



TEST REPORT

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

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1 CONSTRUCTION DETAILS

TEST ASSEMBLY

The test assembly comprised a nominal 1800mm wide × 750mm 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™ Groove decking boards that were 140mm wide × 25mm thick, that were installed perpendicular to the wall system with 6.3mm spacing between each board. The boards were secured to joists with three Trex Hideaway® Universal fastener and 10G × 65mm CAP-TOR Decking screws at the edge of the deck. 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 21st of March 2013. The deck specimen was constructed by EWFA representative on the 21st 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 19 kW/m².

2 SCHEDULE OF COMPONENTS

Item	Description	
1	Name	Trex Transcend® Groove 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	1078 kg/m ³ (measured)
	Installation	Positioned on the top side of the joists parallel 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 board was secured with Trex Hideaway® Universal fastener (item 2) and 10G × 65mm CAP-TOR Decking screws at the edge of the deck.
2	Name	Trex Hideaway® Universal fastener
	Material	Fastener: Glass Filled Nylon Screw: Stainless Steel
	Size	Self-gapping connector clip: 13.1mm high × 31.8mm wide × 19.0mm deep Screw: Ø4.5mm × 40mm long
	Installation	On top of the joist and between the Trex Transcend® Groove decking board (item 1) 
3	Name	CSR Cemintel fibre-cement board
	Size	6mm thick
	Density	1700kg/m ³ (measured)
	Installation	Fixed to the exposed side of the wall on top of "item 4" at nominal 200mm centres with 40mm long 6g needle point screws
4	Name	Gyprock Fyrcheck Plasterboard
	Size	13mm thick
	Density	847 kg/m ³ (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/m ³ (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/m ³ (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

Item	Description	
		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/m ³
	Moisture Content	Average of 11.7% for the joists Average of 10.8% for the bearers
	Fixings	2-off 3mm diameter × 75mm nails on each joist to the bearer
	Installation	5-off 750mm long lengths to form the joists that were located perpendicular to the wall, at nominal 450mm centres. 2-off 1800mm lengths to form the bearers were located parallel to the wall; the bearers were located at the front and the back edge of the specimen.
8	Name	Wall framing
	Material	90mm × 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 joists 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 21st 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	19 kW m ⁻²
Test Result		BAL A19	

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

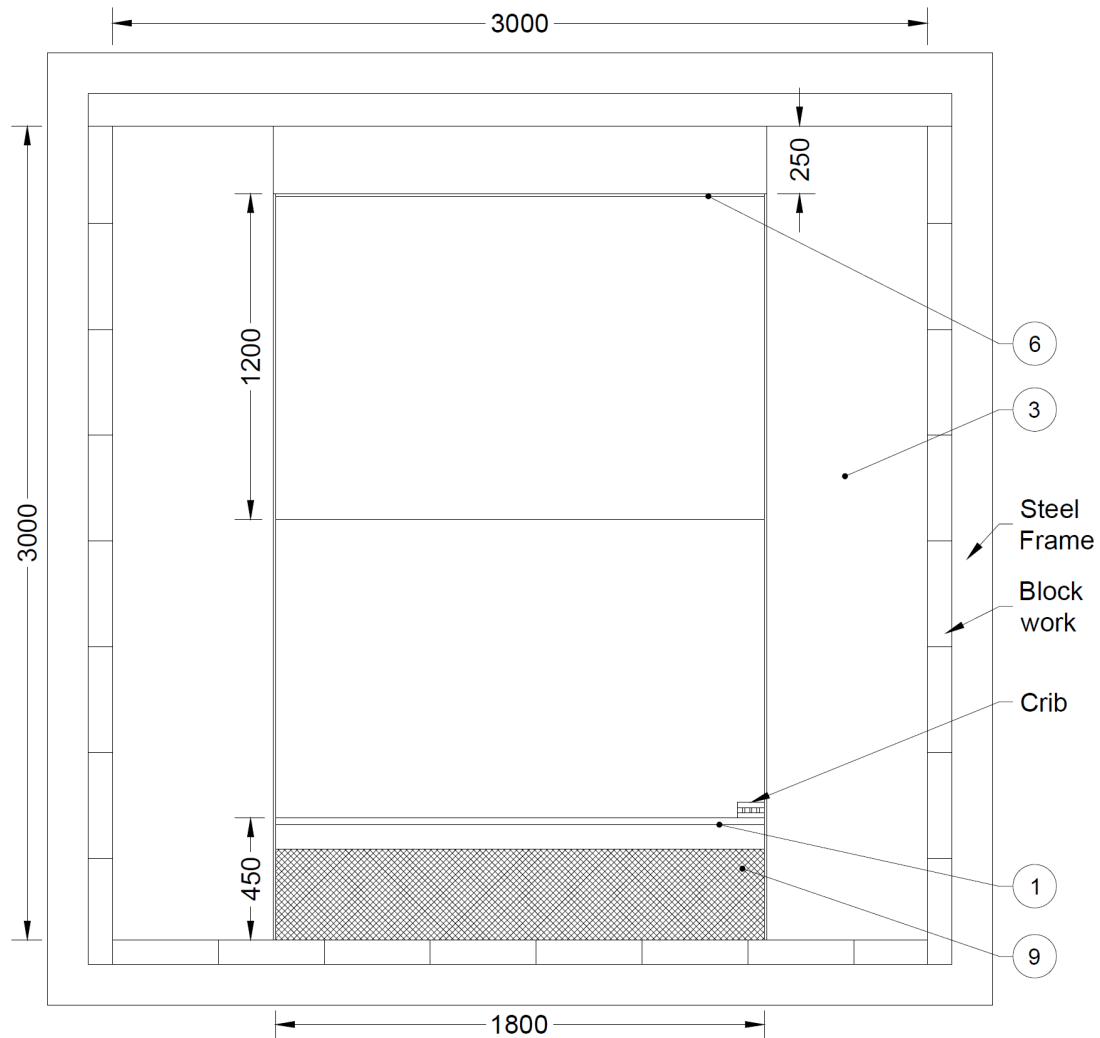


Figure A1.1: Exposed side elevation of test specimen.

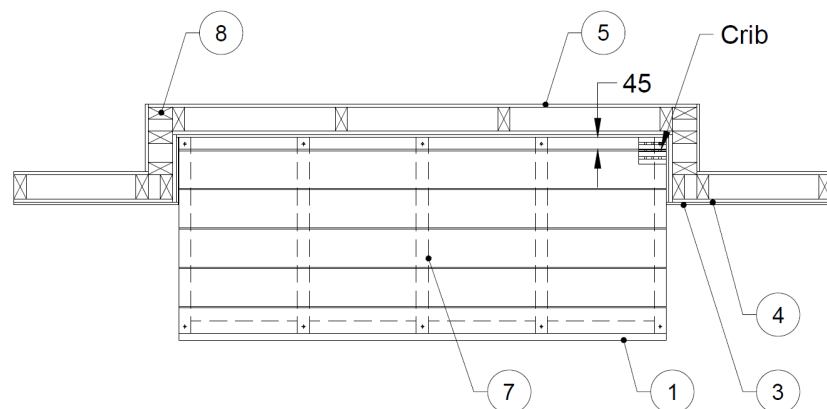


Figure A1.2: Horizontal section through test specimen.

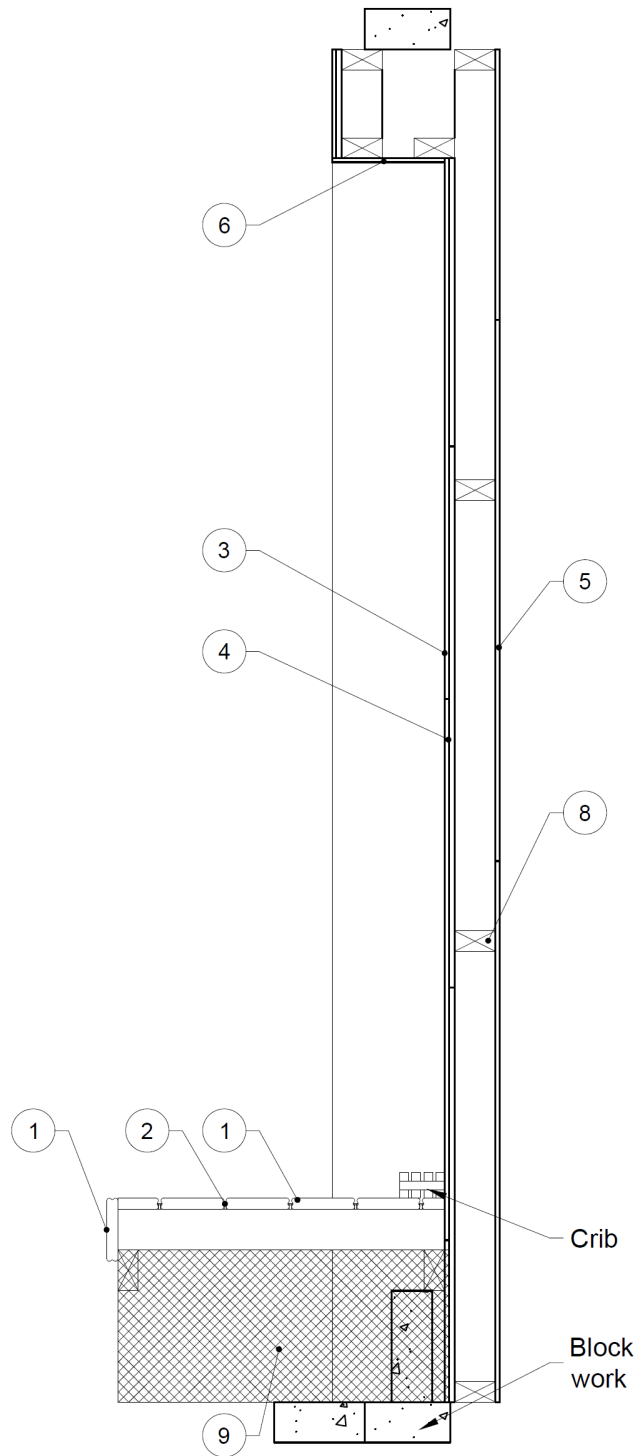


Figure A1.3: Vertical cross section through test specimen.

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 have been positioned in its respective location
0	10	Radiation exposure of the specimen had commenced.
0	47	Smoke emission had become evident on the front and leading face of the deck
1	37	It had become evident that the flaming on the crib had spread to the deck.
3	44	It had become evident that flaming on the deck adjacent to the crib had spread 100mm at both direction
10	00	Exposure to the radiant heat source had ceased in accordance with the procedure of AS 530.8.1-2007
22	00	It had become evident that the flaming appeared on the interface between the deck and the wall near the crib
36	00	It had become evident that the flaming on the deck had self-extinguished. It had become evident that glowing appeared on the interface between the deck and the wall near the crib
60	00	The bushfire test was stopped in accordance with the procedures of AS 1530.8.1-2007

APPENDIX 3 INSTRUMENTATION POSITIONS

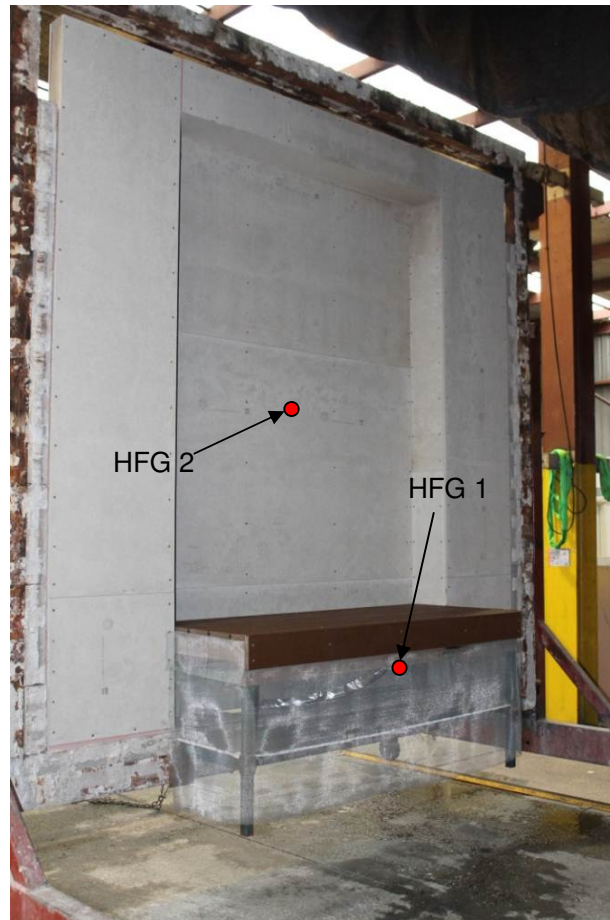


Figure A3.1: Heat Flux Gauge locations on exposed side
HFG 1 centrally located across the deck, nominal 50mm below the bottom of the deck.
HFG 2 located at the centre of the wall.

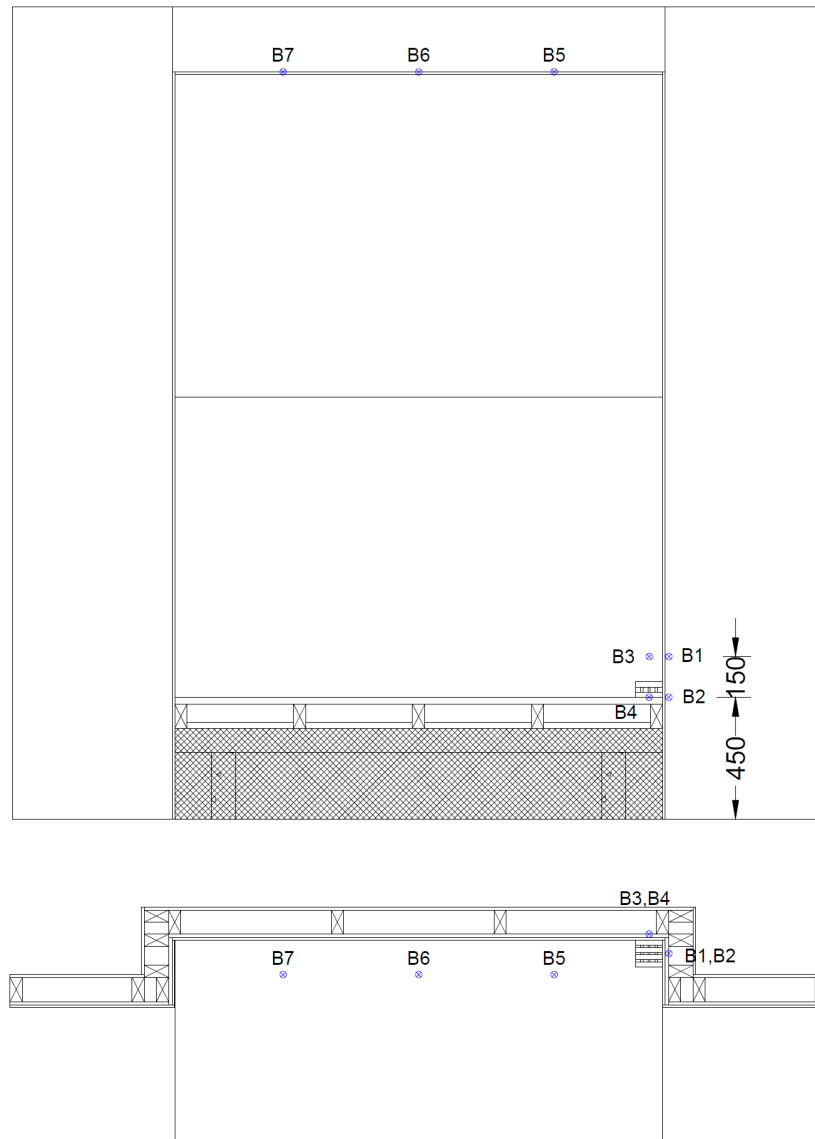


Figure A3.2: Thermocouple locations.

APPENDIX 4 TEST DATA

A 4.1 HEAT FLUX RECEIVED

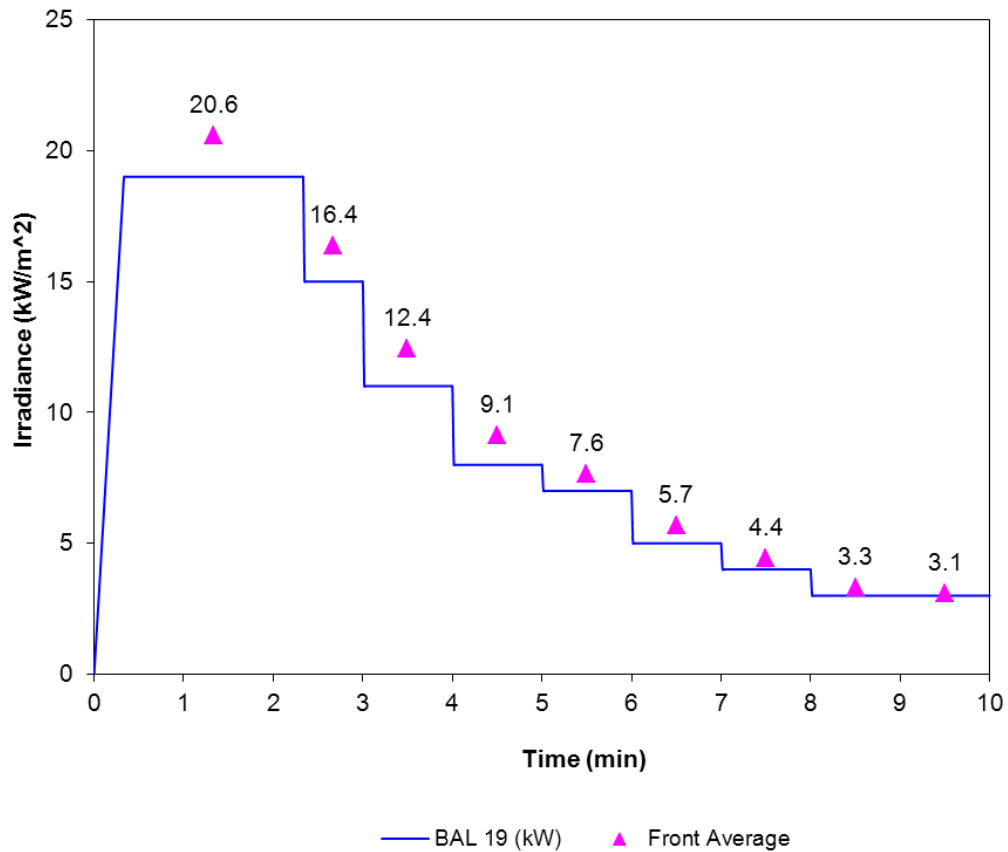
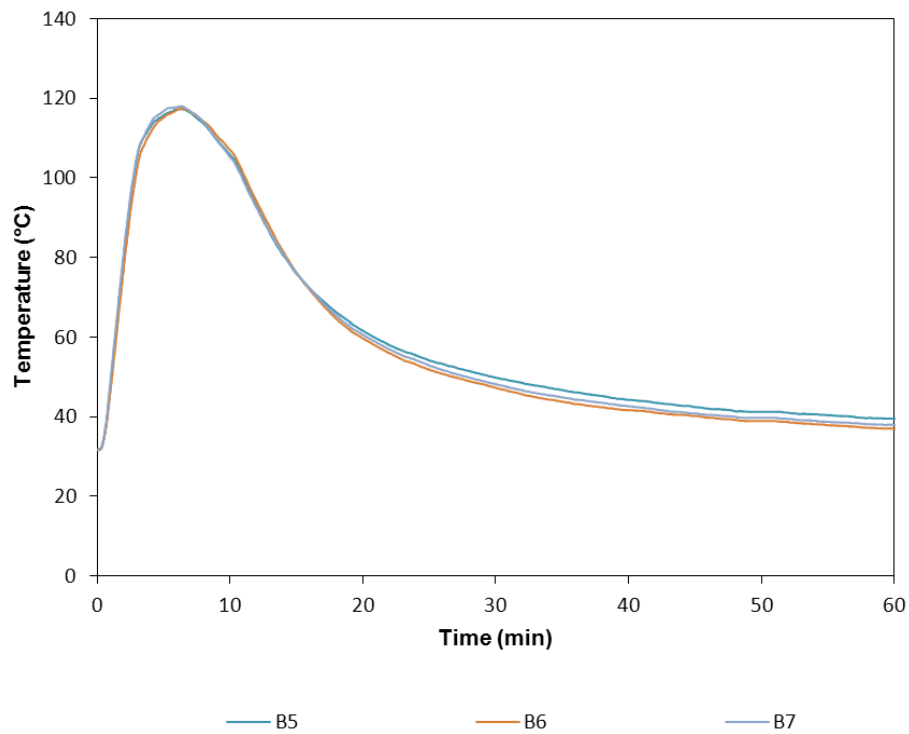
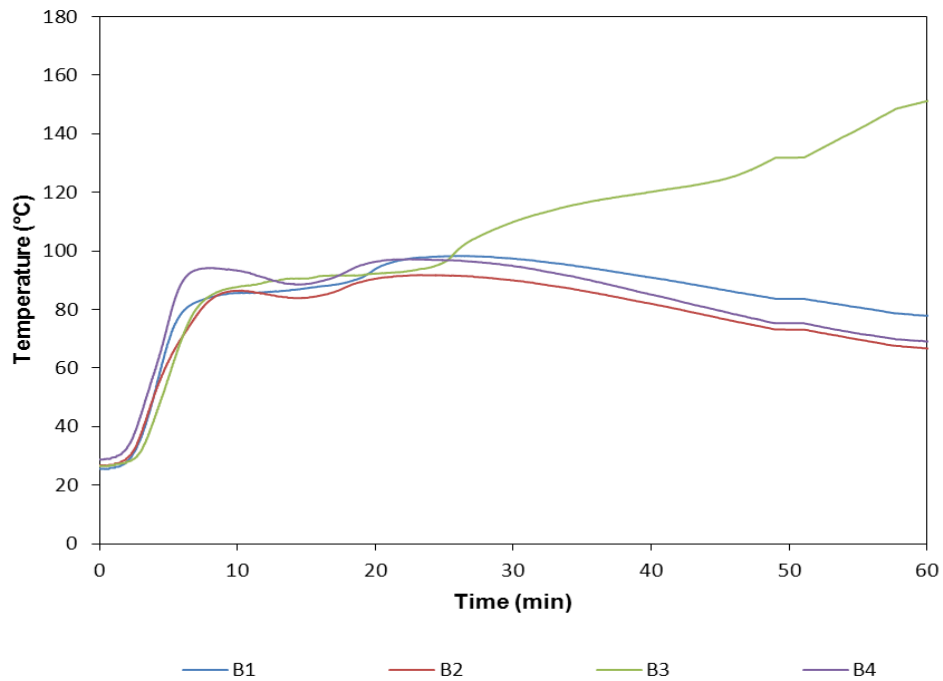


Figure A4.1: Irradiance levels received at the front of the decking system

A 4.2 SPECIMEN TEMPERATURES



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.