



TEST REPORT

Full scale bushfire deck test of Trex®
Transcend™ Square edge decking boards
in accordance with AS1530.8.1-2007

EWFA Report No:

2824600

Report Sponsor:

Trex Company, Inc.
245 Capitol Ln
Winchester, VA 22602
USA

Test Date:

15th March 2013

DOCUMENT REVISION STATUS

Date Issued	Issue No	Description
9 th April 2013	2824600.1	Initial Issue

CONTACT INFORMATION

Exova Warringtonfire Aus Pty Ltd - ABN 81 050 241 524

NATA Registered Laboratory

Unit 2, 409-411 Hammond Road
Dandenong Victoria 3175
Australia

T: +61 (0)3 9767 1000

F: +61 (0)3 9767 1001

New South Wales

Suite 2002a
Level 20, 44 Market Street
Sydney NSW 2000
Australia

T: +61 (0)2 8270 7600

F: +61 (0)2 9299 6076

Victoria

Unit 2, 409-411 Hammond Road
Dandenong Victoria 3175
Australia

T: +61 (0)3 9767 1000

F: +61 (0)3 9767 1001

Queensland

Northpoint, Unit 29, Level 6
231 North Quay
Brisbane QLD 4000
Australia

T: +61 (0)7 3238 1700

F: +61 (0)7 3211 4833

SIGNATORIES

Reviewed by:



Patrick Chan

Reviewed by:



Chad McLean

On behalf of Exova Warringtonfire Aus Pty Ltd

GENERAL CONDITIONS OF USE

This report may only be reproduced in full without modifications by the report sponsor only. Copies, extracts or abridgments of this report in any form shall not be made distributed or published by other organisations or individuals without the permission in writing from a Director of Exova Warringtonfire Aus Pty Ltd.

CONTENTS

1	CONSTRUCTION DETAILS	4
	Test Assembly	4
	Test Specimen	4
	Assembly and Installation Methods	4
	Orientation	4
2	SCHEDULE OF COMPONENTS	5
3	TEST PROCEDURE	7
	Statement of compliance	7
	Variations to test method	7
	Pre-test conditioning	7
	Conditioning of timber components	7
	Ambient Temperature	7
	Test Duration	7
	Instrumentation and Equipment	7
4	TEST MEASUREMENTS	8
	Furnace Temperature and Pressure Measurements	8
	Specimen Temperatures	8
	Observations	8
5	TEST RESULTS	9
6	APPLICATION OF TEST RESULTS	9
	Test Limitations	9
	Variations from the Tested Specimens	9
	Uncertainty of measurement	9
APPENDIX 1	DRAWINGS OF TEST ASSEMBLY	10
APPENDIX 2	TEST OBSERVATIONS	12
APPENDIX 3	INSTRUMENTATION POSITIONS	13
APPENDIX 4	TEST DATA	15
	A 4.2 Specimen Temperatures	16
APPENDIX 5	PHOTOGRAPHS	17

1 CONSTRUCTION DETAILS

TEST ASSEMBLY

The test assembly comprised a nominal 1790mm wide × 725mm deep × 450mm high deck that was set within a 1800mm wide × 250mm deep recess formed within a nominal 3000mm × 3000mm wall system.

TEST SPECIMEN

The deck consisted of Trex® Transcend™ Square edge decking boards that were 140mm wide × 25mm thick, that were installed perpendicular to the wall system with 3mm spacing between each board. The boards were secured to joists with 10G × 65mm long CAP-TOR Decking screws. The front fascia of the specimen consisted of a decking board horizontally installed. Stainless steel mesh was installed below the deck in order to simulate an enclosed sub-floor.

The wall system incorporated a timber framed wall system of 90 × 45mm studs clad with 13mm Gyprock Fyrchek plasterboard and 6mm thick square edge CSR Cemintel fibre-cement board to the exposed side and 10mm standard plasterboard to the unexposed side.

Full specimen details are provided in Figures A1.1 to A1.6 and the 'Schedule of Components' in Section 2.

ASSEMBLY AND INSTALLATION METHODS


The wall system was constructed by EWFA representatives from the 12th to the 13th of March 2013. The deck specimen was constructed by EWFA representative on the 13th of March 2013.

ORIENTATION

The test assembly was asymmetric and the external face with the assembled deck system was exposed to the radiant heat source. The front face of the deck was exposed to a radiant panel at an initial irradiance level of 29 kW/m².

2 SCHEDULE OF COMPONENTS

Item	Description	
1	Name	Trex® Transcend™ Square edge decking boards
	Material	Wood Thermoplastic Composite Lumber (WTCL), with an integrated shell that covers the boards on the top surface and sides. The underside of the boards is not covered by the integrated shell. The integrated shell consists of a proprietary surface formulation that produces a natural wood-like grain pattern finish. The deck boards are made from approximately 50% wood fiber and 50% polyethylene by weight.
	Size	140mm wide × 25mm thick
	Density	1104 kg/m³ (measured)
	Installation	Positioned on the top side of the joists perpendicular to the wall system. The board where the timber crib was positioned was ripped down to 60mm wide, allowing the 100mm × 100mm timber crib to overlap a join in the boards. A full width board was also fixed to the front face of the deck, positioned such that the top of the board was in line with the top of the boards on the deck.
	Fixing	The decking boards were secured with 2 - off Decking screws (Item 2).
2	Name	CAR-TOR Decking screws
	Size	10G × 65mm long
	Installation	Two screws were used to secure the decking board (Item 1) at each joist, located 25mm from the edge of the board.
3	Name	CSR Cemintel fibre-cement board
	Size	6mm thick
	Density	1700kg/m³ (Measured)
	Installation	Fixed to the exposed side of the wall on top of "item 3" at nominal 200mm centres with 40mm long 6g needle point screws
4	Name	Gyprock Fyrcheck Plasterboard
	Size	13mm thick
	Density	847 kg/m³ (measured)
	Installation	Fixed to the exposed side of the wall directly to the wall framing at nominal 400mm centres with 32mm long 6g needle point screws.
5	Name	Gyprock Standard Plasterboard
	Size	10mm thick
	Density	691 kg/m³ (measured)
	Installation	Fixed to the unexposed side of the wall at nominal 400mm centres with 32mm long 6g needle point screws.
6	Name	Eaves sheet lining
	Material	6mm thick cement sheet
	Density	1404 kg/m³ (measured)
	Location	Nominal 250mm width of cement sheet was located into the top of the recess formed in the wall system approximately 1800mm long and secured to the eaves framing with two screws at each support location.
7	Name	Sub-floor of deck
	Material	F17 Grade Hardwood (KD. hardwood)
	Size	90mm × 45mm
	Density	660 kg/m³
	Moisture Content	Average of 11.7% for the joists Average of 10.8% for the bearers
	Fixings	2-off 3mm diameter × 75mm long nails on each joist to the bearer
	Installation	3-off 750mm long lengths to form the bearers that were located perpendicular to the wall, at nominal 600mm centres.
		3-off 1800mm lengths to form the joists were located parallel to the wall; the joists

Item	Description	
		were 340mm apart
8	Name	Wall framing
	Material	90mm x 45mm MGP10 timber
	Density	540 kg/m ³ (measured)
	Installation	Assembled using 3 inch gun nails
9	Name	Metal mesh
	Material	Stainless steel
	Size	0.4mm thick with 1.87mm square hole.
	Installation	<p>The mesh was stapled to the bearers and front fascia, to ensure no gaps greater than 3mm in diameter to the subfloor area. The mesh was fixed to a "floor" of 6mm thick cement sheet as shown below.</p> 

3 TEST PROCEDURE

STATEMENT OF COMPLIANCE

The test was performed in accordance with the requirements of AS 1530.8.1-2007 Section 21.

VARIATIONS TO TEST METHOD

None

PRE-TEST CONDITIONING

The construction of the specimen was finished on the 13th of March 2013. During the construction period, the test specimen was subject to normal laboratory temperatures and relative humidity conditions

CONDITIONING OF TIMBER COMPONENTS

The timber components of the specimen and specimen supporting construction were within the limits of AS1530.8.1-2007.

AMBIENT TEMPERATURE

The ambient temperature at the start of the test was 28°C and did not vary significantly throughout the test

TEST DURATION

The test was terminated at 60 minutes in accordance with the procedure of AS 1530.8.1-2007.

INSTRUMENTATION AND EQUIPMENT

The instrumentation was provided in accordance with AS 1530.8.1-2007 as detailed below:

The radiation received at the front of the deck system was measured by a heat flux meter for the radiant exposure portion of this test.

A second radiometer was placed in the centre of the wall to provide additional information.

The internal specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5 mm diameter soldered to 12 mm diameter × 0.2 mm thick copper discs covered by 30 mm × 30 mm × 2.0 mm inorganic insulating pads. The thermocouples' positions are described in Table A3.1, and are shown on Figure A3.2 in Appendix 3.

A roving thermocouple was available to measure temperatures at positions that appeared hotter than the positions monitored by the fixed thermocouples.

A pilot ignition source was available to assess any areas of the specimen producing significant quantities of volatiles.

A 3±0.1mm gap gauge was available during the test to assess the performance under the criteria for integrity.

Crib was conditioned for at least 24 hours in a conditioning oven and removed 1 hour prior to the commencement of the test. Crib was weighed to confirm that it was within the 0.25±0.05kg mass required by the standard. The crib was lit over a 3 minute period; 30 seconds per exposed side with an additional 30 seconds of overall coverage using an acetylene torch with a Type 551 Size 8 × 10 tip.

4 TEST MEASUREMENTS

FURNACE TEMPERATURE AND PRESSURE MEASUREMENTS

Furnace temperature and pressure data are provided in Section A4.1 and A4.2 in Appendix 4.

SPECIMEN TEMPERATURES

Specimen temperature data is provided in Section A4.3 Appendix 4.

OBSERVATIONS

A table that includes observations of the significant behaviour of the specimen and details of the occurrence of the various performance criteria specified in AS 1530.8.1- 2007 is provided in Appendix 2. Photographs of the specimen are included in Appendix 5.

5 TEST RESULTS

The specimens listed below achieved the following performance when tested in accordance with AS 1530.8.1- 2007.

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	-
Extent of flaming exceeding 500mm limits on decking boards		No Failure	-
Flaming on the fire-exposed side at the end of the 60 minute test period.		No Failure	-
Radiant heat flux 365mm from the non-fire side exceeding 15 kW m ⁻²		Not applicable	-
Mean and maximum temperature rises greater than 140K and 180K		Not applicable	-
Radiant heat flux 250 mm from the specimen, greater than 3 kW m ⁻² between 20 min and 60 min		Not applicable	-
Mean and maximum temperature of internal faces exceeding 250°C and 300 °C respectively between 20 min and 60 min after commencement of test		No Failure	-
Crib class	A	Peak heat flux	29 kW m⁻²
Test Result		BAL A29	

6 APPLICATION OF TEST RESULTS

TEST LIMITATIONS

The results of this fire test may be used to directly assess fire hazard, but it should be recognized 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.

VARIATIONS FROM THE TESTED SPECIMENS

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 the test method with AS1530.8.1. 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 addressed by this report. It is recommended that any proposed variation to the tested configuration other than as permitted under the field of direct application specified in Appendix 3 should be referred to the test sponsor in the first instance to obtain appropriate documentary evidence of compliance from Exova Warringtonfire (Aus) Pty Ltd or another Registered Testing Authority.

UNCERTAINTY OF MEASUREMENT

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

APPENDIX 1 DRAWINGS OF TEST ASSEMBLY

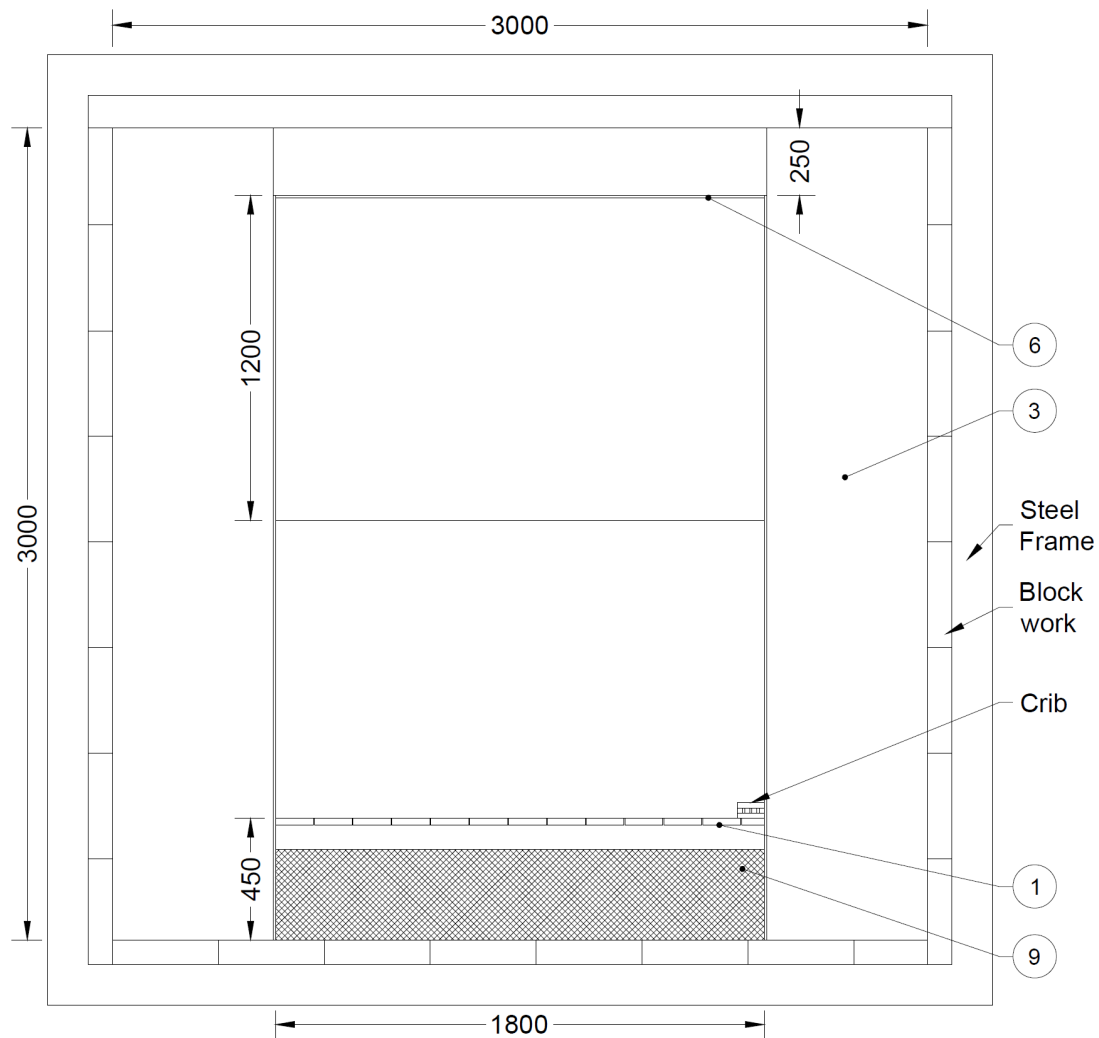


Figure A1.1: Exposed side elevation of test specimen.

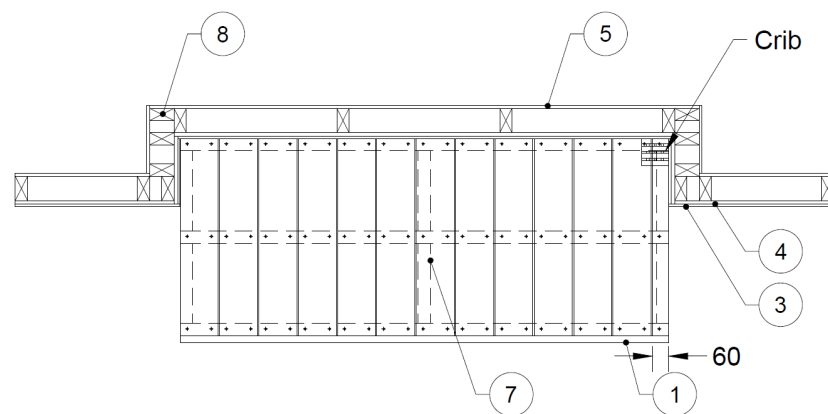


Figure A1.2: Horizontal section through test specimen.

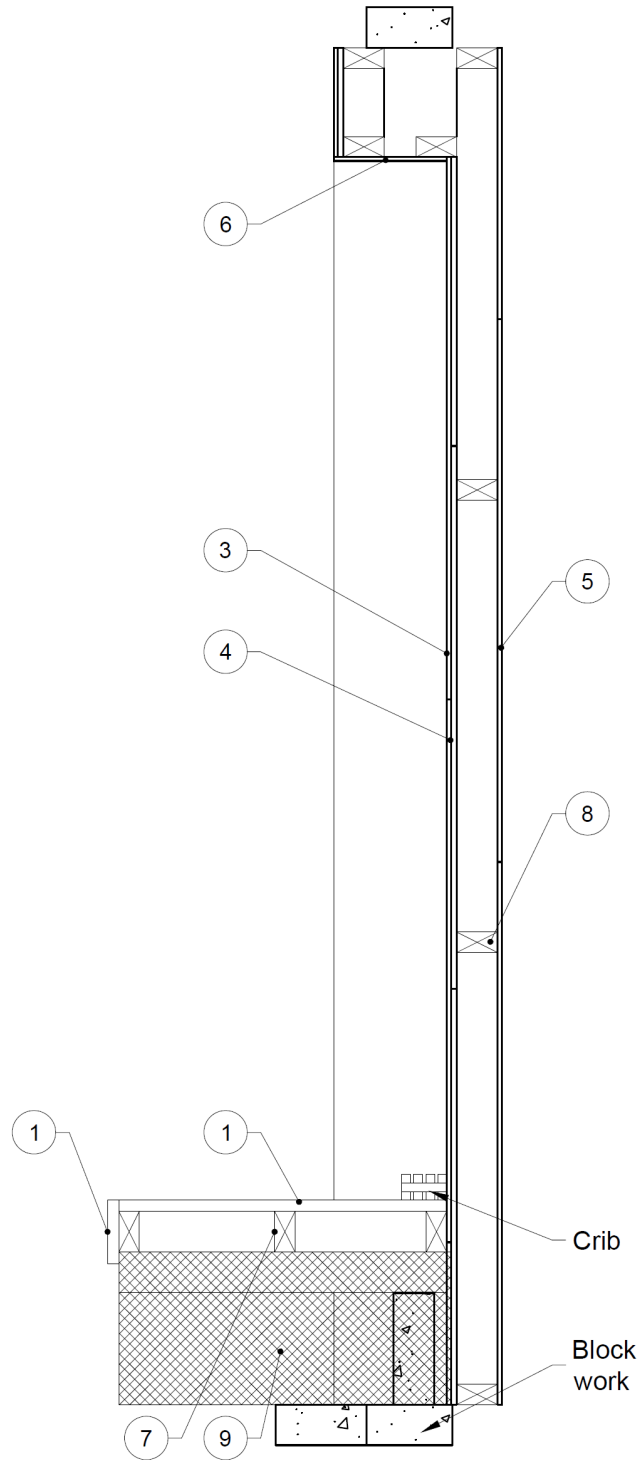


Figure A1.3: Vertical cross section through test specimen.

APPENDIX 2 TEST OBSERVATIONS

The following include observations of the significant behaviour of the specimen.

Time Min Sec		Observation
0	00	The bushfire test was commenced and ambient air temperature was approximately 28°C. The ignited crib has been positioned in its respective location
0	10	Radiation exposure of the specimen had commenced.
0	40	Smoke emission had become evident on the front of the deck
1	10	Pilot flame had applied in the front of the decking. It had become evident that no ignition had occurred
1	40	Pilot flame had applied in the front of the decking. It had become evident that no ignition had occurred
1	40	It had become evident that the flaming on the crib had spread to the deck.
2	50	Pilot flame had applied in the front of the decking. It had become evident that no ignition had occurred
4	10	Decrease in volume of smoke from the deck had become evident.
10	00	Exposure to the radiant heat source had ceased in accordance with the procedure of AS 1530.8.1-2007
15	00	It had become evident that the flaming on the crib had self-extinguished.
16	30	It had become evident that the flaming on the deck had self-extinguished
60	00	The bushfire test was stopped in accordance with the procedures of AS 1530.8.1-2007

APPENDIX 3 INSTRUMENTATION POSITIONS

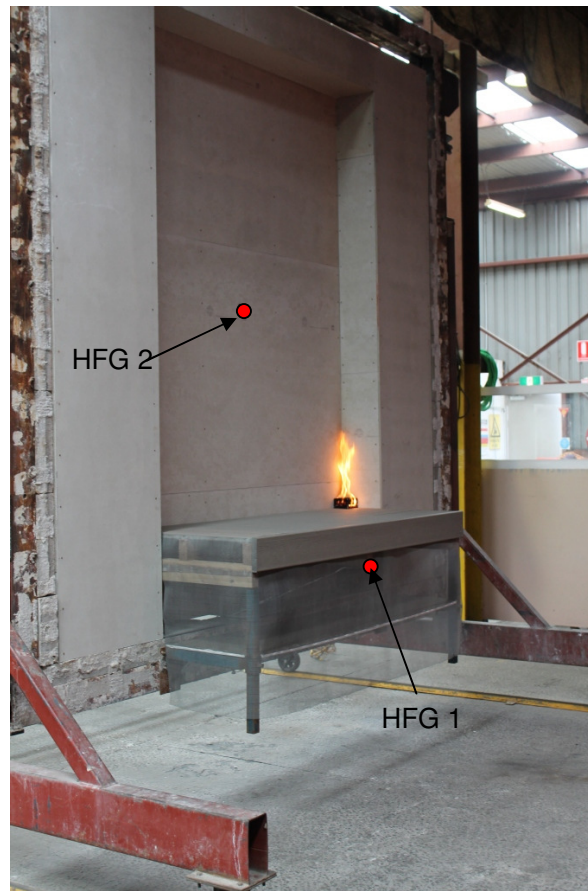


Figure A3.1: Heat Flux Gauge locations on exposed side
HFG 1 centrally located across the deck, nominal 50mm below the bottom of the deck.
HFG 2 located at the centre of the wall.

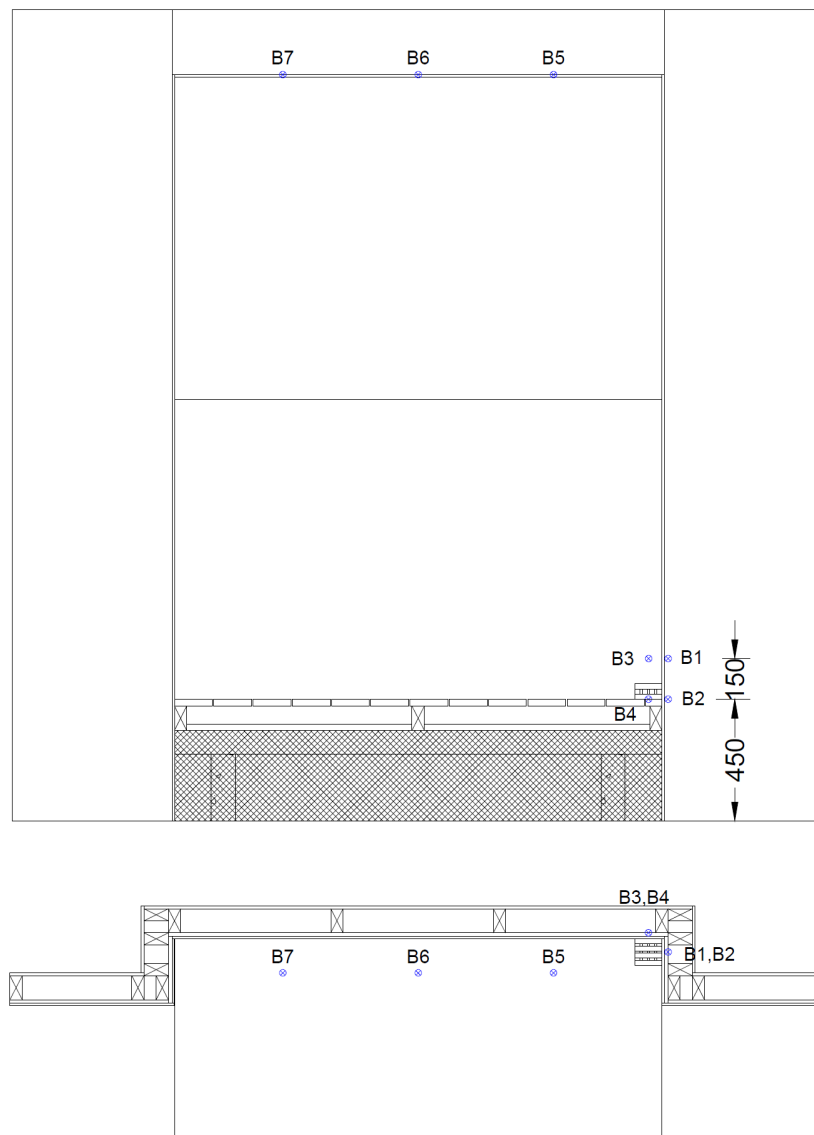


Figure A3.2: Thermocouple locations

APPENDIX 4 TEST DATA

A 4.1 HEAT FLUX RECEIVED

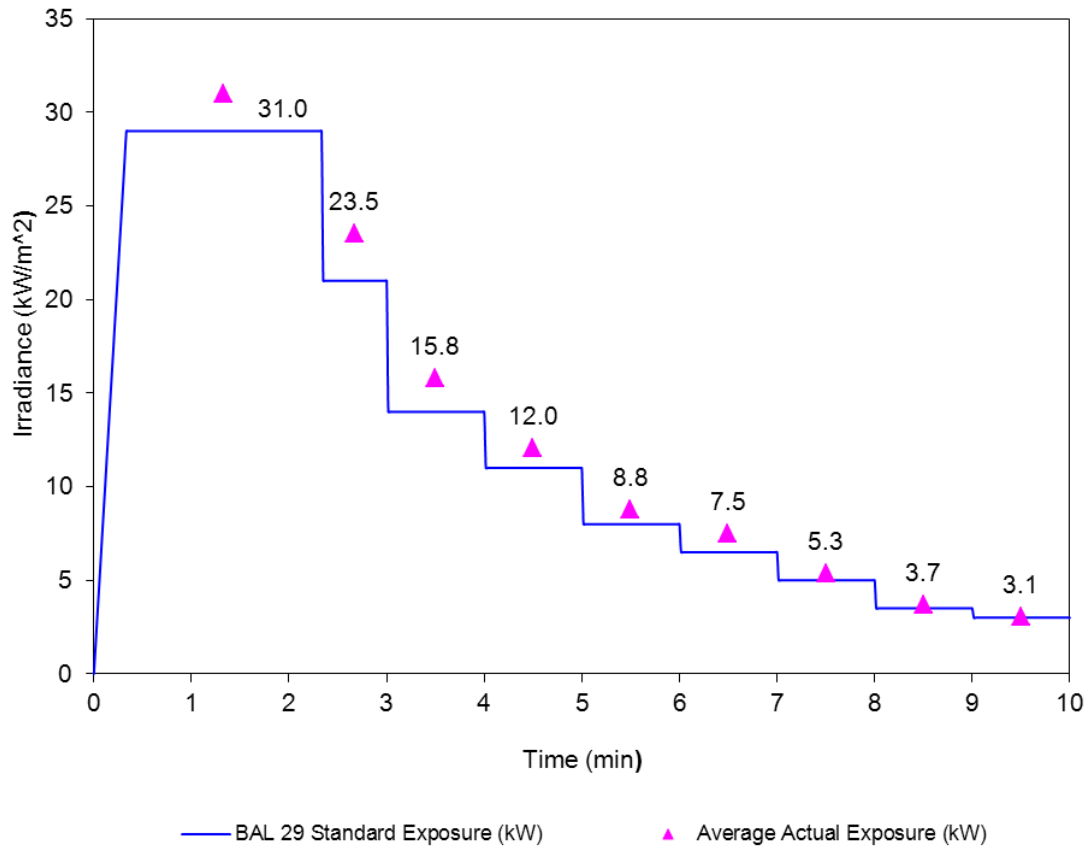


Figure A4.1: Irradiance levels received at the front of the decking system

A 4.2 SPECIMEN TEMPERATURES

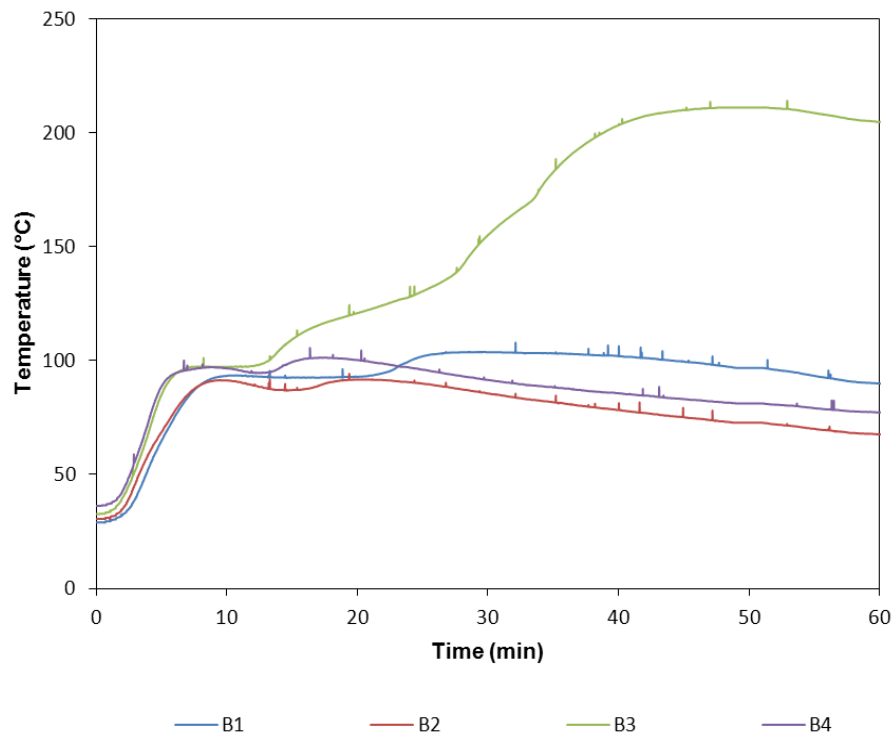


Figure A4.2: Specimen temperatures. Temperatures vs. time
Thermocouples located where the crib was positioned on the deck

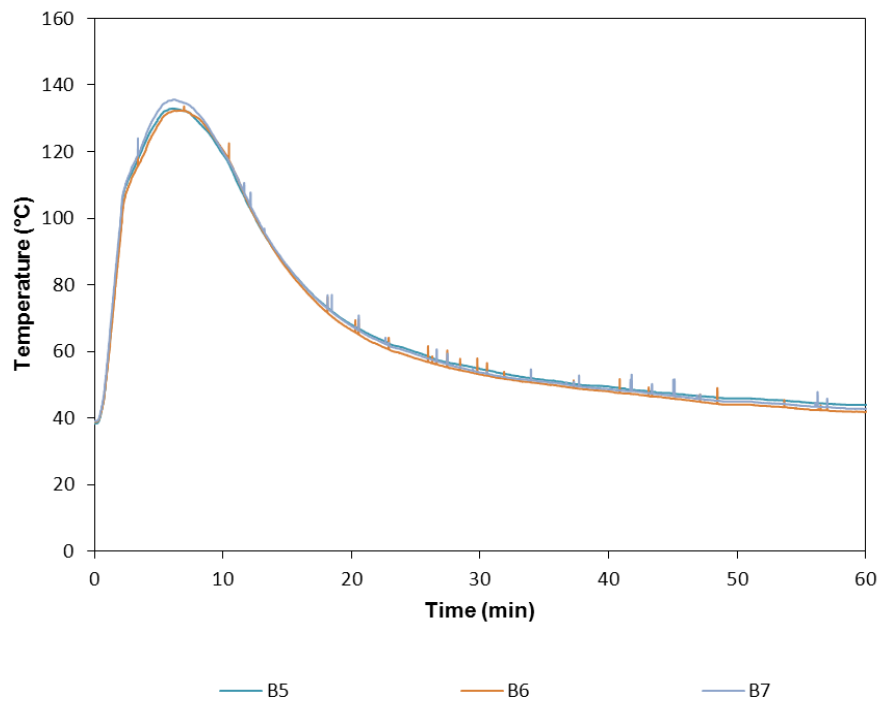


Figure A4.3: Eaves temperatures. Temperatures vs. time

APPENDIX 5 PHOTOGRAPHS



Figure A5.1. Exposed face of specimen before commencement of the test.

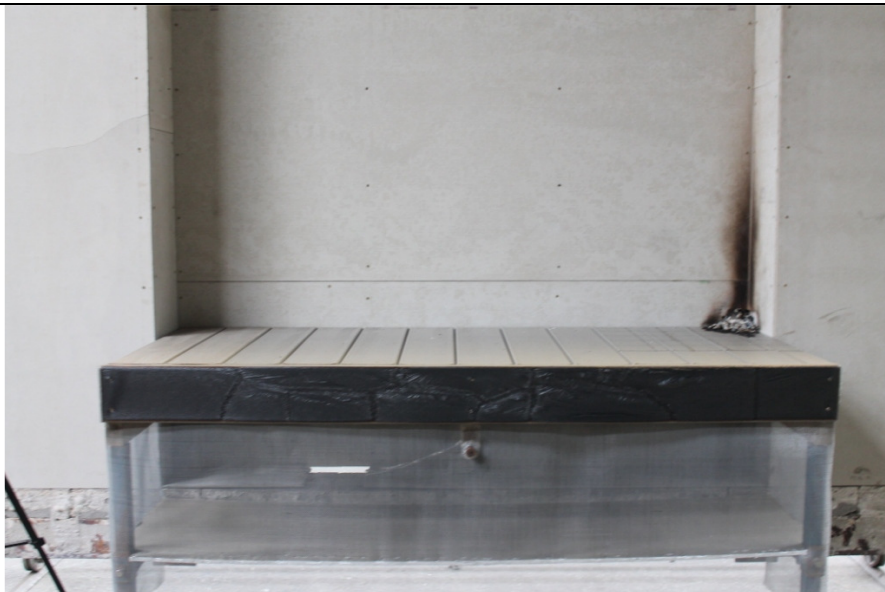


Figure A5.2. Exposed face of specimen at the conclusion of the test.