



PROFESSIONAL FIRE SAFETY TESTING

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FRP Grating MINI – MICRO MESH

**PRODUCT BAL40 TESTING
REPORT
AS 1530.8.1 - 2007**

IGNL-6228-16R I01 R00

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CONDITIONS AND LIMITATIONS

This assessment report does not provide an endorsement by Ignis Labs Pty Ltd of the actual product evaluated.

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 hazards under all conditions.

Because of 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.

The assessment can therefore relate only to the actual prototype test specimens, testing conditions and methodology described in the referenced documents, and does not imply any performance abilities of constructions of subsequent manufacture.

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 the subject of constant review and improvement and it is recommended that this report is reviewed on or, before, the stated expiry date.

This report is prepared in good faith and with due care for information purposes only, and should not be relied upon as providing any warranty or guarantee. In particular, attention is drawn to the nature of the inspection and investigations undertaken and the limitations these impose in determining with accuracy the state of the building, its services or equipment and life safety.

Ignis Labs' involvement in the Project is limited to the role outlined in section 2 'Scope of Service' of the Letter. This report reflects that role. Any reliance on, or use of, this report for purposes outside the scope of service is at the user's own risk.

Ignis Labs shall not be held liable for any loss or damage resulting from any defect of the building or its services or equipment or for any non compliance of the building or its services or equipment with any legislative or operational requirement, whether or not such defect or non-compliance is referred to or reported upon in this report, unless such defect or non-compliance should have been apparent to a competent engineer undertaking the evaluation of the type undertaken for the purpose of preparation of this report.

Ignis Labs has carefully reviewed and applied to the best of our ability the requirements of local Legislation, the NCC and the International Fire Engineering Guidelines.



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1 INTRODUCTION

1.1 General

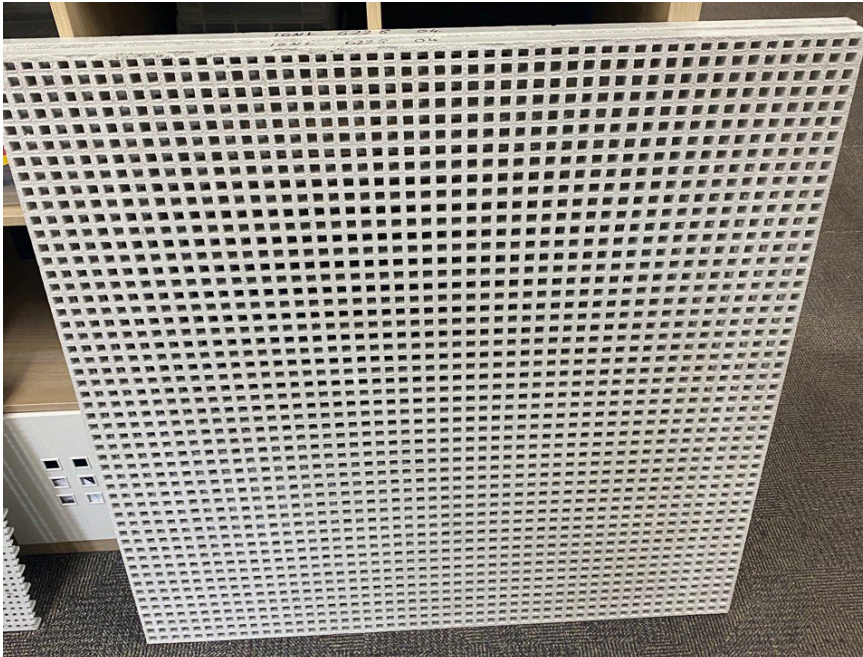
The purpose of this report is to document the pilot bushfire deck test of FRP Grating Mini – Micro mesh undertaken by Ignis Labs. The testing was undertaken in accordance with AS 1530.8.1 – 2007 to BAL 40 conditions.

1.2 Subject Test Specimen

The test sponsor described the test specimen as fibreglass reinforced polymer grating, which is composed of resins, isophthalic polyester. The nominal mass per unit is 18 kg/m² and nominal thickness is 26.29 mm. The colour of specimen is grey. The end use of it is external boardwalks and decks. The openings have height of 12.26 mm and width of 12.57 mm.

FIGURE 1:

SPECIMEN



1.3 Sponsor

Scavenger Supplies Pty Ltd
15 Waverley Drive
Unanderra NSW 2526

1.4 Manufacturer

The test specimen was supplied by Scavenger Supplies Pty Ltd and installed to the testing furnace by Ignis Labs.

1.5 Test Number

The Ignis Labs reference test number is IGNL-6228-16.

1.6 Test date

The fire-resistance test was conducted on 30/11/2022.



2 DESCRIPTION OF SPECIMEN

2.1 General

The specimen comprised an external wall as per Clause 8.4.1 of AS 3959-2018 and a FRP Grating MINI – MICRO Mesh decking board.

2.2 Schedule of components

Component	Description	
Deck		
1	Name	FRP Grating Mini-Micro mesh
	Description	The sponsor described the product as fibreglass reinforced polymer grating with nominal mass per unit area of 18 kg/m ² , and nominal thickness of 30 mm. The product composed of resins, isophthalic polyester or ISO. The colour of the specimen is grey. Its end use is external boardwalks and decks.
	Location	Decking Face
	Installation	No fixings applied
External Wall		
2	Name	Steel Frame
	Description	The steel frame was constructed by C channel frame with height of 400 mm to support specimen and 92 mm track and stud frame that were used to support fibre cement wall and eave.
	Location	Structural framing under deck and behind FC wall
	Installation	Screw fixed
	Name	Fibre Cement
	Description	Two layers of fibre cement with a thickness of 6 mm.
	Location	Two layers of 6 mm fibre cement was sarked on the outside of the steel frame.
	Installation	Screws were used to combine the layers and fix layers to steel frame. Dunlop FC jointing compound was used to seal the joints surface on the fire-exposed face.



FIGURE 2:
SPECIMEN FIRE EXPOSED FACE

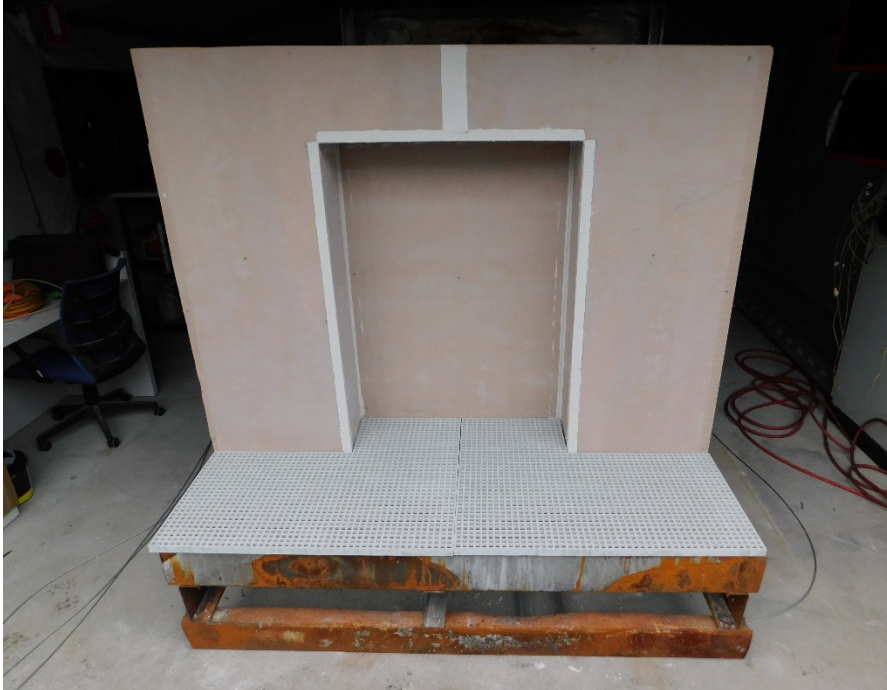


FIGURE 3:
STEEL FRAME



2.3 Selection, construction and installation of the specimen

Ignis Labs was not involved in the selection of the specimen. Ignis Labs was opted to fabricate the specimen to the external wall and the test equipment. The external wall was constructed by Ignis Labs in accordance with the Clause 8.4.1 of AS 3959-2018.



3 INSTRUMENTATION AND EQUIPMENT

3.1 Radiant heat source

The furnace had a nominal size of 1 m x 1 m with a sheet steel closure forming a radiant heat source. The furnace was lined with refractory bricks and materials with thermal properties as specified in AS 1530.4:2014 and was heated by combustion of a mixture of natural gas and air.

3.2 Timber crib

Class C test cribs were prepared and used in this test in accordance with Clause 14.2 of AS 1530.8.1-2007. The crib was conditioned in an oven with temperature of between 40 °C and 50 °C for 24 hrs. It was removed from oven 60 minutes prior to testing. The crib was exposed to the flame of an oxy/acetylene type burner with a Type 551 Size 8 × 10 heating tip for 5 minutes, during which time they were rotated that expose each face for 30 seconds.

One crib was located at a rebate corner on the upper surface of the deck and the second crib was located at the other rebate corner under the deck adjacent to bearers and joists.

3.3 Pilot ignition source

A pilot ignitor with 25 mm long gas flame was available during the whole test.

3.4 Gap gauge

A 3 ± 0.1 mm diameter gap gauge was available during the test for assessing the ember penetration.

3.5 Heat flux

Two water-cooled radiometers complying with the requirements in Table 11.1 of AS 1530.8.1-2007 were used in the test with appropriate mountings. One control radiometer was mounted in the front face of the deck and a second radiometer was fitted at the centre of the wall in accordance with Clause 21.3 of AS 1530.8.1-2007.

3.6 Temperature

The temperature in the furnace chamber was measured by two type K, 3-mm diameter, 310 stainless steel Mineral Insulated Metal Sheathed (MIMS) thermocouples. Each thermocouple was housed in high-nickel steel tubes.

The temperature of the specimen including the joints was measured by glass-fibre insulated and sheathed K-type thermocouples with a wire diameter of 0.5mm.

Locations of the thermocouples on the unexposed face of the specimen are detailed below.



FIGURE 4:
THERMOCOUPLE INSTALLATION



3.7 Measurement System

The thermocouple temperatures were recorded by a Graphtec Corporation GL840 Multichannel data logger.

4 TEST PROCEDURE

4.1 Statement of Compliance

The test was performance in accordance with the requirements of AS 1530.8.1-2007 with the purpose of determining the performance of external construction elements when exposed to radiant heat, burning embers and burning debris.

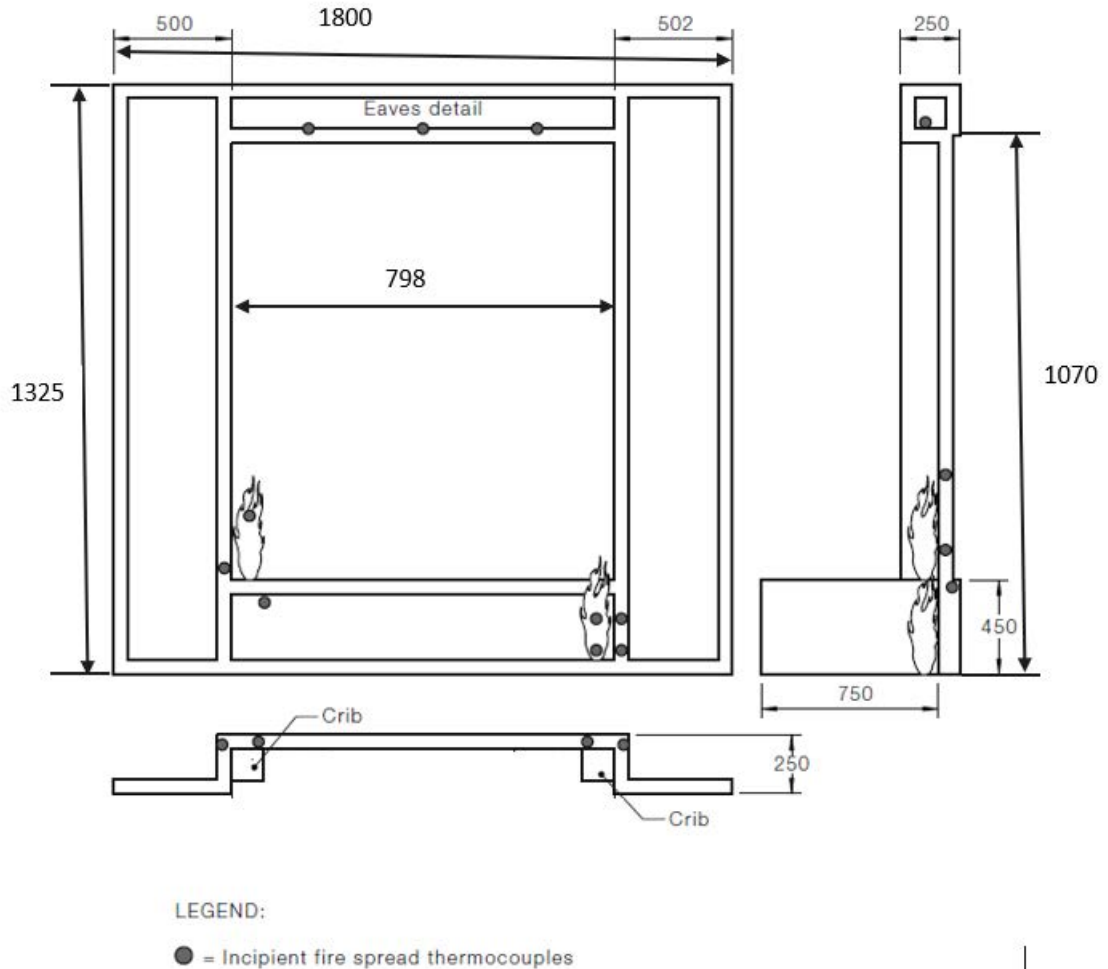
4.2 Variations to the Method

The radiant heat source was the furnace for pilot fire-resistance tests of AS 1530.4 that has a nominal size of 1 m × 1 m with a sheet steel closure.

The external wall was built to have rebate in the centre of the specimen with an eaves detail being 798 mm. The FRP Grating MINI – micro mesh deck was fabricated to fit the rebate of the external wall. The thermocouples on the eaves detail are 1070 mm above the ground. The test configuration for deck assemblies was shown below.



FIGURE 5:
THE TEST CONFIGURATION FOR DECK ASSEMBLIES



4.3 Pre-test Conditioning

Prior to construction, the components of the wall system were subjected to normal temperatures and humidity. The sample materials were not subjected to any conditioning except for being stored within a dry storage shed prior to installation.

As confirmed by the test sponsor, the specimen is not sensitive to moisture content. Prior to construction, the test specimen was subjected to normal temperatures and humidity until the test date. After installation, test specimen supplied by Scavenger Supplies Pty Ltd and supplied to Ignis Labs and left to cure in a weatherproof environment.

4.4 Ambient Temperature

The temperature of the test area was 31.8 °C at the commencement of the test.

4.5 Test Duration

The test duration is 60 minutes in accordance with Clause 14.3 of AS 1530.8.1-2007.



5 TEST RESULTS

5.1 Critical Observations

The following observations were made during the fire-resistance test:

00:00 minutes	Test start.
00:30 minutes	Cribs inserted.
08:00 minutes	Charring on external wall on fibre cement under eaves.
10:00 minutes	The shielding doors were closed and as such no more incident radiation was applied. Smoke from lower right on rear (near top crib), and ash falling from cribs.
11:00 minutes	Deck specimen ignited.
21:26 minutes	Left side specimen (the deck above crib) flame out.
60:00 minutes	Test end.

FIGURE 6:

SPECIMEN 10 min INTO THE TEST





FIGURE 7:

SPECIMEN 35 min INTO THE TEST

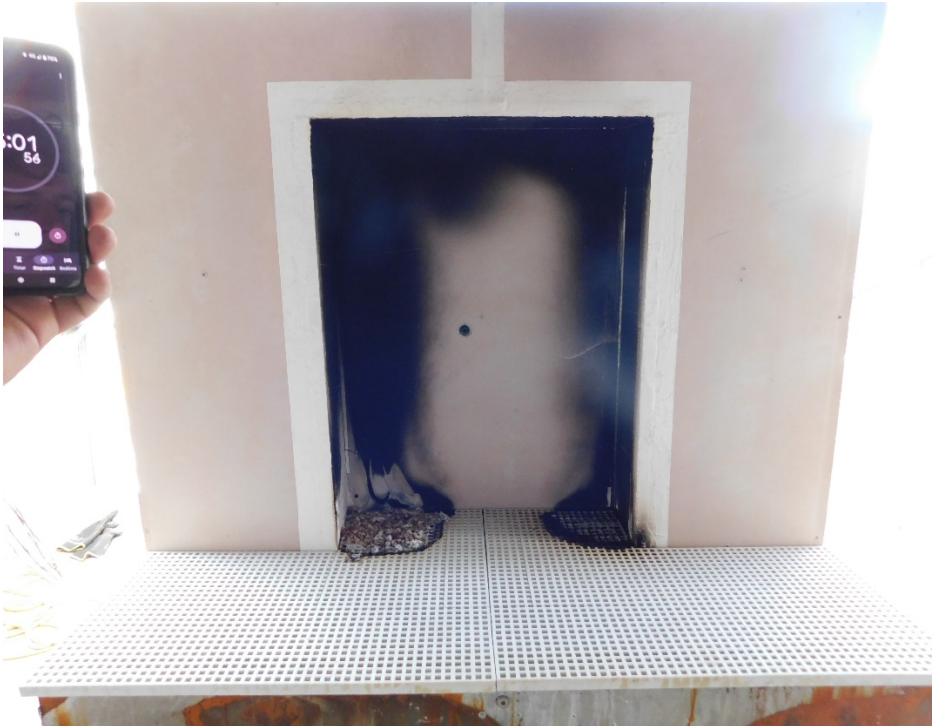


FIGURE 8:

SPECIMEN 60 min INTO THE TEST





FIGURE 9:

POST TEST SPECIMEN - RIGHT CORNER



POST TEST SPECIMEN - RIGHT CORNER



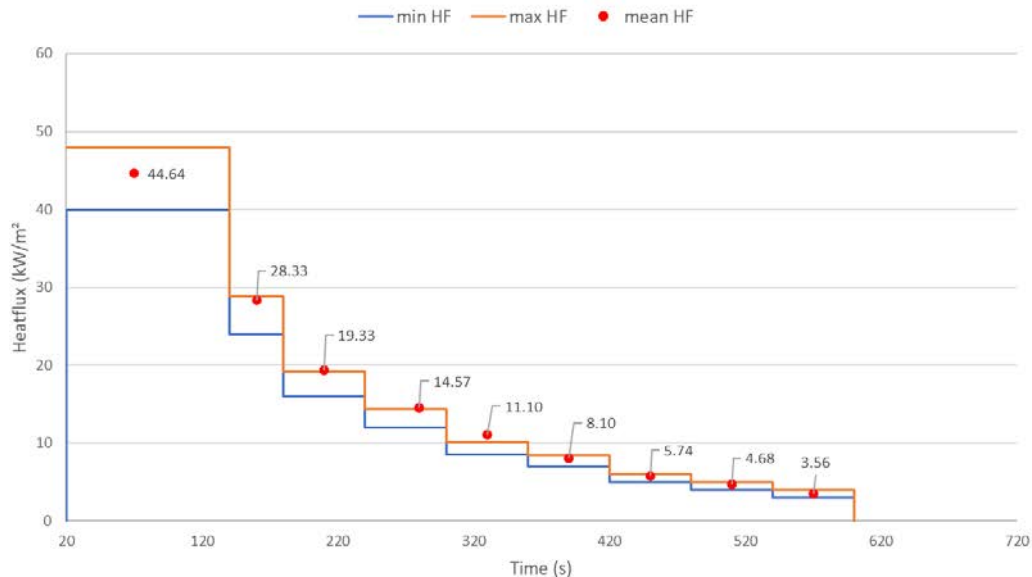
5.2 Bushfire radiant heat test profiles

The furnace temperature and radiant panel was controlled so that the average heat flux, measured at the centre of the panel was maintained within the prescribed radiant heat flux limits in accordance with Table 14.2 of AS 1530.8.1-2007.

The following figure shows the radiant heat test profiles. The mean heat flux measured is within the required the range.

FIGURE 10:

BUSHFIRE RADIANT HEAT TEST PROFILES

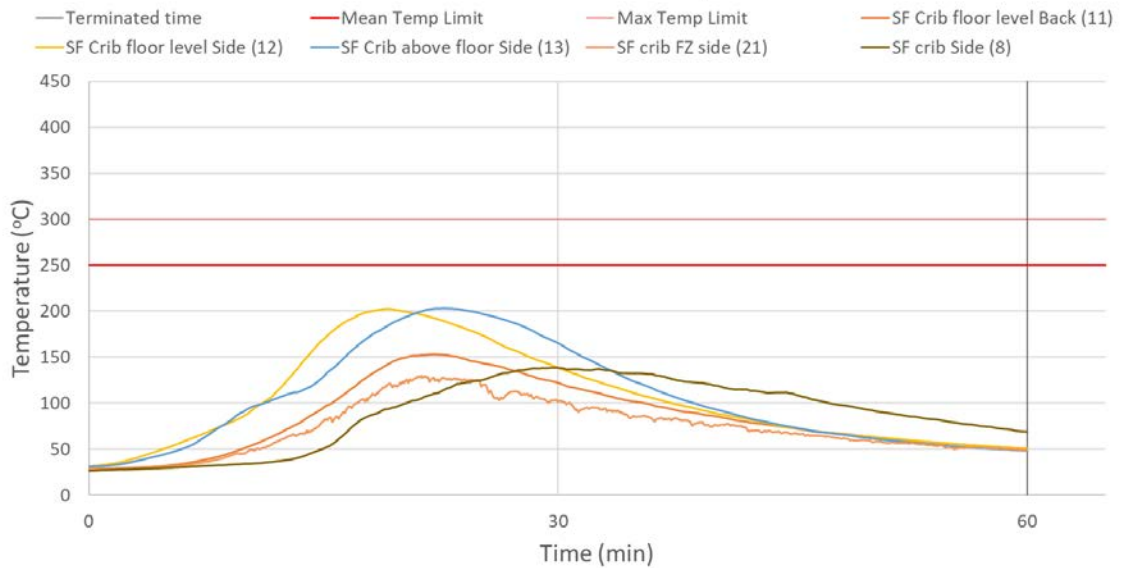


5.3 Specimen Temperature

The specimen temperature was monitored by the thermocouples distributed on the un-exposed face of the test specimen, as shown in Figure 4. All thermocouple temperature on the left side which the side has the crib under the deck are within the mean and maximum temperature limits between 20 minutes and 60 minutes after the commencement of test.

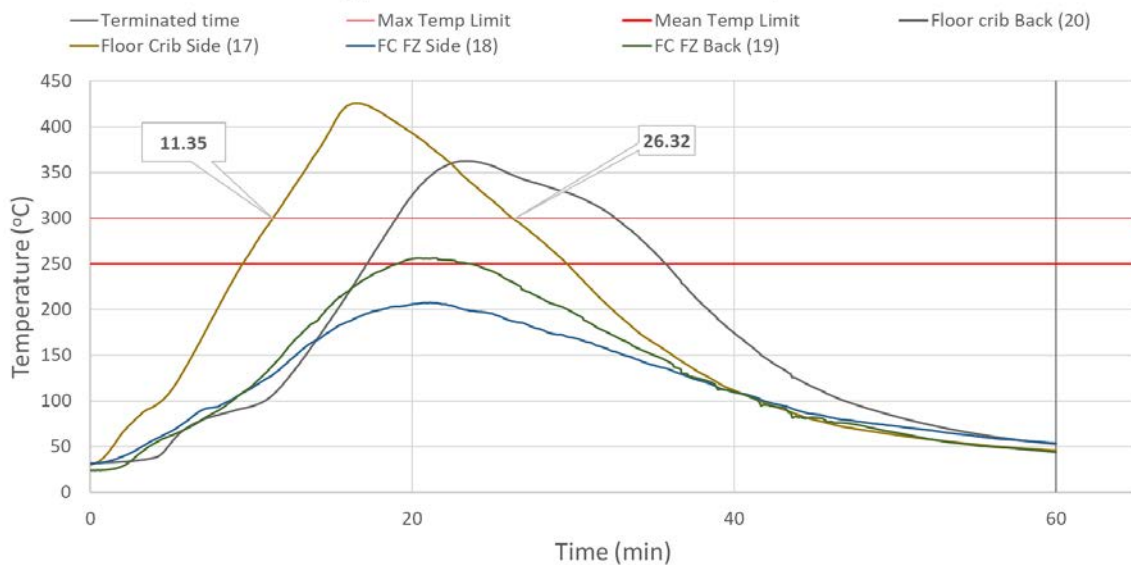


FIGURE 11:
UNDER DECK CRIB THERMOCOUPLE TEMPERATURES



The lower thermocouples located on the fibre cement of upper surface crib side and upper surface crib back exceed 300 °C at 20 minutes after the commencement of test.

FIGURE 12:
UPPER SURFACE DECK CRIB THERMOCOUPLES TEMPERATURES

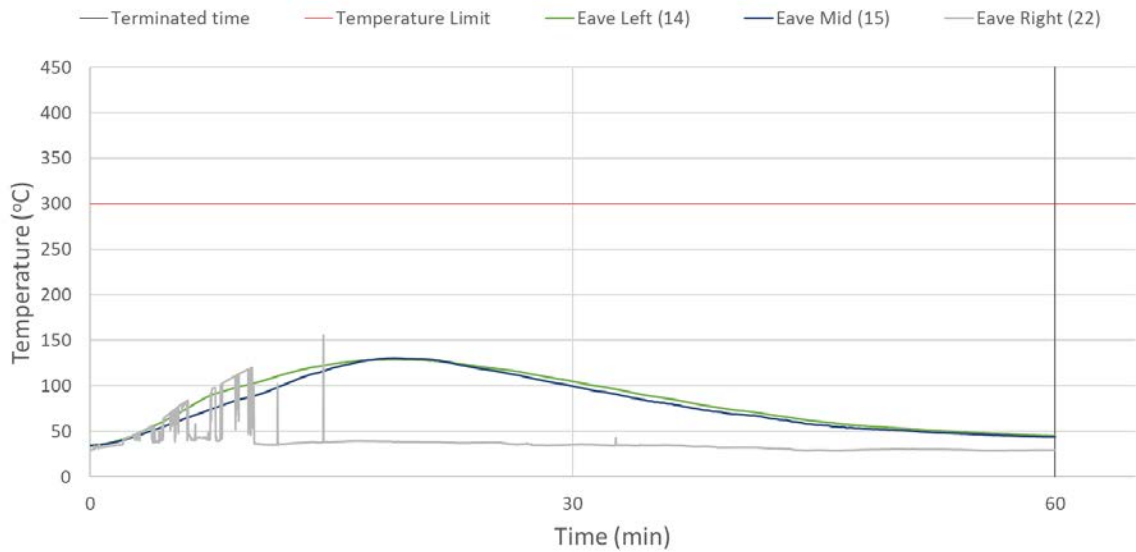


All thermocouple temperature on the eaves is within the mean and maximum temperature limits between 20 minutes and 60 minutes after the commencement of test.



FIGURE 13:

EAVES THERMOCOUPLES TEMPERATURES



5.4 Performance

The performance observed in respect of the following AS 1530.8.1-2007 criteria:

Performance Criteria	Time to failure (min)	Position of failure
Formation of through-gaps greater than 3 mm	No failure	-
Sustained flaming for 10 s on the non-fire side	No failure	-
Flaming on the fire-exposed side at the end of the 60 min test period	No failure	-
Radiant heat flux 365 mm from the non-fire side exceeding 15 kW/m ²	Not applicable	NA
Mean and maximum temperature rises greater than 140 K and 180 K	Not applicable	NA
Radiant heat flux 250 mm from the specimen, greater than 3 kW/m ² between 20 min and 60 min	Not applicable	NA
Mean and maximum temperature of internal faces exceeding 250 °C and 300 °C respectively between 20 min and 60 min after commencement of test	20 mins	The back and side sides on the crib flame bottom of the upper surface crib
Extent of flaming exceeding 500 mm limits on decking boards	No failure	-
Crib class	C	Peak heat flux
		40 kW/m ²



6 APPLICATION OF TEST RESULTS

6.1 Test Limitations

The results of this fire test 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 fire conditions. The results only relate to the behaviour of the specimen of the element of the construction under the particular conditions of the test, they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they necessarily reflect the actual behaviour in fires.

6.2 Variations from the Tested Specimen

This report details methods of construction, the test conditions and the results obtained when the specific element of construction described herein was tested in accordance with test method of AS 1530.8.1. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field of direct application in the relevant test method, is not covered by this report.

6.3 Uncertainty of Measurement

Because of the nature of fire hazard property testing and the consequent difficulty in quantifying the uncertainty of measurement of fire hazard properties, it is not possible to provide a stated degree of accuracy of the result.

PAGE 17 OF 17
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