



REGULATORY INFORMATION REPORT

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 AS1530.4-2005 and assessed in accordance with AS4072.1-2005

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RIR 27937400

Report Sponsor:

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1 INTRODUCTION

This report contains the minimum information sufficient for regulatory compliance and refers to the Assessment Report EWFA 27937400.

The referenced report presents an assessment of 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 AS1530.4-2005 and assessed in accordance with AS4072.1-2005.

The tested prototypes described in Section 2 of this report, when subject to the proposed variations described in Section 3, are to perform satisfactorily if tested in accordance with the referenced test method described in Section 4. The conclusions of the report are summarised in Section 5.

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

Summaries of the test data on which the referenced assessment is based are provided in Appendix A together with a summary of the critical issues leading to the referenced assessment conclusions including the main points of argument.

2 TESTED PROTOTYPES

The referenced assessment is based on reference tests N° 08-E-079-F and N° 07-E-317 describing tests on AS1530.4-2005 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 also refers 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 was sponsored by Hilti (Aust.) Pty Ltd and was conducted by CSIRO.

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

3 VARIATION TO TESTED PROTOTYPES

The proposed construction for penetration seals in walls and floors shall be as tested in Nr 8730/12, Nr 8718/12 and Nr 8688/12 subjecting to the following alterations:

- Confirm the performance of the AS1530.4-2005 Appendix D1 and D2 configuration cables if substituted with the tested cables.
- The tested sealant Hilti Firestop Filler CFS-FIL shall be varied to any of the following,
 - Hilti Intumescent Sealant CP 611A
 - Hilti Intumescent Sealant FS-ONE
- 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 concrete, masonry wall or plasterboard lined wall.
- The plasterboard lined wall shall comprise of timber or 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 or assessed to achieve an FRL of -/120/120 or 120/120/120.

The assessed construction is summarised in section 3.1, 3.2, 3.3 and 3.4 for floors and walls.

3.1 DISTANCE REQUIREMENTS

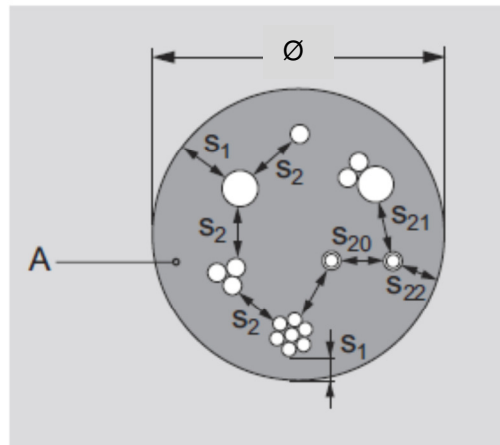


Figure 1 – Distance Requirements of Penetrations

Table 1 – 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	$s_{22} = 0$
Maximum % of the seal can be penetrated	60%
Maximum Conduit Bundle Size	$\varnothing 100\text{mm}$
Maximum Cable Bundle Size	$\varnothing 90\text{mm}$

Table 2 – Product Sizes for Openings

Product	Max. Opening Diameter (\varnothing)
Firestop plug CFS-PL 52	$\varnothing 52\text{mm}$
Firestop plug CFS-PL 107	$\varnothing 107\text{mm}$
Firestop plug CFS-PL 132	$\varnothing 132\text{mm}$
Firestop plug CFS-PL 158	$\varnothing 158\text{mm}$
Firestop plug CFS-PL 202	$\varnothing 202\text{mm}$

3.2 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 $2 \times W_A$ (at least 100mm wide) plus \varnothing (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) ≥ 150 mm.

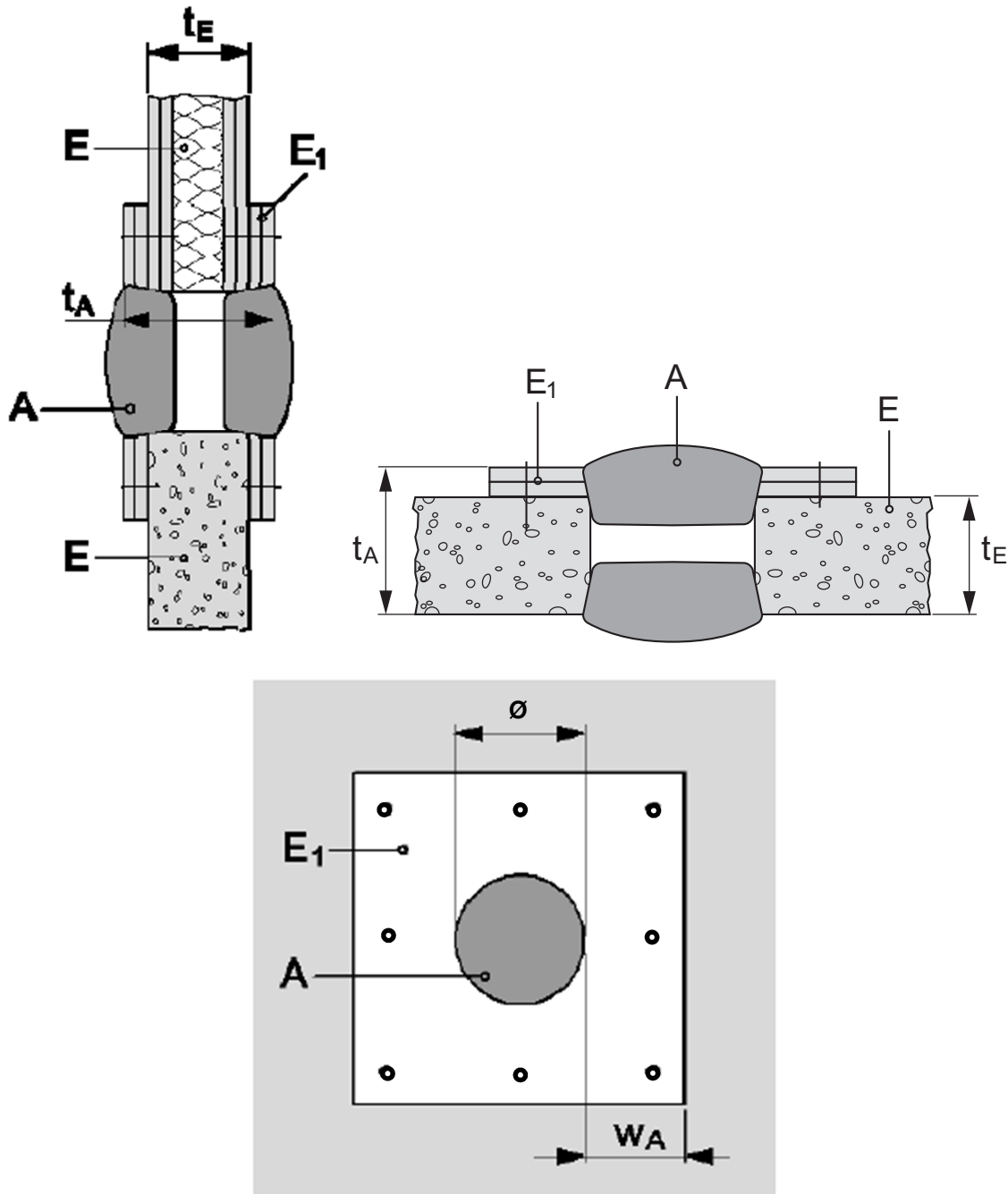


Figure 2 – Aperture framing / beading and position of the seal in walls / floors

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

3.3 WALL PENETRATIONS

The walls must be tested otherwise assessed in accordance with AS1530.4-2005 for the required fire resistance period.

Blank wall seal, no services, figure 3

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

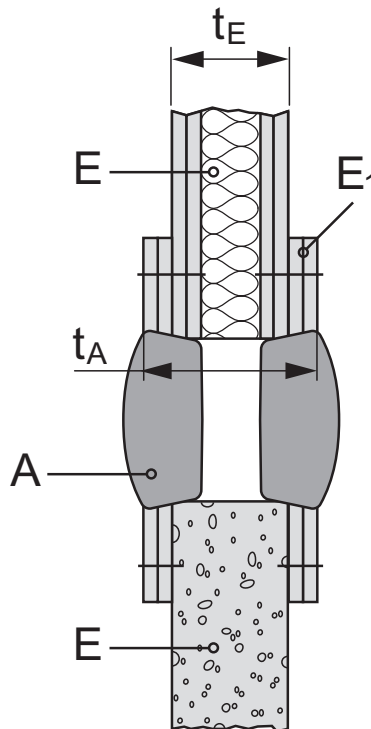


Figure 3 – Blank wall seal, no service

Flexible wall, figure 4, top section (E)

The wall must have a minimum thickness of 100 mm (t_E) and comprise of timber or 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 or otherwise assessed 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^3 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 the each side of the wall to make the seal thickness (t_A) $\geq 150\text{mm}$.

Rigid wall, figure 4, bottom section (E)

The wall must have a minimum thickness of 75 mm (t_E) and comprise of concrete, aerated concrete or masonry with a minimum density of 550kg/m^3 . Beading (E_1) must be used on the each side of the wall to make the seal thickness (t_A) $\geq 150\text{mm}$. 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) $\geq 150\text{mm}$.

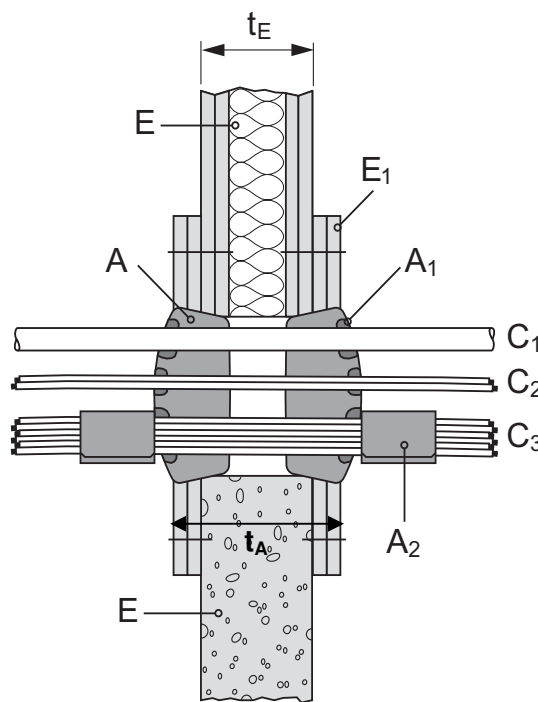


Figure 4 – Details of filler (A_1) and 2 x putty (A_2)

Item	Description	Item	Description
A, A_1 , A_2 ,	A: Hilti Firestop Plug CFS-PL Hilti Firestop Plug CP 658 A_1: Hilti Intumescent Sealant CP 611A Hilti Intumescent Sealant FS-ONE A_2: Hilti Firestop Putty Bandage CFS-P BA	A_1	Hilti Intumescent Sealant CP 611A Hilti Intumescent Sealant FS-ONE 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_2	E: Support Construction elements (wall, floor) E_1: Aperture Beading, 13mm or 16mm fire grade plasterboard E_2: Aperture Beading, 75mm Hebel panel from one side only	t_E	Thickness of the building element
t_A	Thickness of penetration seal		

3.4 FLOOR PENETRATIONS

The floors must be tested or otherwise assessed in accordance with AS1530.4-2005 for the required fire resistance period.

Blank floor seal, no services, figure 5

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

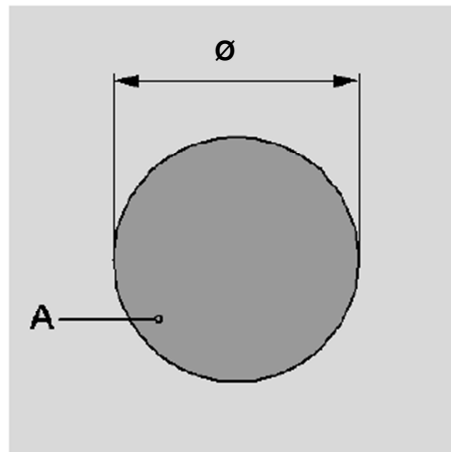


Figure 5 – Blank Floor Seal, No Services

Rigid floor, figure 6, (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/m³.

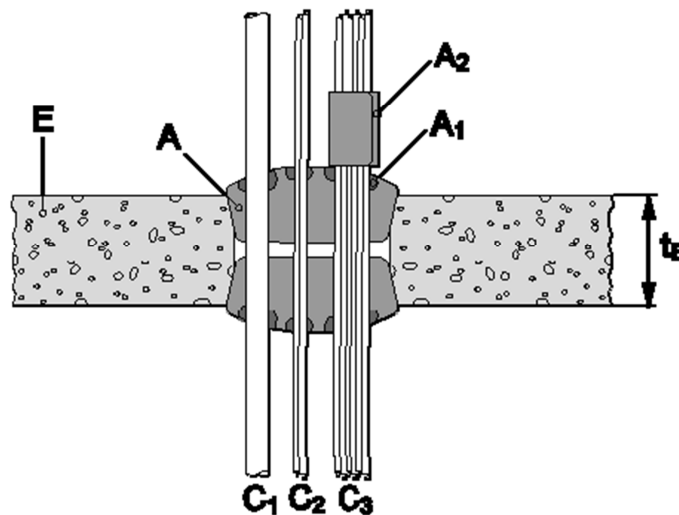


Figure 6 – Details of filler (A_1) and 2 x putty (A_2), $t_E \geq$ 150mm

Rigid floor, figure 7, (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/m³. A beading (E_1) must be used on the topside of the floor to make the seal thickness (t_A) \geq 150mm.

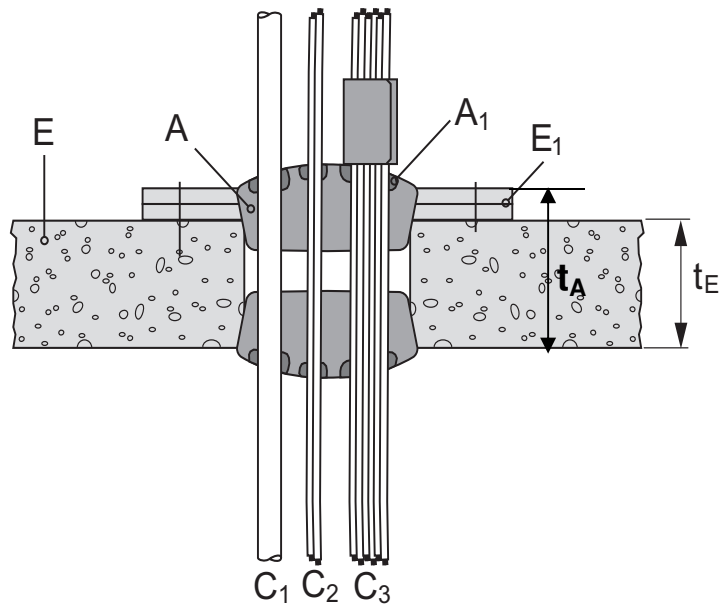


Figure 7 – Details of filler (A_1) and 2 x putty (A_2), $t_E \geq 120$ mm

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 Hilti Intumescent Sealant FS-ONE A₂: Hilti Firestop Putty Bandage CFS-P BA	t_A	Thickness of penetration seal
$C, C_1, C_2,$	C: Service penetrations C₁: Conduit C₂: Single cables C₃: Cable bundle	t_E	Thickness of the support element
$E, E_1,$	E: Building elements (wall, floor) E₁: Aperture beading, 13mm or 16mm fire grade plasterboard	A_1	Hilti Intumescent Sealant CP 611A Hilti Intumescent Sealant FS-ONE at a depth of min. 20 mm
\emptyset	Diameter of the seal	A_2	2 layers of 100mm wide Hilti Firestop Putty Bandage CFS-P BA

4 REFERENCED TEST PROCEDURES

This report is prepared with reference to the requirements of AS1530.4-2005 and AS4072.1-2005.

5 FORMAL ASSESSMENT SUMMARY

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

Table 3 – Service penetrations, flexible wall, at least 100 mm thick (+ Aperture Beading)

Description of Services	FRL	
<i>Blank Opening without Hilti Firestop Intumescent Fillers (A₁) and without Hilti Firestop Putty Bandage CFS-P BA (A₂)</i>	Note: Refer to Section 3.2: BEADING DETAILS FOR WALLS AND FLOORS, and ensure that seal thickness (t_s) ≥ 150mm	
Blank opening: 52mm ≤ Ø ≤ 202mm with and without plastic sleeve	- /120/120	
<i>Standard Cable Services</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>	<i>With Hilti Firestop Intumescent Fillers (A₁) & Hilti Firestop Putty Bandage (A₂)</i>
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS1530.4-2005 Appendix D)	- /120/60	- /120/120
PVC insulated Communication Cables (Standard D2 cable set, in accordance with AS1530.4-2005 Appendix D)		
Steel conduits and tubes up to 16mm filled with cables, optic fibres or empty	- /120/120	
<i>Single Plastic Conduits and tubes: Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid PVC: polyvinyl chloride</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>	
Single Conduit up to 40mm filled with cables, optic fibres or empty	- /120/120	
<i>Bundle Plastic Conduits and tubes: Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid and Flexible PVC: polyvinyl chloride</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>	
Conduits up to 20mm filled with cables, optic fibres or empty. Conduits may be bundled up to 100mm in diameter	- /120/120	

Note: Refer 3.1 for Distance Requirements

Table 4 - Service penetrations, rigid wall, at least 75 mm thick (+ Aperture Beading)

Description of Services	FRL	
<i>Blank Opening without Hilti Firestop Intumescent Fillers (A₁) and without Hilti Firestop Putty Bandage CFS-P BA (A₂)</i>	Note: Refer to Section 3.2: BEADING DETAILS FOR WALLS AND FLOORS, and ensure that seal thickness (t_s) ≥ 150mm	
Blank opening: 52mm ≤ Ø ≤ 202mm with and without plastic sleeve	-/120/120	
<i>Standard Cable Services</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>	<i>With Hilti Firestop Intumescent Fillers (A₁) & Hilti Firestop Putty Bandage (A₂)</i>
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS1530.4-2005 Appendix D)	-/120/60	-/120/120
PVC insulated Communication Cables (Standard D2 cable set, in accordance with AS1530.4-2005 Appendix D)		
Steel conduits and tubes up to 16mm filled with cables, optic fibres or empty	-/120/120	
<i>Single Plastic Conduits and tubes: Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid PVC: polyvinyl chloride</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>	
Single Conduit up to 40mm filled with cables, optic fibres or empty	-/120/120	
<i>Bundle Plastic Conduits and tubes: Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid and Flexible PVC: polyvinyl chloride</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>	
Conduits up to 20mm filled with cables, optic fibres or empty. Conduits may be bundled up to 100mm in diameter	-/120/120	

Note: Refer 3.1 for Distance Requirements

Table 5 - Service penetrations, rigid floor, at least 120 mm thick (+ Aperture Beading)

Description of Services	FRL
<i>Blank Opening without Hilti Firestop Intumescent Fillers (A₁) and without Hilti Firestop Putty Bandage CFS-P BA (A₂)</i>	Note: Refer to Section 3.2: BEADING DETAILS FOR WALLS AND FLOORS, and ensure that seal thickness (t_A) ≥ 150mm
Blank opening: 52mm ≤ Ø ≤ 202mm with and without plastic sleeve	-/120/120
<i>Standard Cable Services</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS1530.4-2005 Appendix D).	-/120/90
PVC insulated Communication Cables (Standard D2 cable set, in accordance with AS1530.4-2005 Appendix D).	-/120/120
Steel conduits and tubes up to 16mm filled with cables, optic fibres or empty	-/120/120
<i>Non-Standard Cable Services</i>	<i>With Hilti Firestop Intumescent Fillers (A₁) & Hilti Firestop Putty Bandage (A₂)</i>
PVC insulated Power Cables (Standard D1 cable set, in accordance with AS1530.4-2005 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 AS1530.4-2005 Appendix D) up to Ø48mm may be bundled up to 90mm in diameter.	-/120/120
<i>Single Plastic Conduits and tubes: Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid PVC: polyvinyl chloride</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>
Single Conduit up to 40mm filled with cables, optic fibres or empty	-/120/120
<i>Bundle Plastic Conduits and tubes: Rigid and Flexible PO: polyolefin (PE, PP, PPE, PPO); Rigid and Flexible PVC: polyvinyl chloride</i>	<i>With Hilti Firestop Intumescent Fillers (A₁)</i>
Conduits up to 20mm filled with cables, optic fibres or empty. Conduits may be bundled up to 100mm in diameter	-/120/120

Note: Refer 3.1 for Distance Requirements

6 DIRECT FIELD OF APPLICATION

The referenced assessment applies to penetrations in walls exposed to fire from either side or floors exposed to fire from underside only.

7 REQUIREMENTS

The referenced 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 AS1530.4.

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

It is required that the supporting construction be otherwise tested or assessed to achieve the required FRL up to -/120/120 in accordance with AS1530.4-2005.

8 VALIDITY

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

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

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

The 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.

The 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 the referenced 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.

9.2 GENERAL CONDITIONS OF USE

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9.3 AUTHORISATION ON BEHALF OF EXOVA WARRINGTONFIRE AUS PTY LTD

Prepared by:

Reviewed by:



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K Nicholls

9.4 DATE OF ISSUE

09/05/2014

9.5 EXPIRY DATE

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