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Fire assessment report

The fire resistance performance of a floor/ceiling system protected with UBIQ INEX>FLOOR19 sheets

Sponsor: UBIQ Technology Pty Ltd

Report number: 38725600 Revision: R4.1 Reference number: FAS200398

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Quality management

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			Prepared by	**Reviewed by**	**Authorised by**
		Name	S. Hu	K. Nicholls	-
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		Name	S. Hu	K. Nicholls	-
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		Name	S. Hu	K. Nicholls	-
38725600 R4.0	Issue: 30/10/20	Reason for issue	Updated to AS 1530.4:2014 and the validity of the report was further extended for 5 years		
			Prepared by	**Reviewed by**	**Authorised by**
		Name	Rami Al Darwish	Imran Ahamed	Omar Saad
38725600 R4.1	Issue: 7/05/21	Reason for issue	Report updated to include Figure 1 to Figure 4		
			Prepared by	**Reviewed by**	**Authorised by**
	Expiry: 30/04/26	**Name**	Rami Al Darwish	Imran Ahamed	Omar Saad
		Signature			

Executive summary

This report documents the findings of the assessment undertaken to determine the fire resistance level (FRL) of floor/ceiling system protected from above with UBIQ INEX>FLOOR19 sheets when tested in accordance with AS 1530.4:2014.

The testing standard AS 1530.4:2014 does not provide guidance for testing of floor ceiling elements when exposed to fire from above. In fact, it specifically states that the required fire exposure is from below only.

It is considered reasonable to notionally rate the fire resistance performance of a floor system when exposed to fire from above to be similar to the fire performance results of a wall system.

It is the opinion of the accredited laboratory that this is a safe and conservative approach to determine the FRL of the proposed construction with consideration to the minimum requirements of AS 1530.4:2014 and the National Construction Code (NCC 2019) Incorporating amendment 1.

The analysis in section 5 of this report found that the proposed variations are likely to achieve the FRLs as shown in Table 1, if tested in accordance with AS 1530.4:2014.

Table 1 Variations and assessment outcome

ID	Floor lining	Joist type	Ceiling lining	Refer figure	Fire direction	FRL
1	1 × 19 mm Plywood or Particleboard + 1 × 19 mm INEX>FLOOR19	Solid timber joist, beam, or truss	Refer section 3	Figure 1	Fire from above or below	60/60/60
2	1 × 19 mm Plywood or Particleboard + 1 × 19 mm INEX>LOOR19	Steel joist, purlin, or truss		Figure 2		
3	2 × 19 mm INEX>FLOOR19	Solid timber joist, beam, or truss		Figure 3		90/90/90
4	2 × 19 mm INEX>FLOOR19	Steel joist, purlin, or truss		Figure 4		

The variations and outcome of this assessment are subject to the limitations and requirements described in sections 2, 3 and 6 of this report. The results of this report are valid until 30 April 2026

Contents

1. Introduction

This report documents the findings of the assessment undertaken to determine the fire resistance level (FRL) of floor/ceiling system protected from above with UBIQ INEX>FLOOR19 sheets when tested in accordance with AS 1530.4:2014[1].

The testing standard AS 1530.4:2014 does not provide guidance for testing of floor ceiling elements when exposed to fire from above. In fact, it specifically states that the required fire exposure is from below only.

It is considered reasonable to notionally rate the fire resistance performance of a floor system when exposed to fire from above to be similar to the fire performance results of a wall system.

It is the opinion of the accredited laboratory that this is a safe and conservative approach to determine the FRL of the proposed construction with consideration to the minimum requirements of AS 1530.4:2014 and the NCC 2019 amendment 1[2].

This assessment was carried out at the request of UBIQ Technology Pty Ltd.

The sponsor details are included in Table 2.

Table 2 Sponsor details

Sponsor	Address
UBIQ Technology Pty Ltd	49 Varna street Clovelly 2031 NSW Australia

2. Framework for the assessment

2.1 Assessment approach

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

No specific framework, methodology, standard or guidance documents exists in Australia for doing 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 2019[3].

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

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 based on the

1 Standards Australia, AS 1530.4:2014, Methods for fire tests on building materials, components and structures – Part 4: Fire-resistance tests for elements of construction, Standards Australia, NSW
2 National Construction Code Volume One – Building Code of Australia 2019 Amendment 1, Australian Building Codes Board, Australia.
3 Passive Fire Protection Forum (PFPF) 2019, Guide to undertaking technical assessments of the fire performance of construction products based on fire test evidence, Passive Fire Protection Forum (PFPF), UK.

tested constructions and performances obtained. The assessment is an evaluation of the potential fire resistance performance if the elements were to be tested in accordance with AS 1530.4:2014.

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 National Construction Code Volumes One and Two – Building Code of Australia (NCC) 2019 including Amendments[4] under A5.2 (1) (d).

This assessment has been written in accordance with the general principles outlined in EN 15725:2010[5] for extended application reports on the fire performance of construction products and building elements. It also references test evidence for meeting a performance requirement or deemed to satisfy (DTS) provisions of the NCC under A5.4 for fire resistance levels, as applicable to the assessed systems.

This assessment report may also be used to demonstrate compliance with the requirements for evidence of suitability under NCC 2016 including Amendments[6].

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 24 September 2020, UBIQ Technology Pty Ltd confirmed that:

- To their knowledge the component or element of structure, which is the subject of this assessment, has not been subjected to a fire test to the standard against which this assessment is being made.
- They agree to withdraw this assessment from circulation if the component or element of structure is the subject of a fire test by a test authority in accordance with the standard against which this assessment is being made and the results are not in agreement with this assessment.
- They are not aware of any information that could adversely affect the conclusions of this assessment and – if they subsequently become aware of any such information – they agree to ask the assessing authority to withdraw the assessment.

3. 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 that are expected if the systems were tested in accordance with AS 1530.4:2014.
- The results of this assessment are applicable to the floor\ceiling systems exposed to fire from either above or below.
- 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).

[4] National Construction Code Volumes One and Two - Building Code of Australia 2019 including Amendments, Australian Building Codes Board, Australia
[5] European Committee for Standardization, EN 15725:2010: Extended application reports on the fire performance of construction products and building elements, European Committee for Standardization, Brussels, Belgium.
[6] National Construction Code Volumes One and Two - Building Code of Australia 2016 including Amendments, Australian Building Codes Board, Australia

- The documentation that forms the basis for this report is listed in Appendix B
- This report has been prepared based on information provided by others. Warringtonfire has not verified the accuracy and/or completeness of that information and will not be responsible for any errors or omissions that may be incorporated into this report as a result.
- 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 the expert handling, placing and finishing of the products on site. These variables are beyond the control and consideration of this report.
- It is required that supporting evidence for the ceiling lining be provided. This shall be a test or assessment of a floor ceiling system protected from below that includes steel or timber framing (as appropriate for design) and plywood or particleboard flooring. It shall verify that the ceiling linings are capable of providing an FRL for the system of 60/60/60 or 90/90/90 (as appropriate for design).

4. Description of the specimen and variations

4.1 Tested system description

The EWFA 2890702.1 test assembly consisted of a nominal 1600 mm wide × 1600 mm high steel frame wall clad with UBIQ INEX>FLOOR 19 mm and PRODUCT A sheeting on the fire side only.

The EWFA 31525900 the assembly consisted of 170 mm thick non-load-bearing party wall system with 2 wall skins consisting of 64 mm Studco steel frames with 10 mm spacing between. The double steel frame system was clad with a product which the sponsor confirmed is identical to 16 mm thick UBIQ INEX>RENDERBOARD on both the exposed side of the exposed frame and unexposed side of the unexposed frame. Two layers of 75 mm thick Acoustiguard Bradford Insulation Batts were installed into the South of the wall system within both skins and 145 mm Earthwool Knauf Ceiling Insulation Batts were installed into the North of the wall system within both skins.

The EWFA 29061000.1 the assembly consisted of a nominal 159 mm thick loadbearing wall system that was comprised of 92 mm steel stud framing with 40 mm top hats on the fire side and was clad with 16 mm INEX>RENDERBOARD 16 sheeting on the exposed side and 10 mm thick Gyprock Plasterboard CD on the non-fire side. An instrumented 90 × 45 mm Radiata Pine MGP10 was installed between the two noggins mid-width at the back of the fire side cladding.

4.2 Referenced test data

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

Table 3 Referenced test data

Report number	Test sponsor	Test date	Testing authority
EWFA 2890702.1	UBIQ Technology Pty Ltd	23 September 2013	Warringtonfire Australia Pty Ltd (formally known as Exova Warringtonfire)
EWFA 29061000.1	UBIQ Technology Pty Ltd	5 May 2014	
EWFA 31525900.1	UBIQ Technology Pty Ltd	14 October 2014	

4.3 Variations to the tested systems

An identical system has not been subject to a standard fire test. We have therefore assessed the system using baseline test information for similar systems. The variations to the tested systems – together with the referenced standard fire tests – are described in Table 4.

Table 4 Variations to tested systems

Item	Reference tests	Variations
Assessments 1	EWFA 2890702.1 EWFA 31525900.1 EWFA 29061000.1	A floor/ceiling system that includes steel or timber framing and plywood or particleboard flooring that is tested or otherwise assessed and capable of achieving an FRL of 60/60/60 or 90/90/90 for fire exposure from below, and be combined with: • An additional layer of 19 mm thick INEX>FLOOR19 sheets as tested in EWFA 2890702.1, or • Replacing the plywood or particleboard flooring with two layers of 19 mm thick INEX>FLOOR19 sheets as tested in EWFA 2890702.1. • Update of testing standard to AS 1530.4:2014

4.4 Purpose of the test

This report is prepared with reference to the requirements of AS 1530.4:2014 as appropriate for floors. AS 1530.4:2014 sets out the procedures for conducting fire resistance tests on building materials, components and structures. Specifically, section 2 of this standard contains general requirements for these tests and section 4 addresses the fire resistance testing of floors.

4.5 Schedule of components

Table 5 outlines the schedule of components for the assessed systems subject to a fire test, as referenced in Appendix B

Table 5 Schedule of components of assessed systems

ID	Description	
1	Name	Floor cladding
	Material	1 × 19 mm thick INEX>FLOOR19 sheet
	Installation	Fully glued to the surface of the plywood and screwed at maximum 300 mm centres across the width of the board (i.e. 3 screws) and at maximum 600 mm centres across the length of the board. Fully glued at the tongue and groove joints. Laid in a staggered pattern and ensuring no joints in the INEX>FLOOR19 align with the joints in the plywood.
2	Name	Flooring
	Material	19 mm thick tongue and grooved plywood or 19 mm thick tongue and grooved particleboard
	Installation	Screwed and glued to the steel framing
3	Name	Timber framing
	Material	Designed in accordance with AS 1684 and minimum 150 mm deep.
	Installation	Installed at maximum 600 mm centres
4	Name	Steel framing
	Material	Designed in accordance with either AS 4600 or AS 4100 and minimum 150 mm deep.
	Installation	Installed at maximum 600 mm centres.
5	Name	Ceiling system - fire rated plasterboard
	Specification	Refer section 3
6	Name	Floor cladding
	Material	2 × 19 mm thick INEX>FLOOR19 sheet

ID	Description	
	Installation	Screwed at maximum 300 mm centres across the width of the board (i.e. 3 screws) and at maximum 600 mm centres across the length of the board. Fully glued at the tongue and groove joints. Laid in a staggered pattern and ensuring no joints in the outer layer of INEX>FLOOR19 align with the joints in the inner layer of INEX>FLOOR19 sheets.

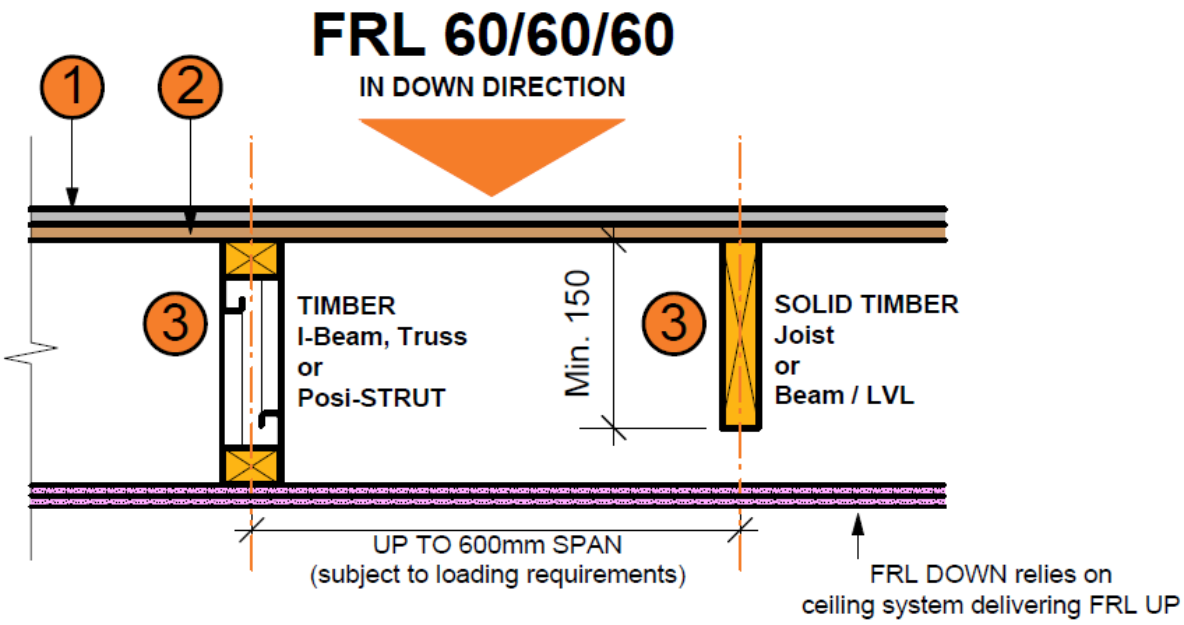

Figure 1 Timber frame floor/ceiling system with 1 × 19 mm INEX>FLOOR19 on top of plywood or particleboard Flooring

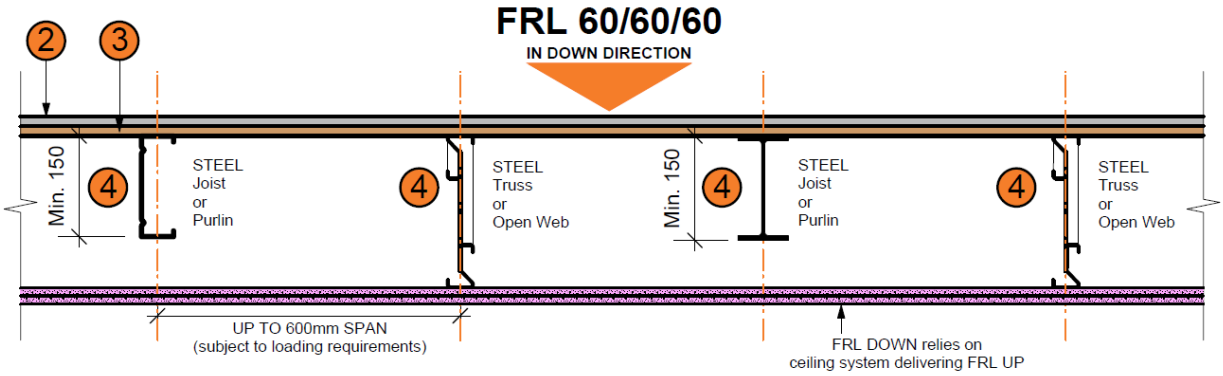

Figure 2 Steel frame floor/ceiling system with 1 × 19 mm INEX>FLOOR19

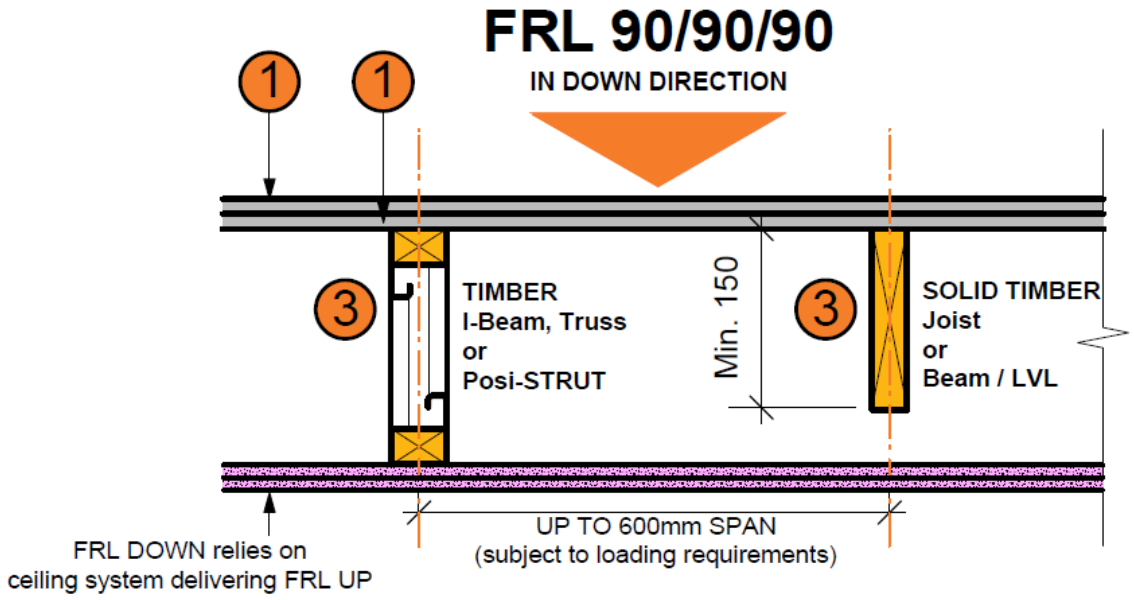

Figure 3 Timber frame floor/ceiling system with 2 × 19 mm INEX>FLOOR19

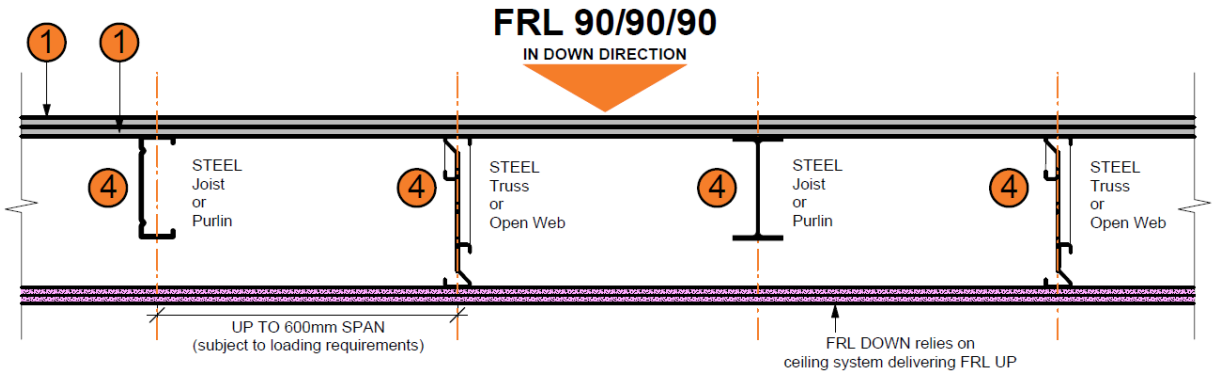

Figure 4 Steel frame floor/ceiling System with 2 × 19 mm INEX>FLOOR19

5. Assessment – Steel and timber framed floor/ceiling systems up to 90 minutes

5.1 Description of variation

The proposed floor/ceiling construction shall be

- A floor ceiling system that includes steel framing and plywood or particleboard flooring that is tested or otherwise assessed and capable of achieving an FRL of up to 90/90/90 for fire exposure from below, and
- Be combined with an additional layer of 19 mm thick INEX>FLOOR19 sheets tested in EWFA 2890702.1 for an FRL of up to 60/60/60 as shown in Figure 1
- Replacing the plywood or particleboard flooring with two layers of 19 mm thick INEX>FLOOR19 sheets tested in EWFA 2890702.1 for an FRL of up to 90/90/90 as shown in

5.2 Methodology

The method of assessment used is summarised in Table 6.

Table 6 Method of assessment

Assessment method	
Level of complexity	Intermediate assessment
Type of assessment	Qualitative – interpolation Comparative

5.3 Assessment

5.3.1 Fire exposure from below up to 90 minutes

AS 1530.4:2014 clause 2.9.7 and clause 4.7 stipulates for horizontal element, the test specimen shall be exposed to heating from the underside only for the determination of FRL.

The requirements of section 3 of this report include “It is required that supporting evidence for the ceiling lining be provided. This shall be a test or assessment of a floor ceiling system protected from below that includes steel or timber framing (as appropriate for design) and plywood or particleboard flooring. It shall verify the ceiling linings are capable providing an FRL for the system of 60/60/60 or 90/90/90 (as appropriate for design) from below.”

It is therefore considered when the proposed construction is exposed to fire exposure from below, the maximum temperature measured on the unexposed side of plywood or particleboard flooring shall be less than 180K temperature rise than the initial temperature in accordance with AS 1530.4:2014.

The additional layer of 19 mm thick INEX>FLOOR19 sheets on top of the plywood or particleboard flooring will significantly improve the insulation performance due to the ability of INEX>FLOOR19 sheets to resist heating as evident in test EWFA 2890702.1

The proposed construction replaces the plywood or particleboard flooring with one layer of 19 mm thick INEX>FLOOR19 for an FRL rating of up to 60 minutes as shown in Figure 1 and Figure 2 or two layers of 19 mm thick INEX>FLOOR19 for an FRL rating of up to 90 minutes as shown in Figure 3 and Figure 4

The significance of the presence of one or two layers of 19 mm thick INEX>FLOOR19 sheets on unexposed side of floor/ceiling system will significantly improve the insulation performance due to the INEX>FLOOR19 sheets is capable of resisting more heat in comparison with same thickness of plywood or particleboard sheets.

Based on the above, it is reasonable to expect that the inclusion of the one or two layers of 19 mm thick INEX>FLOOR 19 on top of floor/ceiling system will not introduce any foreseeable weakness to the performance of the floor/ceiling system for up to 60 and 90 minutes, respectively, if exposed to fire

from below. However, the structural elements of the floor system must be designed incorporating the additional weight imposed by the layer of INEX>FLOOR 19.

In light of the above, it is considered that the proposed construction as shown in Figure 1 to Figure 4 and will maintain structural adequacy, integrity and insulation performance of up to 60 and 90 minutes respectively, when exposed to fire from below and tested in accordance with AS 1530.4:2014.

5.3.2 Fire exposure from above up to 60 minutes

AS 1530.4:2014 does not require the horizontal element to be tested when exposed to heat from above.

When the proposed construction is exposed to fire from above, the proposed INEX>FLOOR19 sheets will then directly be exposed to fire.

When the floor system is in the horizontal orientation and is exposed to fire from above, the likely tendency of gap formation at the sheet joints is lower than in wall in the vertical orientation. This is because the larger pressure in vertical orientation constructions will force heat flow passing through into the cavity more quickly and have more onerous effects on the joints of the board sheets.

As a result, It is considered that the 19 mm thick INEX>FLOOR19 in a vertical orientation to be more onerous compared to the horizontal orientation.

The test specimen tested in EWFA 31525900.2 comprised a 170 mm thick double stud steel framed wall clad with one layer of 16 mm thick UBIQ INEX>RENDERBOARD on the exposed side of the exposed frame and unexposed side of unexposed side frame. No integrity failure was recorded for the duration of the test of 240 minutes. The exposed side linings remained in place for the duration of the test with gaps evident at the vertical joints.

Upon inspection of the test observation and temperature measurements of EWFA 31525900.2, it was observed the fire side INEX>RENDERBOARD 16 sheets delaminated around 10 minutes and vertical joins opened between 20 and 60 minutes. it is noted that the unexposed side temperature of exposed side INEX>RENDERBOARD 16 sheets rose dramatically from 100°C to 650°C between 20 and 60 minutes and stayed around 700°C afterwards for the rest of the test duration.

The above test observation indicates the formation of gap at sheet joins of INEX>RENDERBOARD 16 significantly affects the cavity temperature.

The test specimen in test EWFA 2890702.1 comprised 92 mm steel framing with one layer of 19 mm thick INEX>FLOOR19 sheet on the exposed side of steel framing only. When tested, no integrity failure was recorded for the duration of the test of 65 minutes. The exposed side INEX>FLOOR19 lining remained in place of 65 minutes with cracking evident near joins. The maximum temperature measured on the unexposed side of exposed side INEX>FLOOR19 sheet at 60 minutes was 348°C and there was no formation of gap at sheet joints. The proposed INEX>FLOOR19 sheet is stated by the report sponsor to be identical in material composition as the INEX>RENDERBOARD 16 tested in EWFA 2961000.

With reference to both test EWFA 2890702.1, the test results demonstrated that the proposed INEX>RENDERBOARD 16 sheet would stay in place for at least 65 minutes.

The proposed construction comprised of 19 mm thick INEX>FLOOR19 sheets horizontally orientated on the top of 19 mm thick plywood flooring as shown in Figure 1 and Figure 2.

It is considered if the 19 mm thick INEX>FLOOR19 is in the horizontal orientation and the fire is attacked from above, the likely tendency of gap formation at the sheet joints is less than in the vertical orientation as larger pressure in vertical orientation will force heat flow passing through into the cavity more quickly.

Based on the above discussion, it is expected the unexposed side temperature of single layer of INEX>FLOOR19 in horizontal orientation at 60 minutes with no gap formed at joints would be similar to that tested in EWFA 2890702.1 and is around 348°C.

The proposed 19 mm plywood or particleboard underneath will burn if directly exposed to fire and oxygen at or near 300°C. In the proposed construction plywood is encapsulated and protected on the fire side by single layer of INEX>FLOOR19 sheet which would stay in place for at least 60 minutes.

Installed in this manner, it is expected that the plywood flooring would not be able to freely burn but char once it gets 300°C.

The test specimen in test EWFA 29061000 comprised a nominal 3000 mm wide × 3000mm high × 159 mm thick loadbearing steel framed wall consisting of 92 mm thick steel stud framing with 40 mm top-hat channels on the fire side and was clad with 16 mm INEX>RENDERBOARD sheeting on the exposed side and 10 mm thick standard grade plasterboard on the non-fire side.

The specimen consisted of an instrumented timber stud installed between two noggins. When tested, the depth of the 300°C isotherm was around 6.5 mm at 60 minutes based on the temperatures measured on and within the timber stud.

The cavity temperature recorded in test EWFA 2906100, was approximately 300°C at 47 minutes and 420°C at 60 minutes and

It is calculated that once the unexposed side of proposed INEX>FLOOR19 reaches 300°C, it would take another 31 minutes for the 19 mm plywood to be completely charred and cracked assuming a plywood density of 600 Kg/m^3 and a calculated charring rate of 0.61 mm per minute.

In light of the above, it is expected that the temperature within the cavity of floor/ceiling system at 60 minutes will stay around 300°C to 400°C since the plywood flooring is not fully charred and is not cracked at 60 minutes.

Therefore, the steel framing would retain most of its ambient temperature strength even after fire exposure. It is therefore considered that the proposed construction if exposed to fire from above is unlikely to introduce structural adequacy and integrity for up to 60 minutes.

Moreover, it is reasonable and conservative to expect that the unexposed side temperature on the 19 mm plywood at 60 minutes would remain below 300°C with significant margin. Therefore, the timber joist will maintain most of its required loadbearing capacity for the fire load case at 60 minutes.

The size of cavity and the inherent fire resistance of the ceiling linings will ensure that the insulation performance on the underside will be maintained by some margins at 60 minutes.

In light of the above, it is considered that the proposed construction as shown in Figure 1 and Figure 2 will maintain structural adequacy, integrity and insulation performance of up to 60 minutes, when exposed to fire from above when tested in accordance with AS 1530.4:2014.

5.3.3 Fire exposure from above up to 90 minutes

It is considered the 19 mm thick INEX>FLOOR19 in a vertical orientation to be more onerous compared to the horizontal orientation.

When the floor system is in the horizontal orientation and is exposed to fire from above, the likely tendency of gap formation at the sheet joints is lower than in wall in the vertical orientation. This is because the larger pressure differential in vertical orientation constructions will force heat flow passing through into the cavity more quickly and have more onerous effects on the joints of the board sheets.

The test specimen tested in EWFA 31525900.2 comprised a 170 mm thick double stud steel framed wall clad with one layer of 16 mm thick UBIQ INEX>RENDERBOARD on the exposed side of the exposed frame and unexposed side of unexposed side frame.

With reference to test EWFA 31525900.2, no integrity failure was recorded for the duration of the test of 240 minutes. The exposed side linings remained in place for the duration of the test with gaps evident at the vertical joints.

Moreover, it was observed that the fire side INEX>RENDERBOARD 16 sheets delaminated around 10 minutes and vertical joints opened between 20 and 60 minutes. it is noted that the unexposed side temperature of exposed side INEX>RENDERBOARD 16 sheets rose dramatically from 100°C to 650°C between 20 and 60 minutes and stayed around 700°C afterwards for the rest of the test duration.

The above test observation indicates the formation of gap at sheet joins of INEX>RENDERBOARD 16 significantly affects the cavity temperature.

The test specimen in test EWFA 2890702.1 consisted of 92 mm steel framing with one layer of 19 mm thick INEX>FLOOR19 sheet on the exposed side of steel framing only.

When tested, no integrity failure was recorded for the duration of the test period of 65 minutes. The exposed side INEX>FLOOR19 lining remained in place for 65 minutes with cracking evident near joints. The maximum temperature measured on the unexposed side of exposed side INEX>FLOOR19 sheet at 60 minutes was 348°C.

The proposed INEX>FLOOR19 sheet is stated by the report sponsor to be identical material as the INEX>RENDERBOAR16 tested in EWFA 2961000.

The proposed construction consists of two layers of INEX>FLOOR19 sheet as shown in Figure 3 and Figure 4

It is expected that since the maximum temperature measured on the unexposed side of exposed side INEX>FLOOR19 sheet at 60 minutes was 348°C, a double layer INEX>FLOOR19 construction will maintain the same or lower temperature measurement on the unexposed side for at least 90 minutes.

Therefore, it is reasonable and conservative to expect that the timber joist will then maintain most of its of required loadbearing capacity for the fire load case for up to 90 minutes.

It is therefore considered that the proposed double layers of INEX>FLOOR19 construction if exposed to fire from above is unlikely to introduce any detrimentally structural weakness to the timber framing of floor/ceiling system for up to 90 minutes.

The size of cavity and the inherent fire resistance of the ceiling linings will ensure that the insulation performance on the underside will be maintained at up to 90 minutes.

Based on the discussed above, it is considered that the proposed construction as shown in Figure 3 and Figure 4 will maintain structural adequacy, integrity and insulation performance of up to 90 minutes, when exposed to fire from above when tested in accordance with AS 1530.4:2014.

5.4 Conclusion

In light of the above, it is considered that the proposed construction as shown in Figure 1 to Figure 4 will maintain structural adequacy, integrity and insulation performance of up to 60 minutes and 90 minutes, respectively, when exposed to fire from above and below when tested in accordance with AS 1530.4:2014.

6. Validity

Warringtonfire Australia does not endorse the tested or assessed product in any way. The conclusions of this assessment may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.

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

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are subject to constant review and improvement. It is therefore recommended that this report be reviewed on, or before, the stated expiry date.

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

This assessment is provided to UBIQ Technology Pty Ltd for their own purposes and we cannot express an opinion on whether it will be accepted by building certifiers or any other third parties for any purpose.

Appendix A Drawings and additional information

Table 7 Details of drawings

Drawing title	Date	Drawn by
Timber frame floor/ceiling system with 1 × 19 mm INEX>FLOOR19 on top of plywood or particleboard Flooring	18/03/2021	Supplied by Sponsor
Steel frame floor/ceiling system with 1 × 19 mm INEX>FLOOR19	18/03/2021	Supplied by Sponsor
Timber frame floor/ceiling system with 2 × 19 mm INEX>FLOOR19	18/03/2021	Supplied by Sponsor
Steel frame floor/ceiling System with 2 × 19 mm INEX>FLOOR19	18/03/2021	Supplied by Sponsor

Appendix B Summary of supporting test data

B.1 Test report – EWFA 2890702.1

Table 8 Information about test report

Item	Information about test report
Report sponsor	UBIQ, 1/17 Chester Street, Annandale, NSW 2038
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 23 September 2013.
Test standards	The test was done in accordance with AS 1530.4:2005
Variation to test standards	The size of the specimen was 1600 mm × 1600 mm rather than 3000 mm × 3000 mm required by the standard. The specimen was restrained at all edges The pressure at the horizontal joint was controlled to 15 Pa.
General description of tested specimen	The test assembly comprised a nominal 1600 mm wide × 1600 mm high steel frame clad with UBIQ INEX>FLOOR 19 mm and PRODUCTA sheeting on the fire side only. Only a 1200 mm wide × 1600 mm high portion of the wall was exposed to fire.
Instrumentation	The test report states that the instrumentation was in accordance with AS 1530.4:2005.

The test specimen achieved the following results

Results summary for this test report

The INEX>FLOOR19 sheets stayed in place for the duration of the test of 65 minutes.

Cracking of INEX>FLOOR19 sheets had become evident at 30 minutes 37 seconds.

No gap formed at the sheet joins for the test duration.

The maximum temperature measured on the unexposed side of fire side INEX>FLOOR19 sheets at 60 minutes was 348°C at sheet join.

B.2 Test report – EWFA 31525900.2

Table 9 Information about test report

Item	Information about test report
Report sponsor	UBIQ, 1/17 Chester Street, Annandale, NSW 2038
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 14 October 2014.
Test standards	The test was done in accordance with AS 1530.4:2005
Variation to test standards	None.
General description of tested specimen	The test assembly comprised a nominal 3000 mm wide × 3000 mm high × 170 mm thick non-load-bearing party wall system. The wall was restrained on the south edge and free on the north edge. The test specimen comprised 2-off wall skins consisting of 64 mm Studco steel frames with 10 mm spacing between. The double steel frame system was clad with a product which the sponsor confirmed is identical to 16 mm thick UBIQ INEX>RENDERBOARD on both the exposed side of the exposed frame and unexposed side of the unexposed frame. Two layers of 75 mm thick Acoustiguard Bradford Insulation Batts were installed into the South of the wall system within both skins and 145 mm Earthwool Knauf Ceiling Insulation Batts were installed into the North of the wall system within both skins. The wall system was symmetrical on the z axis (Fire and non-fire side.) The wall system was not symmetrical on the y axis as Bradford Acoustiguard insulation batts were installed on the south side from the first stud to the fourth stud from south side and Knauf Earthwool insulation batts were installed on the north side from the fourth stud to the sixth stud.
Instrumentation	The test report states that the instrumentation was in accordance with AS 1530.4:2005.

The test specimen achieved the following results – see Table 10.

Table 10 Results summary for this test report

Criteria	Result (Bradford Acoustiguard insulation)	Result (Knauf Earthwool insulation)
Structural Adequacy	Not Applicable	Not Applicable
Integrity	No failure at 240 minutes	No failure at 240 minutes
Insulation	Failure at 115 minutes	Failure at 103 minutes

B.3 Test report – EWFA 29061000.1

Table 11 Information about test report

Item	Information about test report
Report sponsor	UBIQ, 1/17 Chester Street, Annandale, NSW 2038
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 5 May 2014
Test standards	The test was done in accordance with AS 1530.4:2005
Variation to test standards	None.
General description of tested specimen	The test assembly comprised a nominal 3000 mm wide × 3000 mm high × nominal 159 mm thick loadbearing wall system that was comprised of 92 mm steel stud framing with 40 mm Top hats on the fire side and was clad with 16 mm INEX>RENDERBOARD 16 sheeting on the exposed side and 10 mm thick Gyprock Plasterboard CD on the non-fire side. An instrumented 90 × 45 mm Radiata Pine MGP10 was installed between the two noggins mid-width at the back of the fire side cladding. The top of specimen was subjected to a total axial load of 19.44 kN (22.3 kN applied to the base of the wall reduced by the 2.9 kN to account for the self-weight of the wall). This load was applied for 88 minutes for the test.
Instrumentation	The test report states that the instrumentation was in accordance with AS 1530.4:2005.

The test specimen achieved the following results

Results summary for this test report

The depth of the 300°C isotherm was around 6.5 mm at 60 minutes based on the temperatures measured on and within the timber stud.

Appendix C Relevance of AS 1530.4:2005 test data to AS 1530.4:2014

The fire resistance tests EWFA 2890702.1, EWFA 31525900.1, and EWFA 29061000.1 were conducted in accordance with AS 1530.4:2005, which differs from AS 1530.4:2014. The effect these differences have on fire resistance performance of the referenced test specimens is discussed below.

C.1 Discussion

The furnace heating regime in fire resistance tests conducted in accordance with AS 1530.4:2014 follows a similar trend to that in AS 1530.4:2005.

The specified specimen heating rate in AS 1530.4:2005 is given by:

$$\mathrm{T} = 345\log(8t + 1) + 20$$

Where:

T = furnace temperature at time t, in degrees Celsius.

t = the time into the test, measured in minutes from the ignition of the furnace.

The parameters outlining the accuracy of control of the furnace temperature in AS 1530.4:2014 and AS 1530.4:2005 are not appreciably different.

Furnace pressure

The furnace pressure conditions for single and multiple penetration sealing systems in AS 1530.4:2005 and AS 1530.4:2014 are not appreciably different.

The parameters outlining the accuracy of control of the furnace pressure in AS 1530.4:2014 and AS 1530.4:2005 are not appreciably different.

Performance criteria

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

- structural adequacy
- integrity.
- insulation.

Structural Adequacy

The structural adequacy performance criteria and criteria of failure in AS 1530.4:2014 and AS 1530.4:2005 are not appreciably different with the same limiting values for parameters such as axial contraction and deflection.

Integrity

AS 1530.4:2014 stipulates in addition to the 20 mm thick × 100 mm × 100 mm cotton pads, additional cotton pads shall be provided with a reduced 30 mm × 30 mm × 20 mm with additional wire frame holder and shall be used to determine integrity failure.

Apart from the above variation, the failure criteria for integrity in AS 1530.4:2014 and AS 1530.4:2005 are not appreciably different.

Insulation

The positions of thermocouples and failure criteria for insulation in AS 1530.4:2014 and AS 1530.4:2005 are not appreciably different.

Application of the test data to AS 1530.4:2014

Based on the above discussion and in absence of any foreseeable integrity and insulation risk, it is concluded that the results relating to the integrity and insulation performance of the specimens – tested in EWFA 2890702.1, EWFA 31525900.2, and EWFA 29061000.1– can be used to assess the integrity and insulation performance in accordance with AS 1530.4:2014.

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