



JENSEN HUGHES



Fire assessment report

Schneider Electric wall boxes in accordance with
AS 1530.4:2014

Sponsor: Schneider Electric Pty Ltd

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Quality management

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Formerly Warringtonfire Australia Pty Ltd¹

¹Warringtonfire Australia Pty Ltd was acquired by Jensen Hughes in December 2023. Jensen Hughes Fire Testing Pty Ltd is not affiliated, associated, authorised, or endorsed by Warringtonfire Australia Pty Ltd, Warringtonfire Testing and Certification Limited or its "Warringtonfire" or "Certifire" brands.

Executive summary

This report documents the findings of the assessment undertaken to determine the expected fire resistance level (FRL) of Schneider Electric wall box penetrations tested in accordance with AS 1530.4:2014.

These electric boxes are described as being fire-rated and made of galvanised steel with 8 or 10 mm of intumescent material inside.

The analysis in sections 5 of this report found that the proposed systems, together with the described variations, are expected to achieve FRLs as shown in Table 1 to Table 3 – in accordance with AS 1530.4:2014.

The variations and outcome of this assessment are subject to the limitations and requirements described in sections 2, 3 and 9 of this report. The results of this report are valid until 30 April 2030.

Table 1 Wall boxes a wall system with 1 × 16 mm fire rated plasterboard on each side

Wall system	Product	Configuration	Sealant	Intumescent thickness	Test standard	Reference test	DTS Provision	Evidence of suitability	FRL
Minimum 124 mm thick wall system with 1 × 16 mm fire rated plasterboard on each side	157/1F	Back-to-back or horizontally separated	Yes	10 mm	AS 1530.4:2014	FRT210428 R1.0	S1C2(c)	A5G3 (1)(d)	-/90/60
	157/2F	Back-to-back	Yes	8 mm					-/90/60
			No	10 mm					-/90/60
	157MDF	Back-to-back	Yes	10 mm					-/90/60
		Horizontally separated (minimum 200 mm)	No	10 mm					-/90/60
	2157/1F	Back-to-back or horizontally separated	No	10 mm					-/90/60
	2157/2F	Back-to-back or horizontally separated	No	10 mm					-/90/60
	2157/3F	Back-to-back or horizontally separated	No	10 mm		-/90/60			
	157/1F with steel mounting plate	On exposed face of the wall	No	8 mm		-/60/60			
	157/1F with steel mounting plate	On unexposed face of the wall	No	8 mm		-/60/60			
• The FRL is limited to the established FRL of the separating element. • The aperture size must not exceed the wall box dimensions by more than 1 mm									

Table 2 Wall boxes in minimum 144 mm thick wall system with 2 × 13 mm fire rated plasterboards on each side

Wall system	Product	Configuration	Sealant	Intumescent thickness	Test standard	Reference test	DTS Provision	Evidence of suitability	FRL
Minimum 144 mm thick wall system with 2 × 13 mm fire rated plasterboards on each side	157/1F	Back-to-back	Yes	10 mm	AS 1530.4:2014	FRT210428 R1.0	S1C2(c)	A5G3 (1)(d)	-/120/90
		Horizontally separated (minimum 200 mm)	Yes	10 mm					-/120/120
	157/2F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
	2157/1F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
	2157/2F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
	2157/3F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
Minimum 144 mm thick wall system with cavity insulation and 2 × 13 mm fire rated plasterboards on each side	157MDF	Horizontally separated (minimum 200 mm)	Yes	11 mm					-/120/90

Table 3 **Wall box in minimum 156 mm thick wall system with 2 × 16 mm fire rated plasterboards on each side**

Wall system	Product	Configuration	Sealant	Intumescent thickness	Test standard	Reference test	DTS provision	Evidence of suitability	FRL
Minimum 156 mm thick wall system with 2 × 16 mm fire rated plasterboards on each side	157/1F	Back-to-back	Yes	10 mm	AS 1530.4:2014	FRT210428 R1.0	S1C2(c)	A5G3 (1)(d)	-/120/90
		Horizontally separated (minimum 200 mm)	Yes	10 mm					-/120/120
	157/2F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
	157MDF	Horizontally separated (minimum 200 mm)	Yes	10 mm					-/120/90
	2157/1F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
	2157/2F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
	2157/3F	Back-to-back or horizontally separated	Yes	10 mm					-/120/90
• The FRL is limited to the established FRL of the separating element. • The aperture size must not exceed the wall box dimensions by more than 1 mm									

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1. Introduction

This report documents the findings of the assessment undertaken to determine the expected fire resistance level (FRL) of Schneider Electric wall box penetrations tested in accordance with AS 1530.4:2014² and assessed in accordance with AS 4072.1:2005³.

This report may be used as evidence of suitability in accordance with the requirements of the relevant National Construction Code (NCC) to support the use of the material, product, form of construction or design as given within the scope of this assessment report. It also references test evidence for meeting deemed-to-satisfy (DTS) provisions of the NCC that apply to the assessed systems.

This assessment was carried out at the request of Schneider Electric Pty Ltd. The sponsor details are included in Table 4.

Table 4 Sponsor details

Sponsor	Address
Schneider Electric Pty Ltd	Level 5, 2 Ferntree Place Notting Hill, Victoria 3168 Australia

2. Framework for the assessment

2.1 Assessment approach

An assessment is a professional opinion about the expected performance of a component or element of structure subjected to a fire test.

No specific framework, methodology, standard or guidance documents exists in Australia for undertaking these assessments. We have therefore followed the 'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence' prepared by the Passive Fire Protection Forum (PFPF) in the UK in 2021⁴.

This guide provides a framework for undertaking 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.
- The 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.

Assessments can 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.

This assessment uses established empirical methods and our experience of fire testing similar products to extend the scope of application by determining the limits for the design and performance based on the tested constructions and performances obtained. The assessment is an evaluation of the potential fire resistance performance of the elements in accordance with AS 1530.4:2014.

² Standards Australia, 2014, Methods for fire tests on building materials, components and structures – Part 4: Fire-resistance tests for elements of construction, AS 1530.4:2014, Standards Australia, NSW.

³ Standards Australia, 2005, Components for the protection of openings in fire-resistant separating elements: Service penetrations and control joints, AS 4072.1:2005, Standards Australia, NSW.

⁴ Passive Fire Protection Forum (PFPF), 2021, Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, Passive Fire Protection Forum (PFPF), UK.

This assessment has been written in accordance with the general principles outlined in EN 15725:2023⁵ for extended application on the fire performance of construction products and building elements: Principle of EXAP standards and EXAP reports.

This assessment has been written using appropriate test evidence generated at accredited laboratories to the relevant test standard. The supporting test evidence has been deemed appropriate to support the manufacturer's stated design.

2.2 Compliance with the National Construction Code

This assessment report has been prepared to meet the evidence of suitability requirements of the NCC 2022⁶ under A5G3 (1) (d). It references test evidence for meeting deemed-to-satisfy (DTS) provisions of the NCC under A5G5 for fire resistance level that apply to the assessed systems based on Specifications 1 and 2 for fire resistance for building elements.

The proposed details and systems (building elements) in this report are confirmed to be assessed, without the aid of an active fire suppression system, based on prototype tests that are equivalent to or more severe than a standard fire test AS 1530.4:2014 as specified in section 4.3, in accordance with NCC 2022 S1C2(b). It is also confirmed that the differences between the proposed systems and details compared to the tested prototypes are considered minor in accordance with NCC 2022 S1C2(c).

This assessment report may also be used to demonstrate compliance with the requirements for evidence of suitability under the relevant sections of previous versions of the NCC.

2.3 Declaration

The 'Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence' prepared by the PFPF in the UK requires a declaration from the client. By accepting our fee proposal on 1 March 2024, Schneider Electric Pty Ltd confirmed that:

- To their knowledge, the variations to the component or element of structure, which is the subject of this assessment, have 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. Requirements and limitations of this assessment

- The scope of this report is limited to an assessment of the variations to the tested systems described in section 4.3.
- This report details the methods of construction, test conditions and assessed results expected in accordance with AS 1530.4:2014.
- This assessment applies to wall systems exposed to fire from each side in accordance with the requirements of AS 1530.4:2014, where vertical elements must be exposed to heat from the direction required to resist fire exposure.
- This assessment report has been prepared based on the fire resistance performance and condition of the systems at the time they were tested. Any deterioration of fire resistance

⁵ European Committee for Standardization, 2023, Extended application on the fire performance of construction products and building elements: Principle of EXAP standards and EXAP reports, EN 15725:2023, European Committee for Standardization, Brussels, Belgium

⁶ National Construction Code Volumes One and Two - Building Code of Australia 2022, Australian Building Codes Board, Australia

performance due to external factors including but not limited to passage of time and exposure to elements – is not considered in this report.

- This report is only valid for the assessed systems and must not be used for any other purpose. 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 need to be done by an Accredited Testing Laboratory (ATL) that is accredited to the same nominated standards of this report.
- This report has been prepared using information provided by others. Jensen Hughes has not verified the accuracy and/or completeness of that information and will not be responsible for any errors or omissions that may have been incorporated into this report as a result.
- This assessment is based on the proposed systems being constructed under comprehensive quality control practices and following appropriate industry regulations and Australian Standards on quality of materials, design of structures, guidance on workmanship and expert handling, placing and finishing of the products on site. These variables are beyond the control and consideration of this report.

4. Description of the specimen and variations

4.1 Systems description

The product has been subjected to several tests with varying configurations and substrates, the following outlined a general description of the tested system:

- The system test in FRT210428 R1.0 consists of various wall boxes installed in a 124 mm thick steel framed plasterboard wall system with a 16 mm fire rated plasterboard on each side.
- The system tested in FRT210429 R1.0 consists of various wall boxes installed in a 144 mm thick steel framed plasterboard wall system with 2 × 13 mm fire rated plasterboards on each side.
- The system tested in RTL FT1991.01 consists of various wall boxes installed in a 90 mm thick steel framed plasterboard wall system with one layer of 13 mm fire rated plasterboards on each side.

4.2 Referenced test data

The assessment of the variation to the tested systems and the determination of the expected performance are based on the results of the fire tests documented in the reports summarised in Table 5. Further details of the tested systems are included in Appendix A.

Table 5 Referenced test data

Report number	Test sponsor	Test date	Testing authority
FRT210428 R1.0	Schneider Electric (Australia) Pty Ltd	16 May 2022	Jensen Hughes Pty Ltd (formerly Warringtonfire Australia)
FRT210429 R1.0		2 June 2022	
RTL FT1991.01	BJS Group (QLD) Pty Ltd	12 October 2023	Resolute Testing Laboratories

4.3 Variations to the tested systems

The tested systems and variations to those tested systems – together with the referenced standard fire tests – are described in Table 6.

Table 6 Variations to tested systems

Item	Reference test	Description	Variations
1	FRT210428 R1.0	Various wall boxes were tested in accordance with AS 1530.4:2014 in a 124 mm thick plasterboard wall system with a 16 mm fire rated plasterboard on each side.	It is proposed to assess the fire performance of wall boxes in various configurations with modifications to the intumescent thickness and sealant requirements.
2	FRT210429 R1.0	Various wall boxes were tested in accordance with AS 1530.4:2014 in a 144 mm thick plasterboard wall system with 2 × 13 mm fire rated plasterboard on each side.	
3	RTL FT1991.01 and FRT210428 R1.0	Various wall boxes were tested in accordance with AS 1530.4:2014 in a 90 mm thick single layer 13 mm plasterboard wall system. Clipsal switch Outlets (157/1F) staggered in horizontal configuration were tested with steel backing plate. Specimen B involved testing with the switch on the exposed side and Specimen D on unexposed side.	It is proposed to assess the fire performance of Clipsal switch Outlet (157/1F) when installed with a 1.13 mm thick steel backing plate in minimum 124 mm thick wall system as tested in FRT210428.
4	FRT210429 R1.0	Various wall boxes were tested in accordance with AS 1530.4:2014 in a 144 mm thick plasterboard wall system with 2 × 13 mm fire rated plasterboard on each side.	It is proposed to assess the fire performance of the 157MDF fire boxes within timber framed walls instead of a steel framed wall system.

4.4 Assessment standard

AS 1530.4:2014 sets out procedures and methods for fire tests on building materials, components, structures, and fire-resistance tests for elements of construction. Section 10 discusses the procedures and methods for service penetrations and control joints.

AS 4072.1:2005 sets out the minimum requirements for the construction, installation and application of fire resistance tests to sealing systems around penetrations through separating building elements that are required to have an FRL.

4.5 Schedule of components

Table 7 outlines the schedule of components for the assessed systems. We have based this schedule of component from the reference test reports shown in Table 5.

Table 7 Schedule of components of assessed systems

Item	Description
Separating element	
1.	Item name
	Wall system
	Dimensions
	Minimum 124 mm thick wall system consisting of a 16 mm fire rated plasterboard on each side for an FRL of -/90/90.
	Minimum 144 mm thick wall system consisting of 2 × 13 or 16 mm fire rated plasterboard on each side for an FRL of -/120/120.

Item	Description		
2.	Item name	Fire rated plasterboard	
Sealant			
3.	Item name	Clipsal Sealant	
	Product name	Clipsal Fyre Seal Mastic (157FSM)	
	Density	1640 kg/m ³	
	Application	In the gap and interface between the aperture and the wall box	
Cable			
4.	Item name	TPS cable	
	Installation	A maximum of up to 9 conductors with a conductor area of 15 mm ² can be entered into the wall box and connected to a GPO and/or /switch. The other ends of the cables protrude from the back of the wall box into the cavity of the wall.	
Mounting plate			
5.	Item	Steel mounting plate	
	Dimensions	180 mm wide × 140 mm high × 1.13 mm thick	
	Installation	Steel mounting plate screwed to the steel stud in the location of each box inside the wall cavity.	
Wall box			
6.	Product name	157/1F Clipsal fire rated wall box	
	Material	Steel	
	Wall box details	Width	95 mm
		Height	52 mm
		Depth	50 mm
		Shell thickness	0.9 mm thick galvanised mild steel
	Intumescent details (10 mm version)	Overall thickness	10 mm
		Density	960 kg/m ³
	Intumescent details (8 mm version)	Overall thickness	8 mm
		Density	920 kg/m ³
7.	Product name	157/2F Clipsal fire rated wall box	
	Material	Steel	
	Wall box details	Width	92 mm
		Height	97 mm
		Depth	48 mm
		Shell thickness	0.9 mm thick galvanised mild steel
	Intumescent details (10 mm version)	Overall thickness	10 mm
		Density	960 kg/m ³
	Intumescent details (8 mm version)	Overall thickness	8 mm
		Density	920 kg/m ³
8.	Product name	157MDF Clipsal fire rated wall box	
	Material	Steel	

Item	Description		
	Wall box details	Width	95 mm
		Height	52 mm
		Depth	70 mm
		Shell thickness	0.9 mm thick galvanised mild steel
	Intumescent details	Overall thickness	10 mm or 11 mm
		Density	960 kg/m ³
9.	Product name	2157/1F Clipsal fire rated wall box	
	Material	Steel	
	Wall box details	Width	60 mm
		Height	97.8 mm
		Depth	58 mm
		Shell thickness	0.9 mm thick galvanised mild steel
	Intumescent details	Overall thickness	10 mm
		Density	960 kg/m ³
10.	Product name	2157/2F Clipsal fire rated wall box	
	Material	Steel	
	Wall box details	Width	135.7 mm
		Height	97.8 mm
		Depth	58 mm
		Shell thickness	0.9 mm thick galvanised mild steel
	Intumescent details	Overall thickness	10 mm
		Density	960 kg/m ³
11.	Product name	2157/3F Clipsal fire rated wall box	
	Material	Steel	
	Wall box details	Width	205 mm
		Height	98 mm
		Depth	58 mm
		Shell thickness	0.9 mm thick galvanised mild steel
	Intumescent details	Overall thickness	10 mm
		Density	960 kg/m ³

5. Assessment 1 – Variations to the intumescent thickness and sealant

5.1 Description of variation

This assessment determines the expected performance of various wall box penetrations based on the fire resistance performance results from test reports FRT210428 R1.0, FRT210429 R1.0 and RTL FT1991.01. Variations in the application of sealant around the wall box, other wall systems, the thickness of intumescent inside the wall box and different installation configurations are assessed in this section.

5.2 Methodology

The method of assessment used is summarised in Table 8.

Table 8 Method of assessment

Assessment method	
Level of complexity	Intermediate assessment
Type of assessment	Qualitative

5.3 Assessment

5.3.1 Wall boxes installed in a minimum 124 mm thick plasterboard wall with a 16 mm fire rated plasterboard on each side

In test FRT210428 R1.0, various wall boxes were tested in accordance with AS 1530.4:2014 in a 124 mm thick steel framed plasterboard wall system with a 16 mm fire rated plasterboard on each side of the wall. The wall boxes were installed either in a back-to-back configuration or with a 200 mm horizontal separation on both sides of the wall. The summary of the tested specimens is shown in Table 9.

Table 9 Summary of tested specimens in FRT210428 R1.0

Item	Product	Configuration	Sealant	Intumescent thickness	Results
A	157/2F	Back-to-back	No	8 mm	No integrity failure at 121 minutes Insulation failure at 58 minutes
B	157/1F	Back-to-back	No	8 mm	No integrity failure at 121 minutes Insulation failure at 59 minutes
C	157/1F	Back-to-back	Yes	8 mm	No integrity failure at 121 minutes Insulation failure at 64 minutes
D	157MDF	Horizontal separation (200 mm)	No	8 mm	No integrity failure at 121 minutes Insulation failure at 53 minutes
E	157/2F	Horizontal separation (200 mm)	No	8 mm	No integrity failure at 121 minutes Insulation failure at 43 minutes
F	157/1F	Horizontal separation (200 mm)	No	8 mm	No integrity failure at 121 minutes Insulation failure at 51 minutes
G	157/1F	Back-to-back	No	10 mm	No integrity failure at 121 minutes Insulation failure at 68 minutes
H	157MDF	Horizontal separation (200 mm)	No	10 mm	No integrity failure at 121 minutes Insulation failure at 61 minutes

Item	Product	Configuration	Sealant	Intumescent thickness	Results
I	2157/3F	Back-to-back	No	10mm	No integrity failure at 121 minutes Insulation failure at 62 minutes
J	2157/3F	Horizontal separation (200 mm)	No	10mm	No integrity failure at 121 minutes Insulation failure at 63 minutes

All the wall boxes did not fail the integrity criteria for 121 minutes. However, they failed the insulation criteria during the test, as shown in Table 9.

Specimens B and C are identical wall boxes; however, sealant was applied in the gap and interface between the aperture and the wall box in specimen C, but not in specimen B. The results showed that by having a sealant, the insulation performance of the wall box increased from 59 minutes to 64 minutes. Furthermore, specimens B and G are in the same wall box with different thicknesses of intumescent installed in the wall box. The thickness of the intumescent in specimens B and G was 8 mm and 10 mm, respectively. Specimen G showed an improved performance in insulation of 68 minutes compared to the 59 minutes insulation performance in specimen B. A similar result was observed for specimens D and H, where a 157MDF wall box with an 8 mm intumescent strip failed insulation at 61 minutes, whereas a 157MDF wall box with a 10 mm intumescent strip maintained the insulation performance for 61 minutes. Based on these results, it is determined that the insulation performance can be increased by approximately 5 minutes when a sealant is used in the gap between the aperture and the wall box, and the insulation performance can be increased by approximately 9 minutes when the thickness of the intumescent in the wall box is increased from 8 mm to 10 mm.

Specimen F consists of a 157/1F wall box installed with a horizontal separation of 200 mm on the exposed and unexposed sides of the wall system. The specimen failed insulation at 51 minutes, as shown in Table 9. Based on the above discussion, it was observed that the insulation performance can be increased by around 9 minutes when the thickness of the intumescent in the wall box is increased from 8 mm to 10 mm and the insulation performance can be increased by around 5 minutes when a sealant is applied in the gap between the aperture and the wall box. Therefore, by taking a conservative approach, a 157/1F, when installed with a horizontal separation, is positively assessed to have an insulation of 60 minutes, provided that a sealant is applied in the gap between the aperture and the wall box and a 10 mm thick intumescent is used in the wall box.

The wall box 157/2F with an 8 mm intumescent strip failed the insulation criteria at 58 minutes when tested without a sealant around the wall box (specimen A) in the referenced test in a back-to-back configuration. Based on the previous discussion, this wall box is assessed for an insulation performance of 60 minutes if installed either with a sealant around the wall box or with a 10 mm intumescent within the box to provide the additional 2 minutes of performance required. Similarly, the 157MDF wall box in a back-to-back configuration is assessed for 60 minutes of insulation performance when installed with a 10 mm thick intumescent and sealant around the wall box, based on the performance of specimen H.

The wall box 2157/3F was tested in both back-to-back configurations and when installed with a 200 mm horizontal separation. Both configurations did not fail the insulation criteria for 60 minutes. It is proposed to assess the fire resistance performance of wall boxes 2157/1F and 2157/2F based on the performance of wall box 2157/3F. The wall boxes 2157/1F and 2157/2F are smaller in size compared to the tested 2157/3F wall box; hence, they are not expected to perform adversely compared to the tested wall box.

5.3.2 Wall boxes installed in a minimum 144 mm thick plasterboard wall with 2 × 13 mm fire rated plasterboards on each side

In test FRT210429 R1.0, various wall boxes were tested in accordance with AS 1530.4:2014 in a 144 mm thick steel framed plasterboard wall system with 2 × 13 mm fire rated plasterboards on each side of the wall. The wall boxes were installed either in a back-to-back configuration or with a 200 mm horizontal separation on the exposed and unexposed sides of the wall. The summary of the tested specimens is as shown in Table 10.

Table 10 Summary of tested specimens in FRT210429 R1.0

Item	Product	Configuration	Sealant	Intumescent thickness	Results
A	157/2F	Back-to-back	Yes	10 mm	No integrity failure at 121 minutes Insulation failure at 111 minutes
B	157/1F	Back-to-back	Yes	10 mm	No integrity failure at 121 minutes Insulation failure at 93 minutes
C	157MDF	Horizontal separation (200 mm)	Yes	10 mm	No integrity failure at 121 minutes Insulation failure at 86 minutes
D	157/2F	Horizontal separation (200 mm)	Yes	10 mm	No integrity failure at 121 minutes Insulation failure at 90 minutes
E	157/1F	Horizontal separation (200 mm)	Yes	10 mm	No integrity failure at 121 minutes No insulation failure at 121 minutes
F	2157/3F	Back-to-back	Yes	10 mm	No integrity failure at 121 minutes Insulation failure at 94 minutes
G	2157/3F	Horizontal separation (200 mm)	Yes	10 mm	No integrity failure at 121 minutes Insulation failure at 96 minutes

All the wall boxes did not fail the integrity criteria, for 121 minutes. However, most of them failed the insulation criteria as shown in Table 10.

As discussed in section 5.3.1, the performance of wall boxes 2157/1F and 2157/2F is assessed based on the performance of wall box 2157/3F (specimens F and G). Since 2157/1F and 2157/2F are smaller in size compared to the tested 2157/3F wall box, they are not expected to perform adversely compared to the tested wall box. Hence, they are positively assessed to an FRL of -/120/90 in accordance with AS 1530.4:2014.

Specimen C in FRT210429 R1.0, containing the 157MDF wall box, failed the insulation criteria at 86 minutes during the test FRT210429, thereby achieving an FRL of -/120/60. As discussed in section 5.3.1, increasing the thickness of the intumescent by 2 mm resulted in an increase in insulation performance up to around 9 minutes. Therefore, it is proposed to increase the thickness of the intumescent in the wall box by 1 mm and install cavity insulation material in the cavity of the wall system to improve the insulation performance of the system. It is therefore expected that the 157MDF wall box, when installed with a horizontal separation of at least 200 mm, will then achieve an FRL of -/120/90 in accordance with AS 1530.4:2014.

5.3.3 Wall boxes installed in a minimum 156 mm thick plasterboard wall with 2 × 16 mm fire rated plasterboards on each side

As discussed in section 5.3.2, the 157MDF wall box tested in FRT210429 R1.0 failed the insulation criteria at 86 minutes during the test, thereby achieving an FRL of -/120/60. It is expected that if the wall box is installed in a wall system with 2 × 16 mm fire rated plasterboards on each side, the insulation performance can be maintained for the additional 4 minutes required to obtain the - /120/90 FRL. This is primarily because 2 × 16 mm fire rated plasterboard stays in place longer than 2 × 13 mm fire rated plasterboard during fire exposure, thus delaying the exposure of unexposed side wall boxes to direct furnace conditions. Therefore, the 157MDF wall box is positively assessed for an FRL of -/120/90 provided that the wall boxes are installed with a horizontal separation of at least 200 mm. The remaining wall boxes and configurations assessed in section 5.3.2 will achieve the same FRLs when installed in a 2 × 16 mm fire rated plasterboard system with a minimum thickness of 156 mm.

6. Assessment 2 – Clipsal 157/1F installed with steel mounting plate in a minimum 124 mm thick plasterboard wall system

6.1 Description of variation

This assessment determines the expected performance of various wall box penetrations based on the fire resistance performance results from test reports FRT210428 R1.0, FRT210429 R1.0 and RTL FT1991.01. Variations in the application of sealant around the wall box, differing wall systems, varying thicknesses of intumescent inside the wall box and different installation configurations are assessed in this section.

6.2 Methodology

The method of assessment used is summarised in Table 11.

Table 11 Method of assessment

Assessment method	
Level of complexity	Intermediate assessment
Type of assessment	Qualitative

6.3 Assessment

In test RTL FT1991.01, various wall boxes were tested in accordance with AS 1530.4:2014 in a 90 mm thick steel framed plasterboard wall system with a single layer of 16 mm fire rated plasterboard on each side of the wall. The wall boxes were installed on the exposed and unexposed sides of the wall system. The summary of the relevant tested specimens is shown in Table 12.

Table 12 Summary of relevant tested specimens in RTL FT1991.01

Item	Product	Configuration	Sealant	Intumescent thickness	Results
B	157/1F	Horizontal configuration in exposed side	No	8 mm	No integrity failure at 61 minutes Insulation failure at 53 minutes
D	157/1F	Horizontal configuration in unexposed side	No	8 mm	No integrity failure at 61 minutes Failure at 61 minutes

The wall system in RTL FT1991.01 consisted of a 64 mm steel stud with a single layer of 13 mm fire rated plasterboard on each side of the wall. The performance of specimens B and D can be compared with the performance of specimen F of FRT210428, wherein the 157/1F was installed on the exposed and unexposed side of the wall with a 200 mm offset between the boxes. The wall system in FRT210428 R1.0 consisted of a 92 mm steel stud lined with one layer of 16 mm plasterboard on either side of the wall. In this test, it was noted that TC27 on the plasterboard maintained insulation performance until 68 minutes. Further TC 29 at the unexposed side (GPO in the unexposed side) maintained insulation until 74 minutes.

In test RTL FT1991.01, Specimen B when installed in a 90 mm thick plasterboard failed insulation at 53 minutes. It is considered that the failure at 53 minutes is not caused due to addition of the steel plate, and that the failure is due to the lower thickness of the wall. Furthermore, when comparing the performance of Specimen D of RTL FT1991.01 to TC 26,27,28 of FRT210428, failure occurred at 61 minutes when the wall thickness was lower, and at 68 minutes when the wall thickness was 124 mm as tested in FRT210428. The significance of this observations is that in this configuration, the metal plate is not closer to the fire exposed face to conduct heat into the wall cavity. Therefore, it can be considered that the worse performance of specimens in RTL FT1991.01 is not due to the addition of the metal plate, rather due to the lower thickness of the wall.

Hence, the addition of the metal plate when installing Clipsal 157/1F wall boxes in a 124 mm thick plasterboard wall is expected to achieve an FRL of -/60/60 in accordance with AS 1530.4:2014.

7. Assessment 3 – 157 MDF fire boxes installed within timber framed walls protected with two layers of 13 mm fire rated plasterboard

7.1 Description of variation

The originally conducted test considered a steel framed wall system; however, it is proposed for the 157 MDF fire boxes to be installed within wall systems which contain timber framing. Therefore, this assessment was to determine the expected performance of various wall box penetrations based on the fire resistance performance results from test report FRT210429 R1.0.

7.2 Methodology

The method of assessment used is summarised in Table 13.

Table 13 Method of assessment

Assessment method	
Level of complexity	Intermediate assessment
Type of assessment	Qualitative

7.3 Assessment

FRT210429 R1.0 describes the 157 MDF fire box as being installed in a 144 mm thick steel framed plasterboard wall system with a 2 × 13 mm fire rated plasterboard on each side. This corresponds to penetration system C which has been outlined to achieve the following FRL as describe within Table 14.

Table 14 Penetration system C within test report FRT210429 R1.0

Penetration system	Product	Configuration	Sealant	Intumescent thickness	Results
C	157MDF	Horizontal separation (200 mm)	Yes	10 mm	No integrity failure at 121 minutes Insulation failure at 86 minutes

The test which comprises of the 144 mm thick steel framing was terminated at 121 minutes, as such the integrity was not observed to fail through the duration of the tests. However, insulation was observed to fail at 86 minutes due to the temperature at the location on the expanded intumescent, where the GPO is installed reaching a temperature of 196 °C.

Several additional thermocouples were installed to observe the temperature within the surrounding area. The locations of the thermocouples are identified within Figure 1.



Figure 1 Thermocouple locations for penetration system C

The following temperatures were observed for the respective thermocouples as outlined within Figure 2, where it is observed that at 60 minutes, temperatures were identified to be less than 80 °C.

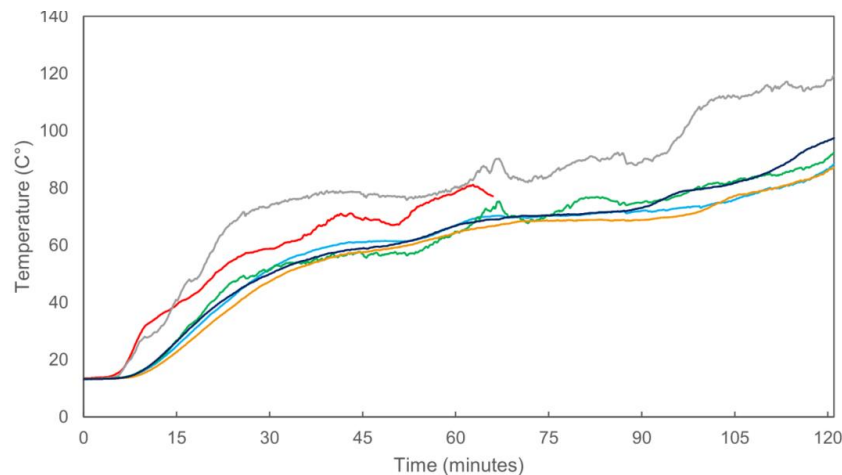


Figure 2 Temperatures throughout the test for penetration system C

The ability of structural timber to resist fire conditions is based on the decrease in cross sectional area of the member as it begins to char. The charring process of wood helps to insulate the remaining timber and prevents elevated temperatures from occurring throughout the entire member. Many studies have been conducted on the temperature at which the onset of charring occurs. The SFPE Handbook of Fire Protection Engineering⁷ states that a temperature of 300 °C is widely used and Eurocode 5 also specifies 300 °C.

Therefore, where the 2 x 13 mm fire rated plasterboard is maintained, the provision of timber framing within the wall system is not expected to be exposed to temperatures which may result in failure of the timber framing at 60 minutes.

⁷ White RH, 2016, Analytical methods for determining fire resistance of timber members, The SFPE Handbook of Fire Protection Engineering, 5th edition, SFPE, Springer, chapter 55

8. Conclusion / Assessment outcome

Based on the above discussions, these assessments demonstrates that the Schneider Electric wall boxes are expected to achieve FRLs as shown in Table 15 to Table 17 in accordance with AS 1530.4:2014.

Table 15 Wall boxes a wall system with 1 × 16 mm fire rated plasterboard on each side

Wall system	Product	Configuration	Sealant	Intumescent thickness	FRL
Minimum 124 mm thick wall system with 1 × 16 mm fire rated plasterboard on each side	157/1F	Back-to-back or horizontally separated	Yes	10 mm	-/90/60
	157/2F	Back-to-back	Yes	8 mm	-/90/60
			No	10 mm	-/90/60
	157MDF	Back-to-back	Yes	10 mm	-/90/60
		Horizontally separated (minimum 200 mm)	No	10 mm	-/90/60
	2157/1F	Back-to-back or horizontally separated	No	10 mm	-/90/60
	2157/2F	Back-to-back or horizontally separated	No	10 mm	-/90/60
	2157/3F	Back-to-back or horizontally separated	No	10 mm	-/90/60
	157/1F with steel mounting plate	On exposed face of the wall	No	8 mm	-/60/60
	157/1F with steel mounting plate	On unexposed face of the wall	No	8 mm	-/60/60
- The FRL is limited to the established FRL of the separating element. - The aperture size must not exceed the wall box dimensions by more than 1 mm					

Table 16 Wall boxes in minimum 144 mm thick wall system with 2 × 13 mm fire rated plasterboards on each side

Wall system	Product	Configuration	Sealant	Intumescent thickness	FRL
Minimum 144 mm thick wall system with 2 × 13 mm fire rated plasterboards on each side	157/1F	Back-to-back	Yes	10 mm	-/120/90
		Horizontally separated (minimum 200 mm)	Yes	10 mm	-/120/120
	157/2F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90
	2157/1F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90
	2157/2F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90
	2157/3F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90

Wall system	Product	Configuration	Sealant	Intumescent thickness	FRL
Minimum 144 mm thick wall system with cavity insulation and 2 × 13 mm fire rated plasterboards on each side	157MDF	Horizontally separated (minimum 200 mm)	Yes	11 mm	-/120/60
- The FRL is limited to the established FRL of the separating element. - The aperture size must not exceed the wall box dimensions by more than 1 mm					

Table 17 Wall box in minimum 156 mm thick wall system with 2 × 16 mm fire rated plasterboards on each side

Wall system	Product	Configuration	Sealant	Intumescent thickness	FRL
Minimum 156 mm thick wall system with 2 × 16 mm fire rated plasterboards on each side	157/1F	Back-to-back	Yes	10 mm	-/120/90
		Horizontally separated (minimum 200 mm)	Yes	10 mm	-/120/120
	157/2F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90
	157MDF	Horizontally separated (minimum 200 mm)	Yes	10 mm	-/120/90
	2157/1F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90
	2157/2F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90
	2157/3F	Back-to-back or horizontally separated	Yes	10 mm	-/120/90
- The FRL is limited to the established FRL of the separating element. - The aperture size must not exceed the wall box dimensions by more than 1 mm					

9. Validity

Jensen Hughes does not endorse the tested or assessed products and systems in any way. The conclusions of this assessment may be used to directly assess fire resistance, but it should be recognised that a single test method will not provide a full assessment of fire resistance 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 test data, information and experience available at the time of preparation. If contradictory evidence becomes available to the assessing authority, the assessment will be unconditionally withdrawn and the report sponsor will be notified in writing. Similarly, the assessment should be re-evaluated, if the assessed construction is subsequently tested since actual test data is deemed to take precedence.

The sponsor is responsible for formally notifying Jensen Hughes of any additional testing performed on their product/system. This obligation applies regardless of where the test was conducted, the results of the test, or whether it was initially considered part of Jensen Hughes' ongoing assessment. The primary goal of this notification is to allow Jensen Hughes to review the changes and determine whether they require re-evaluation or re-testing to determine whether the changes have affected the product's performance. It is important that the client promptly notify Jensen Hughes if any such changes are implemented.

The procedures for the conduct of tests and the assessment of test results are subject to constant review and improvement. The sponsor is therefore recommended that this report be reviewed on, or before, the stated expiry date.

This assessment represents our opinion about the performance of the proposed systems that is expected to be demonstrated when subjected to test conditions in accordance with AS 1530.4:2014, based on the evidence referred to in this report.

This assessment is provided to Schneider Electric Pty Ltd for their own specific purposes. This report may be used as evidence of suitability in accordance with the requirements of the relevant National Construction Code. Building certifiers and other third parties must determine the suitability of the systems described in this report for a specific installation.

Appendix A Summary of supporting test data

A.1 Test report – FRT210428 R1.0

Table 18 Information about test report

Item	Information about test report
Report sponsor	Schneider Electric (Australia) Pty Ltd
Test laboratory	Warringtonfire Australia, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was done on 16 May 2022.
Test standards	The test was done in accordance with AS 1530.4:2014.
Variation to test standards	1. None
General description of tested specimen	Test specimens consist of various wall boxes installed in a 124 mm thick steel framed plasterboard wall system with a 16 mm fire rated plasterboard on each side
Instrumentation	The test report states that the instrumentation was in accordance with AS 1530.4:2014.

The test specimen achieved the following results – see Table 19.

Table 19 Results summary for this test report

Penetration system	Criteria	Results	Fire resistance level (FRL)
A	Structural adequacy	Not applicable	-/90/45
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 58 minutes	
B	Structural adequacy	Not applicable	-/90/45
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 59 minutes	
C	Structural adequacy	Not applicable	-/90/60
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 64 minutes	
D	Structural adequacy	Not applicable	-/90/45
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 53 minutes	
E	Structural adequacy	Not applicable	-/90/30
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 43 minutes	
F	Structural adequacy	Not applicable	-/90/45
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 51 minutes	
G	Structural adequacy	Not applicable	-/90/60
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 68 minutes	

Penetration system	Criteria	Results	Fire resistance level (FRL)
H	Structural adequacy	Not applicable	-/90/60
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 61 minutes	
I	Structural adequacy	Not applicable	-/90/60
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 62 minutes	
J	Structural adequacy	Not applicable	-/90/60
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 63 minutes	

A.2 Test report – FRT210429 R1.0

Table 20 Information about test report

Item	Information about test report
Report sponsor	Schneider Electric (Australia) Pty Ltd
Test laboratory	Warringtonfire Australia, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was done on 2 June 2022.
Test standards	The test was done in accordance with AS 1530.4:2014.
Variation to test standards	None
General description of tested specimen	Test specimen consist of various wall boxes installed in a 144 mm thick steel framed plasterboard wall system with a 2 × 13 mm fire rated plasterboard on each side
Instrumentation	The test report states that the instrumentation was in accordance with AS 1530.4:2014.

The test specimen achieved the following results – see Table 21.

Table 21 Results summary for this test report

Penetration system	Criteria	Results	Fire resistance level (FRL)
A	Structural adequacy	Not applicable	-/120/90
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 111 minutes	
B	Structural adequacy	Not applicable	-/120/90
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 93 minutes	
C	Structural adequacy	Not applicable	-/120/60
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 86 minutes	
D	Structural adequacy	Not applicable	-/120/90
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 90 minutes	
E	Structural adequacy	Not applicable	-/120/120
	Integrity	No failure at 121 minutes	
	Insulation	No failure at 121 minutes	
F	Structural adequacy	Not applicable	-/120/90
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 94 minutes	
G	Structural adequacy	Not applicable	-/120/90
	Integrity	No failure at 121 minutes	
	Insulation	Failure at 96 minutes	

A.3 Test report – RTL FT1991.01

Table 22 Information about test report

Item	Information about test report
Report sponsor	BJS Group (QLD) Pty Ltd
Test laboratory	Resolute Testing Laboratories
Test date	The fire resistance test was done on 12 October 2023.
Test standards	The test was done in accordance with AS 1530.4:2014.
Variation to test standards	None
General description of tested specimen	Test specimens consist of various wall boxes installed in a 90 mm thick steel framed plasterboard wall system with a single layer of 13 mm fire rated plasterboard on each side
Instrumentation	The test report states that the instrumentation was in accordance with AS 1530.4:2014.

The test specimen achieved the following results – see Table 23.

Table 23 Results summary for this test report

Penetration system	Criteria	Results	Fire resistance level (FRL)
A	Structural adequacy	Not applicable	-/60/30
	Integrity	No failure at 61 minutes	
	Insulation	Failure at 57 minutes	
B	Structural adequacy	Not applicable	-/60/30
	Integrity	No failure at 61 minutes	
	Insulation	Failure at 53 minutes	
C	Structural adequacy	Not applicable	-/60/30
	Integrity	No failure at 61 minutes	
	Insulation	Failure at 59 minutes	
D	Structural adequacy	Not applicable	-/60/60
	Integrity	No failure at 61 minutes	
	Insulation	Failure at 61 minutes	