, may be used on 75mm thick walls, to make the seal thickness ( $t_A$ )  $\geq$  150mm. No beading is required for minimum 155mm thick Dintel walls.



**Figure 5** Details of filler ( $A_1$ ) and 2 x putty ( $A_2$ )

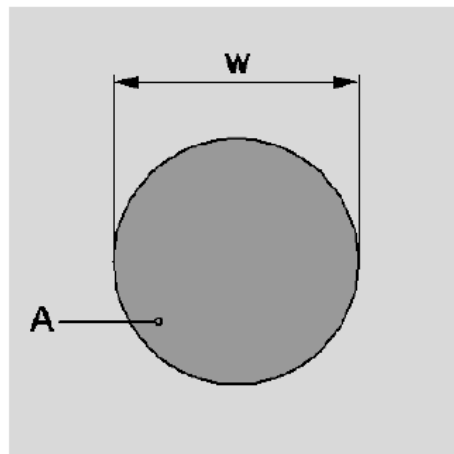
Item	Description	Item	Description
A,A <sub>1</sub> ,A <sub>2</sub> ,	A: Hilti Firestop Plug CFS-PL Hilti Firestop Plug CP 658 A <sub>1</sub> : Hilti Intumescent Sealant CP 611A A <sub>2</sub> : Hilti Firestop Putty Bandage CFS-P BA	A <sub>1</sub>	Hilti Intumescent Sealant CP 611A at a depth of min. 20 mm
C,C <sub>1</sub> ,C <sub>2</sub> ,C <sub>3</sub>	C: Service penetrations C <sub>1</sub> : Conduit C <sub>2</sub> : Single cables C <sub>3</sub> : Cable bundle	A <sub>2</sub>	2 layers of 100mm wide Hilti Firestop Putty Bandage CFS-P BA  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.
E,E <sub>1</sub> ,E <sub>2</sub>	E: Support Construction elements (wall, floor) E <sub>1</sub> : Aperture Beading, 13mm or 16mm fire grade plasterboard	t <sub>E</sub>	Thickness of the building element
t <sub>A</sub>	Thickness of penetration seal	NA	NA

### 3.6 Floor penetrations

The floors must be tested in accordance with AS 1530.4:2014 for the required fire resistance period.

#### Blank floor seal, no services, Figure 6

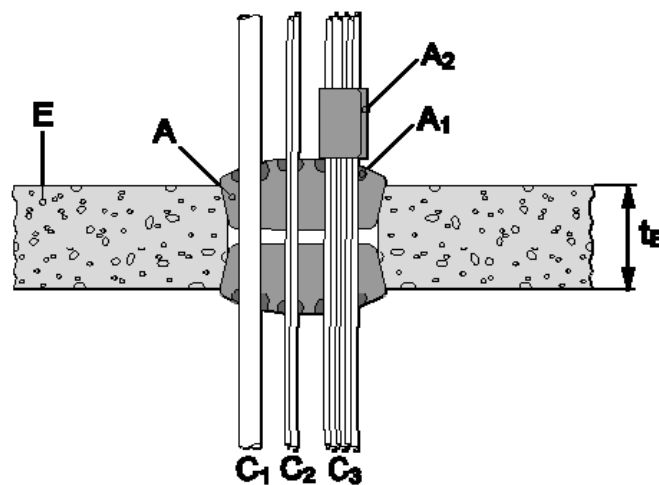
Maximum opening size 202mm, and 60% of the seal area can be penetrated. Seal thickness ( $t_A$ )  $\geq$  150 mm.



**Figure 6** Blank Floor Seal, No Services

#### Rigid floor, Figure 7, (E)

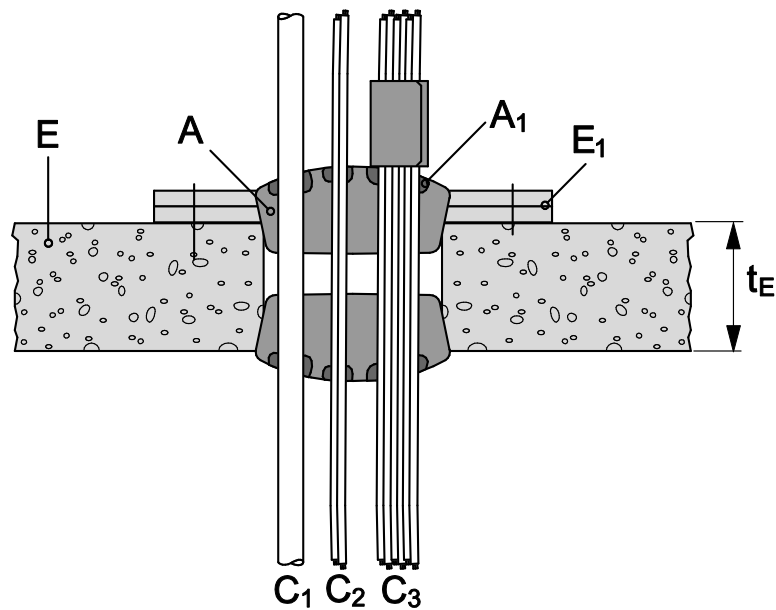
The floor must have a minimum thickness of 150 mm ( $t_E$ ) and comprise of aerated concrete or concrete with a minimum density of 550 kg/m<sup>3</sup>.



**Figure 7** Details of filler ( $A_1$ ) and 2  $\times$  putty ( $A_2$ ),  $t_E \geq 150\text{mm}$

#### Rigid floor, Figure 8, (E)

The floor must have a minimum thickness of 120 mm ( $t_E$ ) and comprise of aerated concrete or concrete with a minimum density of 550 kg/m<sup>3</sup>. A beading ( $E_1$ ) must be used on the topside of the floor to make the seal thickness ( $t_A$ )  $\geq$  150mm.



**Figure 8** Details of filler ( $A_1$ ) and 2 x putty ( $A_2$ ),  $t_E \geq 120\text{mm}$

Item	Description	Item	Description
$A, A_1, A_2$	A: Hilti Firestop Plug CFS-PL Hilti Firestop Plug CP 658 A1: Hilti Intumescent Sealant CP 611A A2: Hilti Firestop Putty Bandage CFS-P BA	$A_1$	Hilti Intumescent Sealant CP 611A at a depth of min. 20 mm
$C, C_1, C_2, C_3$	C: Service penetrations $C_1$ : Conduit $C_2$ : Single cables $C_3$ : Cable bundle	$A_2$	2 layers of 100mm wide Hilti Firestop Putty Bandage CFS-P BA
$E, E_1$	E: Support Construction elements (wall, floor) $E_1$ : Aperture Beading, 13mm or 16mm fire grade plasterboard	$t_E$	Thickness of the support element
$t_A$	Thickness of penetration seal	$\varnothing$	Diameter of the seal

## 4. Referenced test standard

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

## 5. Scope, objective and assumptions

### 5.1 Scope and objective

- The scope of this report is limited to an assessment of the variations to the tested systems described in Section 3.2.
- This report details the methods of construction, test conditions and assessed results that would have been expected if the specific elements of construction described here had been tested in accordance with AS 1530.4:2014.
- The results of this assessment are applicable to penetrations in walls exposed to fire from either side or floors exposed to fire from underside only.
- This report is only valid for the assessed system/s. Any changes with respect to size, construction details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the findings of this assessment. If there are changes to the system, a reassessment will be needed to verify consistency with the assessment in this report.
- The data, methodologies, calculations and conclusions documented in this report specifically relate to the assessed system/s and must not be used for any other purpose.
- This report has been prepared based on information provided by others. Warringtonfire has not verified the accuracy and/or completeness of that information and will not be responsible for any errors or omissions that may be incorporated into this report as a result.

### 5.2 Requirements

The referenced assessment 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 3.2. 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 to achieve the required FRL up to -/120/120 in accordance with AS 1530.4:2014



## 6. Formal assessment summary

On the basis of the discussion presented in the referenced assessment report, it is the opinion of this testing authority that if the tested prototype described in Section 3.1 had been varied as in Section 3.2, it will likely achieve the fire resistance performance as stated below if tested in accordance with the test method referenced in Section 4 when subject to the limitations and requirements of Sections 2, 5 and 7.

**Table 4 Service penetrations, flexible wall, at least 100 mm thick (+ aperture beading)**

Description of Services	FRL	
<b>Blank Opening without Hilti Firestop Intumescent Fillers (A<sub>1</sub>) and without Hilti Firestop Putty Bandage CFS-P BA (A<sub>2</sub>)</b>	Note: Refer to Section 3.2: Beading details for walls and floors, and ensure that seal thickness (t <sub>A</sub> ) ≥ 150mm	
Blank opening: 52mm ≤ Ø ≤ 202mm with and without plastic sleeve	- /120/120	
<b>Standard Cable Services</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> ) & Hilti Firestop Putty Bandage (A <sub>2</sub> )
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS 1530.4:2014 Appendix D)	- /120/60	- /120/120
PVC insulated Communication Cables (Standard D2 cable set, in accordance with AS 1530.4:2014 Appendix D)		
Steel conduits and tubes up to 16mm filled with cables, optic fibres or empty	- /120/120	
<b>Single Plastic Conduits and tubes:</b> <b>Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid PVC: polyvinyl chloride</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )	
Single Conduit up to 40mm filled with cables, optic fibres or empty	- /120/120	
<b>Bundle Plastic Conduits and tubes:</b> <b>Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid and Flexible PVC: polyvinyl chloride</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )	
Conduits up to 20mm filled with cables, optic fibres or empty. Conduits may be bundled up to 100mm in diameter	- /120/120	

Note: Refer Section 3.3 for Distance Requirements. The PVC conduit or pipe sleeve can be left in the wall. The PVC conduit or pipe sleeve can protrude beyond the slab, as long as the Hilti Firestop Plugs CFS-PL are pushed into the opening such that their entirety is within the slab thickness. The same is also applicable in the case of Hilti cast in collars without any services which are blocked with Hilti Firestop Plugs CFS-PL.

**Table 5 Service penetrations, rigid wall, at least 75 mm thick (+ aperture beading) or minimum 155mm thick Dintel wall (without aperture beading)**

Description of Services		FRL
<b>Blank Opening without Hilti Firestop Intumescent Fillers (A<sub>1</sub>) and without Hilti Firestop Putty Bandage CFS-P BA (A<sub>2</sub>)</b>	Note: Refer to Section 3.2: Beading details for walls and floors, and ensure that seal thickness (t <sub>A</sub> ) ≥ 150mm	
Blank opening: 52mm ≤ Ø ≤ 202mm with and without plastic sleeve	-/120/120	
<b>Standard Cable Services</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> ) & Hilti Firestop Putty Bandage (A <sub>2</sub> )  For Dintel 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.
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS 1530.4:2014 Appendix D)	-/120/60	-/120/120
PVC insulated Communication Cables (Standard D2 cable set, in accordance with AS 1530.4:2014 Appendix D)		
Steel conduits and tubes up to 16mm filled with cables, optic fibres or empty	-/120/120	
<b>Single Plastic Conduits and tubes:</b> <b>Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid PVC: polyvinyl chloride</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )	
Single Conduit up to 40mm filled with cables, optic fibres or empty	-/120/120	
<b>Bundle Plastic Conduits and tubes:</b> <b>Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid and Flexible PVC: polyvinyl chloride</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )	
Conduits up to 20mm filled with cables, optic fibres or empty. Conduits may be bundled up to 100mm in diameter	-/120/120	

Note: Refer Section 3.3 for Distance Requirements. The PVC conduit or pipe sleeve can be left in the wall. The PVC conduit or pipe sleeve can protrude beyond the slab, as long as the Hilti Firestop Plugs CFS-PL are pushed into the opening such that their entirety is within the slab thickness. The same is also applicable in the case of Hilti cast in collars without any services which are blocked with Hilti Firestop Plugs CFS-PL.

**Table 6 Service penetrations, rigid floor, at least 120 mm thick (+ aperture beading)**

Description of Services	FRL
<b>Blank Opening without Hilti Firestop Intumescent Fillers (A<sub>1</sub>) and without Hilti Firestop Putty Bandage CFS-P BA (A<sub>2</sub>)</b>	Note: Refer to Section 3.2: Beading details for walls and floors, and ensure that seal thickness (t <sub>A</sub> ) ≥ 150mm
Blank opening: 52mm ≤ Ø ≤ 202mm with and without plastic sleeve	-/120/120
<b>Standard Cable Services</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS 1530.4:2014 Appendix D)	-/120/90
PVC insulated Communication Cables (Standard D2 cable set, in accordance with AS 1530.4:2014 Appendix D)	
Steel conduits and tubes up to 16mm filled with cables, optic fibres or empty	-/120/120
<b>Non-Standard Cable Services</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> ) & Hilti Firestop Putty Bandage (A <sub>2</sub> )
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS 1530.4:2014 Appendix D) up to Ø48mm may be bundled up to 90mm in diameter.	-/120/120
PVC insulated Communication Cables (Standard D2 cable set, in accordance with AS 1530.4:2014 Appendix D) up to Ø48mm may be bundled up to 90mm in diameter.	-/120/120
<b>Single Plastic Conduits and tubes:</b> <b>Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid PVC: polyvinyl chloride</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )
Single Conduit up to 40mm filled with cables, optic fibres or empty	-/120/120
<b>Bundle Plastic Conduits and tubes:</b> <b>Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid and Flexible PVC: polyvinyl chloride</b>	With Hilti Firestop Intumescent Fillers (A <sub>1</sub> )
Conduits up to 20mm filled with cables, optic fibres or empty. Conduits may be bundled up to 100mm in diameter	-/120/120

Note: Refer Section 3.3 for Distance Requirements. The PVC conduit or pipe sleeve can be left in the wall. The PVC conduit or pipe sleeve can protrude beyond the slab, as long as the Hilti Firestop Plugs CFS-PL are pushed into the opening such that their entirety is within the slab thickness. The same is also applicable in the case of Hilti cast in collars without any services which are blocked with Hilti Firestop Plugs CFS-PL.

## 7. Validity

Warringtonfire Australia does not endorse the tested or assessed product in any way. The conclusions of this 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.

Due to 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.

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 subject to constant review and improvement. It is therefore recommended that this report be reviewed on or, before, the stated expiry date.

This assessment represents our opinion about the performance likely to be demonstrated on a test in accordance with AS 1530.4:2014, based on the evidence referred to in this report.

This assessment is provided to the Hilti Australia Pty Ltd and Hilti New Zealand Limited for its own purposes and we cannot express an opinion on whether it will be accepted by building certifiers or any other third parties for any purpose.