

Test Report

**Title:**

Fire Resistance test of singly glazed windows covered by screens of aluminized fabric tested in general accordance with AS 1530.8.1-2007

BWA Report No:

2258400

Test Applicant:

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1 CONSTRUCTION DETAILS

TEST ASSEMBLY

The test was undertaken on two identical test specimens, designated Specimen F and Specimen R. Specimen F was subjected to the application of a burning crib and radiant heat while Specimen R was exposed to radiant heat only.

Each assembly comprised a nominal 1210 mm x 1210 mm x 100 mm timber and cement sheet surround incorporating a singly glazed window covered by an aluminized fabric screen.

TEST SPECIMEN

The test specimens comprised of a Wildfire Heat Protective Shield, nominally 970 mm high x 920 mm wide x 1 mm thick fixed to the faced of the window frame.

ASSEMBLY AND INSTALLATION METHODS

The window was installed into the opening in the wall. The screen frame guides and pelmet were mounted over the exposed timber frame and cement sheet junction on the external side assembly. The aluminized screen was extended from the pelmet to cover the glazing. The screen bottom bar was fixed at each end with right angled steel locking pins. The system was constructed by representatives of the test applicant on 28th April 2008.

ORIENTATION

The specimen was asymmetric and tested such that the aluminized fabric screen was between the radiant heat source and the glazed elements of the window at the request of the test applicant.

2 SCHEDULE OF COMPONENTS

ITEM	DESCRIPTION
Product Name	Wildfire Heat Protective Shield
Screen size	Nominally 970 mm high × 920 mm wide × 1 mm thick.
Screen Composition	A single layer of Wildfire Protection Layer sandwiched between layers of Wildfire Aluminized Fabric #40 on each side. (Alternative trade names held on file.) Horizontal strengthening rods of 6 mm diameter steel were sewn into the screen at nominally 440 mm and 860 mm above the bottom edge of the screen. The screen bottom bar was fixed at each end with right angled steel locking pins, 230 mm by 6 mm, which engaged an aluminium tube of rectangular cross section, 40 mm by 10 mm.
Edging channels	Aluminium extruded edging channels, 50 mm wide and 35.1 mm deep, were fitted to the exposed face along the vertical sides and along the bottom edge of the window. Each channel had a slot along the back face which engaged with screws fixed through the cement sheet to the timber surround. The edges of each channel were sealed to the surface of the cement sheet using silicone sealant. The aluminized fabric screen was inserted into the track on each vertical side to a depth of 35 mm.
Pelmet	The screen was hung from an aluminium roller bar, 38 mm in diameter with a 14 mm diameter axle, supported at each end by aluminium end brackets approximately 110 mm by 110 mm, fixed to the exterior surface by 2-off screws passing through a fixing plate 50 mm wide and 10 mm thick. The screen passed over a guide roller nominally 16 mm in diameter. The roller bar and guide roller were covered by an aluminium cover, 0.64 mm thick, 960 mm long and approximately 110 mm by 110 mm in cross section. The back of the pelmet was screw fixed to an aluminium tube of square cross section, 40 mm by 10 mm along the back edge of the pelmet, fixed through the cement sheet to the timber surround by 3-off screws.

Window

Description Single glazed window comprising of 6 mm thick float glass, 900 mm by 900 mm, held in place by timber nominally 100 mm by 28 mm on each face, screw fixed around the edge of the glass.



Supporting Construction

Description Timber frame nominally 1210 mm by 1210 mm comprised of 100 mm by 28 mm timber reveal faced with cement sheet.

3 TEST PROCEDURE

STATEMENT OF COMPLIANCE

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

VARIATIONS FROM TEST STANDARDS

The initial radiant heat profile for Specimen F was slightly below that required by the standard for short periods of time, the radiant heat flux was 35 kW m^{-2} as opposed to 40 kW m^{-2} for 30 seconds and 18 kW m^{-2} as opposed to 24 kW m^{-2} for 20 seconds. The average radiant heat flux for the two initial exposure periods was 40 kW m^{-2} and 24 kW m^{-2} respectively. Outside of the brief periods where the radiant heat was below that required by the standard the test specimen did not emit any volatiles which could be ignited and the transmitted irradiance through the screen was negligible throughout the whole testing period. Therefore it is considered that the lower irradiance levels did not affect the results of this test.

PRE-TEST CONDITIONING

The specimens were stored in the test laboratory and were subjected to indoor ambient normal laboratory conditions for 48 hours prior to testing.

SAMPLING / SPECIMEN SELECTION

The laboratory was not involved in the selection of the test specimens for test.

AMBIENT TEMPERATURE

The ambient temperature at the start of the first test was $34 \text{ }^{\circ}\text{C}$ and varied between $33 \text{ }^{\circ}\text{C}$ and $40 \text{ }^{\circ}\text{C}$ during the tests.

TEST DURATION

Each test was terminated after 60 minutes.

INSTRUMENTATION AND EQUIPMENT

The instrumentation was provided in accordance with AS 1530.8.1-2007.

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

Radiant heat flux measurements to determine the irradiance transmitted through the specimen were made using a Medtherm Heat Flux Gauge. In each test the radiometer was centrally located with respect to the specimen at a distance of 167 mm away from the rear surface of the glazing. The radiant heat incident on the specimen was derived from a Medtherm Heat Flux Gauge mounted to one side of the specimen, at the mid-height, using values found during an ancillary pre-test calibration.

4 TEST MEASUREMENTS

INCIDENT AND TRANSMITTED HEAT FLUX MEASUREMENTS

Heat flux measurements are provided in A4.1 and A4.2 in Appendix 4.

OBSERVATIONS

A table that includes observations of the significant behaviour of each 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 specimens are included in Appendix 5.

5 TEST RESULTS

The specimens achieved the following performance when tested in general accordance with AS 1530.8.1–2007.

Results for Radiant Exposure and Class A Crib

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 minute test period.	No Failure	
Radiant heat flux 365mm from the non-fire side exceeding 15 kW m ⁻²	No Failure	
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	No Failure	
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
		40 kW m⁻²
Test Result	BAL: A40	
In addition to the requirements in Section 6 the results of this test are applicable to the tested system being installed near ground level or adjacent to horizontal surfaces.		

Results for Radiant Exposure only

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 minute test period.		No Failure	
Radiant heat flux 365mm from the non-fire side exceeding 15 kW m ⁻²		No Failure	
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		No Failure	
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	None Applied	Peak heat flux	40 kW m⁻²
Test Result		BAL: -/40	
In addition to the requirements in Section 6 the results of this test are applicable to the tested system being installed at a minimum height of 500 mm above ground level or adjacent horizontal surfaces.			

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 the 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 AS1530.8.1. The results of the fire test contained in this test report are directly applicable, without reference to any testing authority for a technical opinion, to similar constructions provided that no individual component is removed or reduced where there has been a variation in the height of the assembly above ground level. 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 should be referred to the test applicant in the first instance to obtain appropriate documentary evidence of compliance from Bodycote 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

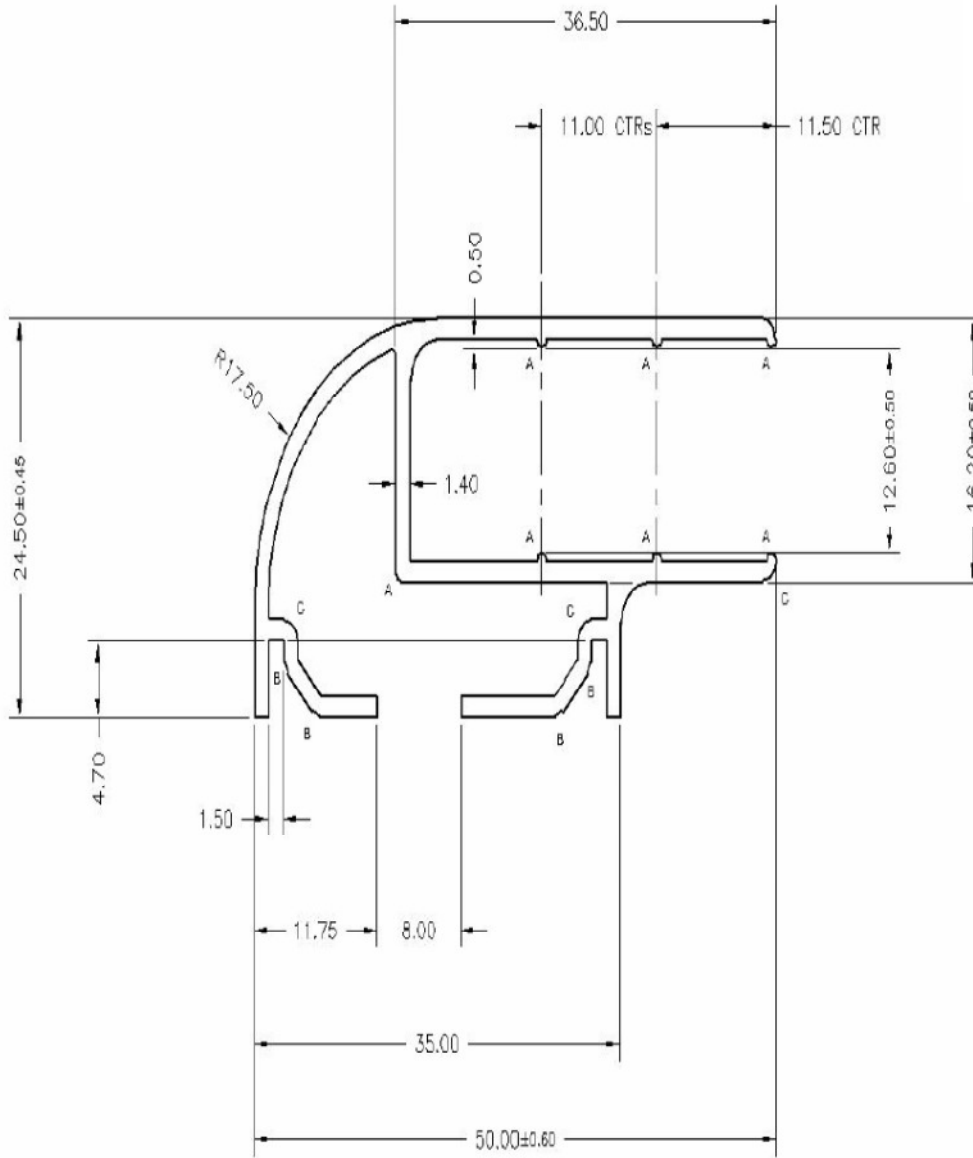


Figure A1.1: Edging Channel (Drawing provided by test sponsor.)

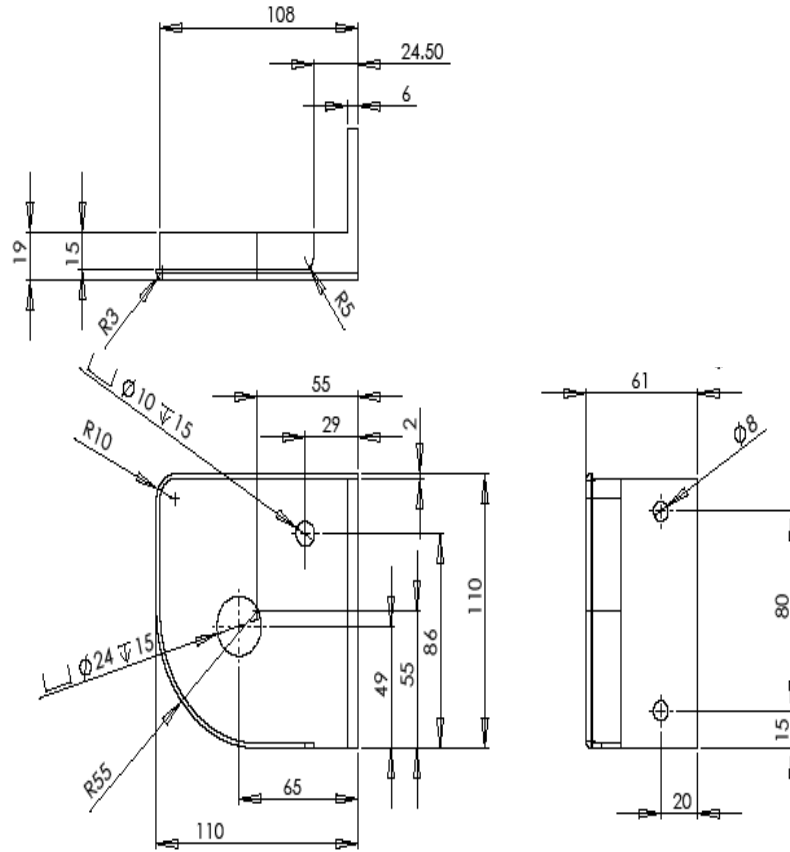


Figure A1.2: Pelmet Bracket (Drawing supplied by test sponsor.)

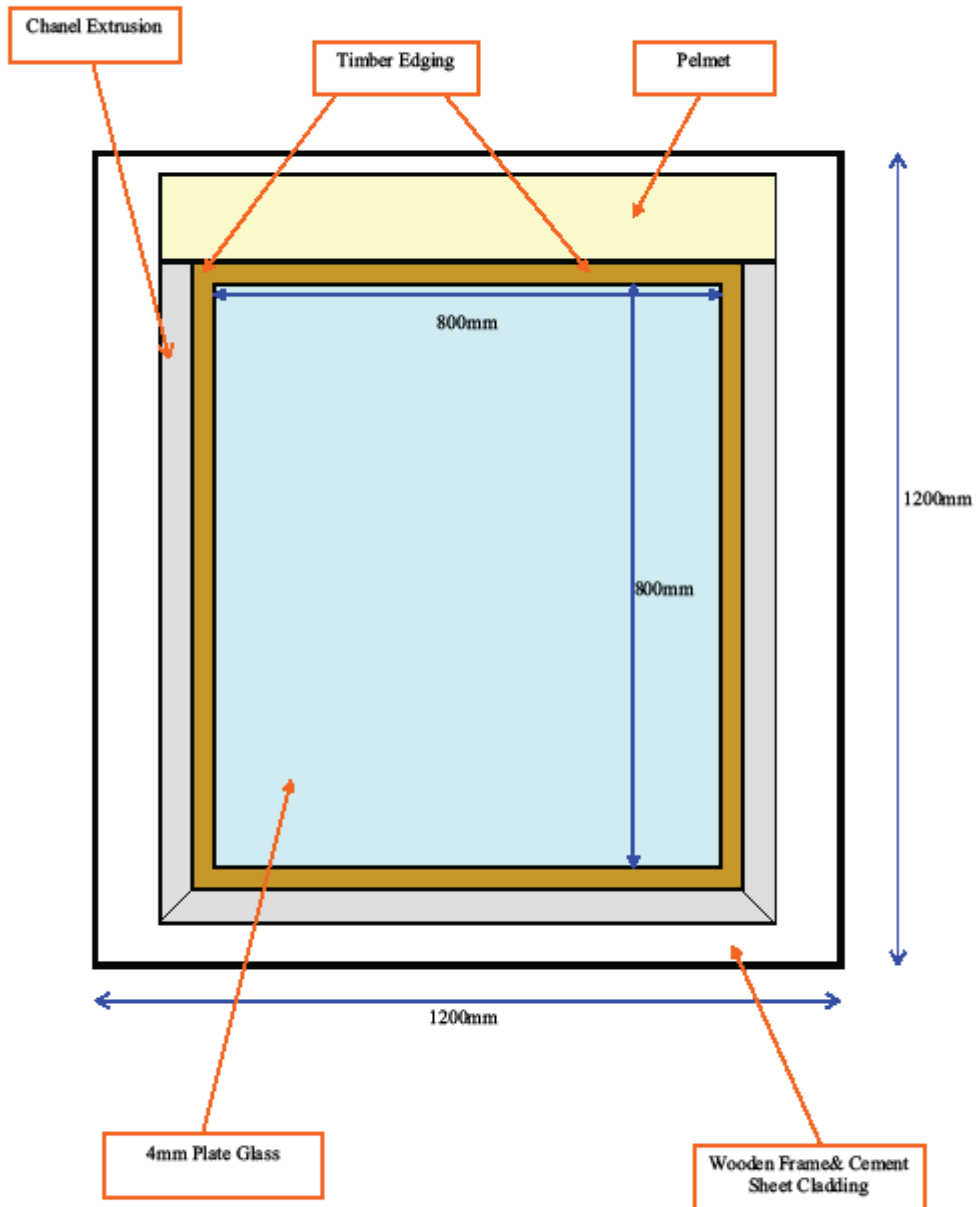


Figure A1.3: Assembly detail (Drawing supplied by test sponsor.)

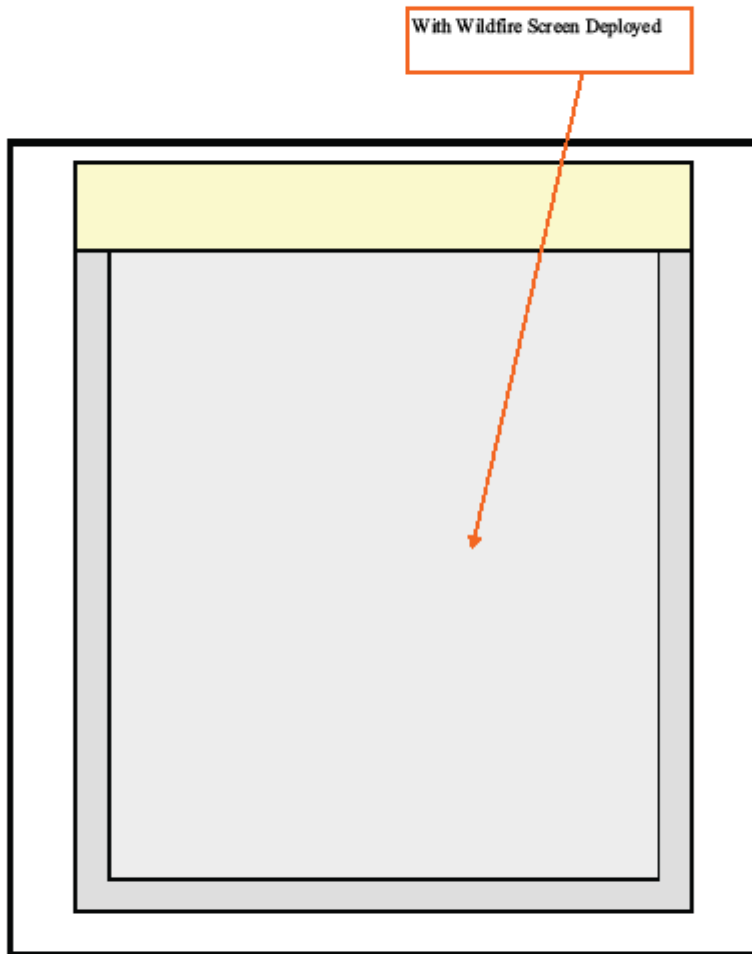


Figure A1.4: Assembly detail (Drawing supplied by test sponsor.)

APPENDIX 2 TEST OBSERVATIONS

Time		Observation
Minutes	Seconds	
Specimen F		
0	00	Crib ignited and placed upon sill, adjacent to the specimen which was then exposed to radiant panel.
1	39	Heavy grey smoke observed emanating from the pelmet.
10	00	At the end of the radiant exposure the glazing and screen were intact with some scorch marks apparent on the aluminized screen, adjacent to crib location.
60	00	No gaps have formed in the assembly nor was there any ignition of the exposed face.
60	05	Test terminated.
Specimen R		
0	00	Specimen exposed to radiant panel.
2	07	Heavy grey smoke observed emanating from the pelmet.
2	39	Some discolouration of the paint on pelmet occurred.
10	00	At the end of the radiant panel test the glazing and screen were intact.
60	00	No gaps have formed in the assembly nor was there any ignition of the exposed face.
60	05	Test terminated.

APPENDIX 3 TEST DATA

A 3.1 HEAT FLUX MEASUREMENTS

Before the test heat flux emitted by the radiant panel was measured at the centre and quarter points and the results are indicated below:

5.1 kW m ⁻²	5.1 kW m ⁻²
5.5 kW m ⁻²	
5.3 kW m ⁻²	5.1 kW m ⁻²

The average of the irradiance emitted at each of the quarter points was 0.93 of that at the central point and therefore satisfied the requirements of AS1530.8.1-2007.

A 3.2 AVERAGE HEAT FLUX RECEIVED

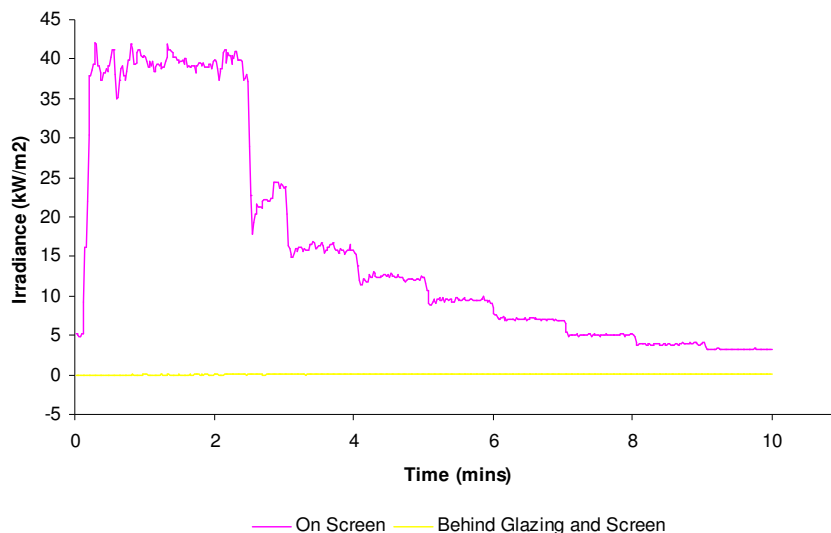


Figure A3.1. Radiant heat exposure profile and irradiance calculated for a distance of 365mm away from unexposed face of Specimen F.

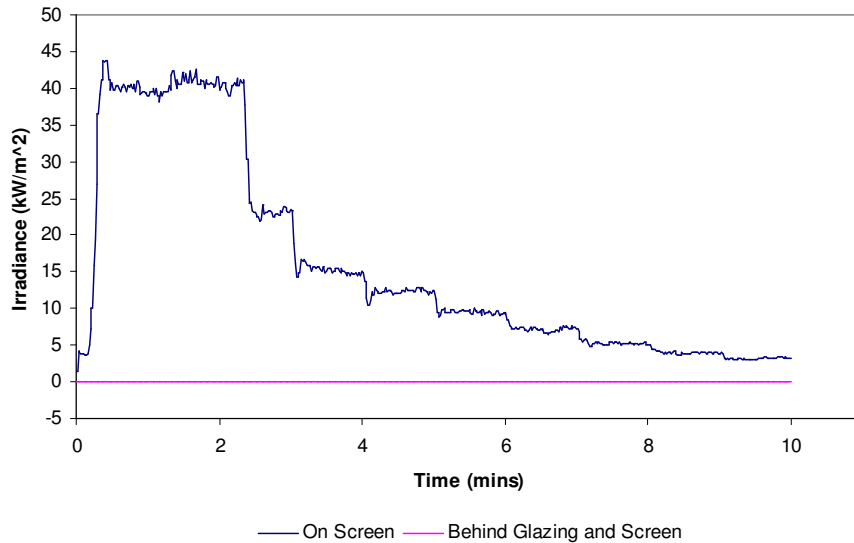


Figure A3.2. Radiant heat exposure profile and irradiance calculated for a distance of 365mm away from unexposed face of Specimen R.

APPENDIX 4 PHOTOGRAPHS



Figure A5.1 Specimen F before commencement of exposure to radiant heat.



Figure A5.2: Specimen F after exposure to radiant heat and placement of crib.



Figure A5.3: Specimen R before commencement of exposure to radiant heat.



Figure A5.4: Specimen R after exposure to radiant heat.