



REGISTERED

This is to certify that:

The Laboratory
of
Warrington Fire Research (Aust) Pty Ltd
has been accepted by the Council of
NATIONAL ASSOCIATION OF
TESTING AUTHORITIES, AUSTRALIA

as a

Registered Laboratory

The laboratory has been registered for specific tests
within the field of

Heat and Temperature Measurement

The COMMON SEAL of
NATIONAL ASSOCIATION
OF TESTING AUTHORITIES,
AUSTRALIA was affixed hereto
by authority of the Council of the
Association in the presence of -

J. A. GILMOUR
Chief Executive



Date of Registration 7 November 1991

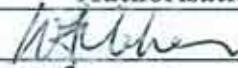
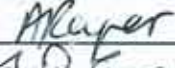
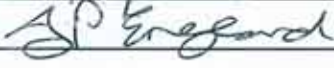
Registered Number 3277

CONFIDENTIAL REPORT

**FIRE RESISTANCE TEST IN ACCORDANCE
WITH AS1530.4-1997 SECTIONS 2 & 3 AS
APPROPRIATE ON A NON-LOADBEARING
STEEL STUD PARTITION INCORPORATING
A PHENOLIC FOAM INFILL AND FACED WITH
INSUL-CRETE SUNBLOK**

Report for

Insul-crete Pty Ltd
628 Skipton Street
Ballarat
Victoria 3350
AUSTRALIA

Report	Name	Signature/* Authorisation	Date
Prepared by:	K.W. Chan		3/7/01
Prepared by:	A.F. Rayner		3/7/01
Reviewed by:	J.P. England		3/7/01

* For and on behalf of Warrington Fire Research Group.

This report may only be reproduced in full without modifications. Extracts or abridgments of reports shall not be published without permission of Warrington Fire Research.

© 2001 Warrington Fire Research (Aust) Pty Ltd
03/07/01
F91864.doc

Warrington Fire Research (Aust) Pty Ltd., Unit 2, 409 - 411 Hammond Road, Dandenong, Victoria 3175, Australia.
P.O. Box 4282, Dandenong South, Victoria 3164, Australia. Tel: Int+61 (0)3 9793 0088, Fax: Int+61 (0)3 9793 0111 or (0)3 9701 7222
Email: testing@wfra.com.au, Home Page: www.wfra.com.au A.B.N. 81 050 241 524

**FIRE RESISTANCE TEST IN ACCORDANCE WITH AS1530.4-1997 SECTIONS
2 & 3 AS APPROPRIATE ON A NON-LOADBEARING STEEL STUD PARTITION
INCORPORATING A PHENOLIC FOAM INFILL AND FACED WITH
INSUL-CRETE SUNBLOK**

Report Sponsor	Insul-crete, 628 Skipton Street, Ballarat, Victoria 3350, Australia.
Test Laboratory	Warrington Fire Research (Aust) Pty Ltd, Unit 2, 409-411 Hammond Road, Dandenong South, Victoria 3175, Australia.
Test Date	5th June 2001.
Test standards	AS1530.4-1997 Sections 2 & 3 as appropriate.
General description of tested specimen	<p>The test assembly comprised a nominal 3000mm × 3000mm × 145mm thick steel stud partition incorporating a phenolic foam infill and faced with a render material named by the test sponsor as insul-crete sunblok. The partition was constructed by the test sponsor within a concrete block lined steel test frame supplied by Warrington Fire Research (Aust) Pty Ltd. The steel stud partition was constructed using BHP House framing studs and tracks (Nominal 75mm x 35mm x 0.75mm). The top and bottom tracks were fastened to the concrete block surround and the studs were fastened to the top track only. The eastern edge was fastened to the concrete block surround of the test frame whereas the western edge remained free with an approximate 50mm gap (Ceramic fibre wool was hand fed into this gap) to the concrete block surround. Builders strapping (30mm wide x 1mm thick) was fastened to the exposed face only. The Phenolic foam wall panel infill was supplied by NOVIO Vic Pty Ltd and installed between the stud sections by the test sponsor. A coating of insul-crete sunblok material was hand trowelled to the two faces of the specimen to a nominal thickness of about 15mm. A small amount of Fondue cement was added to the render applied about the butt joint region of the mesh. The surface was then scored using a comb type trowel. A second coat render was applied directly to the scoured up face of the first render coating on both faces. A final coating (finishing coat for internal walls) was applied to a nominal thickness of 3.0mm. This coating was applied only to the exposed face of the test specimen. For the final coating, an adhesive material was added to the insul-crete sunblok applied to the eastern half (vertical) of the exposed face. A detailed description of the test construction is contained within Appendix 1.</p>
Instrumentation	<p>The instrumentation was provided in accordance with AS1530.4-1997 Sections 2 & 3 as appropriate. The positions of the thermocouples are described in Table A2.1, and are shown in Drawing F91864-TS-02. Deflection measurement positions are shown in Drawing F91864-TS-03.</p>
Test Procedures	<p>The test procedures were as specified in AS1530.4-1997 Sections 2 & 3 as appropriate. Control of the furnace temperature was maintained within the prescribed limits of variance from the time/temperature curve. The pressure was maintained at approximately 0 Pa at 500mm from the notional floor level after the first five minutes then for the duration of the test. Heating was terminated after 241 minutes at the request of the test sponsor.</p>
Test Duration	241 minutes.

Table 1: Test Results

Ambient Air Temperature	Approximately 23°C at the commencement of the fire resistance test.		
Temperatures Measured versus Time	Refer to Table A2.1 and Figures A2.1 to A2.5 in Appendix 2		
Irradiance Measured versus Time	Refer to Figure A2.6 in Appendix 2		
Deflections Measured versus Time	Refer to Figure A2.7 in Appendix 2		
Pre-test observations	Refer to Table A2.2 in Appendix 2.		
Observations	Refer to Table A2.3 in Appendix 2.		
Performance Against the Criteria Specified in AS1530.4-1997	Structural Adequacy	Integrity (minutes)	Insulation (minutes)
	Not applicable	No failure at 241 minutes	232
Fire Resistance Level (FRL) Designation	For the purposes of the Building Code of Australia in Australia the specimen may be regarded as having achieved the Fire Resistance Levels (FRL's) as shown in Table 2.		

Table 2: Summary of Fire Resistance Levels Ascertained for the Purpose of the Building Code of Australia for the Tested Specimen

Test Specimen Designation	Fire Resistance Level (FRL)
Nominal 3000mm × 3000mm × 145mm thick steel stud partition incorporating a phenolic foam infill and faced with insul-crete sunblok	-/240/180

LIMIT OF APPLICATION

The results of this fire test may be used to directly assess fire hazard, but it should be recognised that a single test method does not provide a full assessment of fire hazard under all fire conditions.

The results of this fire test apply to the configuration as tested. Any variations to the test configuration may achieve different results. It is therefore recommended that any proposed variation to the tested configuration should be referred in the first instance to Warrington Fire Research (Aust) Pty Ltd in the first instance.

WFRA

APPENDIX 1

DESCRIPTION OF THE SPECIMEN

A1.1 GENERAL DESCRIPTION

- A1.1.1 The test assembly comprised a nominal 3000mm × 3000mm × 145mm thick steel stud partition incorporating a phenolic foam infill and faced with a render material named as insul-crete sunblok by the test sponsor. The partition was constructed by the test sponsor within a test frame supplied by Warrington Fire Research (Aust) Pty Ltd.
- A1.1.2 The frame was constructed using BHP House Framing Studs and track members (75mm × 35mm × 0.75mm Nominal). The top and bottom tracks were fastened to the concrete block surround using M8 × 50mm long masonry anchors at 600mm centres. Studs were fastened to the top track only with M6 × 25mm long bolts with nuts and mudguard washers with slotted holes provided in the stud material. The eastern edge stud (looking from unexposed face) was fastened to the concrete block surround using M10 × 50mm long masonry anchors whereas the western edge was free with an approximate 50mm gap to the concrete block surround. Noggins were fastened between the studs at approximately mid-height of the specimen frame.
- A1.1.3 Ceramic fibre wool was hand fed to fill the 50mm gap between the vertical steel stud and the concrete block surround along the western edge of the test specimen.
- A1.1.4 Builders strapping of 30mm wide × 1.0mm thick was fastened to the frame on the fire exposed side only at the studs/noggins/tracks using M4 × 10mm long Hex head Tek screws (self drilling/tapping).
- A1.1.5 The test sponsor then installed the phenolic foam infill of 68mm thickness, supplied by NOVIO (VIC) Pty Ltd, between the stud sections. The measured density of the foam infill was recorded as being 46.7 kg/m³.
- A1.1.6 A series of 'bottle-tops' were screw fixed to the studs and tracks using self-drilling/tapping screws on both faces of the specimen and acted as spacers (approximately 2mm) for the weld mesh as detailed below.
- A1.1.7 A single layer of 25mm × 25mm × 2.5mm galvanized weld mesh made up in two sections, 2400mm wide and 600mm wide respectively, and butt jointed together with five (5-off) wire twitches and three (3-off) flattened saddles (detailed below), was fixed to both faces of the specimen. The vertical butt joints were staggered to each other with the joint on the exposed face being in the eastern half of the specimen. The fixing was achieved using flattened saddles (60mm long × 14mm wide) and self drilling and tapping hex head TEK screws (2-off per saddle) at each bottle top location (Refer Drawing F91864-

TS-01 for further information). Random gaps of up to approximately 10mm between the mesh and the studs and panel infills (phenolic foam) were observed due to local buckling of the mesh.

- A1.1.8 A coating of insul-crete sunblok was hand trowelled to the two faces of the specimen to a nominal thickness of about 15mm. A small amount of Fondue cement was added to the insul-crete sunblok applied about the butt joint region after straightening out the mesh by using a steel angle leaning against the outwards bowing of the mesh. The angle was removed after this insul-crete sunblok had gone off, leaving the rendered face flat. The surface was then scored using a comb type trowel. This coat was applied on 22/3/01.
- A1.1.9 An average coating thickness of 15.5mm and 16.4mm was obtained for the exposed face and the unexposed face respectively.
- A1.1.10 A second coat render was applied directly to the scoured up face of the first coating. This second coating was applied by the test sponsor to both faces except for a 750mm wide strip across the top section of the unexposed face. This coat was applied on 28/3/01.
- A1.1.11 The average thickness of the second coat was determined to be 18.5mm and 15.2mm on the exposed face and the unexposed face respectively.
- A1.1.12 A final coating (finishing coat for internal walls) was applied by the test sponsor to a nominal thickness of 3.0mm. This coating was applied only to the exposed face of the test specimen. At the same time, the remaining portion of the second coating was applied to the top section of the unexposed face, which, although trowelled flat, had an open texture finish. This coat was applied on 4/04/01.
- A1.1.13 For the final coating, an adhesive material was added to the insul-crete sunblok applied to the eastern half (vertical) of the exposed face.
- A1.1.14 The specimen had a final thickness of approximately 145mm after the application of the insul-crete sunblok.
- A1.1.15 Samples of the insul-crete sunblok for coats 1 and 2, as applied, were retained by Warrington Fire Research (Aust) Pty Ltd for density and moisture content calculations. A confidential disclosure has also been provided by the test sponsor for the insul-crete sunblok composition and is held on a confidential file by Warrington Fire Research (Aust) Pty Ltd.

A1.2 DRAWINGS OF SPECIMEN

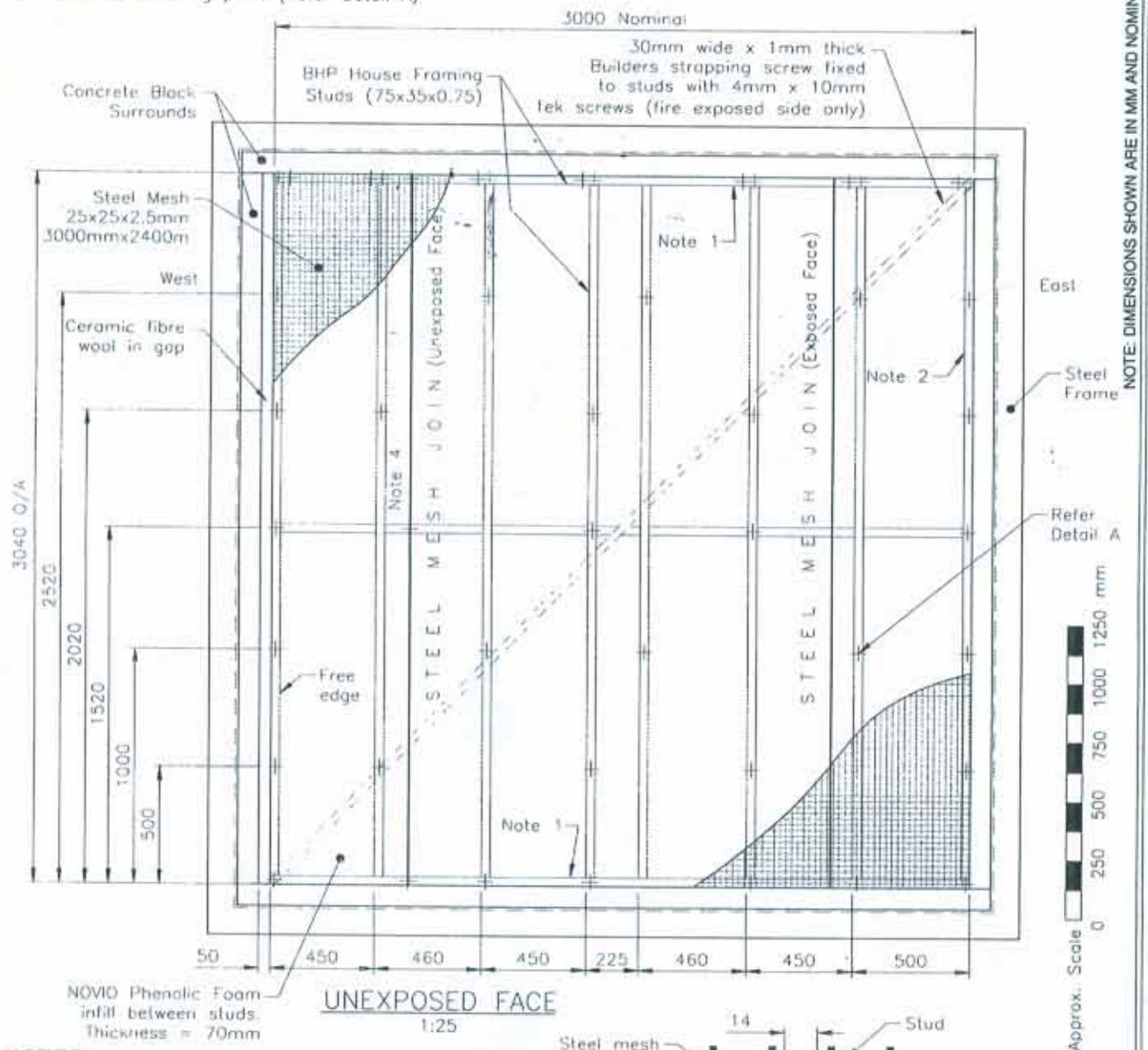
Drawing No.	Description
F91864-TS-01	Construction details
F91864-TS-02	Thermocouple positions and Deflection measurement positions
F91864-TS-03	Building Panel – Cross section of panel

LEGEND:

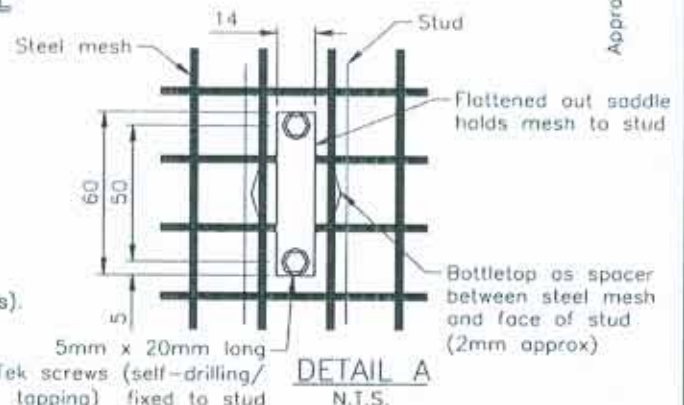
- | Stud fixing point (Refer Note 3)
 + Steel mesh fixing point (Refer Detail A)

REVISIONS

REV	DESCRIPTION	BY	DATE	APP
0	Issued For Report Information	AR	28/06/01	-

**NOTES:**

- Top and bottom channel sections (stud material) (material) fastened to concrete block surround with M8 x 50 long masonry anchors at 600 centres.
- Stud along eastern side fastened to concrete block surround with M10 x 50 long masonry anchors.
- Studs fixed to top channel only with M6x25 bolts and nuts with mudguard washers (Slotted holes in studs).
- Mesh joined with five (5-off) wire twitches and three (3-off) cleats at 90° as per Detail A. Note that joints are staggered for exposed/unexposed faces.



Warrington
FIRE
research

P.O. Box 4282
 Dandenong South
 Victoria 3164
 Australia
 Tel: +613 9767 1066
 Fax: +613 9767 1001
 or +613 9767 1051
 Email: testing@wfra.com.au
 A.B.N. 61 050 241 524

SIGNATURES		Scale	Project	Title
	SIGNED	As Shown	F91864	Insul-crete Wall Test Construction Details Pre-Render Stage
DRAWN	A F Rayner	DRG No.	F91864-TS-01	
		CAD Ref.	F91864-WALLTEST-00	

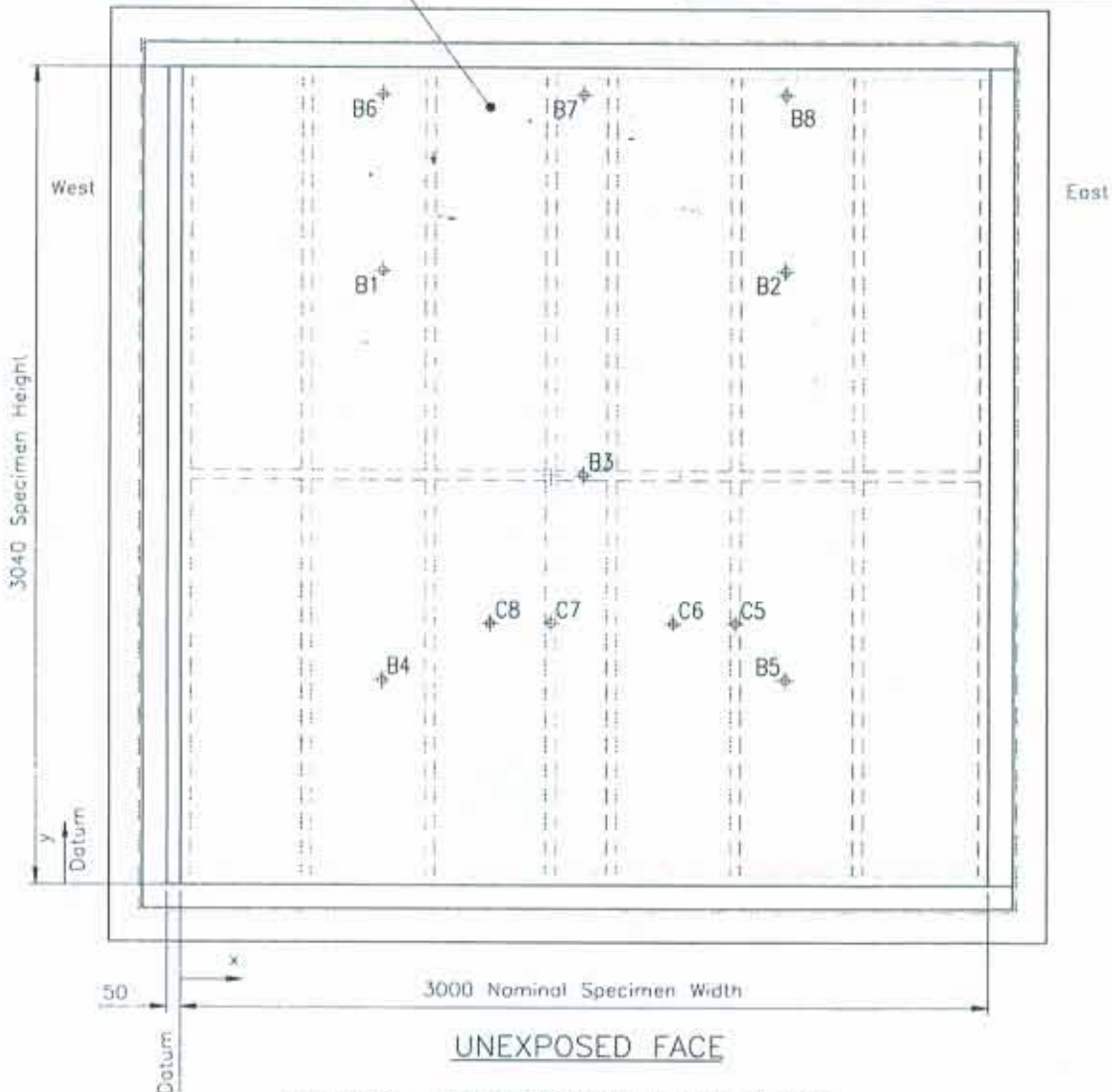
© 2001 Warrington Fire Research (Aust) Pty Ltd.
 03/07/01

F91864.doc

Warrington
FIRE
research
 CONSULTANCY • TESTING

See table below for insul-crete sunblok material coat thicknesses

REVISIONS				
REV	DESCRIPTION	BY	DATE	APP
0	Issued For Report Information	AR	28/06/01	-



SURFACE THERMOCOUPLE POSITIONS

T/C	x	y	Description	T/C	x	y	Description
B1	750	2280	Partition 1/4 point	B7	1500	2940	100mm from top edge
B2	2250	2280	Partition 1/4 point	B8	2250	2940	100mm from top edge
B3	1500	1520	Partition mid point	C5	2064	970	Lower section on stud
B4	750	760	Partition 1/4 point	C6	1834	970	Lower section between studs
B5	2250	760	Partition 1/4 point	C7	1378	970	Lower section on stud
B6	750	2940	100mm from top edge	C8	1154	970	Lower section between studs

LEGEND:

✦ x Thermocouple position

INSUL-CRETE SUNBLOK COAT THICKNESS (AVERAGE)

Side of specimen	Coat thickness (mm)			Notes
	1	2	3	
Non-fire side	16.4	15.2	-	
Fire exposed side	15.5	18.5	3.0	3rd coat on Eastern half of specimen included an adhesive additive.

Approx. Scale 0 250 500 750 1000 1250 mm

NOTE: DIMENSIONS SHOWN ARE IN MM AND NOMINAL

Warrington
FIRE
research

P.O. Box 4282
Dandenong South
Victoria 3164
Australia.
Tel: +613 9767 1066
Fax: +613 9767 1001
or +613 9767 1051
Email: testing@wfra.com.au
A.B.N. 61 050 241 524

SIGNATURES

SIGNED	DATE
DRAWN A F Royner	28/06/01

Scale

1:25

Project

F91864

Title

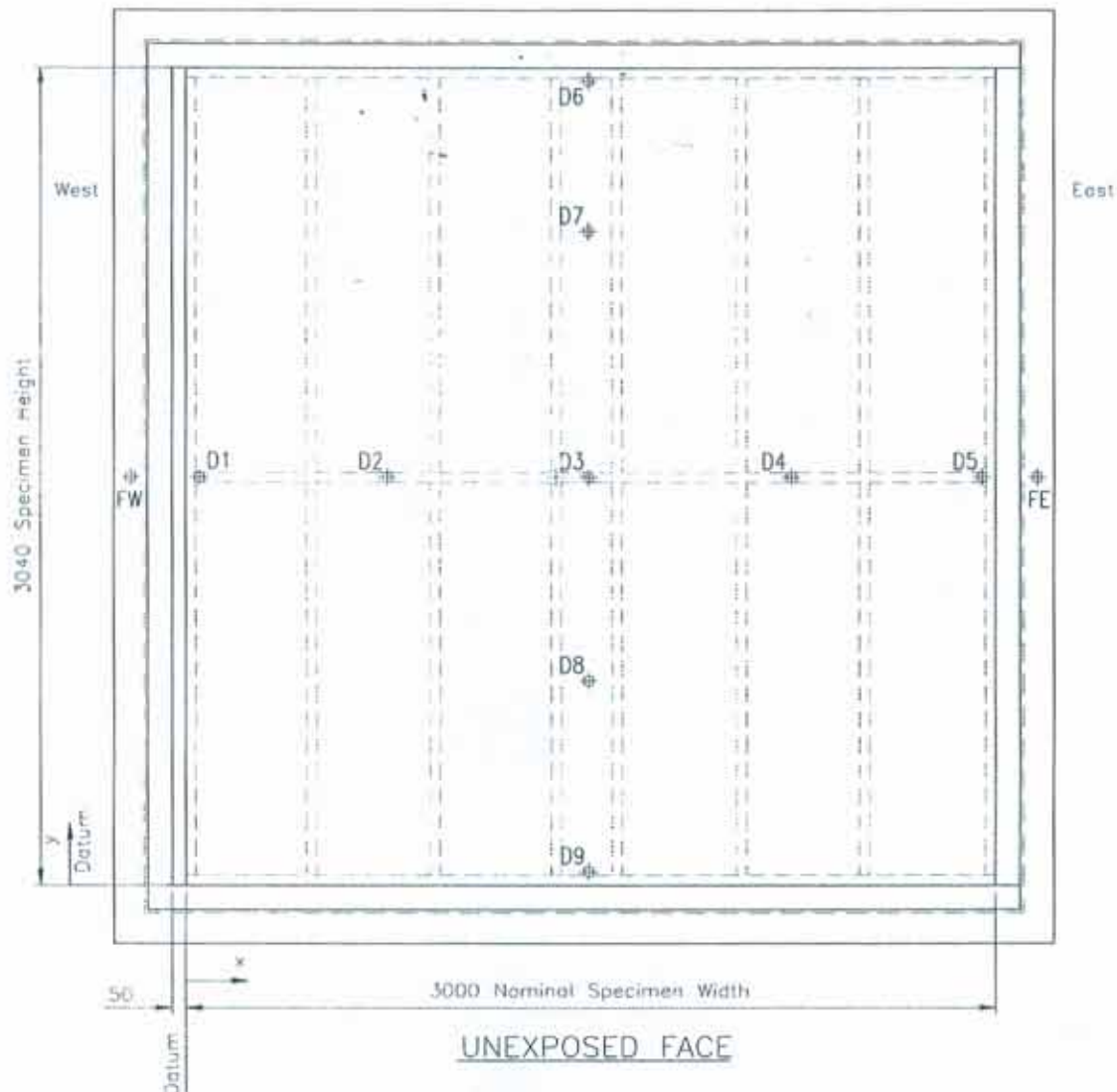
Insul-crete Wall Test
Thermocouple positions
and General details

DRG No.
F91864-TS-02

CAD Ref.
F91864-WALLTEST-00

REVISIONS

REV	DESCRIPTION	BY	DATE	APP
0	Issued For Report Information	AR	28/06/01	-



DEFLECTION MEASUREMENT POINTS

Pt	x	y	Description	Pt	x	y	Description
D1	1130	2380	Western edge (horizontal centreline)	D7	1730	1220	Upper 1/4 point (vertical centreline)
D2	1210	2380	Western 1/4 point (horizontal centreline)	D8	2260	1220	Lower 1/4 point (vertical centreline)
D3	80	1220	Midpoint	D9	1130	60	Bottom (vertical centreline)
D4	610	1220	Eastern 1/4 point (horizontal centreline)	FW	-	-	Test frame West
D5	1120	1220	Eastern edge (horizontal centreline)	FE	-	-	Test frame East
D6	1220	1220	Top (vertical centreline)				

LEGEND:

⊕ x Deflection measuring point

Approx. Scale 0 250 500 750 1000 1250 mm

NOTE: DIMENSIONS SHOWN ARE IN MM AND NOMINAL

Warrington
FIRE
research

P.O. Box 4282
Dandenong South
Victoria 3184
Australia.

Tel: +613 9767 1066
Fax: +613 9767 1001
or +613 9767 1051
Email: testing@wfrs.com.au
A.B.N. 81 050 241 524

SIGNATURES		
	SIGNED	DATE
DRAWN	A F Royner	28/06/01

Scale	Project
1:25	F91864
DRG. No.	F91864-TS-03
CAD Ref.	F91864-WALLTEST-00

Title
Insul-crete Wall Test
Deflection measurement
locations

APPENDIX 2**TEST DATA & OBSERVATIONS****Table A2.1: Specimen Temperatures**

Element	T/C No.	DESCRIPTION	POSITON ¹	TEMP (°C) at t (minutes)						LIMIT ² (minutes)
				t=0	t=30	t=60	t=120	t=180	t=240	
Partition Surfaces (¼ & mid)	B1	TOP WEST ¼ POINT	x=750, y=2280	23	76	71	83	137	199	-
	B2	TOP EAST ¼ POINT	x=2250, y=2280	23	59	65	77	86	167	-
	B3	CENTRE PARTITION	x=1500, y=1520	23	54	68	85	99	185	-
	B4	BOTTOM WEST ¼ POINT	x=750, y=760	22	38	55	81	87	168	-
	B5	BOTTOM EAST ¼ POINT	x=2250, y=760	22	40	59	75	82	137	-
Partition Surfaces (Top Section)	B6	100mm FROM TOP EDGE	x=750, y=2940	23	43	62	79	92	165	-
	B7	100mm FROM TOP EDGE	x=1500, y=2940	23	64	68	74	81	101	-
	B8	100mm FROM TOP EDGE	x=2250, y=760	23	45	65	81	89	143	-
Partition Surfaces (Additional)	C5	ON STUD	x=2064, y=970	22	60	72	85	106	191	-
	C6	BETWEEN STUDS	x=1834, y=970	22	65	66	82	92	167	-
	C7	ON STUD	x=1378, y=970	22	57	71	88	102	188	-
	C8	BETWEEN STUDS	x=1154, y=970	23	68	66	85	92	169	-

- Notes: ¹ Positions are all shown in millimetres and are measured from the bottom western corner of the doorframe (See Drawing F91882-TS-01).
- ² Limit time is the time to the nearest whole minute, rounded down to the nearest minute, at which the temperature recorded by the thermocouple does not rise by more than 180 K above the initial mean temperature.
- ³ '-' indicates the temperature limit was not exceeded during the test period.

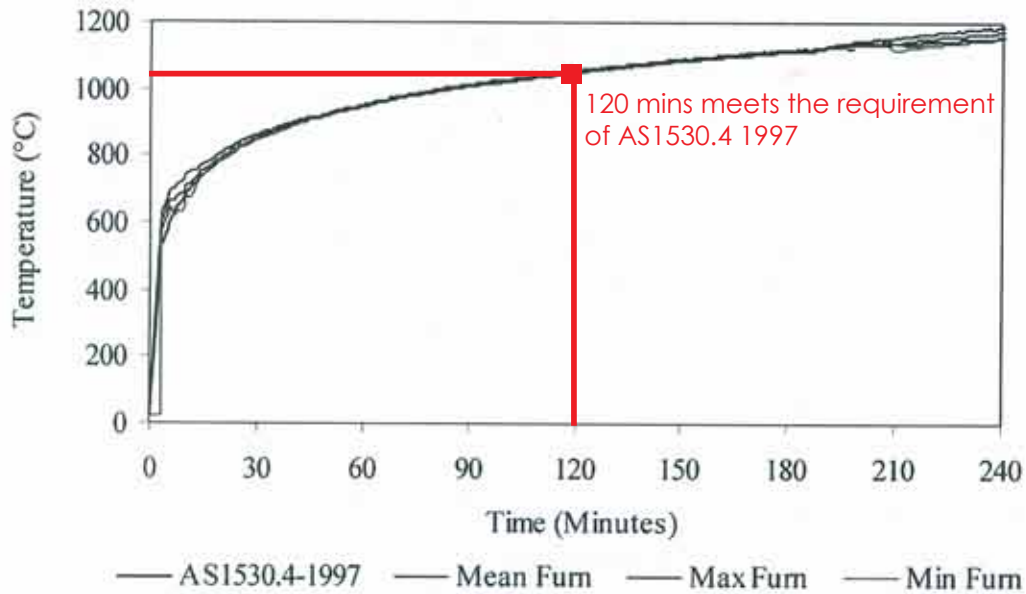


Figure A2.1: **Furnace Temperatures** versus Time

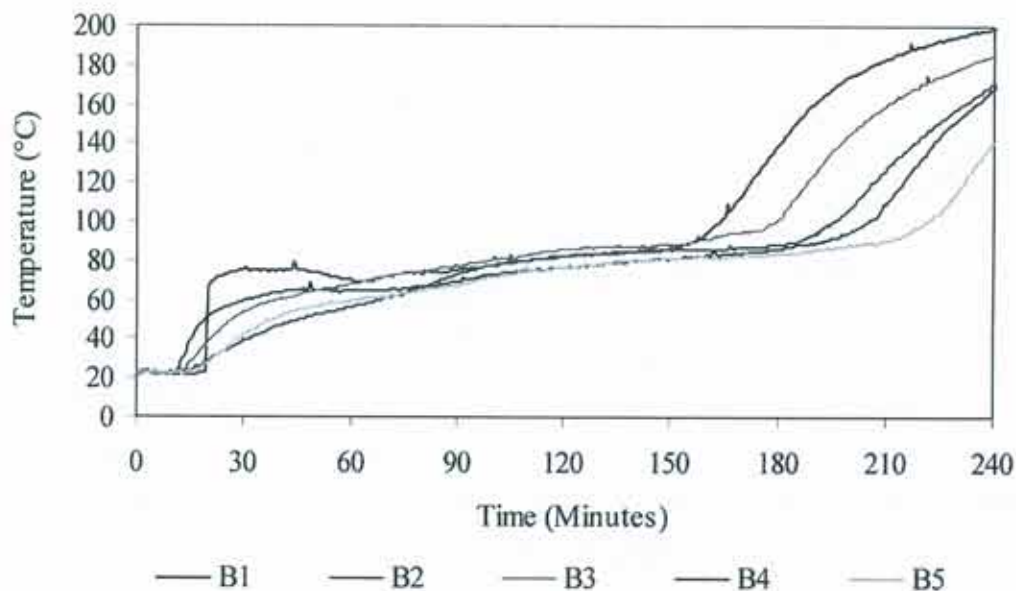


Figure A2.2: Temperatures on partition at 1/4 and mid point Vs Time

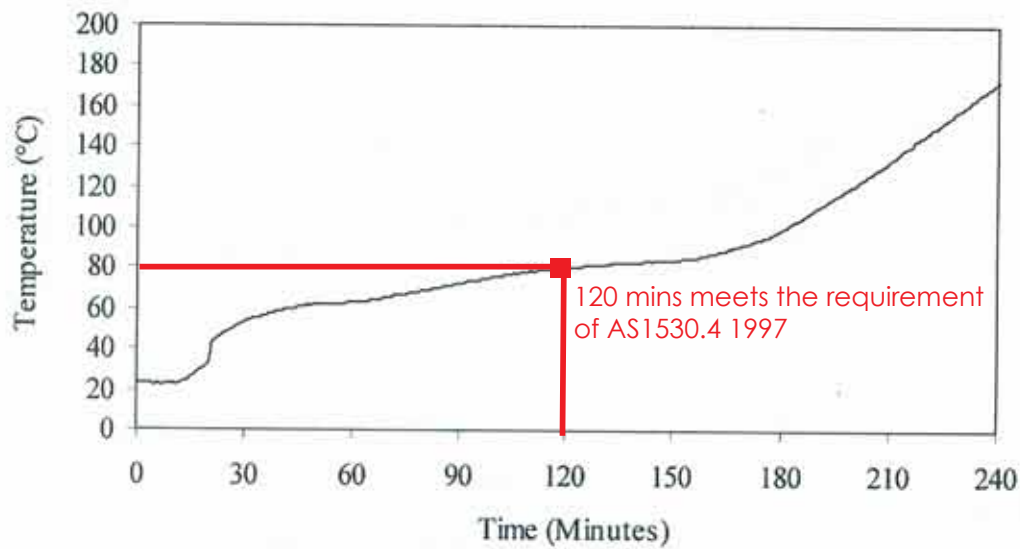


Figure A2.3: Average partition temperature (average of B1-B5) Vs Time

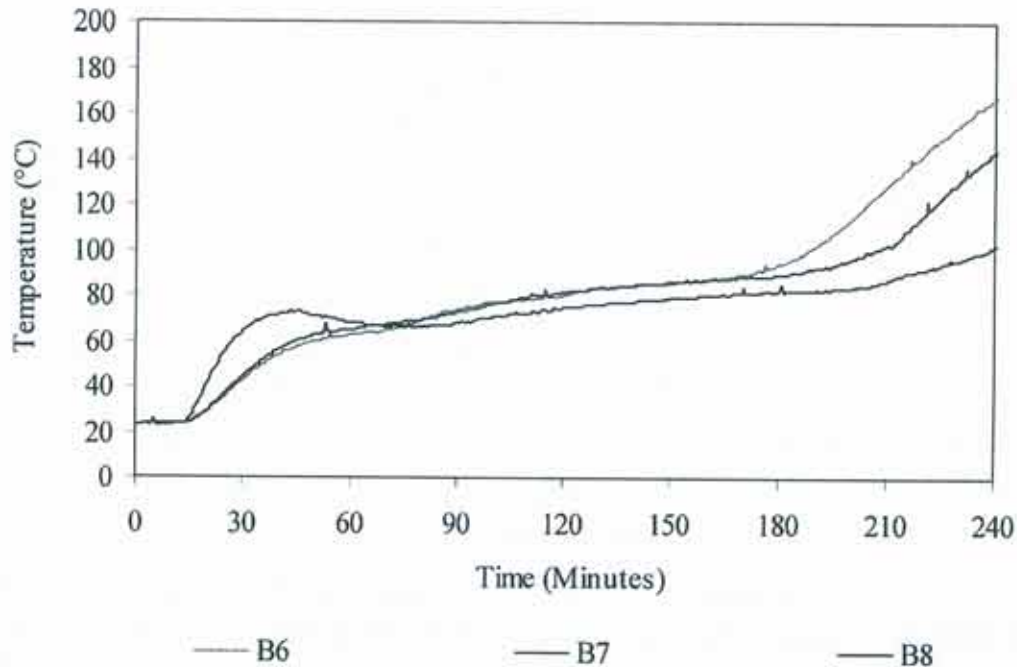


Figure A2.4: Temperatures at top section of partition Vs Time

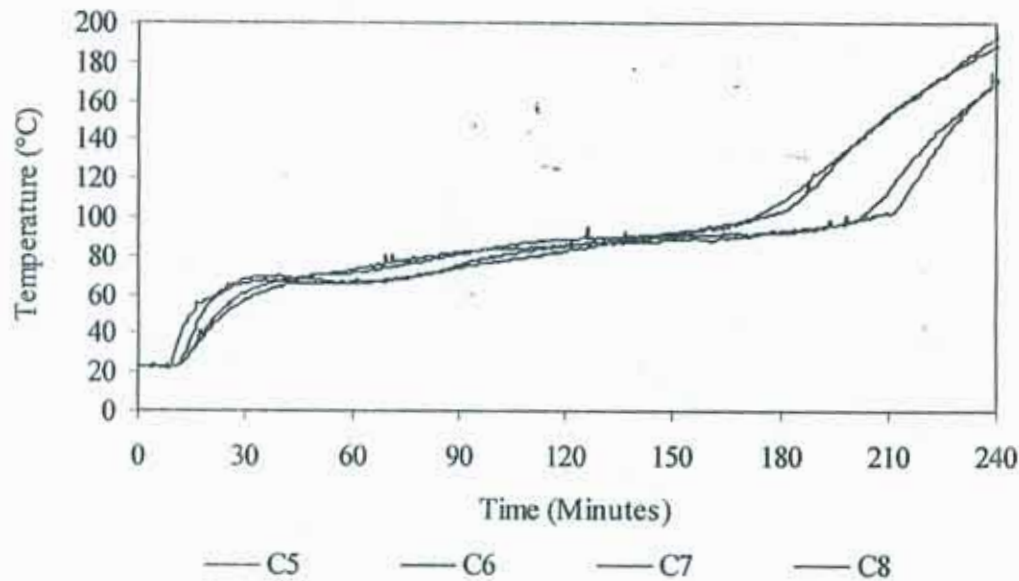


Figure A2.5: Temperatures at lower-mid section of partition Vs Time

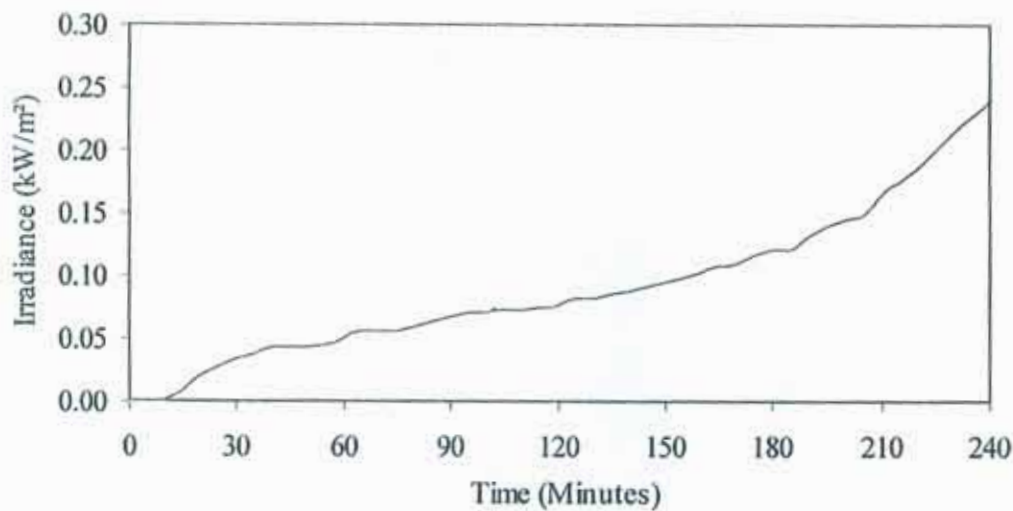


Figure A2.6: Radiation emitted from partition Vs Time

The Radiometer was positioned 2255mm above floor level (coinciding with centre point of partition) with a viewing angle of 60°, and was placed 3702mm away from the specimen.

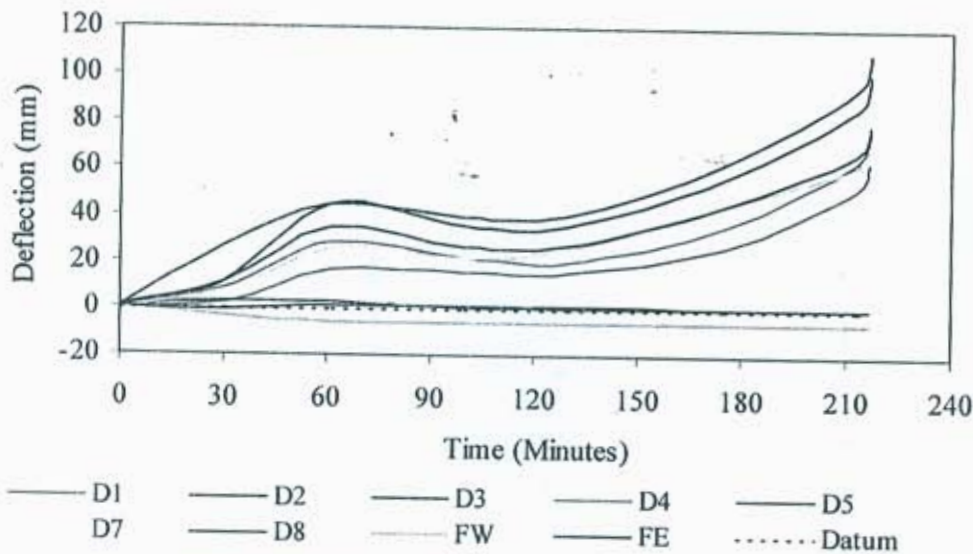


Figure A2.7: Out-of-Plane Deflection of Wall Vs Time

*Positive measurements was movement of partition inward (towards furnace) and
Negative measurements was movement of partition outward (away from furnace)*

A2.2 PRE-TEST OBSERVATIONS

A2.2.1 Two material cracks of hairline thickness were noted in the exposed face of the test specimen. One crack ran vertically down the specimen and was approximately 610mm from the eastern edge. The position of this crack appeared to coincide with the position of the join in the steel weld mesh that was under the layers of insul-crete sunblok. The second crack was a horizontal crack and was approximately 810mm long and started from the western edge of the test specimen 1100mm from the bottom. These cracks had occurred during the curing cycle (Refer Plates 1 and 2 in Appendix 3 for further information).

A2.2.2 Following the placement of the test specimen against the furnace and before commencement of the fire resistance test it was noted that cracking of the material at both top corners of the unexposed face had occurred. The two cracks were at about 45° across each corner commencing at about 600mm out from each corner. These cracks of hairline thickness were not observed when the surface thermocouples were attached in this area. The exposed face was then looked at through the observation ports and there were no cracks evident in either corner section.

Table A2.3: Test Observations

Time		U/E	Test Observations F91864
Min	Sec		
0	00	U	Fire Resistance Test commenced.
1	20	U	Slight amount of smoke was emitted from between the furnace seals at the top of the test specimen.
6	10	U	Cement render on eastern exposed face was sloughing off. Cracking sounds were heard coming from the test specimen.
7	00	U	The partition had deflected inwards.
7	30	E	Cement render on the top section of the eastern exposed face had sloughed off.
9	00	U	Smoke was emitted from the top of the test specimen between the concrete blocks and the edge of the test specimen.
14	00	U	Smoke was emitted from around the edges of the test specimen.
15	30	U	Top right hand eastern corner of the unexposed face had darkened in colour.
17	30	U	Smoke was emitted from around the edges of the test specimen.
18	00	U	Moisture precipitation was observed along the eastern edge of the test specimen.
20	30	E	Cement render on the entire eastern exposed face had sloughed off.
23	40	U	Smoke was emitted from the top of the test specimen between the concrete blocks and the edge of the test specimen.
27	30	U	There was a decrease in the amount of smoke that was emitted from the edges of the test specimen.
30	00	U	No further changes had occurred. Test specimen was still maintaining integrity in accordance with AS1530.4-1997.
36	20	U	Smoke was emitted from around the edges of the test specimen.
42	00	E	Western exposed face appeared to be intact.
57	00	E	A horizontal crack had developed and widened on the western exposed face.
63	20	U	Cracking sound was heard from the specimen.
60	00	U	No further changes had occurred. Test specimen was still maintaining integrity in accordance with AS1530.4-1997.
65	00	E	Eastern exposed edge was buckled inwards towards the furnace.
66	00	E	An additional crack running vertically down from near the top of the eastern exposed face had developed.
70	10	E/U	Flaming was observed on the eastern exposed face of the test specimen. Smoke was emitted along this edge on the unexposed face.
75	00	U	Smoke was emitted from the specimen at the positions of Thermocouples B11 and C9.
76	00	U	Smoke was emitted from around the edges of the test specimen.
86	00	U	Smoke was emitted along the eastern edge of the test specimen. There was a decrease in the amount of smoke that was emitted from the top of the test specimen.
90	00	U	No further changes had occurred. Test specimen was still maintaining integrity in accordance with AS1530.4-1997.
91	30	E/U	There was a continuation of the flaming on the eastern exposed face of the test specimen. Smoke was emitted along this edge on the unexposed face.
98	00	U	A crack was observed on the unexposed face about 620mm from the western edge of the test specimen. The position of the crack was coincident with the join between the steel mesh on the unexposed face. Steam was emitted from the crack.

Table A2.3 (continued...): Test Observations

Time		U/E	Test Observations F91864
Min	Sec		
104	00	U	A slight crack had appeared at the top western corner of the test specimen.
106	00	U	Smoke was only emitted from the eastern edge of the test specimen.
107	00	E	The flaming on the eastern exposed face had ceased.
109	05	E	Eastern exposed face was buckled in shape.
120	00	U	Smoke was emitted from along the eastern edge and from the crack on the western side (identified at 98 minutes) of the test specimen. Test specimen was still maintaining integrity in accordance with AS1530.4-1997.
128	00	U	There was a slight increase in the amount of smoke that was emitted from the crack in the western side.
145	00	U	Smoke was emitted from along the eastern edge of the test specimen. Smoke emission from the crack on the western side remained as in 128'00''.
150	00	U	Test specimen was still maintaining integrity in accordance with AS1530.4-1997.
160	00	U	Smoke was emitted (as before) from the crack in the western side of the test specimen. Smoke was emitted from the eastern side of the test specimen.
177	30	U	Roving thermocouple was applied near the crack near B11 for a period of 90 seconds and a reading of 118°C was obtained.
180	00	U	Cracks had developed in the top section of the test specimen. Test specimen was still maintaining integrity in accordance with AS1530.4-1997.
185	00	U	Roving thermocouple was applied on the crack of the western side of the test specimen.
186	30	U	Roving thermocouple reading was 98.5°C after 90 seconds.
187	00	U	Roving thermocouple was applied on the top crack of the western side of the test specimen.
188	30	U	Roving thermocouple reading was 138°C after 90 seconds.
189	00	U	No further changes had occurred.
204	30	U	Roving thermocouple was applied at approximately 470mm from the top and 950mm from the western edge of the test specimen.
206	00	U	Roving thermocouple reading was 157°C after 90 seconds.
210	00	U	Smoke was emitted from the eastern edge and through the crack in the partition of the test specimen.
216	00	U	Roving thermocouple was applied on the crack 200mm below deflection point D2.
217	30	U	Roving thermocouple reading was 180°C after 90 seconds.
220	00	U	Roving thermocouple was applied near Thermocouple B5.
221	30	U	Roving thermocouple reading was 90°C after 90 seconds. This compared to Thermocouple B5 reading of 99°C.
228	00	E	No further changes of the exposed face had occurred
239	00	U	Crack had developed above Thermocouple C2. Smoke was emitted from the eastern edge of the test specimen.
241	00	U	The furnace was shut down and the fire resistance test was terminated at the request of the test sponsor.

Please Note: U- Observations from non-fire side of the test specimen
 E- Observations from fire exposed side of the test specimen

APPENDIX 3**PHOTOGRAPHS**

- PLATE 1: Exposed face vertical hairline crack on eastern side prior to commencement of the fire resistance test.
- PLATE 2: Exposed face horizontal hairline crack on western lower corner prior to commencement of the fire resistance test.
- PLATE 3: Exposed face prior to commencement of the fire resistance test.
- PLATE 4: Unexposed face prior to commencement of the fire resistance test.
- PLATE 5: Unexposed face after approximately 120 Minutes Test Duration.
- PLATE 6: Unexposed face after completion of the fire resistance test.
- PLATE 7: Exposed face after completion of the fire resistance test and after being detached from the furnace.



Plate 1: Exposed face vertical hairline crack on eastern side prior to commencement of the fire resistance test.

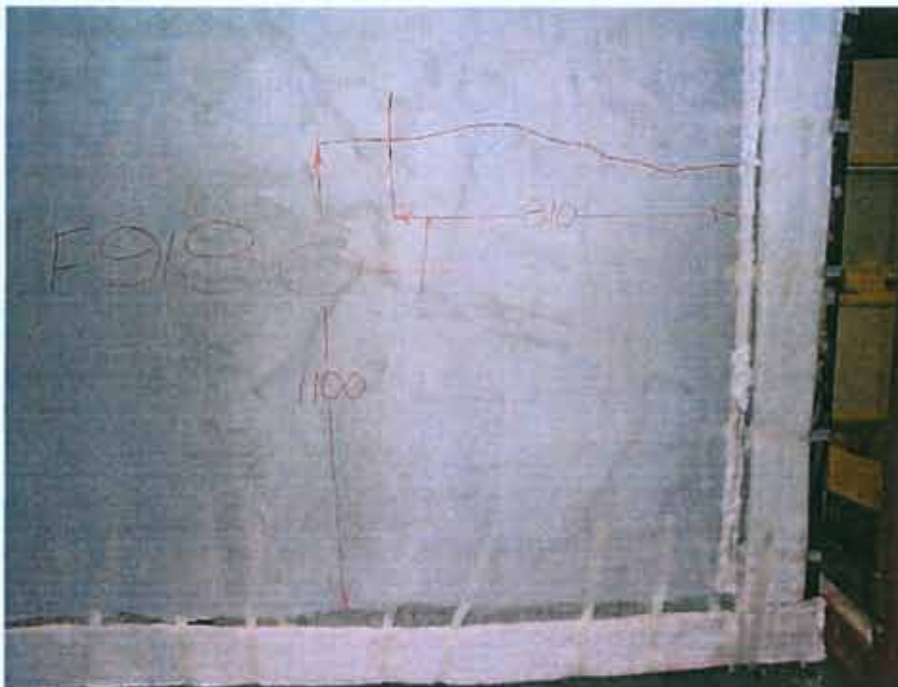


Plate 2: Exposed face horizontal hairline crack on western lower corner prior to commencement of the fire resistance test.



Plate 3: Exposed face Prior to Commencement of the fire resistance test.

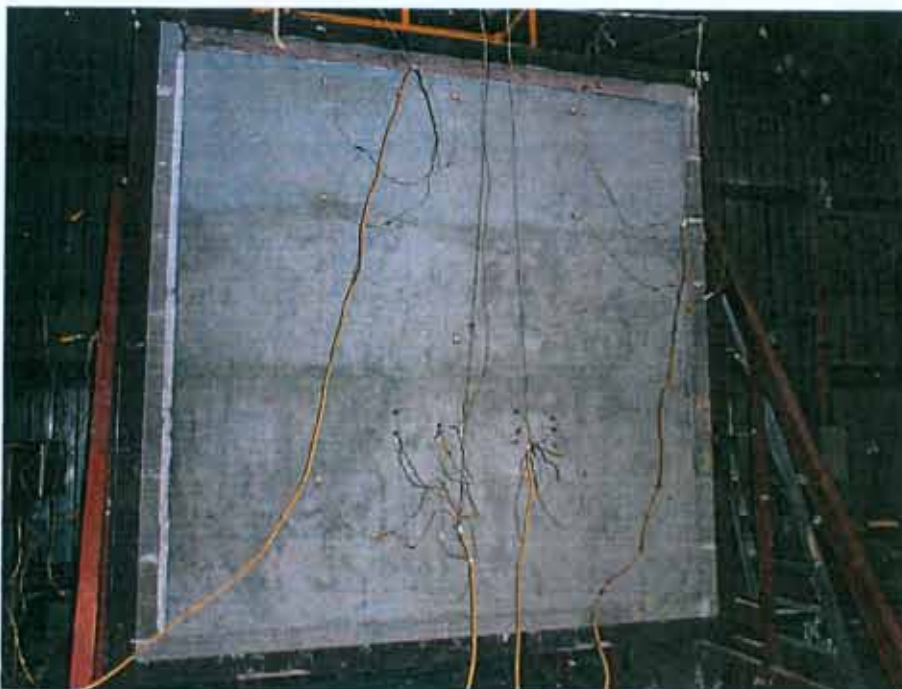


Plate 4: Unexposed face Prior to Commencement of the fire resistance test.

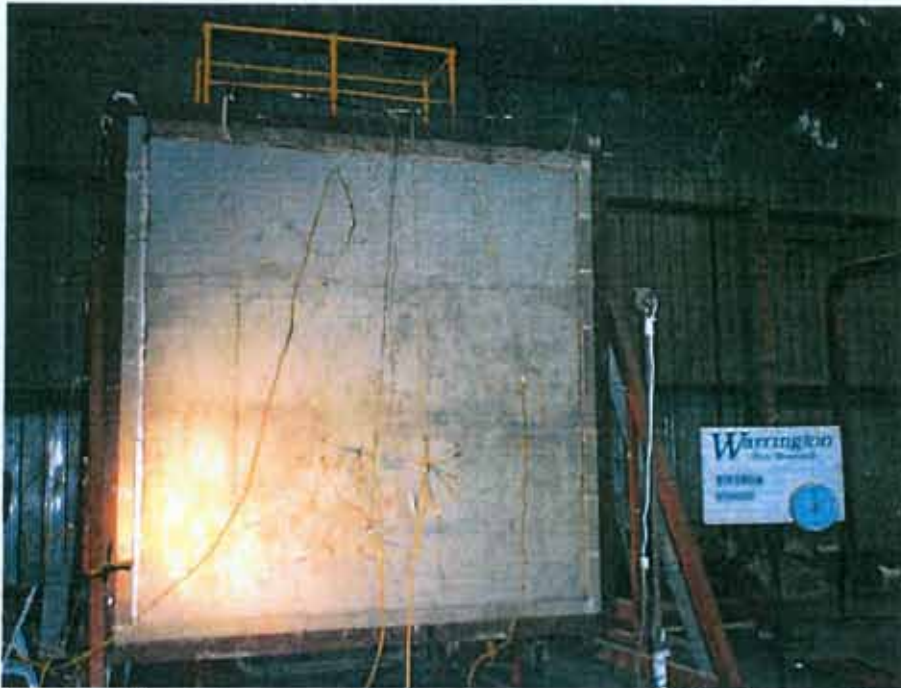


Plate 5: Unexposed face of test specimen after approximately 120 Minutes Test Duration.



Plate 6: Unexposed face of test specimen after completion of the fire resistance Test.



Plate 7: Exposed face of test specimen after completion of the fire resistance test and after being detached from the furnace.