The Building Test Centre
Fire Acoustics Structures

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Report Number **BTC 16459F**

A FIRE RESISTANCE TEST ON A METAL STUD PARTITION WITH 70mm STUD FRAMEWORK CLAD EACH SIDE WITH A DOUBLE LAYER OF 15mm GYPROC SOUNDBLOC EX EAST LEAKE LINE 3, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

Test Date: 4th August 2009
Report Amended: 5th August 2009

www.btconline.co.uk

Customer: **Hadley Group / Hadley Industries FZE (Dubai)**
Downing Street,
Smethwick,
West Midlands,
B66 2PA

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1. FOREWORD

This test report details a fire resistance test conducted on a metal stud partition clad on each face with a double layer of Gyproc SoundBloc. The test sponsor was Hadley Group / Hadley Industries FZE (Dubai).
The test specimen was installed by Alltone Limited. The construction of the specimen took place between 29th of July and 3rd August 2009. The Building Test Centre played no role in the design or selection of materials comprising the test specimen.

The test was witnessed by Mr Chris Hobbs of CMH Design and Consultancy Services Limited and conducted on the 4th August 2009.

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedures outlined in EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in EN 1364-1 is not covered by this report.

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.

2. REPORT AUTHORISATION

Report Author	Authorised by
Felix Ahatty BEng. (Hons.) Technologist	**Paul Miller** BSc. (Hons) Laboratory Supervisor

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3. TEST REPORT AMENDMENTS

Page	Amendments	Date
1	Added report amended date	05/08/09
5	Added amendments	05/08/09
7	Moved screw positioning drawing and added name of Resilient Bar	05/08/09
11	Added name of Resilient Bar and supplier	05/08/09

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4. TEST CONSTRUCTION

4.1 Description of Construction

The specimen was constructed in a refractory concrete lined steel restraint test frame with an opening of 3000 mm (high) x 3000 mm (wide).

HTS 5307 72mm tracks were fixed to the head and base of the test aperture at 600mm centres using 60mm fire resistant fixings.

HTS 5299 70mm studs were positioned at 600mm centres between the channels. The right-hand stud viewed from the unexposed face was not fixed to the perimeter of the test frame, and the gap between the stud and the frame lining was filled with a 25mm thick rock mineral fibre gasket.

At the left-hand edge an HTS 5299 70mm Stud was used to fix the partition to the test frame, using 60mm fire resistance fixings at 600mm centres.

Resilient bar was fixed horizontally across the studs on both the exposed and the unexposed face of the specimen at the top and bottom and at 600mm intervals. It was fixed using 13mm wafer head screws.

The Resilient bar was clad on both sides with a double layer of 15mm Gyproc SoundBloc board. The inner layer boards were fixed to the resilient bar sections at 300mm intervals with 25mm Gyproc Drywall screws around the perimeter and within the field of the boards. The outer layer boards were fixed with 42mm Gyproc Drywall screws at 300mm centres around the perimeter and within the field of the boards.

The cavity was filled with a single layer of 50mm thick Isover APR 1200 insulation.

All vertical joints were staggered between layers, with a full board at the free edge of the exposed face. A horizontal joint was positioned at 2400mm from the base on the outer layer boards and at 600mm from the base on the inner layer boards, on both faces of the specimen.

All external board joints were taped and filled using Gyproc Paper Joint Tape and Gyproc Joint Filler as appropriate. All screw heads w
ere spotted using Gyproc Joint Filler.

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4.2 Test Construction Drawings

4.2.1 Horizontal Cross Section

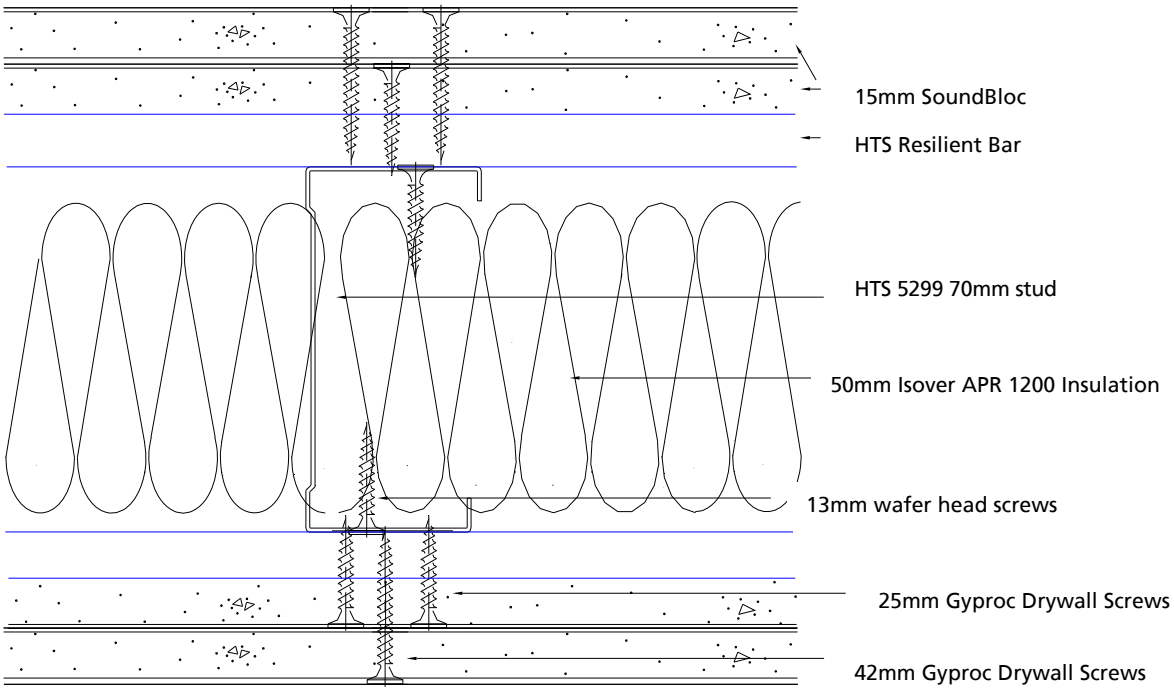

Figure 1 - Horizontal Cross Section

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4.2.2 Exposed Face Elevation

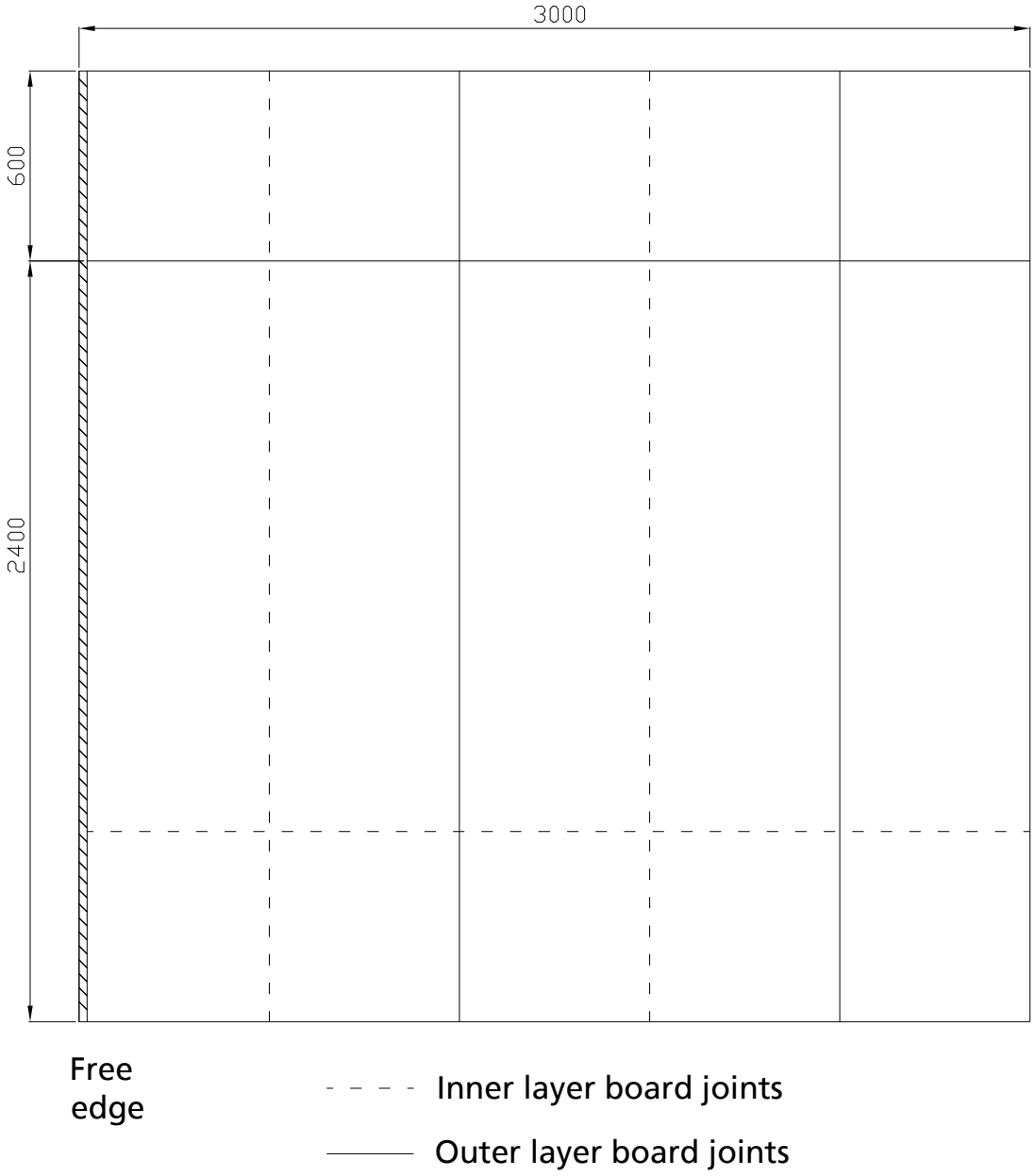

Figure 2 - Exposed Face Elevation

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4.2.3 Unexposed Face Elevation

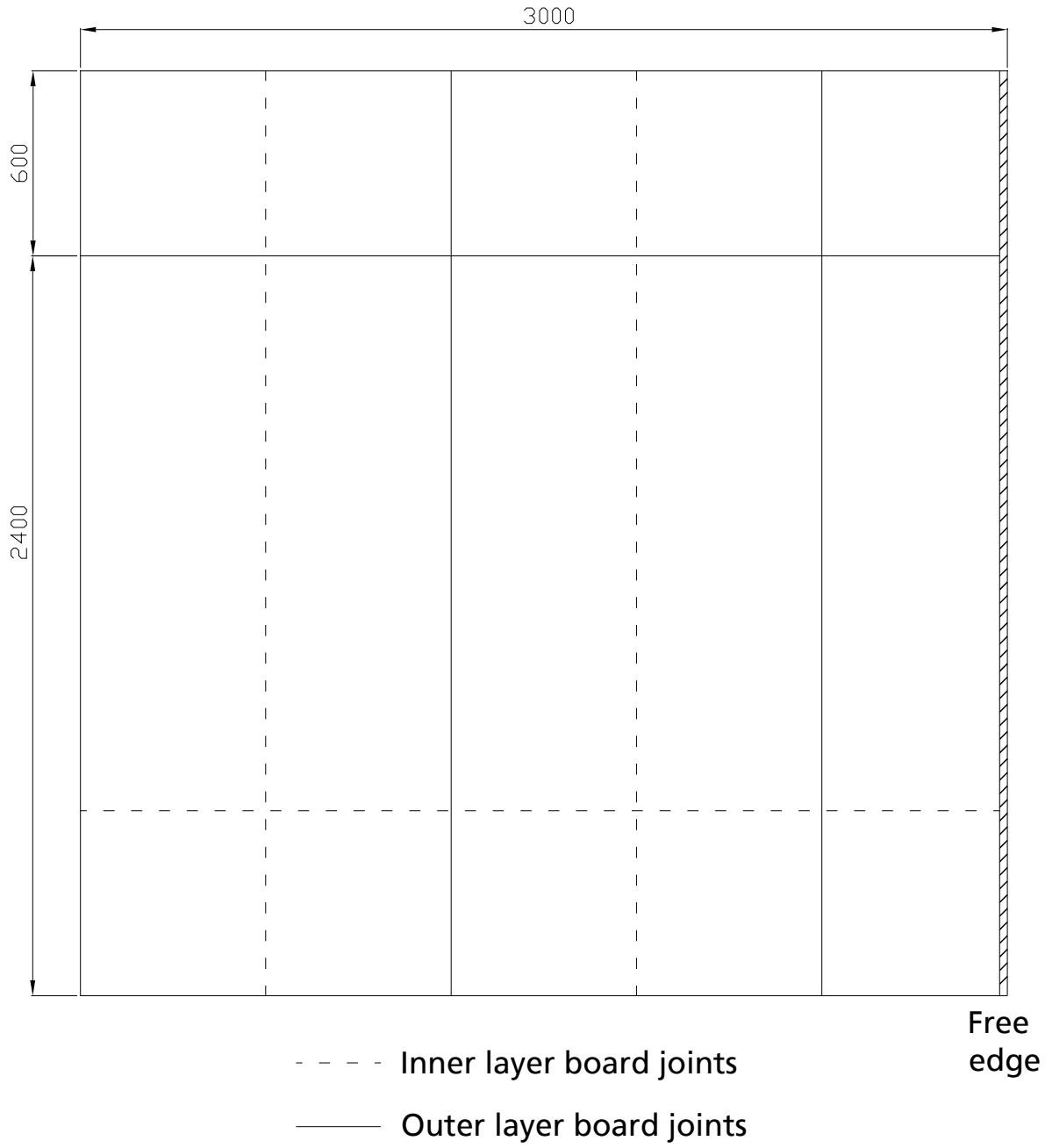

Figure 3 - Unexposed Face Elevation

The descriptions of individual components making up the test specimen were provided by the customer and were checked for accuracy wherever possible.

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5. TEST MATERIALS

5.1 Gyproc SoundBloc

i) Nominally, 2400mm (long) x 1200mm (wide) x 15mm (thick), Gyproc SoundBloc, manufactured and supplied by British Gypsum ex East Leake.

Measured weight per unit area:	13.5 kg/m^2
Measured thickness:	14.43 mm
Board identification numbers:	16 185 9 10:38
	16 185 9 10:38
	16 185 9 10:38
Measured moisture content:	1.08%

The surface density and board thickness were calculated using the actual weight and size of a selection of boards used in the test specimen. The moisture content of plasterboard was determined using samples dried to constant weight in an oven at 50°C.

5.2 Metal Components

ii) HTS 5307 72mm track, 0.55mm gauge metal channel, supplied by CMH Design and Consultancy Service.

Measured web dimension	71mm
Measured short flange dimension	25mm
Measured long flange dimension	26mm
Measured thickness	0.57mm
Measured weight per metre	0.51kg/m

iii) HTS 5299 70mm stud, 0.55mm gauge metal stud, supplied by CMH Design and Consultancy Service.

Measured web dimension	70mm
Measured short flange dimension	32mm
Measured long flange dimension	34mm
Measured thickness	0.53mm
Measured weight per metre	0.56kg/m

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iv) HTS Resilient bar, nominally 3000mm (long) x 50mm (wide) x 1mm (thick), supplied by CMH Design and Consultancy Service.

Measured web dimension	47mm
Measured short flange dimension	10mm
Measured long flange dimension	15mm
Measured thickness	1.09mm
Measured weight per metre	0.33kg/m

5.3 Fasteners

v) 25mm Gyproc Drywall Screws, supplied by British Gypsum.
vi) 60mm fire resistant fixings, supplied by the Building Test Centre.
vii) 13mm wafer head screws, supplied by the Building Test Centre.

5.4 Miscellaneous Components

viii) Gyproc Paper Joint Tape, supplied by British Gypsum.
ix) Gyproc Joint Filler, supplied by British Gypsum.
x) Rock mineral fibre gasket, supplied by the Building Test Centre.

5.5 Insulation

xi) Nominally, 10000mm (long) x 600mm (wide) x 50mm (thick) Isowool APR 1200 manufactured by Isover and supplied by The Building Test Centre.

Measured density:	11.8kg/m^3
Measured surface density:	0.59kg/m^2

The density was calculated using the insulation slabs used in the test specimen.

Where measurements could not be taken then weight and dimensions were provided by the customer or the manufacturer e.g. from material labelling. Material information was recorded according to procedure MAT/1.

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6. TEST PROCEDURE

The test was conducted fully in accordance with BS EN 1364-1: 1999. The specimen was subjected to fire from one side, as specified in BS EN 1364-1: 1999.

As the test specimen is considered to be symmetrical one test is adequate to cover the fire resistance performance in both directions.

Where areas of the test specification are ambiguous, or open to interpretation, the Fire Test Study Group Resolutions 43, 72, 83 and 85 have been followed (where appropriate). These Resolutions provide the basis of common agreements between the fire test laboratories, which are members of this group.

The test procedure used was EN 1364-1 Issue 3.

The ambient temperature at the commencement of the test was 20 °C.

The furnace pressure was set to control at 18 ± 2 Pa positive with respect to atmosphere, at the top of the specimen. Furnace pressure data is shown in figure 5.

The test conditions did not meet the full requirements of BS EN 1363-1: 1999 as the test frame stiffness did not fully comply.

The specimen and associated construction were not conditioned in accordance with clause 8 of BS EN 1363-1: 1999.

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7. TEST RESULTS

The requirements of the standard were satisfied for the following periods:

Integrity	**Sustained flaming**	**No Failure** (the test having been discontinued at the request of the sponsor)
	6mm gap gauge	**No Failure** (the test having been discontinued at the request of the sponsor)
	25mm gap gauge	**No Failure** (the test having been discontinued at the request of the sponsor)
	Cotton Pad	**No Failure** (the test having been discontinued at the request of the sponsor)
Insulation		**124 minutes**

The test was terminated at 150 minutes at the request of the sponsor.

8. LIMITATIONS

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

The scope of the Field of Direct Application of the results and construction detailed in this test report is explained in BS EN 1364-1: 1999, section 13.

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9. TEST DATA

9.1 Observations

Observers: Unexposed face F Ahatty
Exposed face L Cooper

Time		Observations
hours	mins	*All observations refer to the exposed face unless otherwise stated.*
0	0	Test started.
0	15	Left hand vertical joint had opened to approximately 2mm. All other joints had opened to approximately 1mm. Vertical crack on upper and lower centre board. Hairline vertical cracks on left hand board.
0	20	Left hand vertical joint had opened to approximately 3mm. All other joints had opened to approximately 2mm. Vertical cracks on centre board opened to approximately 1mm.
0	30	Left hand vertical joint had opened to approximately 8mm. Right hand vertical joint had opened to approximately 5mm. Horizontal joint had opened to approximately 5mm. Vertical cracks on centre board opened to approximately 1mm.
0	40	Left hand vertical joint had opened to approximately 12mm. Right hand vertical joint had opened to approximately 6mm. Horizontal joint had opened to approximately 8mm. Cracks around screw heads adjacent to all joints.
0	52	Left hand vertical joint had opened to approximately 12mm. Right hand vertical joint had opened to approximately 6mm. Horizontal joint had opened to approximately 8mm. Vertical cracks on centre board opened to approximately 4mm.

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Time		Observations
hours	mins	*All observations refer to the exposed face unless otherwise stated.*
1	00	Left hand vertical joint had opened to approximately 15mm – 18mm. Right hand vertical joint had opened to approximately 6mm. Horizontal joint had closed to approximately 4mm. Vertical cracks on centre board opened to approximately 8mm. Hairline vertical cracks on left hand board still opened to approximately 1mm.
1	20	Lower centre board had fallen. Right hand vertical joint in second layer boards had opened to approximately 18mm. Cracks appeared around screw heads. Second layer crazed. Vertical hairline cracks in exposed second layer boards. Lower left hand board pulled away from screw heads adjacent to horizontal joint and bowed into the furnace.
1	23	Part of lower left hand board fell, piece approximately 600mm high x 1200mm wide.
1	30	Second layer right hand vertical joint had opened to approximately 20mm. Second layer left hand vertical joint had opened to approximately 18mm. Lower left hand board had fallen. Remainder of lower centre board had fallen. Upper centre board had fallen. Approximately 60% of first layer boards had now fallen. Cracks around screw heads adjacent to second layer vertical joints.
1	40	Part of second layer boards had fallen from lower centre of specimen. Insulation eroded and melted away.
1	50	Approximately 80% of first and second layer boards had now fallen. Third layer crazed. Studs buckled. Resilient bar still in position. No insulation visible.
1	56	*Unexposed face* Screw heads discoloured on horizontal joint of centre board.

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Time		Observations
hours	mins	*All observations refer to the exposed face unless otherwise stated.*
2	00	More of first and second layer boards had fallen from right hand side of specimen. Approximately 90% of first and second layer boards had now fallen. *Unexposed face* Screw heads discoloured on left and right hand vertical joint from approximately 1700mm – 2400mm height.
2	04	*Unexposed face* **INSULATION FAILURE**. The temperature rise of thermocouple no.32, positioned at mid-height in the centre of the centre board, exceeded 180 °C.
2	07	*Unexposed face* The temperature rise at a point approximately 1500mm height in the centre of the centre board, exceeded 180 °C (roving thermocouple).
2	08	*Unexposed face* Centre of centre board discoloured from approximately 1200mm – 2400mm height.
2	10	Resilient bar started to erode. Studs bowed into the furnace. Approximately 95% of first and second layer boards had now fallen.
2	20	Vertical joint in third layer boards had opened to approximately 6mm – 8mm. *Unexposed face* Centre of lower left hand board discoloured from approximately 800mm – 2400mm height. The mean temperature rise of the standard five thermocouples exceeded 140 °C.
2	23	*Unexposed face* Cotton pad attempt on left hand vertical joint at approximately 1200mm height, no failure.

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Time		Observations
hours	mins	*All observations refer to the exposed face unless otherwise stated.*
2	25	No visible change. *Unexposed face* Left hand vertical joint had opened by approximately 6mm – 7mm from approximately 1200mm – 1800mm height.
2	26	*Unexposed face* Cotton pad attempt on left hand vertical joint at approximately 1200mm height, no failure.
2	30	**TEST TERMINATED** at the request of the sponsor.

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9.2 Furnace Temperature Graph

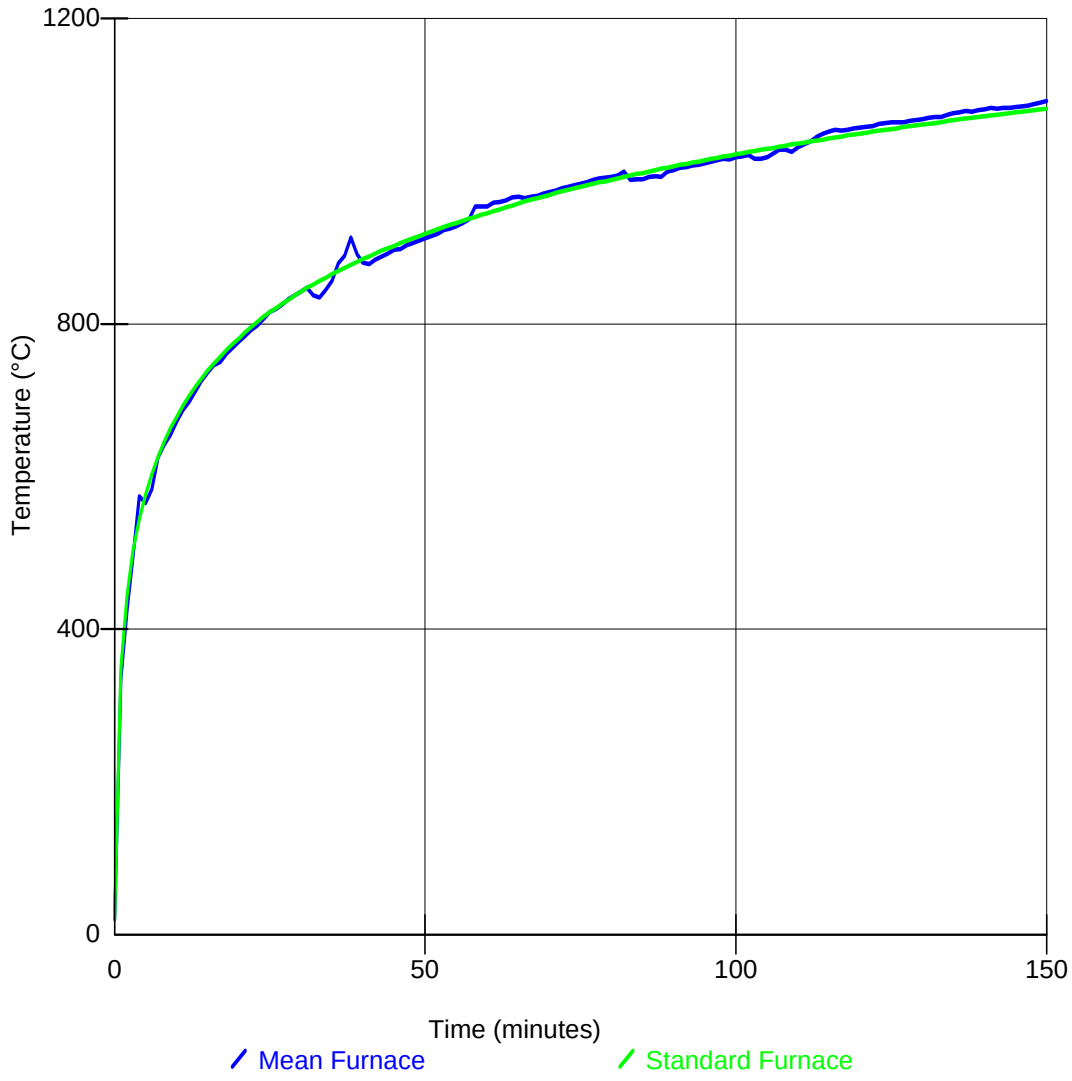

Figure 4 - Furnace temperature graph

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9.3 Furnace Pressure Graph

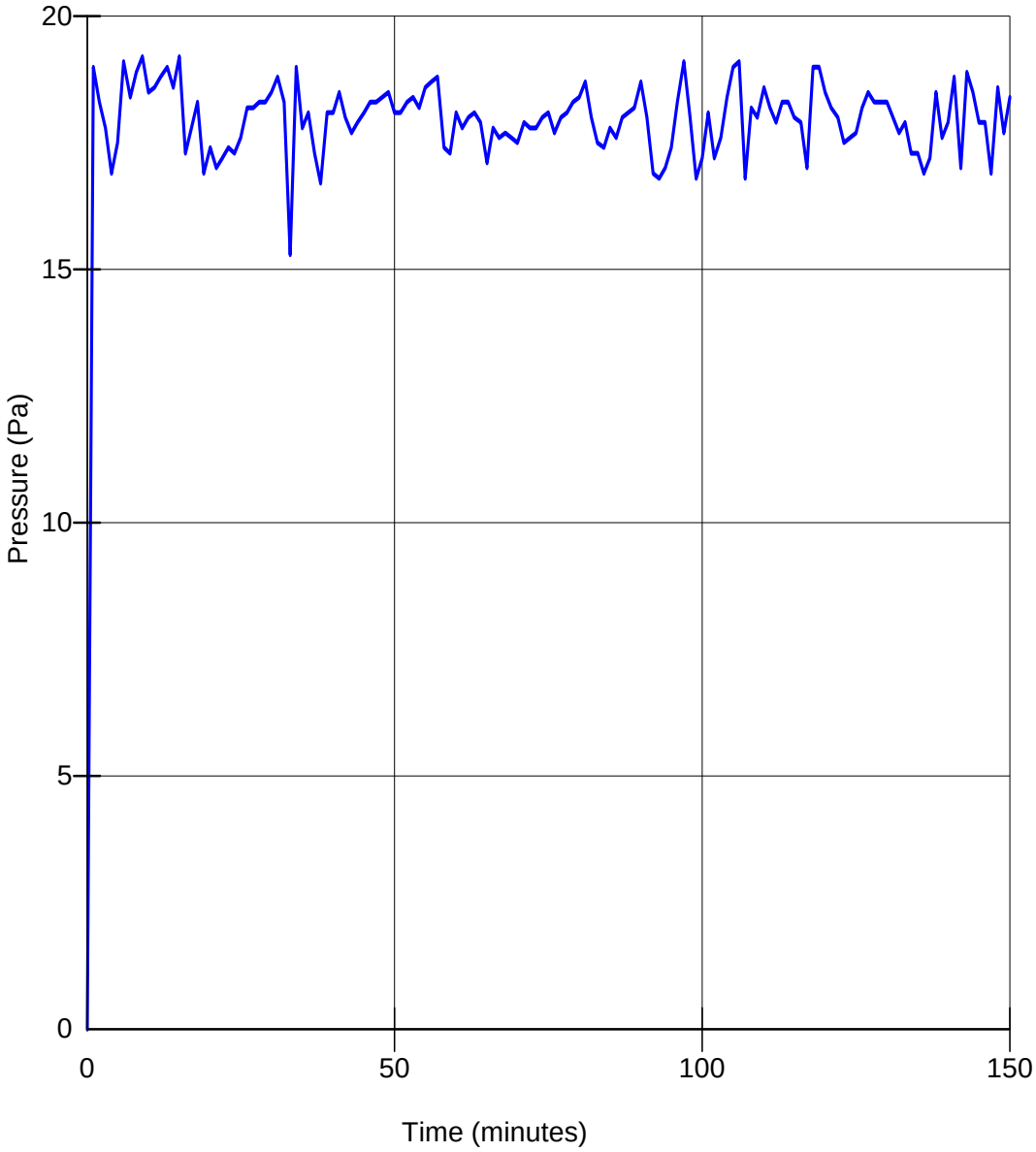

Figure 5 - Furnace pressure graph

The furnace pressure was set to control at 18 ± 2 Pa positive with respect to atmosphere, at the top of the specimen.

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9.4 Unexposed Face Temperature Graph

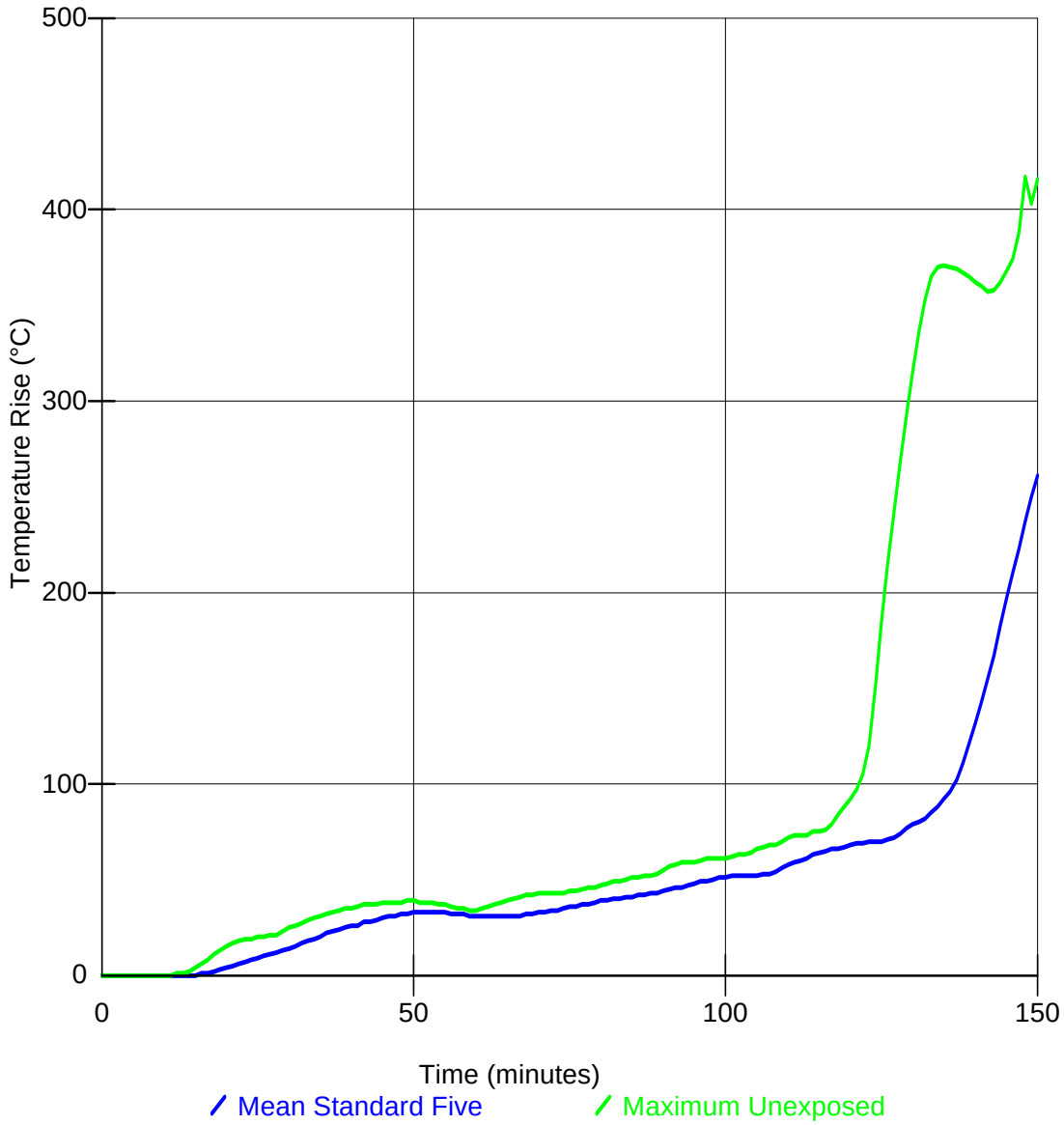

Figure 6 - Unexposed face temperature graph

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9.5 Unexposed Face Thermocouple Layout

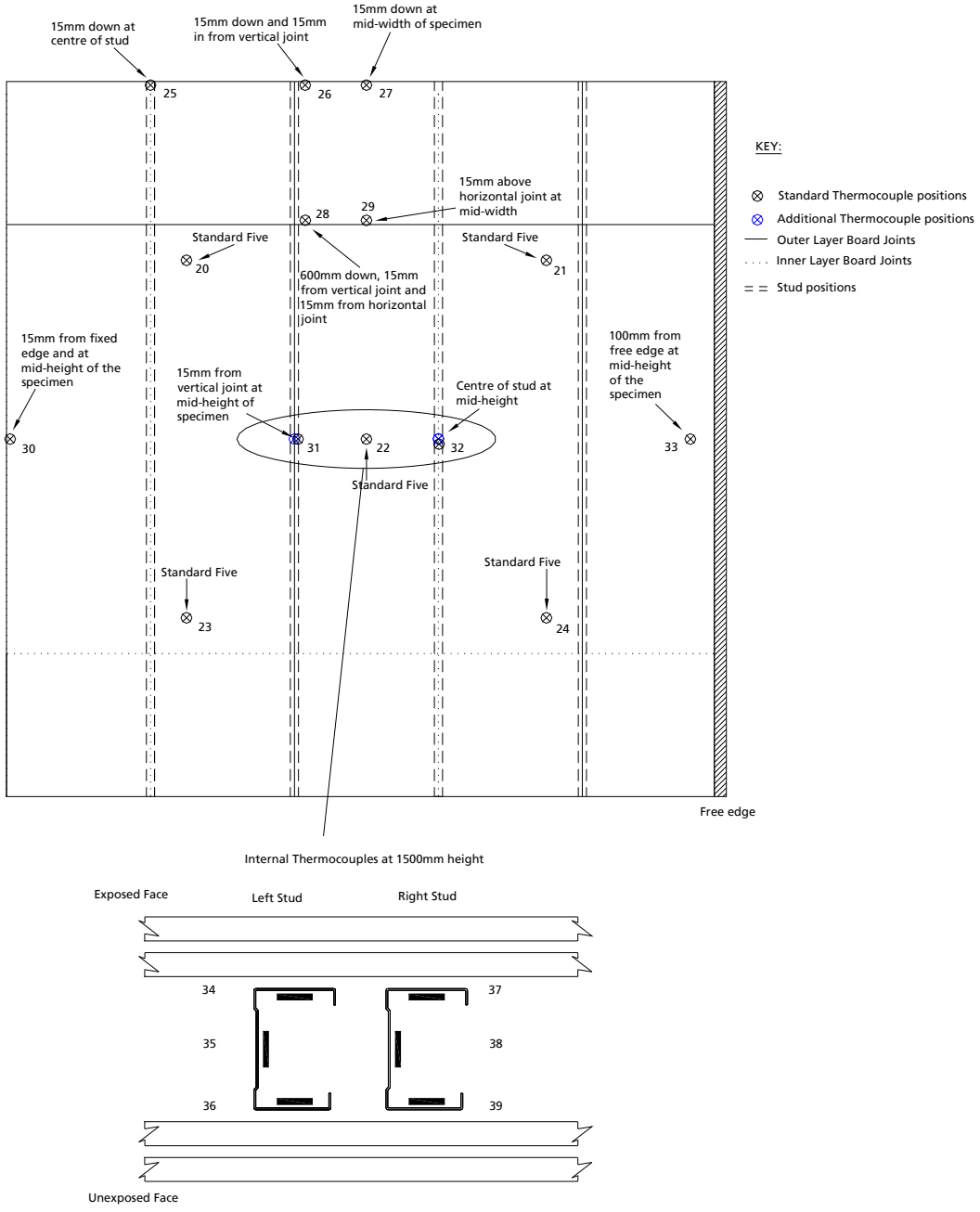

Figure 7 - Unexposed face thermocouple layout

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9.6 Unexposed Face Standard Five Temperature Data

Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	Mean Standard 5
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	1	1	0	0	0	0
15	2	1	0	0	0	0
16	2	2	1	1	0	1
17	4	2	1	1	0	1
18	5	3	2	2	1	2
19	7	4	3	2	1	3
20	8	6	3	3	1	4
21	10	7	4	3	1	5
22	12	8	5	4	2	6
23	13	10	6	4	2	7
24	15	11	7	5	2	8
25	17	12	8	6	3	9
26	19	14	9	7	3	10
27	20	15	10	8	4	11
28	21	16	11	8	4	12
29	23	18	12	9	5	13
30	25	19	14	10	5	14
31	26	21	15	11	6	15
32	27	22	17	13	7	17
33	29	23	18	14	8	18
34	30	24	19	16	9	19
35	31	25	21	17	10	20
36	32	26	22	19	11	22

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Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	Mean Standard 5
37	33	27	23	20	12	23
38	34	28	25	22	13	24
39	35	29	26	23	14	25
40	35	30	27	25	16	26
41	36	31	28	26	12	26
42	37	31	29	27	17	28
43	37	32	29	28	18	28
44	37	33	30	29	20	29
45	38	33	31	30	21	30
46	38	34	32	31	23	31
47	38	34	32	32	23	31
48	38	34	32	32	24	32
49	38	34	33	33	25	32
50	39	34	33	34	26	33
51	38	34	33	34	26	33
52	38	34	33	34	27	33
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66	32	31	32	33	29	31
67	32	32	32	33	30	31
68	32	32	33	33	30	32
69	33	33	33	33	30	32
70	33	34	34	33	31	33
71	34	35	34	34	31	33
72	35	35	35	34	31	34
73	35	36	35	35	32	34
74	36	37	36	35	32	35
75	37	38	37	36	33	36

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Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	Mean Standard 5
76	38	39	37	36	33	36
77	39	39	38	37	34	37
78	39	40	39	37	34	37
79	40	40	39	38	35	38
80	41	41	40	38	36	39
81	41	42	40	39	36	39
82	42	42	41	40	37	40
83	42	42	41	40	38	40
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99	54	52	55	47	47	51
100	54	52	55	48	48	51
101	55	52	56	48	49	52
102	55	52	56	49	50	52
103	54	52	56	49	51	52
104	54	52	55	49	51	52
105	54	53	55	50	52	52
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107	53	54	54	51	57	53
108	53	54	55	53	58	54
109	53	56	58	55	58	56
110	53	60	63	57	58	58
111	54	64	65	57	57	59
112	55	65	66	57	57	60
113	58	67	67	57	59	61
114	63	67	68	57	62	63

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Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	Mean Standard 5
115	66	68	69	57	63	64
116	67	69	69	57	66	65
117	68	69	70	58	67	66
118	68	70	70	60	65	66
119	68	70	71	62	68	67
120	68	71	71	63	69	68
121	69	71	72	64	69	69
122	69	72	72	65	69	69
123	70	72	73	66	70	70
124	70	73	73	67	70	70
125	70	73	74	67	70	70
126	71	74	75	68	71	71
127	72	75	76	69	72	72
128	72	79	82	69	72	74
129	73	85	86	70	73	77
130	74	89	88	70	74	79
131	75	91	90	71	74	80
132	79	92	92	72	75	82
133	84	95	96	72	78	85
134	87	98	102	73	83	88
135	88	103	110	74	85	92
136	89	110	122	75	87	96
137	91	118	136	78	90	102
138	95	132	157	83	92	111
139	100	144	180	87	96	121
140	107	168	199	88	101	132
141	116	188	215	90	109	143
142	130	205	230	93	119	155
143	143	219	244	97	133	167
144	168	233	257	103	155	183
145	186	245	268	110	178	197
146	202	256	280	120	196	210
147	216	266	290	134	212	223
148	228	275	300	156	226	237
149	240	285	308	179	239	250
150	251	294	315	197	251	261

Figures highlighted in red indicate the minute in which the mean temperature rise exceeded 140°C.

See figure 7 for thermocouple layout.

Customer: **Hadley Group / Hadley Industries FZE (Dubai)**

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9.7 Additional Unexposed Face Temperature Data

Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
0	0	0	0	0	0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	1	1	1	0	0
13	1	1	1	0	1
14	2	1	2	1	1
15	3	2	4	1	1
16	4	3	6	2	2
17	5	4	8	3	3
18	7	5	11	4	4
19	8	7	13	5	4
20	10	8	15	7	5
21	11	10	17	8	7
22	12	11	18	9	8
23	14	12	19	11	9
24	15	14	19	12	10
25	16	15	20	14	12
26	17	16	20	15	13
27	18	17	21	16	14
28	19	18	21	17	15
29	20	19	21	19	16
30	21	20	21	20	17
31	22	21	21	21	19
32	23	22	21	22	19
33	24	23	21	23	20
34	25	24	21	24	22
35	26	25	21	25	22
36	26	26	21	26	23

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Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
37	27	27	21	27	24
38	28	28	21	27	25
39	29	28	21	28	26
40	30	28	22	29	26
41	31	29	22	29	27
42	33	29	22	29	28
43	34	29	23	30	28
44	35	29	23	30	28
45	36	30	24	30	29
46	37	30	24	30	29
47	38	30	24	30	30
48	38	31	25	31	30
49	39	31	25	31	30
50	39	31	26	31	30
51	38	31	26	31	30
52	37	31	27	31	30
53	36	31	27	31	30
54	36	31	27	31	30
55	35	31	28	31	30
56	34	31	29	31	30
57	33	31	30	30	30
58	33	31	31	30	30
59	32	32	32	30	30
60	32	33	33	30	30
61	31	33	35	30	30
62	31	34	36	31	30
63	31	35	37	31	30
64	31	36	38	31	31
65	31	37	39	32	32
66	31	38	40	33	32
67	31	39	41	33	33
68	31	40	42	34	34
69	31	41	42	35	35
70	31	41	43	36	36
71	32	42	43	37	37
72	32	42	43	38	38
73	33	43	43	39	39
74	33	43	43	40	40
75	34	44	43	41	40

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Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
76	35	44	44	41	41
77	35	44	45	42	42
78	36	45	46	43	43
79	36	45	46	43	43
80	37	46	47	44	44
81	37	46	48	45	44
82	38	46	49	45	45
83	38	47	49	46	46
84	39	47	50	46	46
85	39	48	51	47	46
86	40	48	51	48	47
87	40	49	52	49	47
88	41	50	52	51	48
89	41	52	53	53	49
90	42	53	53	55	50
91	42	55	54	57	51
92	43	57	54	58	52
93	43	58	55	59	53
94	44	58	56	59	54
95	44	58	56	59	55
96	45	59	57	60	56
97	45	59	58	61	57
98	46	59	59	61	58
99	46	59	60	61	58
100	47	60	61	61	59
101	47	60	62	61	60
102	48	61	63	62	61
103	48	61	63	63	61
104	49	62	64	64	62
105	50	62	65	66	62
106	50	63	66	67	63
107	52	64	66	68	65
108	54	65	67	68	66
109	56	66	68	69	68
110	58	67	69	70	69
111	59	68	70	71	70
112	61	69	71	72	71
113	62	70	72	73	73
114	63	71	73	73	73

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Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
115	65	71	74	74	75
116	67	73	74	76	76
117	66	71	74	79	78
118	69	73	75	84	78
119	67	74	76	88	84
120	70	74	77	92	89
121	70	74	80	95	97
122	71	75	85	98	104
123	71	75	89	101	113
124	72	76	92	106	127
125	73	79	93	111	147
126	73	82	96	118	172
127	74	85	98	129	199
128	75	87	103	143	224
129	78	89	111	157	247
130	81	91	120	173	268
131	84	93	134	190	286
132	86	95	151	204	300
133	88	98	168	219	312
134	90	102	187	232	322
135	92	106	203	245	329
136	94	111	217	258	336
137	96	117	231	270	341
138	100	129	243	280	344
139	105	149	254	290	347
140	112	169	264	299	349
141	121	198	275	306	351
142	134	218	286	314	353
143	148	238	298	319	358
144	163	259	309	322	362
145	180	276	321	324	368
146	197	306	337	325	374
147	214	388	356	327	385
148	230	417	374	332	392
149	248	391	388	335	403
150	266	376	400	342	416

See figure 7 for thermocouple layout.

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9.8 Additional Unexposed Face Temperature Data

Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	1
14	1	1	0	1
15	1	1	1	1
16	1	1	1	2
17	2	2	1	2
18	3	3	2	3
19	4	3	3	3
20	5	4	4	4
21	6	5	5	5
22	6	6	6	5
23	7	7	7	6
24	8	8	9	7
25	9	9	10	8
26	10	11	11	9
27	11	12	13	9
28	12	13	14	10
29	13	14	15	11
30	14	16	17	12
31	15	17	18	14
32	16	19	19	15
33	17	20	20	16
34	19	22	21	17
35	20	23	22	19

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Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
36	21	24	23	20
37	22	26	24	21
38	23	27	25	23
39	25	28	26	24
40	26	29	27	25
41	26	30	27	26
42	27	30	28	27
43	28	31	28	28
44	29	32	29	29
45	30	32	29	30
46	31	33	30	30
47	31	33	30	31
48	32	33	30	31
49	32	34	30	31
50	33	34	30	31
51	33	34	30	31
52	33	34	30	31
53	33	33	30	31
54	32	33	30	31
55	32	33	30	31
56	32	32	30	31
57	31	32	30	30
58	31	32	29	30
59	31	32	29	30
60	30	31	29	29
61	30	31	29	29
62	30	31	30	29
63	30	32	30	29
64	29	32	30	29
65	29	33	31	29
66	29	33	31	29
67	30	34	32	30
68	30	35	32	30
69	30	36	33	30
70	31	37	34	31
71	31	38	34	31
72	32	38	35	32
73	32	39	36	32
74	33	40	36	33

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Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
75	34	40	37	34
76	34	41	38	35
77	35	41	38	35
78	35	42	39	36
79	36	42	40	37
80	36	42	40	37
81	37	43	40	38
82	37	43	41	38
83	37	43	41	39
84	38	44	41	39
85	38	45	42	40
86	39	45	42	40
87	39	46	42	40
88	40	48	43	41
89	40	49	43	41
90	41	50	44	41
91	41	51	45	42
92	42	52	46	42
93	42	53	46	43
94	42	54	48	43
95	43	54	49	43
96	43	55	50	44
97	43	55	51	44
98	44	56	52	45
99	44	56	53	46
100	44	56	54	47
101	44	56	54	48
102	44	56	55	49
103	45	57	55	50
104	45	58	57	51
105	45	59	60	53
106	46	62	63	54
107	46	64	66	55
108	46	66	68	56
109	47	68	70	56
110	47	69	72	57
111	48	69	73	58
112	50	70	73	58
113	53	71	73	57

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Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
114	55	71	75	56
115	58	72	75	57
116	60	72	76	59
117	60	72	76	62
118	60	72	77	64
119	60	72	78	65
120	59	72	84	66
121	60	73	95	67
122	60	73	105	67
123	60	74	120	68
124	60	76	150	69
125	60	79	185	69
126	61	86	215	70
127	63	90	242	70
128	64	94	268	71
129	66	99	292	71
130	68	104	315	71
131	70	109	336	72
132	74	119	353	72
133	79	135	365	73
134	90	154	370	74
135	99	179	371	75
136	104	199	370	76
137	112	217	369	82
138	116	234	367	87
139	143	253	365	89
140	125	271	362	90
141	157	290	360	92
142	139	308	357	96
143	166	323	356	101
144	180	336	355	108
145	181	347	355	117
146	182	353	355	131
147	182	356	355	144
148	211	360	355	169
149	234	363	356	188
150	256	365	356	204

Figures highlighted in red indicate the minute in which the temperature rise exceeded 180°C.

See figure 7 for thermocouple layout.

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Customer: **Hadley Group / Hadley Industries FZE (Dubai)**

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9.9 Internal Temperature Data at 1500mm Height

Time (mins)	Actual Temperature (°C)					
	Left stud			Right stud		
	Hot Flange Thermocouple No. 34	Web Thermocouple No. 35	Cold Flange Thermocouple No. 36	Hot Flange Thermocouple No. 37	Web Thermocouple No. 38	Cold Flange Thermocouple No. 39
0	20	20	20	20	20	20
1	20	20	20	20	20	20
2	20	20	20	20	20	20
3	20	20	20	20	20	20
4	24	21	20	20	20	20
5	30	25	22	21	21	20
6	39	33	27	25	22	21
7	43	38	33	32	27	23
8	49	44	39	42	36	28
9	55	52	48	53	46	36
10	60	58	55	61	55	45
11	64	64	61	66	62	53
12	67	68	66	70	68	59
13	70	71	68	72	71	64
14	71	73	70	73	73	67
15	73	74	72	74	72	69
16	74	75	72	75	75	71
17	75	76	73	76	76	72
18	76	77	74	77	77	73
19	77	77	75	78	78	74
20	78	79	76	79	79	75
21	79	80	78	81	81	77
22	82	82	80	83	83	79
23	84	83	82	84	85	80
24	86	85	83	86	86	82
25	88	87	85	88	88	83
26	90	89	87	90	90	84
27	92	91	89	91	91	85
28	94	92	90	92	92	86
29	95	93	90	93	93	86
30	97	95	89	95	94	87
31	98	95	90	96	94	86
32	99	97	90	97	95	86
33	99	98	90	97	95	86

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Time (mins)	Actual Temperature (°C)					
	Left stud			Right stud		
	Hot Flange Thermocouple No. 34	Web Thermocouple No. 35	Cold Flange Thermocouple No. 36	Hot Flange Thermocouple No. 37	Web Thermocouple No. 38	Cold Flange Thermocouple No. 39
34	98	99	89	99	96	86
35	100	100	88	99	96	86
36	102	101	89	100	97	86
37	103	101	89	100	97	86
38	105	102	90	100	98	87
39	107	103	94	100	98	87
40	111	104	93	101	98	88
41	114	105	93	101	99	90
42	115	106	93	101	98	89
43	121	108	95	101	98	87
44	122	109	98	102	98	89
45	123	112	100	103	99	89
46	129	114	98	104	100	89
47	137	119	106	105	103	92
48	149	125	108	108	106	89
49	160	133	115	120	112	94
50	172	140	113	156	121	100
51	186	147	115	184	133	104
52	197	157	123	206	148	113
53	217	168	127	232	166	122
54	237	185	139	258	186	136
55	264	204	153	284	210	150
56	296	227	170	310	237	166
57	320	250	187	337	263	189
58	345	273	205	363	289	209
59	369	295	220	386	316	226
60	390	315	235	401	338	243
61	406	333	247	413	357	254
62	421	348	255	425	372	266
63	435	360	266	439	385	276
64	449	375	277	454	397	288
65	465	389	288	471	409	299
66	476	402	297	480	418	308
67	487	411	303	490	427	316
68	496	420	309	500	435	322
69	504	428	315	507	443	329
70	512	435	321	514	451	335

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Time (mins)	Actual Temperature (°C)					
	Left stud			Right stud		
	Hot Flange Thermocouple No. 34	Web Thermocouple No. 35	Cold Flange Thermocouple No. 36	Hot Flange Thermocouple No. 37	Web Thermocouple No. 38	Cold Flange Thermocouple No. 39
71	518	442	328	521	458	341
72	524	448	335	527	465	347
73	528	453	340	533	471	352
74	532	457	346	538	477	357
75	535	460	350	543	483	361
76	538	463	354	548	488	365
77	541	466	357	553	493	369
78	544	468	359	557	497	372
79	548	470	361	562	501	375
80	607	484	367	565	505	378
81	650	507	378	571	508	379
82	669	525	391	579	514	382
83	680	540	405	589	521	386
84	692	558	420	600	530	392
85	702	574	437	610	539	400
86	709	588	458	617	545	407
87	711	602	480	623	548	412
88	710	616	505	631	554	421
89	714	634	538	641	563	433
90	722	655	570	649	575	448
91	727	669	594	655	588	469
92	730	-	608	641	586	488
93	-	-	621	615	571	493
94	-	-	-	612	568	490
95	-	-	-	619	572	490
96	-	-	-	622	576	498
97	-	-	-	627	585	510
98	-	-	-	631	596	524
99	-	-	-	635	604	535
100	-	-	-	640	614	543
101	-	-	-	646	623	546
102	-	-	-	651	630	556
103	-	-	-	-	-	731
104	-	-	-	-	-	-

- Indicates a broken thermocouple.
See figure 7 for the location of the thermocouples.

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9.10 Specimen Lateral Deflection

Time (mins)	Deflection (mm)	
	Centre	Free Edge
0	0	0
1	1	0
2	1	0
3	1	0
4	1	0
5	1	0
6	2	0
7	2	0
8	3	0
9	3	0
10	4	0
11	4	0
12	4	0
13	4	0
14	4	0
15	4	0
16	4	0
17	5	0
18	5	0
19	5	0
20	4	0
21	4	0
22	4	0
23	4	0
24	4	0
25	4	0
26	4	0
27	4	0
28	4	0
29	4	0
30	4	0
31	5	0
32	5	0
33	5	1
34	5	1
35	5	1
36	5	1

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Time (mins)	Deflection (mm)	
	Centre	Free Edge
37	6	1
38	6	1
39	6	1
40	6	1
41	6	1
42	6	1
43	6	1
44	6	1
45	7	1
46	7	1
47	8	1
48	8	1
49	10	2
50	11	2
51	13	2
52	15	3
53	17	3
54	19	4
55	21	4
56	24	5
57	27	6
58	29	6
59	32	7
60	34	7
61	36	8
62	38	8
63	39	8
64	41	9
65	43	9
66	44	9
67	45	10
68	45	10
69	45	10
70	45	10
71	44	10
72	44	10
73	44	10
74	44	10
75	44	10

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Time (mins)	Deflection (mm)	
	Centre	Free Edge
76	44	10
77	44	10
78	44	10
79	44	10
80	45	10
81	45	10
82	46	10
83	46	10
84	47	10
85	48	10
86	49	10
87	50	10
88	50	10
89	51	10
90	51	10
91	52	10
92	52	10
93	52	10
94	52	10
95	53	10
96	53	10
97	53	10
98	54	10
99	53	10
100	53	10
101	52	10
102	52	10
103	53	10
104	52	10
105	52	10
106	52	10
107	52	10
108	52	10
109	52	10
110	51	10
111	51	10
112	51	10
113	51	10
114	51	10

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Time (mins)	Deflection (mm)	
	Centre	Free Edge
115	51	10
116	51	10
117	52	10
118	52	10
119	52	10
120	53	10
121	53	11
122	52	11
123	52	12
124	52	13
125	53	14
126	52	15
127	51	16
128	49	16
129	47	16
130	44	16
131	40	16
132	36	16
133	33	16
134	28	16
135	25	16
136	25	16
137	23	16
138	19	16
139	15	18
140	12	21
141	8	23
142	5	24
143	2	25
144	-3	25
145	-7	25
146	-10	25
147	-13	22
148	-19	17
149	-21	8
150	-21	2

The deflection was recorded at the approximate centre of the specimen and at mid-height at the free edge. Positive readings indicate deflection into the furnace.

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10. PHOTOGRAPHS

10.1 Exposed face prior to test

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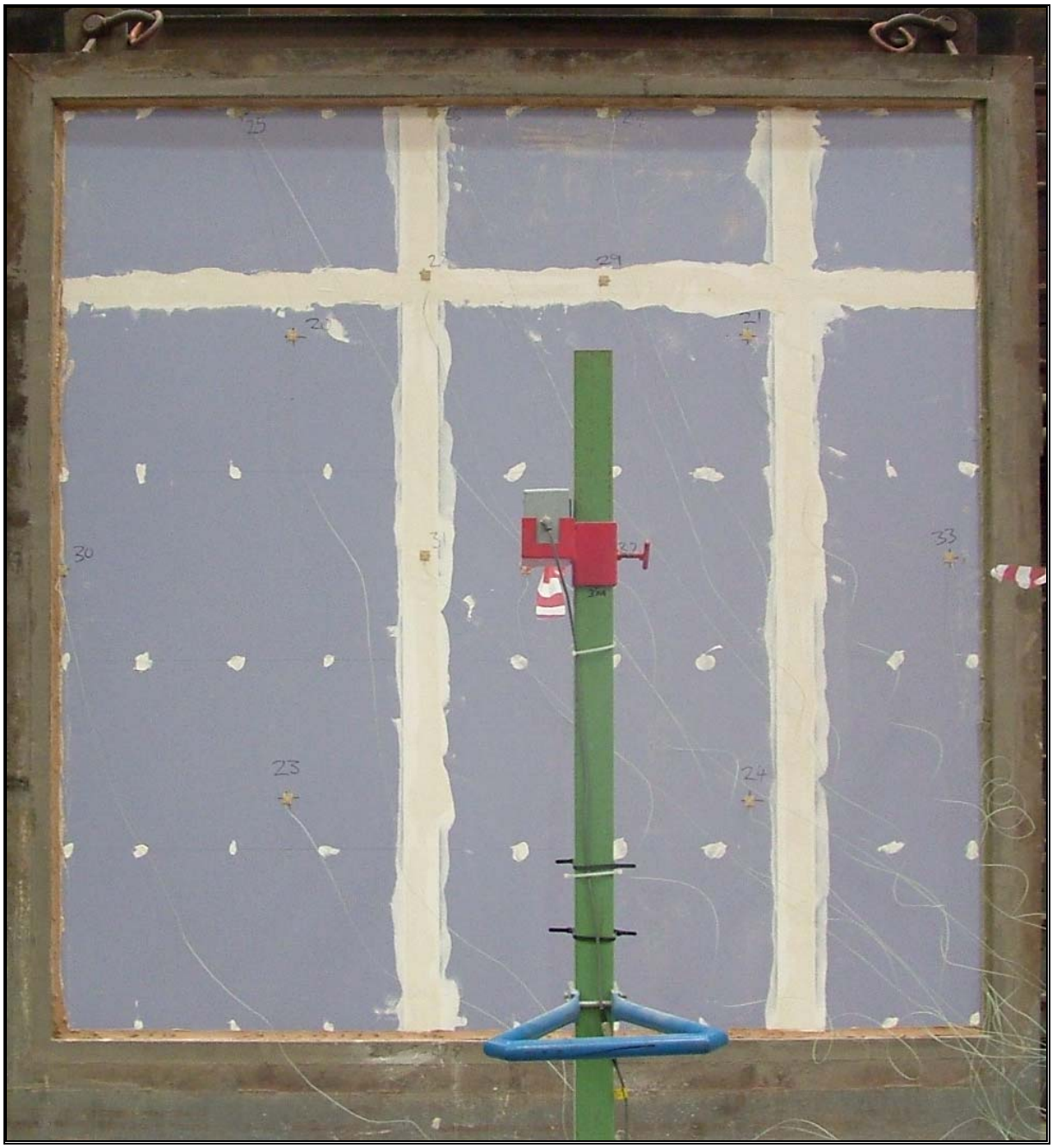
10.2 Unexposed face prior to test



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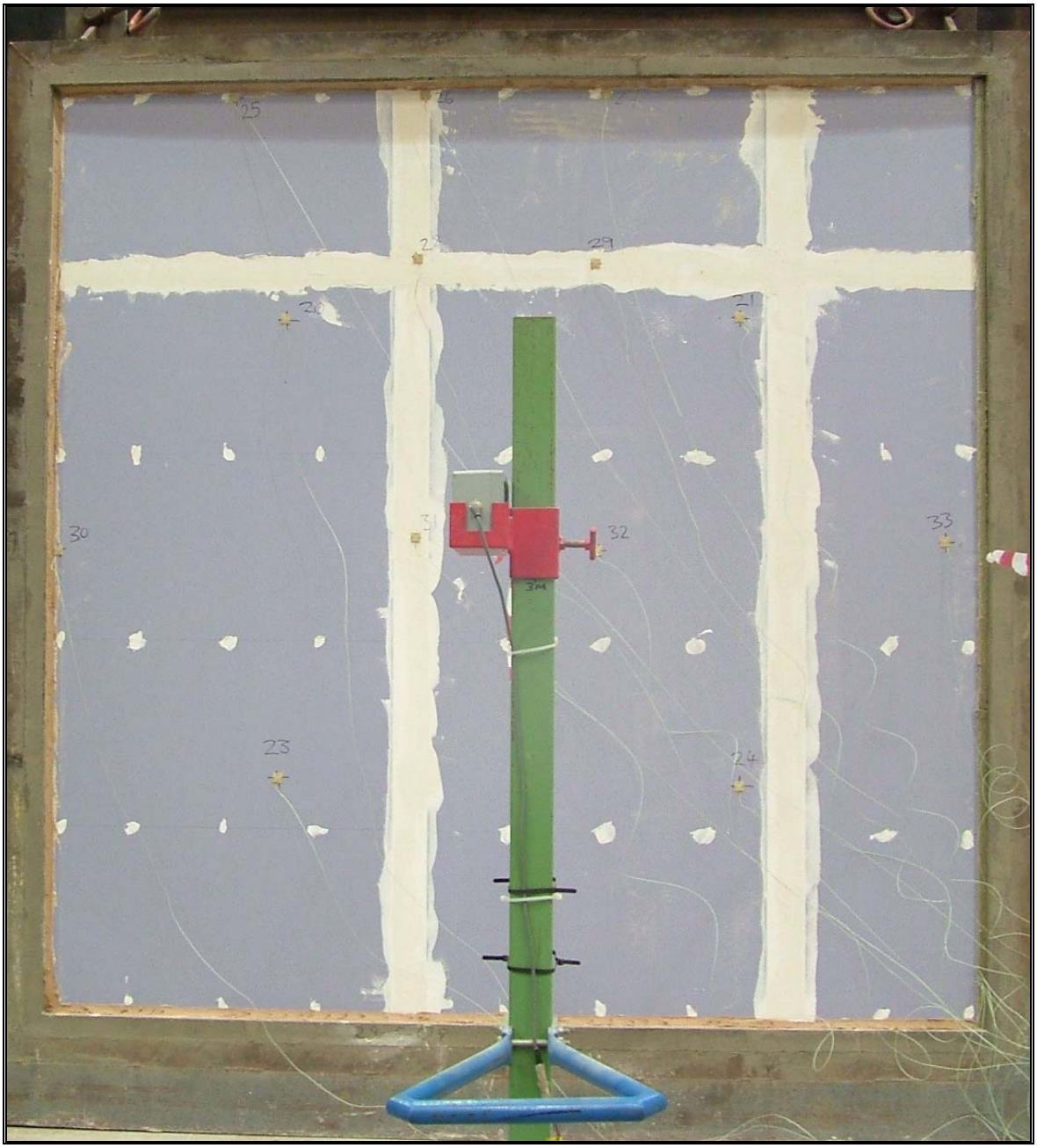
10.3 Unexposed face at 1 hour



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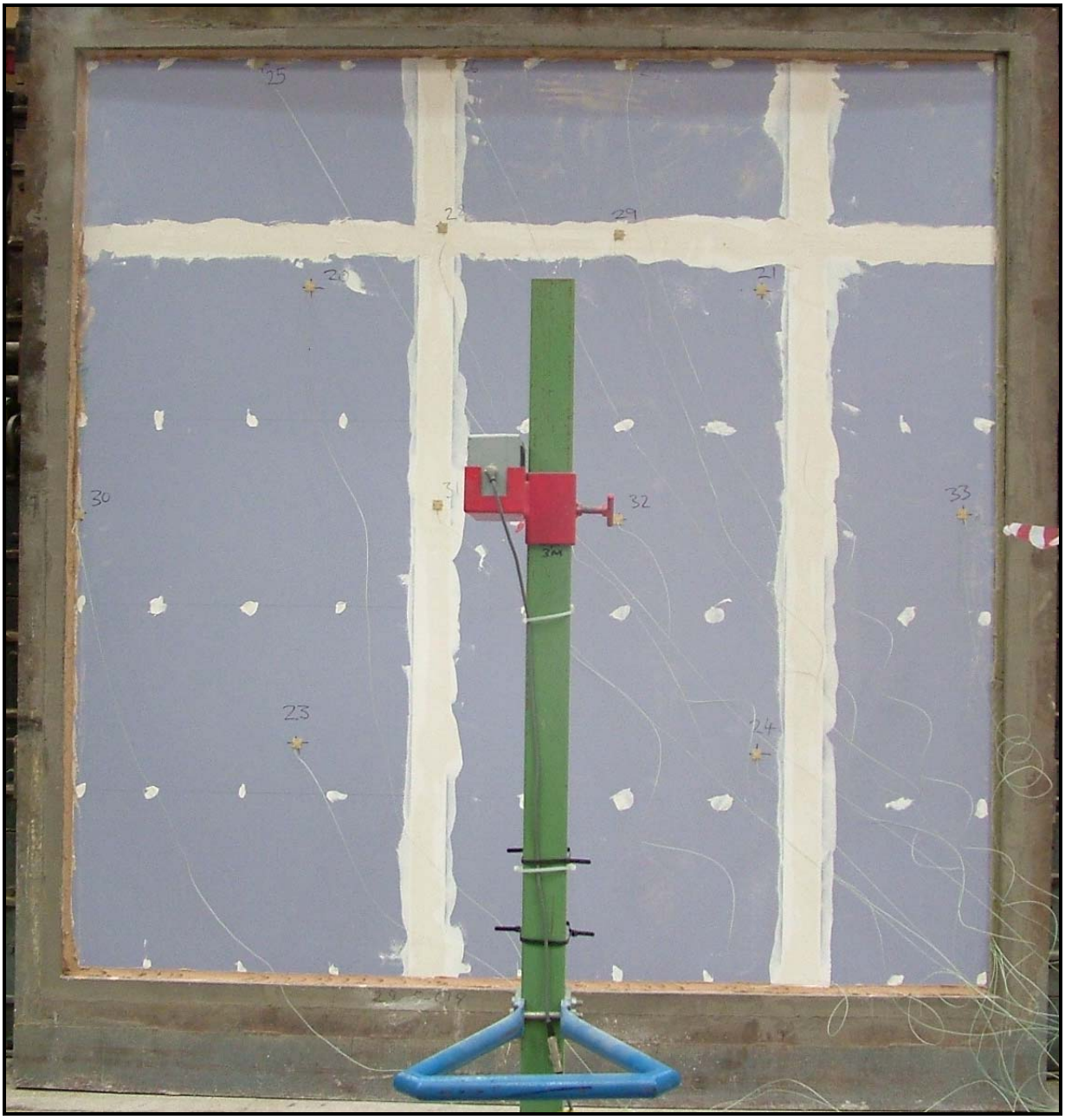
10.4 Unexposed face at 1 hour, 30 minutes



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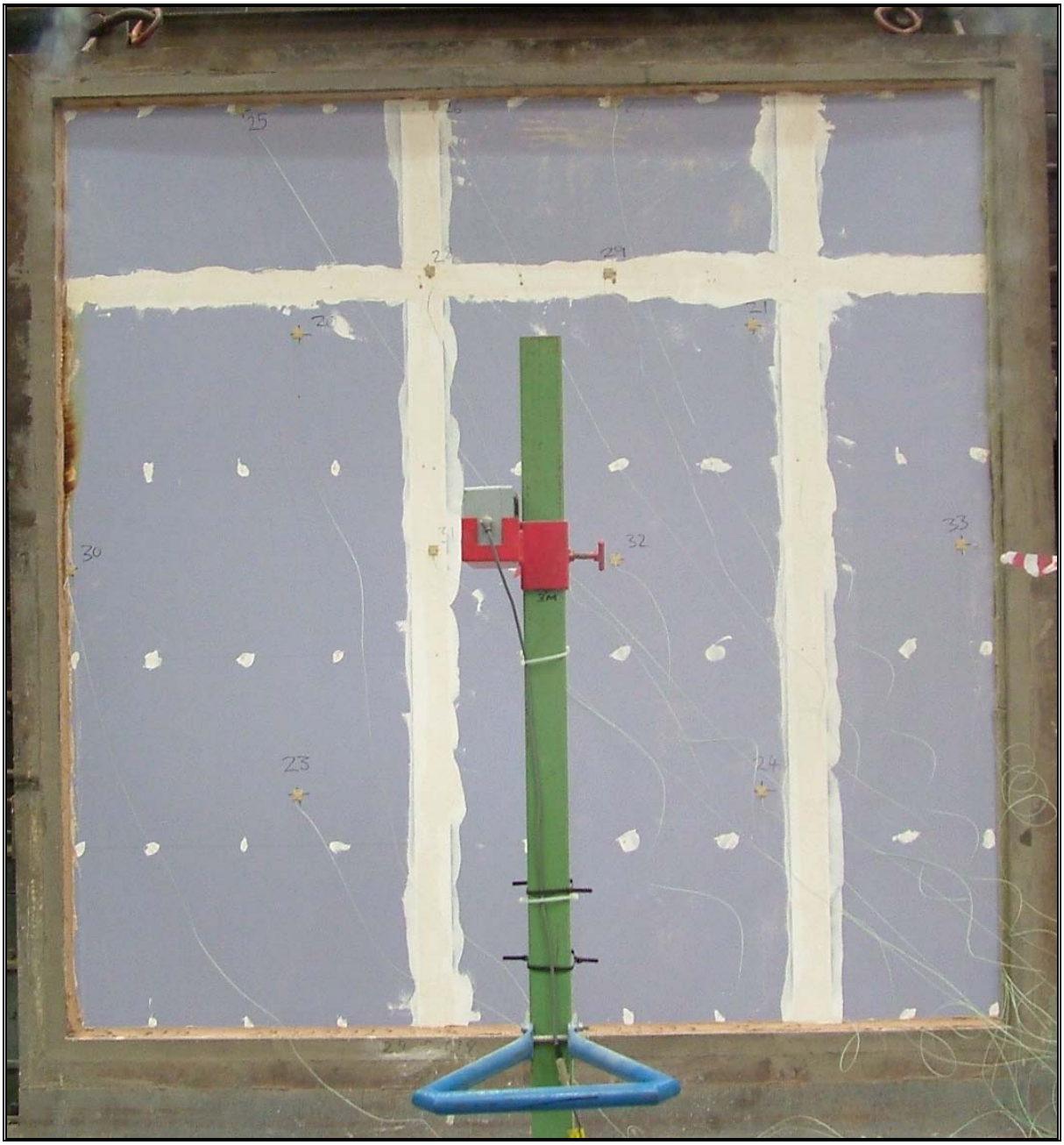
10.5 Unexposed face at 2 hours



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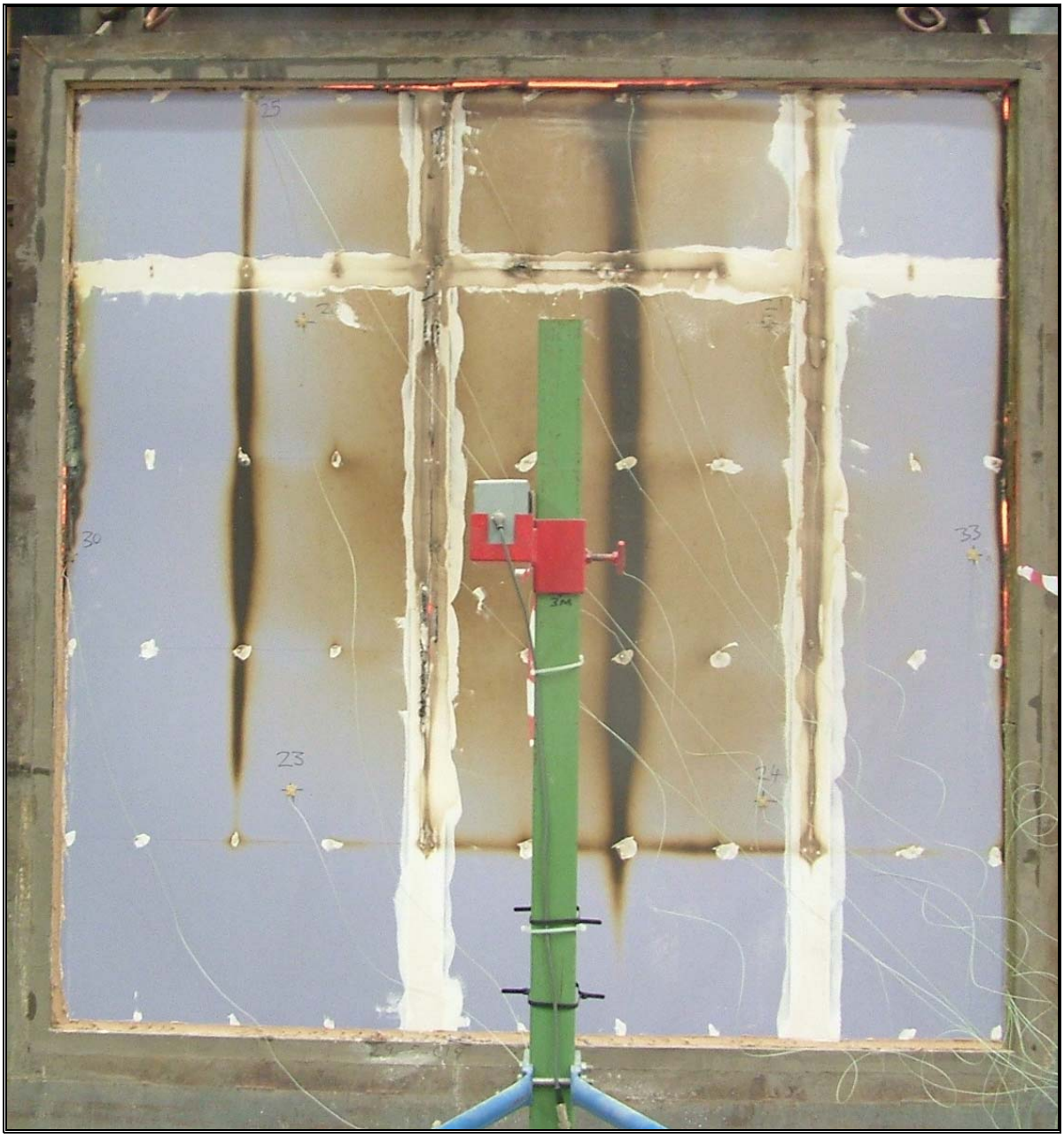
10.6 Unexposed face at 2 hours, 26 minutes



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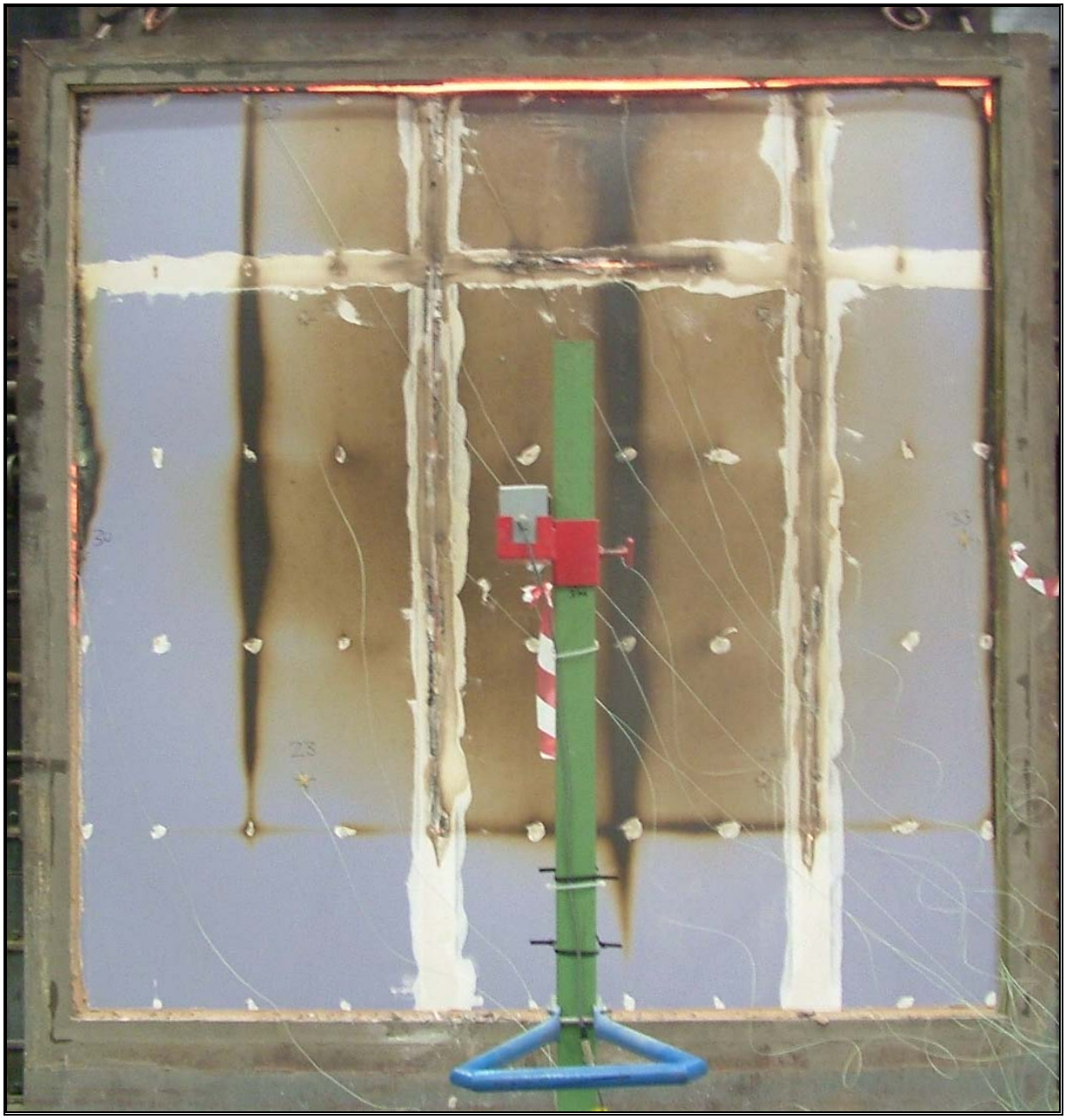
10.7 Unexposed face at test termination



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11. FIELD OF DIRECT APPLICATION

11.1 General

The results of the fire test are directly applicable to similar constructions where one or more of the changes listed below are made and the construction continues to comply with the appropriate design code for its stiffness and stability.

(i) Decrease in height from 3000mm

(ii) Increase in the thickness of the wall (minimum thickness 142mm)

(iii) Increase thickness of component materials (minimum HTS 5299 stud depth 70mm, minimum HTS 5299 'C' stud gauge 0.50mm)

(iv) Decrease in the linear dimensions of the boards but not thickness (≤ 2400mm (long) x ≤ 1200mm (wide) Gyproc SoundBloc)

(v) Decrease stud spacing from 600mm

(vi) Decrease in fixing centres from 300mm

(vii) Horizontal and vertical joints, of the type tested

11.2 Extension of width

The width of an identical construction may be increased as the specimen was tested at nominally 3000mm wide with one vertical edge without restraint.

11.3 Extension of height

The height of constructions tested at a minimum of 3000mm, maybe increased to 4000mm at the following fire resistance periods as the lateral deflection was below 100mm.

30 minutes	60 minutes	90 minutes	120 minutes
≤100mm, ∴4000mm	≤100mm, ∴4000mm	≤100mm, ∴4000mm	≤100mm, ∴4000mm