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Fire assessment report

Electrical floorbox in ComFlor and concrete floor slab near structural steel beams

Sponsor: BOSS Products (Australia) Pty Ltd

Report number: FAS230092 Revision: R1.0

Issued date: 17 May 2023 Expiry date: 31 May 2028

Quality management

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R1.0	Issue: 17 May 2023	Reason for issue	Initial issue		
	Expiry: 31 May 2028		**Prepared by**	**Reviewed by**	**Authorised by**
		Name	Edward Kwok	Omar Saad	Imran Ahamed
		Signature			

Executive summary

This report documents the findings of the assessment undertaken to determine the expected fire resistance level (FRL) of recessed electrical floorboxes in ComFlor® and concrete floor systems with cable bundles penetrating through one or two layers of BOSS® batts when installed close to intumescent coated steel beam or concrete filled block wall – in accordance with AS 1530.4:2014.

The analysis in sections 5 and 6 of this report found that the proposed systems, together with the described variations, are expected to achieve the FRLs as shown in Table 1 – in accordance with AS 1530.4:2014.

The variations and outcomes of this assessment are subject to the limitations and requirements described in sections 2, 3 and 7 of this report. The results of this report are valid until 31 May 2028.

Table 1 Assessment outcome

System	Reference tests	Floor system	Cable penetrations	Batt insulation	Figure reference	FRL
Recessed electrical floorboxes in floor systems	FRT180137 R2.0 WF359904 Issue 2	Minimum 130 mm thick ComFlor®	Up to three 32 mm cable bundles, each including up to eight CAT6 and up to four 2C+E power cables (PVC sheathed)	1 × 50 mm	Figure 1 and Figure 2	-/60/60
		Minimum 150 mm thick concrete		1 × 50 mm		
		Minimum 130 mm thick ComFlor®		2 × 50 mm	Figure 3 and Figure 4	-/120/120
		Minimum 150 mm thick concrete		2 × 50 mm		

Contents

1. Introduction

This report documents the findings of the assessment undertaken to determine the expected fire resistance level (FRL) of recessed electrical floorboxes in ComFlor® and concrete floor systems with cable bundles penetrating through one or two layers of BOSS® batts when installed close to intumescent coated steel beam and concrete filled block wall – in accordance with AS 1530.4:2014[1].

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 BOSS Products (Australia) Pty Ltd.

The sponsor details are included in Table 2.

Table 2 Sponsor details

Sponsor	Address
BOSS Products (Australia) Pty Ltd	Unit 1, 16 Atkinson Road Taren Point NSW 2229 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 2021[2].

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.

[1] 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.
[2] 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 15725:2010[3] for extended application reports on the fire performance of construction products and building elements.

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 2022[4] 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.

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 2023, BOSS Products (Australia) 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 floor systems exposed to fire from below in accordance with the requirements of AS 1530.4:2014, where horizontal elements must be exposed to heat from the underside only.
- This report is valid for ComFlor® systems with minimum thickness of 130 mm and concrete floor with minimum thickness of 150 mm.
- 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.
- The documentation that forms the basis for this report is listed in Appendix A and Appendix B.

[3] European Committee for Standardization, 2010, Extended application reports on the fire performance of construction products and building elements, EN 15725:2010, European Committee for Standardization, Brussels, Belgium
[4] National Construction Code Volumes One and Two - Building Code of Australia 2022, Australian Building Codes Board, Australia

- This report has been prepared using 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 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 Description of assessed systems

The proposed construction details consist of a recessed electrical floorbox in a ComFlor® or concrete floor system close to intumescent coated structural steel beams or concrete filled block wall. The cable bundles – up to three 32 mm cable bundles with eight CAT6 and four 2C+E power cables (PVC sheathed) – enter the electrical box penetrates through 1 × 50 mm or 2 × 50 mm BOSS batts, which are mechanically fixed to the underside of the floor system as shown in Figure 1 to Figure 4. FireMastic - HPE™ fire sealant is used to protect the cables passing through the Batt systems and the cut edges of the insulation batts.

4.2 Referenced test data

The assessment of the variation to the tested systems and the determination of the expected performance is based on the results of the fire tests documented in the reports summarised in Table 3. Further details of the tested systems are included in Appendix B.

Table 3 Referenced test data

Report number	Report sponsor	Test date	Issued by
WF359904 Issue 2	FSi Limited	15 September 2015	Warringtonfire
FRT180137 R2.0	BOSS Fire & Safety Pty Ltd	7 March 2019	Warringtonfire

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 4.

Table 4 Variations to tested systems

Item	Reference test	Description	Variations
Detail 1	FRT180137 R2.0 WF 359904 Issue 2	WF 359904 issue 2 consisted of various service penetrations through 2 × 50 mm batts – identical to BOSS batts – installed in a 150 mm thick concrete slab. FRT180137 consisted of various service penetrations through 1 × 50 mm batt installed in a 130 mm thick ComFlor® system. The BOSS batts were fixed to the ComFlor® system with four masonry anchors with washer fixings.	The proposed electrical floorbox recessed in a ComFlor® or concrete floor system – with an established FRL by the others – is installed near a 190 mm thick concrete filled block wall with an established FRL of -/60/60. The area between the top of the block wall and the ComFlor® is filled with minimum 120 kg/m^3 mineral wool and a layer of BOSS batt, as shown in Figure 1 and Figure 2.
Detail 2			The proposed electrical floorbox recessed in a ComFlor® or concrete floor

Item	Reference test	Description	Variations
			system – with an established FRL by the others – is installed near an intumescent coated structural steel beam which has a structural adequacy performance of minimum 120 minutes. The area between the top flange of the steel beam and the ComFlor® system is filled with minimum 120 kg/m^3 mineral wool insulation and a layer of BOSS batt, as shown in Figure 3 and Figure 4.

4.4 Construction details

Figure 1 to Figure 4 show the assessed systems.

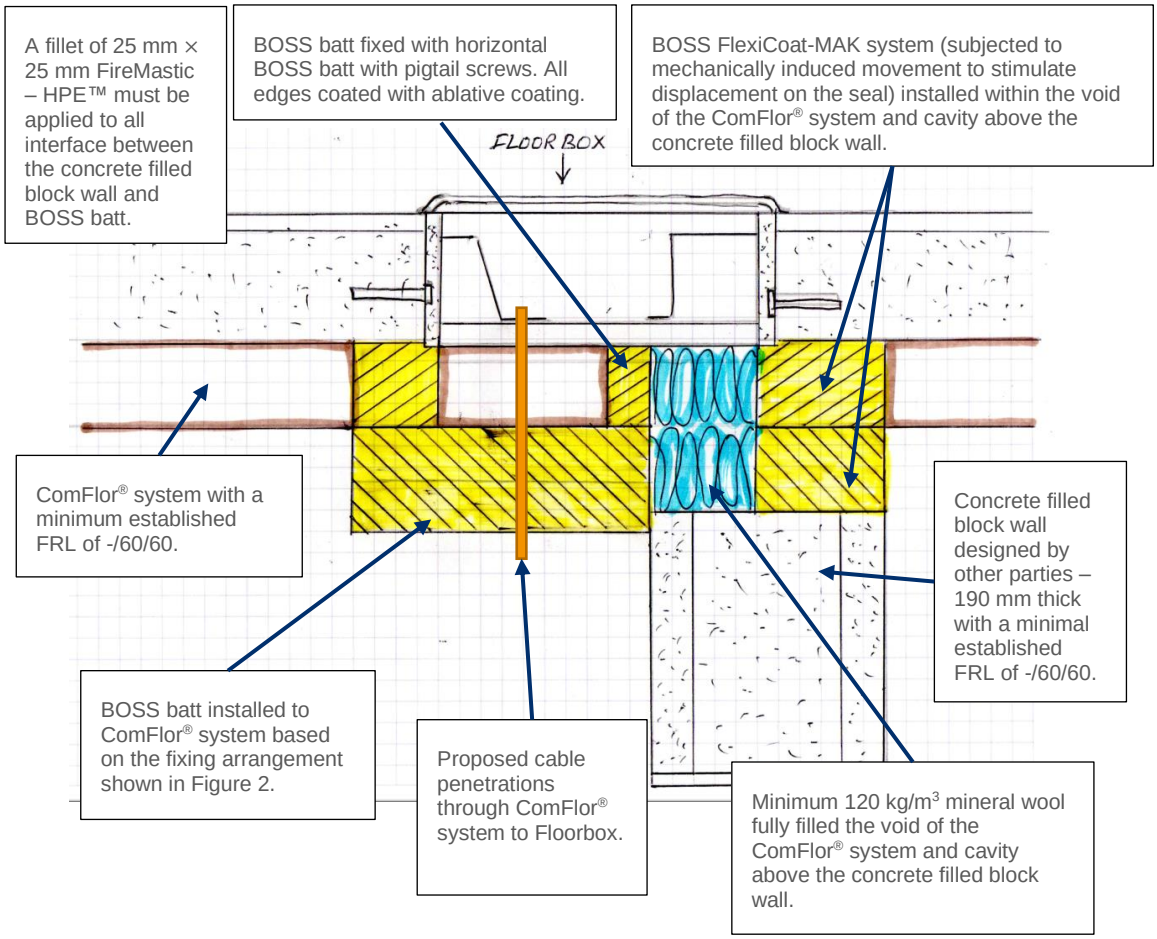

Figure 1 Detail 1 – side view

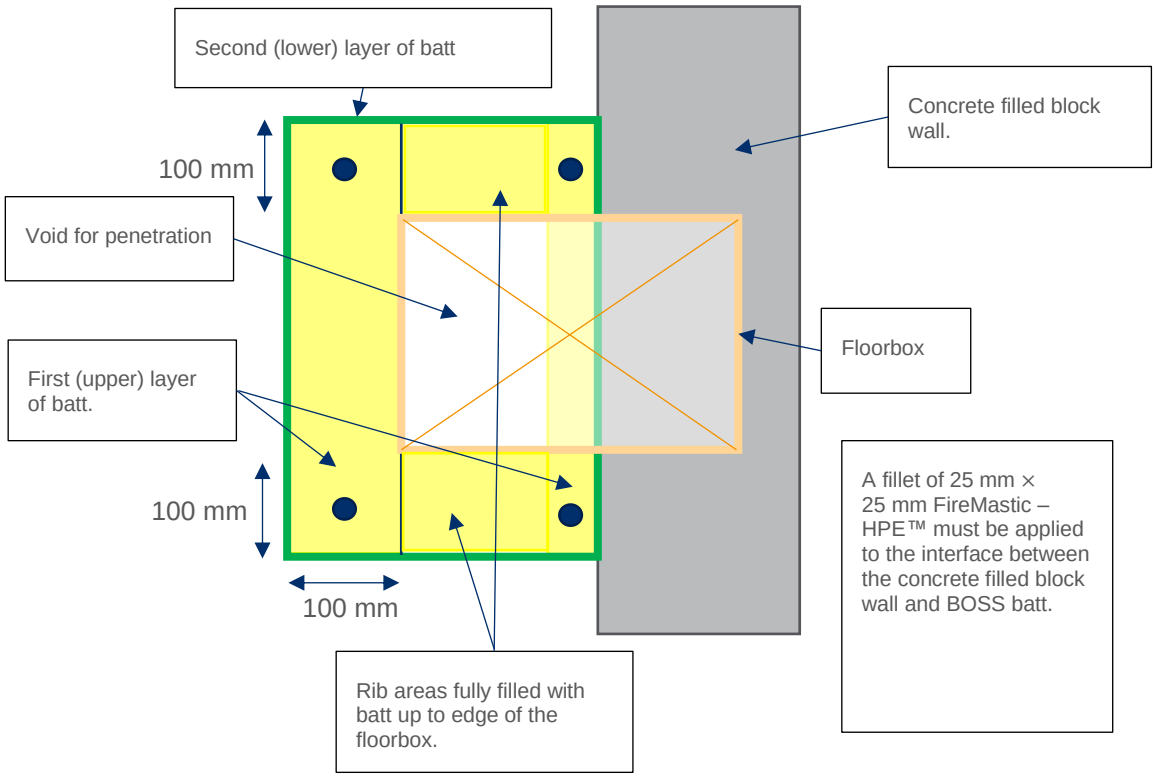

Figure 2 Detail 1 – Plan view – fixing arrangement

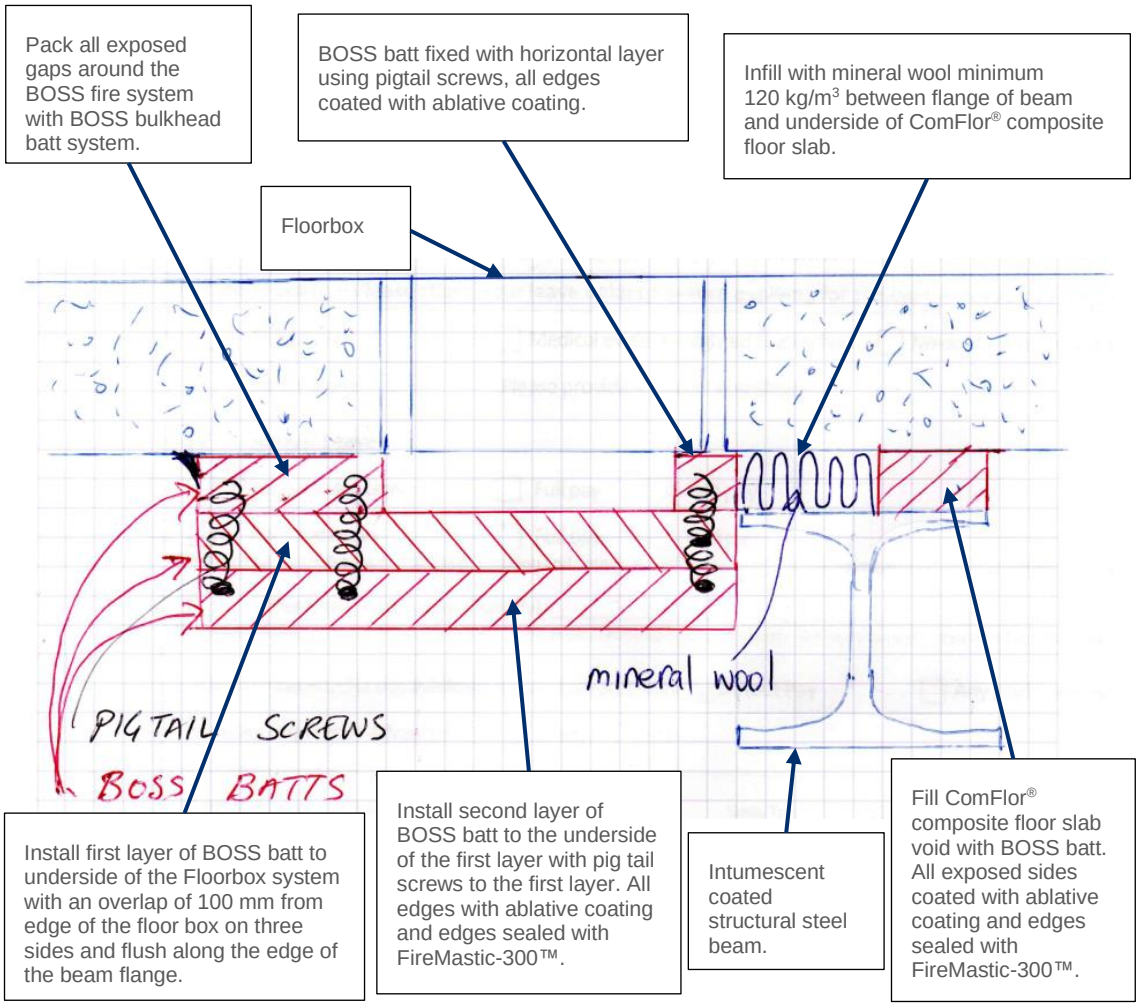

Figure 3 Detail 2 – side view

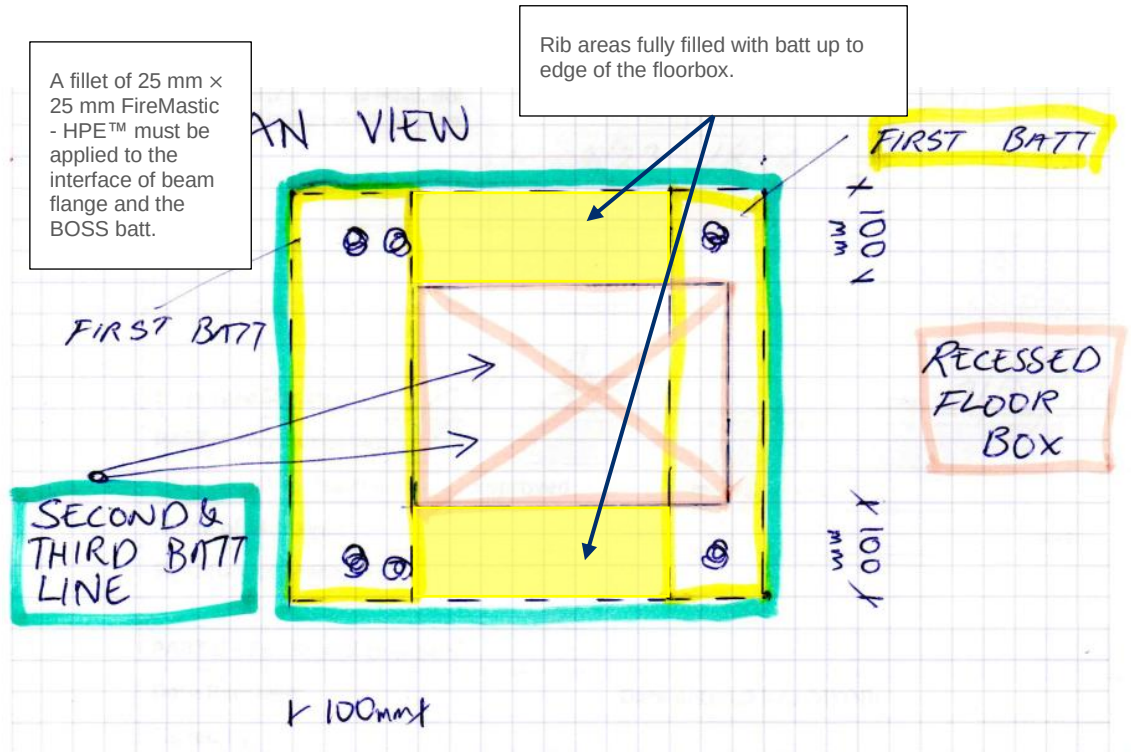

Figure 4 Detail 2 – Plan view – fixing arrangement

5. Relevance of BS EN 1366.3:2009 test data with respect to AS 1530.4:2014

5.1 Introduction

The fire resistance test WF 359904 Issue 2 was conducted in accordance with BS EN 1366-3:2009[5] and BS EN 1363.1:2012[6]. This standard differs from AS 1530.4:2014, and the significance of these differences is discussed below.

5.2 Discussion

5.2.1 Temperature regime

The furnace temperature regime for fire resistance tests conducted in accordance with AS 1530.4:2014 follows the same trend as BS EN 1363.1:2012.

The parameters outlining the accuracy of control of the furnace temperature in AS 1530.4:2014 and BS EN 1363.1:2012 are not appreciably different.

5.2.2 Furnace thermocouples

The furnace thermocouples specified in AS 1530.4:2014 are type K, mineral insulated metal sheathed (MIMS), with a stainless-steel sheath having a wire diameter of less than 1.0 mm and an overall diameter of 3 mm. The measuring junction protrudes at least 25 mm from the supporting heat resistant tube.

The furnace thermocouple specified in EN 1363.1:2012 is made from folded steel plate that faces the furnace chamber. A thermocouple is fixed to the side of the plate facing the specimen, with the thermocouple's hot junction protected by a pad of insulating material.

The plate part is to be constructed from 150 $\pm$ 1 mm long by 100 $\pm$ 1 mm wide by 0.7 $\pm$ 0.1 mm thick nickel alloy sheet strips.

The measuring junction is to consist of nickel chromium/nickel aluminium (Type K) wire as defined in IEC 60584-1, contained within mineral insulation in a heat-resisting steel alloy sheath of nominal diameter 1 mm, with the hot junctions electrically insulated from the sheath.

The thermocouple hot junction is to be fixed to the geometric centre of the plate in the position shown in Figure B6.1 by a small steel strip made from the same material as the plate. The steel strip can be welded to the plate – or may be screwed to it – to facilitate replacement of the thermocouple. The strip should be approximately 18 mm by 6 mm if it is spot-welded to the plate and nominally 25 mm by 6 mm if it is to be screwed to the plate. The screw is to be 2 mm in diameter.

The assembly of plate and thermocouple should be fitted with a pad of inorganic insulation material 97 $\pm$ 1 mm by 97 $\pm$ 1 mm by 10 $\pm$ 1 mm thick with a density of 280 $\pm$ 30 kg/m^3.

The relative location of the furnace thermocouples for the exposed face of the specimen – for AS 1530.4:2014 and EN 1363.1:2012 – is 100 mm + 10 mm and 100 mm + 50 mm, respectively.

The furnace control thermocouples required by EN 1363.1:2012 are less responsive than those specified by AS 1530.4:2014. This variation in sensitivity can produce a potentially more onerous heating condition for specimens tested to EN 1363.1:2012, particularly when the furnace temperature is changing quickly in the early stages of the test.

5.2.3 Specimen thermocouples

For penetration sealing systems, thermocouples are fixed in generally similar locations on the unexposed face. On the supporting construction and/or seal and on the penetrating service adjacent

[5] European Committee for Standardization, 2009, Fire resistance tests for service installations. Penetration seals, BS EN 1366-3:2009, European Committee for Standardization, Brussels, Belgium.
[6] European Committee for Standardization, 2012, Fire resistance tests – General requirements, BS EN 1363-1:2012, European Committee for Standardization, Brussels, Belgium.

to the plane of penetration, and on the penetrating service some distance from the plane of penetration.

5.2.4 Furnace pressure

It is a requirement of AS 1530.4:2014 and EN 1363.1:2012 that for horizontal elements, a furnace gauge pressure of 20 Pa is established at a height of 100 mm below the floor soffit level.

The parameters outlining the accuracy of control of the furnace pressure in AS 1530.4:2014 and BS EN 1363.1:2012 is also not appreciably different.

5.2.5 Performance criteria

AS 1530.4:2014 specifies the following performance criteria for building materials and structures:

- structural adequacy (not relevant to the referenced test)
- integrity
- insulation

Integrity

The integrity criteria differ slightly between AS 1530.4:2014 and BS EN 1363.1:2012.

While a specimen maintains its insulation performance, the specimen shall be deemed to have failed the integrity criterion – in accordance with AS 1530.4:2014 – if it collapses or sustains flaming or other conditions on the unexposed face, which ignites the cotton pad when applied for up to 30 seconds.

A specimen shall be deemed to have failed the integrity criterion in accordance with AS 1530.4:2014 when any of the following occur:

- Sustained flaming for 10 seconds.
- A gap forms that allows the passage of hot gases to the unexposed face and ignites the cotton pad when applied for up to 30 seconds.
- A gap forms that allows the penetration of a 25 mm gap gauge anywhere on the specimen.
- A gap forms that allows a 6mm × 150mm gap gauge to penetrate the specimen anywhere on the specimen.

Except for minor technical variations, the integrity criteria in EN 1363.1:2012 are generally applied in a comparable manner.

Insulation

The general insulation criteria of AS 1530.4:2014 and EN 1363.1:2012 are not appreciably different.

5.3 Application of test data to AS 1530.4:2014

The variation in furnace heating regimes, furnace thermocouples, and the responses of the different thermocouple types to the furnace conditions are not expected to have an overall significant effect on the outcome of the referenced fire resistance tests.

The furnace pressure report – WF 359904 Issue 2 – stated that 100 mm below the soffit of the floor assembly, the pressure was maintained between 19 Pa and 23 Pa. Thus, those were all within the limits – specified by AS 1530.4:2014 – for both the wall and floor specimens.

Based on the above discussion, the results relating to the integrity and insulation performance of the referenced test can be used as a basis to assess the FRL of the specimens if tested in accordance with AS 1530.4:2014.

6. Assessment of electrical floorbox recessed in a ComFlor® system and concrete slabs with cable bundles penetrating Boss batts near an intumescent coated steel beam and concrete filled block wall

6.1 Description of variation

It is proposed to assess the FRL of an electrical floorbox recessed in a minimum 130 mm thick ComFlor® system or a minimum 150 mm thick concrete slab with up to three 32 mm cable bundles with eight CAT6 and four 2C+E power cables (PVC sheathed) penetrating 1 × 50 mm and 2 × 50 mm Boss batts which are mechanically fixed to the underside of the ComFlor® and concrete floor systems. The recessed electrical floorbox with cable penetrations is installed near an intumescent coated structural steel beam or concrete filled block wall as shown in Figure 1 to Figure 4.

6.2 Methodology

The method of assessment used is summarised in Table 5.

Table 5 Method of assessment

Assessment method	
Level of complexity	Intermediate assessment
Type of assessment	Qualitative

6.3 Assessment

6.3.1 Test evidence

The specimen tested in WF 359904 Issue 2 consisted of various cable and pipe services that penetrate through two layers of 50 mm thick bulkhead batts in floor and wall configurations in accordance with BS EN 1366-3:2009. In service penetration J, a 500 mm wide × 25 mm high × 1.0 mm thick perforated steel cable tray supporting 10 “A1”, 10 “A2”, 10 “A3”, two “B”, one “C1”, one “C2” and one “C3” cables were tested in 2 × 50 mm bulkhead batts in floor orientation. With reference to table A.1 of BS EN 1366-3:2009, the standard cable configurations are described in Table 6.

Upon testing, the “A1”, “A3”, “B”, “C1” and “C3” cable configurations achieved an integrity and insulation performance of up to 132 minutes.

Table 6 BS EN 1366-3:2009 standard cable type configurations

Cable	Cable Type	Group	Number of cables	Dimensions
A1	Small sheathed	1	10	5 mm × 1.5 mm^2
A2	Small sheathed	1	10	5 mm × 1.5 mm^2
A3	Small sheathed	1	10	5 mm × 1.5 mm^2
B	Small sheathed	1	2	1 mm × 95 mm^2
C1	Medium sheathed	2	1	4 mm × 95 mm^2
C2	Medium sheathed	2	1	4 mm × 95 mm^2
C3	Medium sheathed	2	1	4 mm × 95 mm^2

In FRT180137 R2.0, several services were penetrating through the single layer Boss batts fixed to the ComFlor® 60 floor system, with a minimum thickness of 130 mm while being protected with FireMastic - HPE™ and BOSS batts. The Boss batts were secured onto the separating element on the bottom rib of the decking with four masonry anchors with washer fixings. The gap between the top rib and the BOSS batts was covered with trapezoid shaped sections of batt. The test was conducted for a period of 121 minutes, and the batt system for all specimens showed no sign of detachment throughout the test. Specimen A consisted of a bundle of 22 × TPS cables in 130 mm thick ComFlor® 60 system with

1 × 50 mm thick Boss batts. The TPS bundle had an overall diameter of 50 mm and achieved an integrity and insulation performance of 120 minutes. Specimen C consisted of a 16 mm and 6 mm pair coil copper pipe 13 mm ¼" × 5/8" with lagging, and 25 mm uPVC pipe, which were tested in a 130 mm thick ComFlor® 60 system with 1 × 50 mm thick Boss batts. The pair coil copper pipe achieved an integrity and insulation performance of 120 minutes.

6.3.2 Integrity and insulation performance of the proposed systems

Performance of single batt system

The proposed construction shown in Figure 1 and Figure 2 consists of one layer of 50 mm thick BOSS batt fixed to the ComFlor® or concrete slab system, with the gap between the rib of the slab filled with BOSS batt and minimum 120 kg/m^3 mineral wool – as shown in Figure 1. The proposed CAT6 and 2C+E cables are expected to be terminated at the bottom of the floorbox, with no cables penetrating to the unexposed side, which is considered to be less onerous than the tested system. The system is penetrated by three 32 mm cable bundles with eight CAT6 and four 2C+E power cables (PVC sheathed). This is similar to the tested specimen A and C of FRT180137 R2.0, but with slight changes due to the location of the concrete filled block wall. As discussed earlier, the single layer Boss batt for specimen A and C of FRT180137 R2.0 – installed to the separating element with four masonry anchors with washer fixings – remained attached throughout the 121 minutes fire test period and achieved an FRL of -/120/120 for both specimens.

For the proposed construction shown in Figure 1 and Figure 2, two masonry anchors were required to install to a different location due to the arrangement of the concrete filled block wall. However, considering the amount of anchor fixings and the installation method remain the same as tested, and the size of the batt and the floorbox are not expected to be significantly larger than the tested systems, the BOSS batts are expected to remain attached and maintain the integrity performance of the aperture. Based on the above discussion and the test outcome of FRT180137 R2.0, it is considered that the four masonry anchors with washer fixings are sufficient support the weight of the batt and prevent any gaps opening for a period of 121 minutes. To further secure the performance of the system, it is proposed to apply a fillet of 25 mm × 25 mm FireMastic – HPE™ to the interface between the concrete filled block wall and BOSS batt.

While the proposed construction shown in Figure 1 and Figure 2 remains the same amount of anchor fixings, and the required FRL is 60 minutes instead of the tested 120 minutes, it is reasonable to consider that the proposed single batt system shown in Figure 1 to Figure 2 is capable of achieving an FRL of -/60/60 – when installed to ComFlor® or concrete floor system with an established FRL of minimum -/60/60.

Performance of double batt system

The proposed construction shown in Figure 3 and Figure 4 consists of two layers of batt systems penetrated by three 32 mm cable bundles with eight CAT6 and four 2C+E power cables (PVC sheathed). As discussed earlier, the proposed CAT6 and 2C+E cables are expected to be terminated at the bottom of the floorbox, with no cables penetrating to the unexposed side, which is considered to be less onerous than the tested system. All gaps between the rib of the slab are filled with BOSS batt and minimum 120 kg/m^3 mineral wool – as shown in Figure 3. This proposed construction is similar to the tested systems in WF 359904 Issue 2 where services were penetrating two layers of 50 mm thick Bulkhead batts. The "A1", "A3", "B", "C1" and "C3" cables in accordance with BS EN 1366-3:2009 are considered to have similar dimensions, conductive area and insulation / sheath material to the proposed penetration services, thus could be used to assess the performance of the proposed system. While the tested "A1", "A3", "B", "C1" and "C3" cables in WF 359904 Issue 2 maintained both integrity and insulation performance for up to 132 minutes, it is expected that the proposed double layer BOSS batt system would maintain an insulation performance for up to 120 minutes, providing the proposed construction is capable of maintaining an integrity performance of 120 minutes.

The batts to concrete slab fixing of the proposed construction is similar to specimen A and C of FRT180137 R2.0, where four masonry anchors were used to secure the BOSS batts to the floor system. As discussed earlier, in FRT180137 R2.0 the BOSS batt installed to the floor slab system maintained the integrity performance of 120 minutes with no sign of detachment throughout the 121 minutes test. Similar to the discussion for the 60 minutes system, for the proposed construction two masonry anchors were required to install to a different location due to the arrangement of the

intumescent coated steel beam. However, considering the amount of anchor fixings and the installation method remain the same as tested, and the size of the batt and the floorbox are not expected to be significantly larger than the tested systems, the BOSS batts are expected to remain attached for at least 120 minutes of fire exposure.

To further secure the proposed system, a fillet of 25 mm × 25 mm FireMastic - HPE™ is to be applied to the interface of beam flange and the BOSS batt – as shown in Figure 3 and Figure 4. The proposed sealant configuration of the FireMastic – HPE™ sealant is considered sufficient to maintain the integrity performance of the services. It is understood that the proposed sealant has intumescent capabilities and will be able to close off any gaps formed by the melting of the plastic sheathing of the cables.

For insulation performance, the proposed CAT6 and 2C+E cables are expected to be terminated at the bottom of the floorbox, with no cables penetrating to the unexposed side. This is considered to be less onerous than the tested system, as normally the main mode of insulation failure is due to a temperature increase on the cables on the unexposed side 25 mm from the separating element. This is mainly governed by heat conduction through the cable cores. Given that the cables are not penetrated to the unexposed side of the floor slab in the proposed system, it is reasonable to consider that the temperature rise on the floorbox would not exceed the 180 °C temperature insulation criteria. Moreover, the proposed cable penetrations have an overall conductor area less than the tested cable configurations in penetration J of WF 359904 Issue 2. Thus, the proposed penetrations are expected to have lower heat conduction compared to the tested penetrations in specimen J in WF 359904 Issue 2.

Based on the above discussion, it is expected that the proposed construction shown in Figure 3 and Figure 4 is capable of achieving an FRL of -/120/120 – when installed to ComFlor® or concrete floor system with an established FRL of minimum -/120/120 – providing the intumescent coating protected steel beam have an structural adequacy performance of minimum 120/-/-.

6.3.3 Structural adequacy of the intumescent coated beam

The proposed construction shown in Figure 3 and Figure 4 consists of an intumescent coated structural steel beam next to the floorbox system. The area between the top flange of the beam and the floor system is filled with 120 kg/m^3 mineral wool material and capped with a single layer of BOSS batt. The top flange of the beam is expected to be protected by the mineral wool material and the BOSS batt; thus, it is not expected to have any weak points on the top flange of the beam. The expansion of the intumescent coating applied to the edge of the flange close to the floorbox is expected to be restricted by the BOSS batt. However, it is expected that the BOSS batt in contact with the flange of the beam would provide sufficient insulation performance to the steel beam. To prevent any heat ingress to the steel beam, a fillet of 25 mm × 25 mm FireMastic - HPE™ must be applied to the interface of beam flange and the BOSS batt. Based on the above, the structural steel beam is expected to maintain its structural adequacy throughout the designed period, provided that the intumescent coating is applied in accordance with the manufacturer guideline and relevant AS 4100:1998 Incorporating Amendment 1[7] and AS 1530.4:2014 assessment report.

[7] Standards Australia, 1998, Steel structures, AS 4100:1998 Incorporating Amendment 1, Standards Australia, NSW.

6.4 Assessment outcome

This assessment demonstrates that the electrical floorboxes recessed in ComFlor® and concrete floor systems with cables penetrating through one or two layers of BOSS batts systems, with the construction details as shown in Figure 1 to Figure 4 – are expected to achieve the FRL as shown in Table 7 in accordance with AS 1530.4:2014.

Table 7 Assessment outcome

System	Reference tests	Floor system	Cable penetrations	Batt insulation	Figure reference	FRL
Recessed electrical floorboxes in floor systems	FRT180137 R2.0 WF359904 Issue 2	Minimum 130 mm thick ComFlor®	Up to three 32 mm cable bundles, each including up to eight CAT6 and up to four 2C+E power cables (PVC sheathed)	1 × 50 mm	Figure 1 and Figure 2	-/60/60
		Minimum 150 mm thick concrete		1 × 50 mm		
		Minimum 130 mm thick ComFlor®		2 × 50 mm	Figure 3 and Figure 4	-/120/120
		Minimum 150 mm thick concrete		2 × 50 mm		

7. Validity

Warringtonfire 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 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 BOSS Products (Australia) 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 Drawings and additional information

Table 8 Details of drawings

Figure	Provided by	Note
Figure 1	BOSS Passive Fire	Edited by Warringtonfire
Figure 2	Warringtonfire	-
Figure 3	BOSS Passive Fire	Edited by Warringtonfire
Figure 4	BOSS Passive Fire	Edited by Warringtonfire

Appendix B Summary of supporting test data

B.1 Test report – WF 359904 Issue 2

Information about test report

Item	Information about test report
Report sponsor	FSi Limited, Westminster Industrial Estate, Tamworth Road, Measham, DE12 7DS
Test laboratory	Warringtonfire United Kingdom
Test date	The fire resistance test was done on 7 May 2019.
Test standards	The test was done in accordance with BS EN 1366-3:2009.
Variation to test standards	None
General description of tested specimen	The specimens were referenced as A and B for the purpose of the test, and the penetrations within the specimens were referenced as services A to I in the wall and J to R in the floor. For the horizontal floor specimen (Specimen B), the section of floor had overall dimensions of 2230 mm long by 1740 mm wide by 150 mm thick and was provided with a single aperture measuring 1100 mm long by 750 mm wide and was penetrated with various plastic pipes and cables. The service J is relevant for this assessment. In service penetration J, a 500 mm wide × 25 mm high × 1.0 mm thick perforated steel cable tray supporting 10 “A1”, 10 “A2”, 10 “A3”, two “B”, one “C1”, one “C2” and one “C3” cables was tested in 2 × 50 mm bulkhead batts in floor orientation.
Instrumentation	The test report states that the instrumentation was in accordance with BS EN 1366-3:2009.

The test specimen achieved the following results – see Table 9.

Table 9 Results summary for this test report

SpecimenB (Floor)		Integrity (minutes)			
Service	Details	Cotton pad	Sustained flaming	Gap gauge	Insulation (minutes)
J	500 mm perforated tray	132*	132*	132*	132*
	A1	132*	132*	132*	126
	A2	132*	132*	132*	99
	A3	132*	132*	132*	132*
	B	132*	132*	132*	132*
	C1	132*	132*	132*	132*
	C2	132*	132*	132*	70
	C3	132*	132*	132*	132*

B.2 Test report – FRT180137 R2.0

Table 10 Information about test report

<table>
<tr><th>Item</th><th>Information about test report</th></tr>
<tr><td>Report sponsor</td><td>BOSS Fire & Safety Pty Ltd</td></tr>
<tr><td>Test laboratory</td><td>Warringtonfire Australia, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.</td></tr>
<tr><td>Test date</td><td>The fire resistance test was done on 7 May 2019.</td></tr>
<tr><td>Test standards</td><td>The test was done in accordance with AS 1530.4:2014.</td></tr>
<tr><td>Variation to test standards</td><td>None</td></tr>
<tr><td>General description of tested specimen</td><td>The tested system consists of various service penetrations through a 75 mm thick ComFlor® 60 floor system. The relevant services were protected with 1 x 50 mm thick BOSS Batts and BOSS FireMastic - HPE™ fire sealants. The relevant services are stated in the below table
<table>
<tr><th>Penetration system</th><th>Service</th><th>Primary fire-stopping protection</th><th>Second fire-stopping protection</th><th>Aperture size (mm)</th></tr>
<tr><td>A</td><td>Bundle of 22 TPS cables with outside diameter of 50 mm</td><td>BOSS Batt</td><td>BOSS FireMastic - HPE™</td><td>Ø76 mm</td></tr>
<tr><td>C</td><td>16 mm & 6 mm pair coil pipe and 25 mm uPVC Drainpipe</td><td>BOSS Batt</td><td>BOSS FireMastic – HPE™</td><td>Ø100 mm</td></tr>
</table></td></tr>
<tr><td>Instrumentation</td><td>The test report states that the instrumentation was in accordance with AS 1530.4:2014.</td></tr>
</table>

The test specimen achieved the following results – see Table 11.

Table 11 Results summary for this test report

Penetration system	Service	Primary fire-stopping protection	Second fire-stopping protection	Aperture size (mm)	FRL
A	Bundle of TPS cables	BOSS Batt	BOSS FireMastic - HPE™	Ø76 mm	-/120/120
C	Pair Coil pipe and 25 mm uPVC drainpipe	BOSS Batt	BOSS FireMastic – HPE™	Ø100 mm	-/120/120

warringtonfire
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