

Report Number BTC 13482F

A FIRE RESISTANCE TEST ON A BRITISH GYPSUM GYPWALL QUIET SF PARTITION CLAD WITH A DOUBLE LAYER OF 12.5mm GYPROC SOUNDBLOC EACH SIDE OF GYPFRAME 70S50 STUDS WITH GYPFRAME RB1 RESILIENT BAR ON THE EXPOSED FACE, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

Test Date: 2nd September 2004

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Customer: British Gypsum Limited
East Leake
Loughborough
Leicestershire
LE12 6HX

Customer: **British Gypsum Limited**

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A FIRE RESISTANCE TEST ON A BRITISH GYPSUM GYPWALL QUIET SF PARTITION CLAD WITH A DOUBLE LAYER OF 12.5mm GYPROC SOUNDBLOC EACH SIDE OF GYPFRAME 70S50 STUDS WITH GYPFRAME RB1 RESILIENT BAR ON THE EXPOSED FACE, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

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FOREWORD

This test report details a fire resistance test conducted on a sheet and stud partition system. The test sponsor was British Gypsum Limited.

The test specimen was installed by British Gypsum Limited. The construction of the specimen took place between the 20th and 23rd August 2004. British Gypsum Limited designed the partition system and selected the materials for the test specimen.

The test was carried out on the 2nd September 2004.

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, construction 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.

REPORT AUTHORISATION

Report Author



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TEST CONSTRUCTION

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

Gypframe 72C50 Standard Floor & Ceiling Channels were fixed to the head and base of the test aperture at 600mm centres with 60mm fire resistant fixings. Gypframe 70S50 'C' Studs were positioned at 600mm centres between the channels. The right hand stud viewed from unexposed face was not fixed to the perimeter test frame, and the gap between the stud and the frame lining was filled with a 25mm rock mineral fibre gasket. At the left-hand end a Gypframe 70S50 'C' Stud was used to fix the partition to the test frame with 60mm fire resistant fixings at 600mm centres.

50mm Isowool Acoustic Partition Roll (1200) was positioned in the partition cavity.

Gypframe RB1 Resilient Bar was fixed horizontally to the metal framework on the exposed face at 600mm centres with Gyproc Wafer Head Drywall Screws. The Gypframe RB1 Resilient Bar was positioned such that it backs the partitions horizontal joints (see below). Sections of Gypframe RB1 Resilient Bar were fixed vertically to the fixed end stud using two Gyproc Wafer Head Drywall Screws per section.

The Gypframe RB1 Resilient Bar on the exposed face was lined with a double layer of 12.5mm Gyproc SoundBloc board. The inner layer was fixed around the perimeter and within the field of the board with 25mm Gyproc drywall screws at 300mm centres. The outer layer was fixed around the perimeter and within the field of the board with 36mm Gyproc drywall screws at 300mm centres. All joints were staggered between layers.

The Gypframe 70S50 studs on the unexposed face were lined with a double layer of 12.5mm Gyproc SoundBloc board. The inner layer was fixed around the perimeter with 25mm Gyproc drywall screws at 300mm centres. The outer layer was fixed around the perimeter and within the field of the board with 36mm Gyproc drywall screws at 300mm centres. All joints were staggered between layers.

Horizontal joints were positioned 2400mm from the base for the outer layers on both the exposed and unexposed faces of the construction. Horizontal joints were positioned 600mm from the base for the inner layers on both the exposed and unexposed faces of the construction.

All horizontal joints on the exposed face coincided with the Gypframe RB1 Resilient Bar positions.

A Gypframe GFS1 Fixing Strap was used behind the horizontal board joint in the unexposed face outer layer.

All joints were taped and filled using Gyproc Paper Joint Tape and Gyproc Joint Filler. All screw heads were spotted using Gyproc Joint Filler.

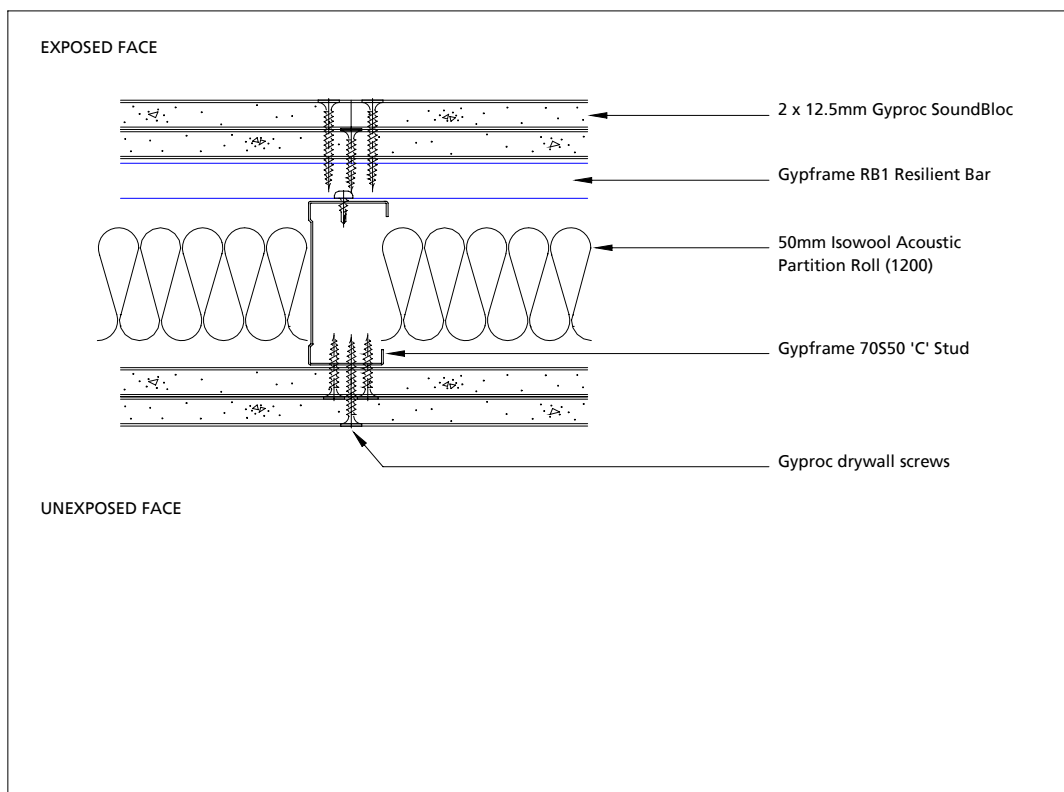


Figure 1. Cross-section of partition specimen.

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

TEST MATERIALS

Gyproc SoundBloc

Nominally, 3000mm (long) x 1200mm (wide) x 12.5mm (thick), Gyproc SoundBloc plasterboard manufactured and supplied by British Gypsum Limited, ex East Leake works.

Actual surface density:	10.72kg/m ² .
Actual thickness:	12.66mm.
Board identification numbers:	18 219 4 09:08
Actual moisture content:	0.51%.

The surface density and thickness was calculated using the actual weight and size of a selection of the boards used in the test specimen. The moisture content of the plasterboard used in construction was established from measurements made using samples dried to a constant weight in an oven at 40°C.

Metal components

- i) Gypframe 70S50'C' Studs manufactured from galvanised mild steel using the 'UltraSTEEL' process.
- ii) Gypframe 72C50 Standard Floor & Ceiling Channel manufactured from galvanised mild steel using the 'UltraSTEEL' process.
- iii) Gypframe RB1 Resilient Bar.
- iv) Gypframe GFS1 Fixing Strap.

All metal components supplied by British Gypsum Limited.

Insulation

Nominally 50mm (thick) Isowool Acoustic Partition Roll (1200) glass mineral wool manufactured and supplied by British Gypsum – Isover Limited.

Measured density:	14.23kg/m ³
Measured surface density:	0.71kg/m ²

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

Customer: **British Gypsum Limited**

Fasteners

- i) 25mm Gyproc drywall screws supplied by British Gypsum Limited.
- ii) 36mm Gyproc drywall screws supplied by British Gypsum Limited.
- iii) 13mm Gyproc Wafer head Drywall Screws supplied by British Gypsum Limited.
- iv) 60mm fire resistant fixings.

Miscellaneous components

- i) Gyproc Paper Joint Tape.
- ii) Gyproc Joint Filler.

All miscellaneous components were supplied by British Gypsum Limited.

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. The test specimen was asymmetrical therefore separate test would be required to cover the fire resistance from the other direction.

The test procedure used was EN 1364-1 Issue 2.

The ambient temperature at the commencement of the test was 19°C.

The furnace pressure was set to control at 18 ± 2 Pa positive with respect to atmosphere, at the top of the specimen, except during the first 5 minutes of the test.

The allowable tolerances are ± 5 Pa from 5 minutes to 10 minutes and ± 3 Pa from 10 minutes onwards. It is of the opinion of the laboratory that the variations in the furnace pressure exceeding the tolerances stated in BS EN 1363-1:1999 have not unduly influenced the results of this test. Furnace pressure data is shown on page 17.

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 test centre is of the opinion that this deviation from the documented method will not unduly effect the result of the test.

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TEST RESULTS

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

Integrity:	Sustained flaming	125 minutes (no failure test discontinued at the request of the customer)
	25mm Gap gauge	125 minutes (no failure test discontinued at the request of the customer)
	6mm Gap gauge	124 minutes
	Cotton pad	120 minutes
Insulation:		96 minutes

The test was terminated at 125 minutes at the request of the customer.

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.



TEST DATA

Observations

Observers: Unexposed face J McLavy
Exposed face P Cao

Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
	0	Test started.
	5	The jointing material and face paper had started to char.
	10	The jointing material and face paper continued to char.
	15	All board joints had opened to approximately 2mm.
	20	All board joints had opened to approximately 8-9mm.
	25	All board joints had opened to approximately 11-12mm. The lower left-hand board had bowed into the furnace at the top right-hand corner.
	30	All board joints had opened to approximately 12-14mm. The lower centre board had detached from its fixings along the horizontal joint. The lower left-hand board had detached from its fixings along the horizontal joint.
	35	No visible change to the specimen.
	40	The left-hand vertical joint had opened to approximately 15-16mm. The right-hand vertical joint had opened to approximately 10mm. The horizontal joint had opened to approximately 15-16mm.
	45	No visible change to the specimen.
	50	The left-hand vertical joint had opened to approximately 20mm.





Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
	55	The lower centre board had peeled into the furnace by approximately 50mm adjacent to the left-hand vertical joint.
1	00	The lower centre board had peeled into the furnace by approximately 150mm at the top left-hand corner.
1	05	A section of the outer layer lower centre board approximately 1200mm x 1200mm had fallen into the furnace. The inner layer vertical joints had opened to approximately 20mm (where exposed).
1	10	A section of the outer layer lower left-hand board approximately 2000mm x 1200mm had fallen into the furnace. A section of the outer layer lower centre board approximately 800mm x 1200mm had fallen into the furnace. Large cracks had developed on the inner layer boards.
1	15	Sections of the inner layer upper centre board and upper right-hand board had fallen into the furnace (approximately 1800mm x 1000mm in total).
1	17	<i>Unexposed face</i> The free end had buckled out of the furnace at mid-height.
1	20	A section of the outer layer lower right-hand board approximately 1000mm x 600mm had fallen into the furnace. Sections of the inner layer upper centre board and upper left-hand board had fallen into the furnace (approximately 1200mm x 1200mm in total). <i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the left-hand vertical joint at approximately 900-2100mm height.
1	24	<i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the right-hand vertical joint at approximately 1800-2100mm height. Smoke issued from the free end at mid-height.



Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
1	25	No visible change to the specimen. Visibility was poor inside the furnace.
1	27	<i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the left-hand vertical joint at approximately 600-2100mm height. The jointing material had discoloured at the screw head positions on the right-hand vertical joint at approximately 1200-2100mm height.
1	30	No further exposed face observations were possible due to poor visibility. <i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the left-hand vertical joint at approximately 600-2100mm height. The jointing material had discoloured at the screw head positions on the right-hand vertical joint at approximately 600-2100mm height.
1	36	<i>Unexposed face</i> Discolouration had developed on the centre line of the lower centre board at approximately 1500mm height. INSULATION FAILURE. The temperature rise of thermocouple No. 32 exceeded 180°C.
1	43	<i>Unexposed face</i> A glow was visible at the screw head position on the centre line of the lower centre board at approximately 1200mm height. A cotton pad was used on the above location but did not glow or ignite.
1	44	<i>Unexposed face</i> Discolouration had developed on the centre line of the lower centre board at approximately 600-2100mm height.
1	45	<i>Unexposed face</i> Discolouration had developed across the specimen at approximately 600mm height.





Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
1	46	<i>Unexposed face</i> Discolouration had developed on the left-hand vertical joint at approximately 900-2400mm height. Discolouration had developed on the centre line of the lower left-hand board at approximately 900-1800mm height.
1	51	<i>Unexposed face</i> Discolouration had developed on the left-hand side of the lower centre board. Discolouration had developed on the right-hand side of the lower left-hand board. Discolouration had developed on the right-hand vertical joint at approximately 900-2400mm height.
1	53	<i>Unexposed face</i> A slight glow was visible on the left-hand vertical joint at approximately 900mm height. A cotton pad was used on the above location but did not glow or ignite.
1	56	<i>Unexposed face</i> A slight glow was visible on the left-hand vertical joint at approximately 900-1800mm height. A cotton pad was used on the left-hand vertical joint at approximately 1800mm height but did not glow or ignite.
1	57	<i>Unexposed face</i> Discolouration had developed on the right-hand side of the lower centre board. Discolouration had developed on the lower right-hand board.
1	59	<i>Unexposed face</i> A glow was visible at the head approximately 1200mm from the free end of the specimen.

Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
2	00	<i>Unexposed face</i> INTEGRITY FAILURE. The cotton pad glowed when used at the head approximately 1200mm from the free end of the specimen.
2	04	<i>Unexposed face</i> FURTHER INTEGRITY FAILURE. The 6mm x 150mm gap gauge entered the furnace through the head approximately 600mm from the free end of the specimen.
2	05	TEST TERMINATED at the request of the customer.

Furnace Temperature Graph

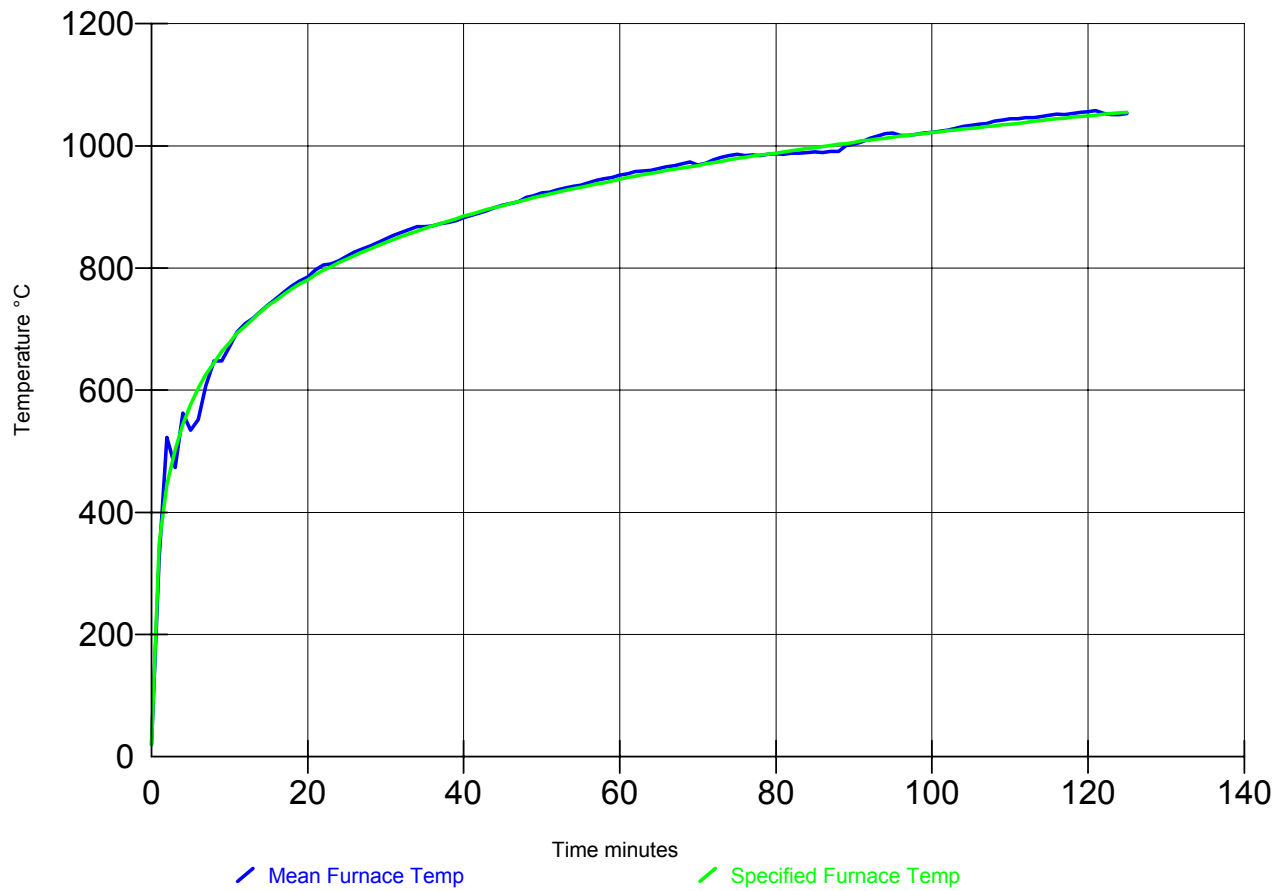


Figure 2. Furnace temperature graph.

Furnace Pressure Graph

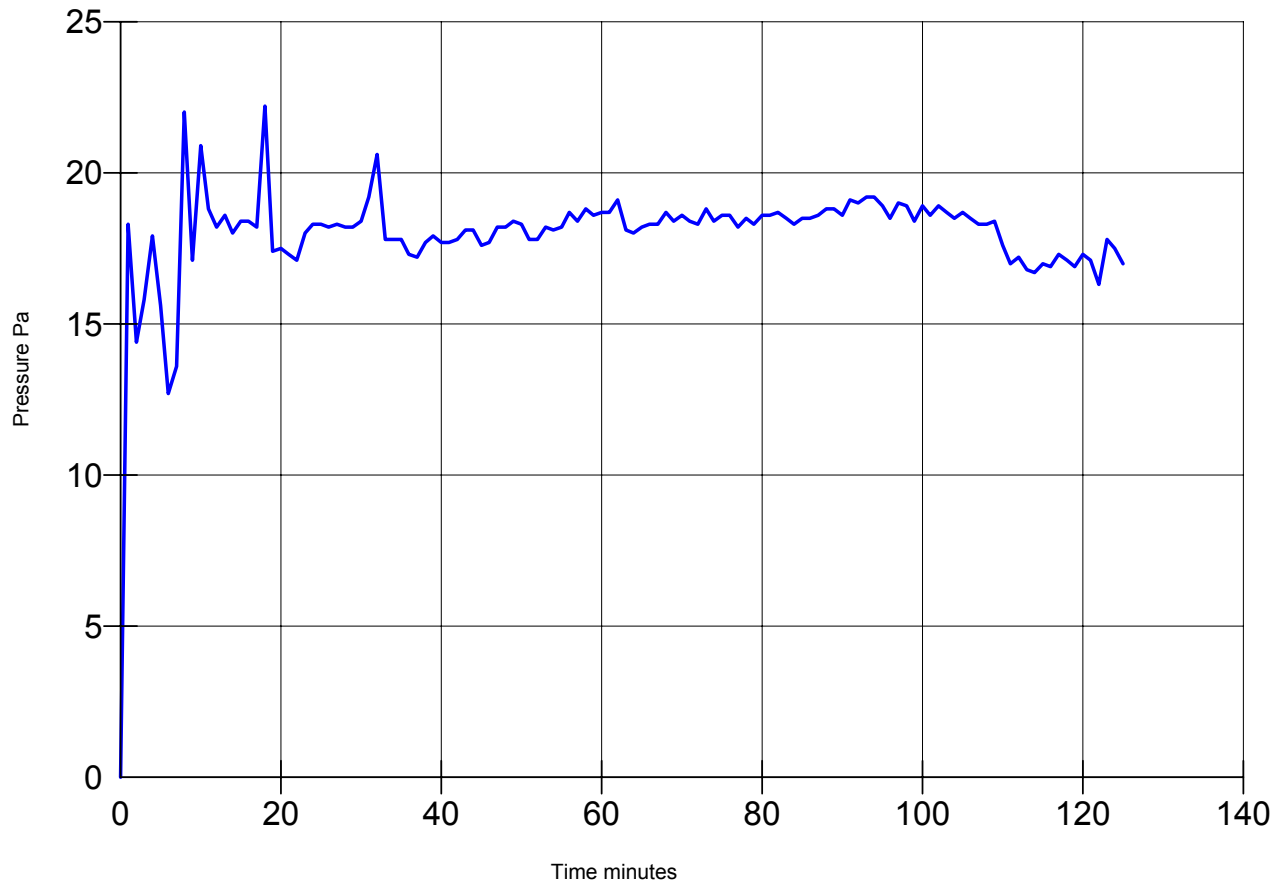


Figure 3. Furnace pressure graph.

The furnace pressure was outside of the allowable tolerance at 6-8, 10, 18 and 32 minutes.

Unexposed Face Temperature Graph

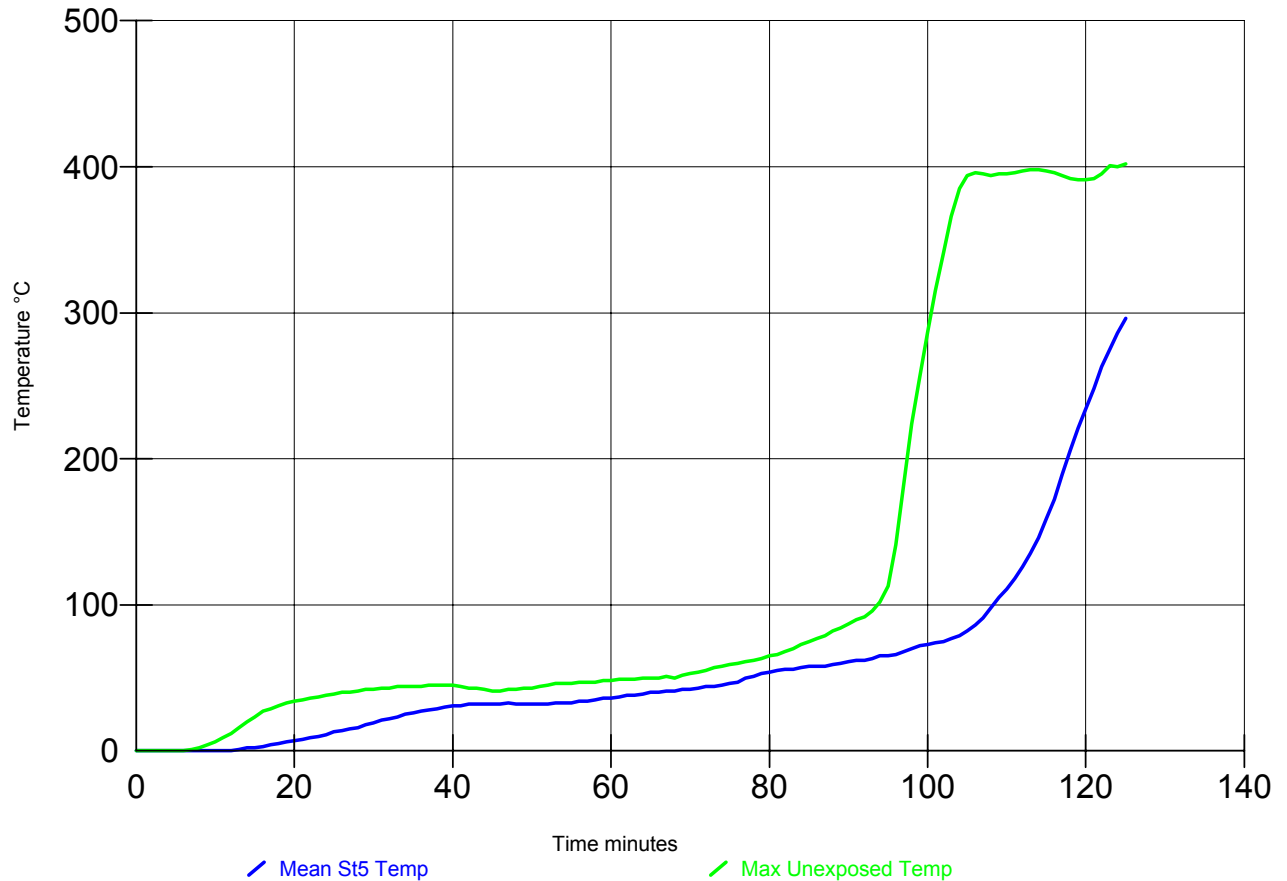


Figure 4. Unexposed face temperature graph.

Unexposed Face Thermocouple Layout

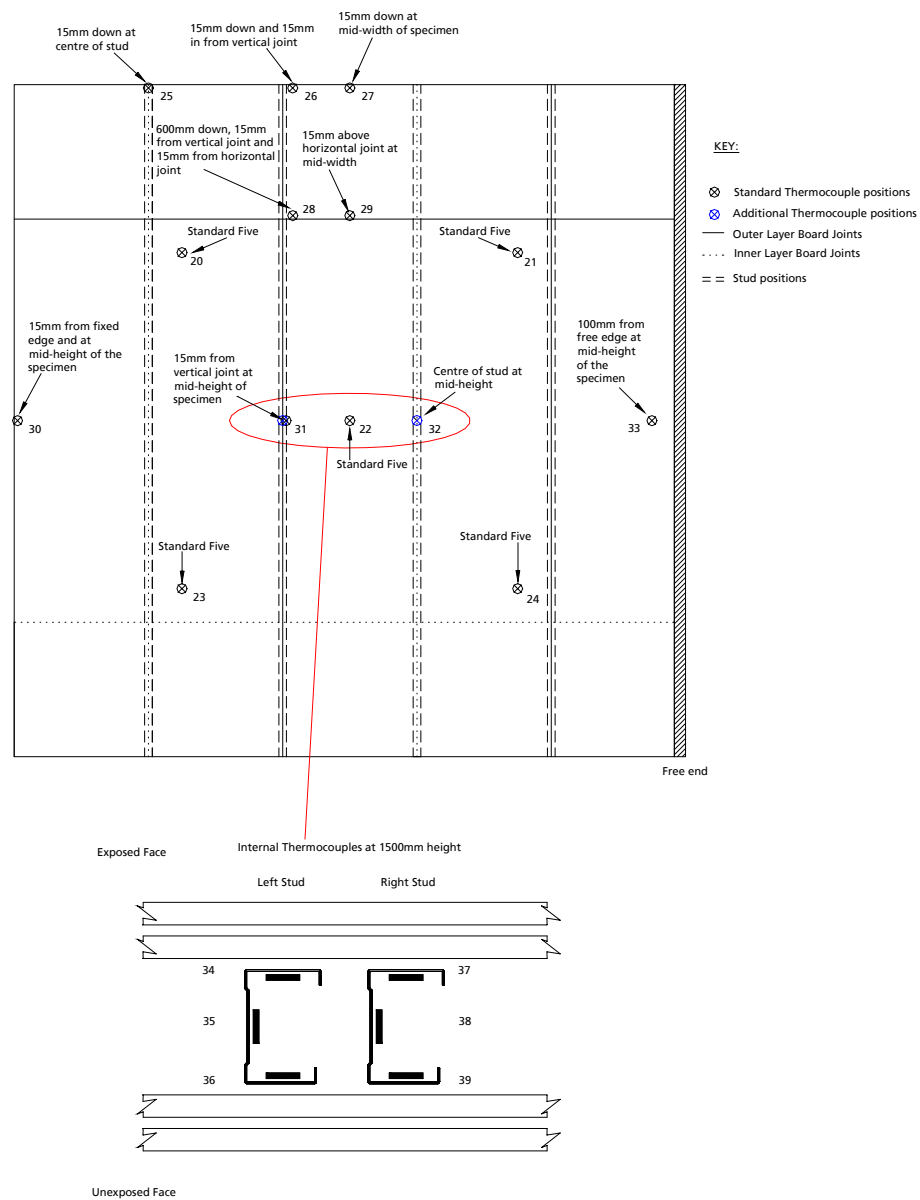


Figure 5. Unexposed face thermocouple layout.



Unexposed Face Standard Five Thermocouple Data

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



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24
34	30	29	26	16	25
35	31	30	27	17	27
36	31	31	28	19	28
37	32	32	29	21	29
38	33	32	30	22	30
39	33	33	30	24	31
40	34	33	31	25	32
41	34	34	31	26	32
42	34	34	32	27	33
43	34	34	32	28	33
44	34	34	32	29	34
45	34	34	32	30	34
46	34	34	32	30	34
47	34	34	32	31	34
48	33	33	32	31	34
49	33	33	32	31	34
50	32	33	32	32	34
51	32	33	32	32	34
52	32	33	32	32	34
53	32	34	32	33	34
54	32	34	33	33	34
55	32	35	33	34	35
56	32	35	34	34	35
57	32	36	34	35	35
58	33	37	35	36	36
59	34	38	36	36	37
60	34	38	37	37	37
61	35	39	38	38	38
62	35	40	39	38	39
63	36	41	39	39	39
64	37	42	40	40	40
65	38	42	40	41	41
66	38	43	40	41	41
67	39	44	41	42	42
68	39	44	41	42	42
69	40	45	42	43	43
70	41	45	42	43	43



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24
71	41	46	43	44	44
72	42	46	44	44	44
73	43	47	45	45	44
74	44	47	46	45	45
75	46	48	47	46	45
76	47	49	49	47	46
77	50	50	55	49	46
78	52	51	57	50	47
79	54	53	58	53	48
80	55	55	59	55	49
81	55	56	58	57	50
82	56	57	58	58	51
83	55	57	60	59	52
84	55	58	64	60	52
85	54	58	66	60	52
86	54	58	67	60	53
87	54	58	67	59	55
88	54	58	68	61	57
89	54	58	69	65	58
90	54	59	69	67	58
91	54	61	70	67	58
92	54	64	71	66	58
93	54	66	71	66	61
94	55	67	72	67	65
95	55	68	73	68	65
96	56	69	74	69	66
97	59	70	76	70	67
98	62	70	80	71	67
99	64	71	86	71	68
100	65	71	89	72	69
101	66	72	91	73	70
102	66	72	94	74	70
103	67	74	97	76	71
104	68	75	102	82	71
105	68	79	108	85	72
106	69	86	116	88	74
107	69	89	132	90	78



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24
108	70	90	156	93	83
109	71	92	183	97	86
110	72	94	203	102	88
111	75	98	219	109	90
112	81	103	234	120	93
113	84	109	248	139	97
114	87	115	260	169	102
115	90	134	271	196	108
116	93	149	281	218	120
117	97	181	291	239	139
118	103	204	300	258	167
119	110	223	308	275	190
120	121	238	314	291	209
121	139	252	319	307	227
122	168	264	322	321	242
123	191	275	323	332	256
124	210	286	324	341	269
125	228	296	328	347	281

See figure 5 for the locations of the thermocouples.



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	1	1	0	0
8	1	2	1	1	0
9	2	4	2	1	0
10	4	6	4	2	0
11	8	9	7	3	1
12	11	12	10	5	1
13	13	16	13	6	2
14	16	20	16	8	3
15	18	23	19	10	3
16	20	27	21	12	5
17	22	29	24	13	6
18	23	31	26	15	7
19	25	33	27	17	8
20	26	34	29	18	10
21	27	35	30	20	11
22	27	36	31	21	12
23	28	37	33	23	13
24	29	38	34	24	14
25	29	39	35	25	16
26	30	40	36	27	17
27	31	40	37	28	18
28	32	41	38	29	19
29	33	42	39	30	21
30	34	42	40	31	22
31	35	43	41	32	23
32	36	43	42	33	24
33	38	44	43	33	25

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



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
71	48	51	46	54	42
72	48	52	46	55	43
73	48	52	47	57	43
74	49	52	47	58	44
75	49	53	48	59	46
76	49	53	48	60	47
77	49	53	49	61	49
78	50	54	49	62	50
79	50	54	49	63	51
80	50	55	50	65	52
81	50	55	50	66	53
82	50	55	51	68	53
83	50	56	51	70	52
84	52	56	52	73	52
85	50	55	51	75	52
86	50	56	51	77	51
87	50	56	52	79	51
88	50	56	52	82	51
89	51	56	52	84	51
90	51	57	52	87	50
91	51	58	52	90	50
92	51	59	53	92	49
93	51	60	53	96	49
94	52	61	53	99	50
95	52	62	54	102	50
96	53	63	55	105	51
97	53	65	56	109	54
98	54	66	59	114	58
99	55	68	61	121	64
100	56	70	62	132	67
101	57	71	63	145	69
102	59	73	64	158	71
103	61	75	66	177	72
104	63	77	69	197	74
105	64	79	70	214	75
106	65	82	72	230	76
107	66	84	74	245	78

Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
108	67	86	76	259	81
109	68	89	80	273	84
110	69	91	83	287	87
111	70	94	86	300	89
112	72	98	88	315	92
113	74	101	90	330	94
114	78	106	91	347	95
115	82	111	92	365	97
116	87	118	94	377	100
117	91	128	96	383	105
118	96	140	100	383	113
119	101	153	107	386	123
120	107	168	116	388	139
121	114	189	130	390	157
122	120	212	156	395	184
123	132	239	189	401	206
124	158	270	224	400	225
125	194	301	253	402	241

See figure 5 for the locations of the thermocouples.



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



Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
34	33	31	36	17
35	34	32	36	19
36	35	33	36	20
37	36	33	36	21
38	36	34	36	22
39	37	34	35	23
40	38	34	35	24
41	38	34	35	25
42	38	35	35	26
43	38	35	34	26
44	38	35	34	27
45	38	35	34	27
46	37	35	34	28
47	37	36	34	28
48	37	36	34	28
49	36	37	35	28
50	36	38	36	29
51	36	38	37	29
52	35	39	38	30
53	35	40	39	30
54	35	41	40	31
55	35	42	41	31
56	35	44	42	32
57	36	45	43	32
58	36	46	44	33
59	36	47	44	34
60	37	49	45	34
61	37	50	46	35
62	38	51	46	35
63	38	52	47	36
64	39	53	47	37
65	39	54	47	37
66	40	55	48	37
67	40	56	48	38
68	40	56	49	38
69	40	58	49	38
70	41	60	49	39



Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
71	41	62	50	39
72	41	64	50	39
73	41	67	51	39
74	42	70	51	40
75	42	73	51	40
76	43	77	52	41
77	43	82	55	42
78	44	88	57	42
79	44	93	58	43
80	45	98	60	44
81	45	103	62	44
82	45	108	63	45
83	45	113	65	45
84	46	118	67	46
85	46	122	67	48
86	46	128	69	50
87	46	133	70	52
88	46	140	72	54
89	47	147	73	56
90	47	156	74	57
91	47	165	76	58
92	47	174	81	57
93	47	185	92	56
94	48	196	102	58
95	48	207	113	62
96	48	218	141	65
97	49	229	184	66
98	49	240	224	67
99	50	251	257	68
100	51	262	287	68
101	53	274	315	69
102	53	285	341	70
103	54	297	366	71
104	55	310	385	72
105	55	321	394	72
106	56	332	396	73
107	57	343	395	75

Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
108	58	353	394	79
109	59	362	395	85
110	60	370	395	88
111	63	375	396	89
112	65	379	397	90
113	67	381	398	93
114	68	381	398	97
115	70	381	397	103
116	71	380	396	109
117	74	379	394	119
118	78	376	392	136
119	80	373	391	167
120	83	372	391	192
121	84	371	392	214
122	85	364	395	232
123	86	360	396	248
124	88	357	398	263
125	88	349	400	278

See figure 5 for the locations of the thermocouples.

Figures shown in red indicate the time and position of insulation failure.

Thermocouple No. 31 was located on a screw head therefore is discounted from the failure criteria.



Internal Thermocouple Data at 1500mm height

Time (mins)	Actual Temperature (°C)					
	Left-hand stud			Right-hand 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	29	27	25	-	28	26
1	29	27	25	-	28	26
2	31	27	25	-	28	26
3	39	31	26	-	28	26
4	58	47	36	-	29	26
5	66	55	38	-	34	27
6	73	66	45	-	57	36
7	80	75	50	-	75	50
8	83	80	54	-	83	60
9	87	84	58	92	88	67
10	89	86	64	92	89	70
11	87	85	69	92	87	70
12	87	85	71	93	85	71
13	86	84	72	93	85	71
14	86	84	72	93	85	72
15	85	84	72	93	85	72
16	86	85	72	92	86	74
17	87	86	73	94	88	75
18	89	88	76	97	90	77
19	91	89	78	97	91	79
20	92	91	80	103	92	81
21	93	92	82	108	93	83
22	94	93	83	106	94	84
23	96	93	84	108	95	85
24	97	94	86	110	96	87
25	98	96	87	111	96	88
26	100	97	88	112	97	90
27	102	97	89	112	98	90
28	105	97	91	111	98	91
29	107	98	92	112	98	91
30	109	98	92	113	98	92
31	109	99	92	115	98	92



Time (mins)	Actual Temperature (°C)					
	Left-hand stud			Right-hand 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
32	110	99	92	118	98	92
33	110	99	93	125	97	92
34	110	100	93	135	97	92
35	111	101	93	151	97	91
36	111	102	94	172	99	91
37	111	103	94	187	99	91
38	110	104	94	195	100	91
39	110	106	94	198	101	91
40	113	109	94	205	104	91
41	121	112	96	202	105	90
42	141	117	98	247	108	92
43	184	126	101	286	116	98
44	244	141	105	328	133	105
45	281	158	111	352	161	114
46	310	180	117	382	199	125
47	334	201	123	404	239	135
48	354	220	128	421	270	148
49	373	237	134	439	293	161
50	390	251	141	446	309	175
51	410	263	144	462	323	185
52	426	275	149	475	334	194
53	437	285	155	487	344	203
54	449	295	161	496	353	211
55	462	305	167	504	362	219
56	473	315	173	512	370	226
57	479	324	179	519	377	233
58	485	332	185	526	383	239
59	492	339	190	533	390	245
60	499	347	196	540	396	251
61	505	354	202	547	402	256
62	511	360	208	554	408	262
63	515	366	213	560	413	268
64	518	370	218	564	417	273
65	526	374	222	568	420	278
66	552	382	227	575	423	282



Time (mins)	Actual Temperature (°C)					
	Left-hand stud			Right-hand 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
67	622	404	238	586	429	287
68	665	437	255	598	437	293
69	698	474	274	-	447	300
70	732	527	303	-	461	310
71	751	574	343	-	473	320
72	737	587	404	-	485	332
73	723	619	514	-	499	344
74	747	668	618	-	513	356
75	869	-	729	-	567	377
76	887	-	884	-	903	600
77	893	-	-	-	-	711
78	-	-	-	-	-	837
79	-	-	-	-	-	837
80	-	-	-	-	-	-

See figure 5 for the locations of the thermocouples.

Thermocouple No. 34 did not work after 77 minutes.
Thermocouple No. 35 did not work after 74 minutes.
Thermocouple No. 36 did not work after 76 minutes.

Thermocouple No. 37 did not work until 9 minutes.
Thermocouple No. 37 did not work after 68 minutes.

Thermocouple No. 38 did not work after 76 minutes.
Thermocouple No. 39 did not work after 79 minutes.



Specimen Lateral Deflection

Time (mins)	Deflection at centre of the specimen (mm)	Deflection 50mm from free end of the specimen (mm)
0	0	0
1	4	5
2	4	5
3	3	5
4	4	5
5	5	5
6	6	6
7	6	6
8	6	7
9	7	7
10	6	6
11	6	6
12	6	6
13	5	6
14	5	6
15	5	5
16	4	5
17	4	5
18	4	5
19	4	5
20	4	5
21	4	5
22	4	5
23	4	5
24	4	5
25	4	5
26	4	5
27	4	5
28	5	5
29	5	5
30	5	5
31	5	5
32	5	5
33	5	5
34	5	5



Time (mins)	Deflection at centre of the specimen (mm)	Deflection 50mm from free end of the specimen (mm)
35	6	6
36	7	6
37	7	6
38	9	6
39	10	6
40	12	7
41	14	7
42	17	8
43	21	9
44	25	10
45	29	11
46	33	12
47	36	13
48	39	14
49	42	15
50	45	15
51	47	15
52	48	16
53	50	16
54	51	16
55	53	16
56	54	16
57	56	16
58	57	16
59	58	15
60	58	15
61	60	14
62	60	14
63	61	14
64	62	14
65	63	14
66	64	14
67	65	14
68	66	14
69	66	14
70	66	14
71	67	14
72	67	13



Time (mins)	Deflection at centre of the specimen (mm)	Deflection 50mm from free end of the specimen (mm)
73	68	13
74	69	13
75	70	12
76	70	10
77	69	10
78	69	8
79	69	8
80	69	5
81	67	4
82	67	3
83	66	0
84	65	-2
85	65	-5
86	65	-5
87	65	-6
88	66	-7
89	66	-6
90	66	-6
91	66	-7
92	66	-6
93	66	-6
94	65	-7
95	64	-8

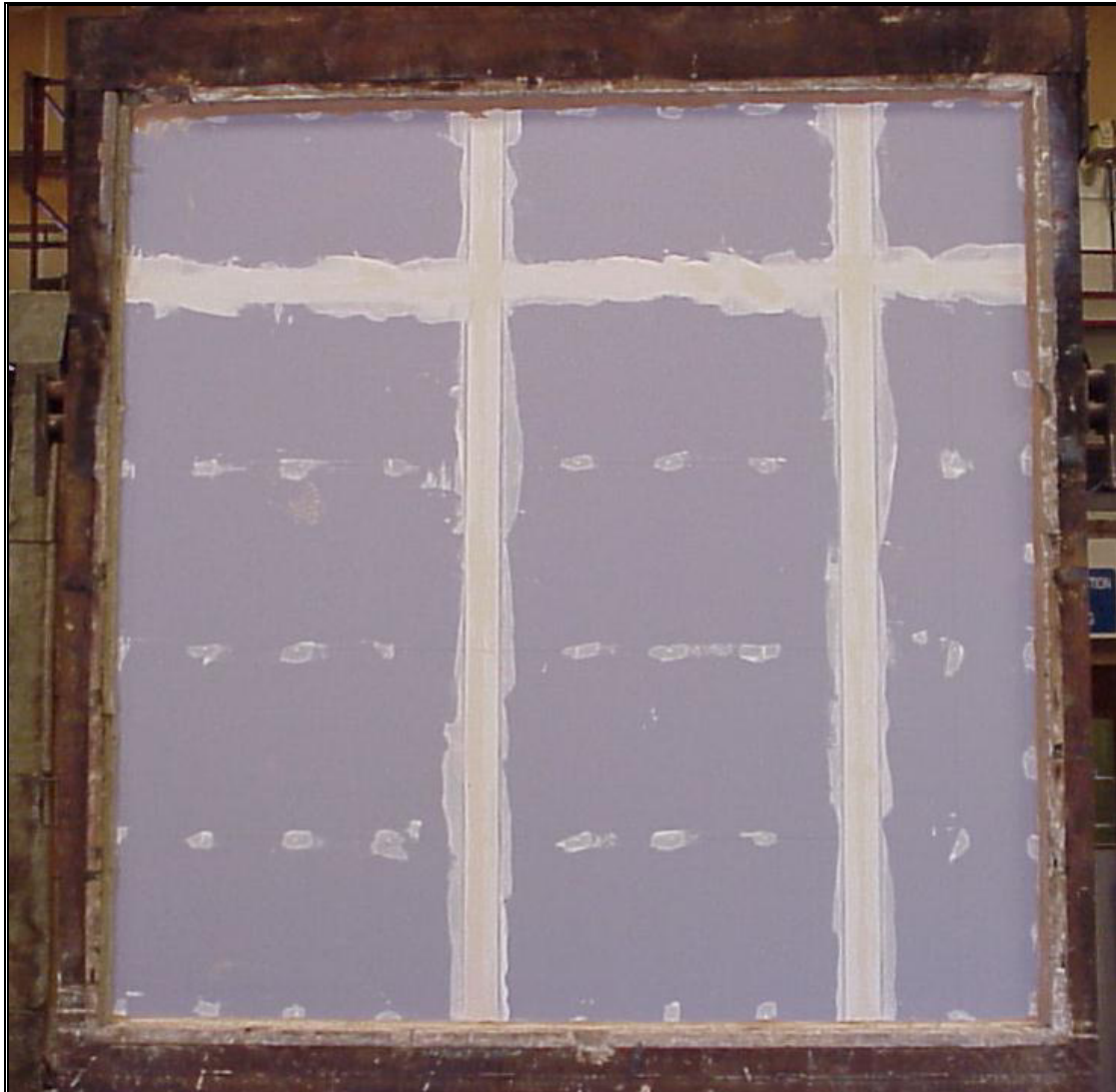
Both deflection measurements were taken at the mid-height of the specimen.

Negative values indicate that the specimen deflected out of the furnace.

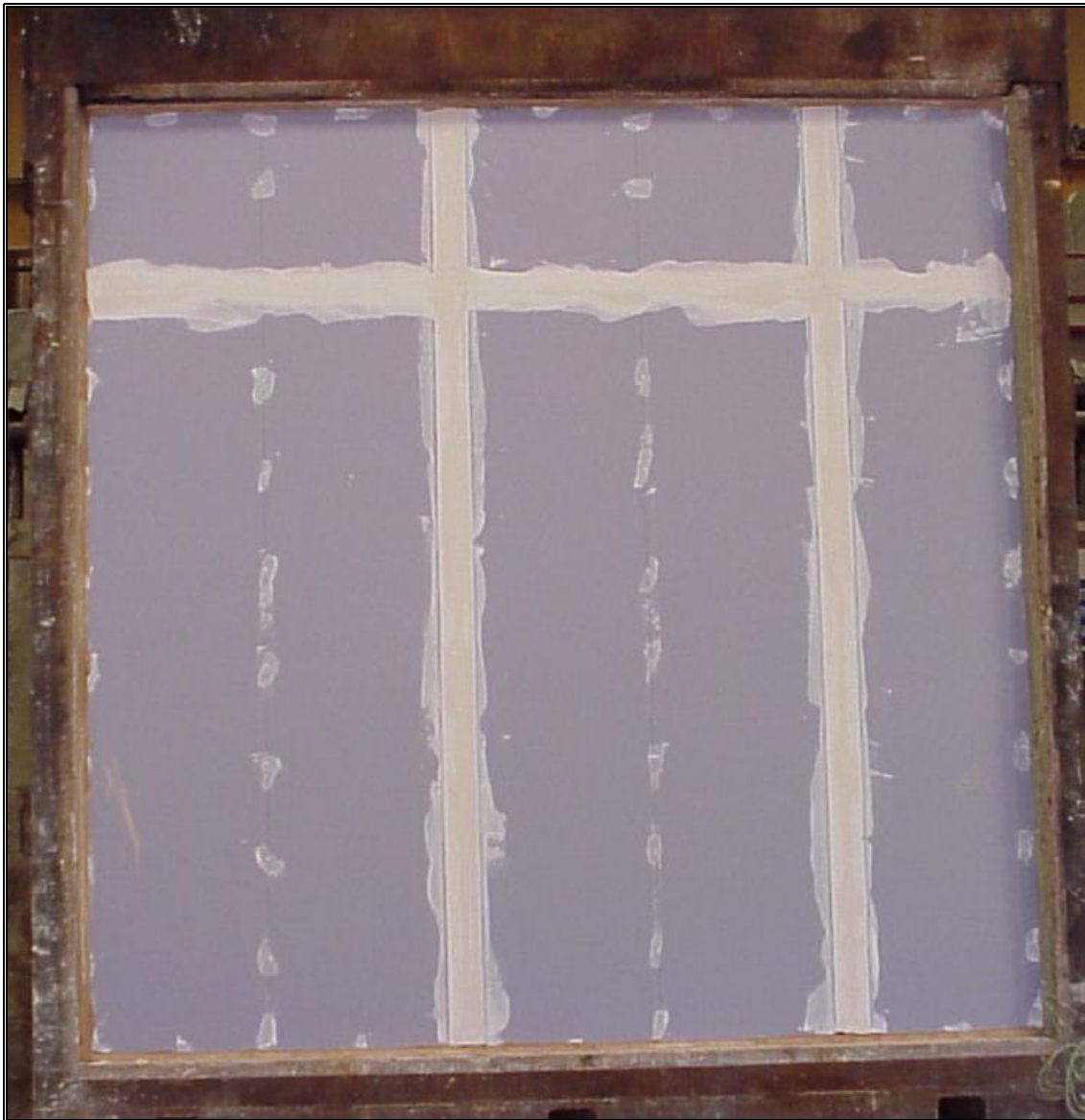
The deflection readings were discontinued after 95 minutes.

(The lateral deflection was recorded by taking measurements relative to a fixed reference wire at 1 minute intervals due to equipment availability at the time of the test).

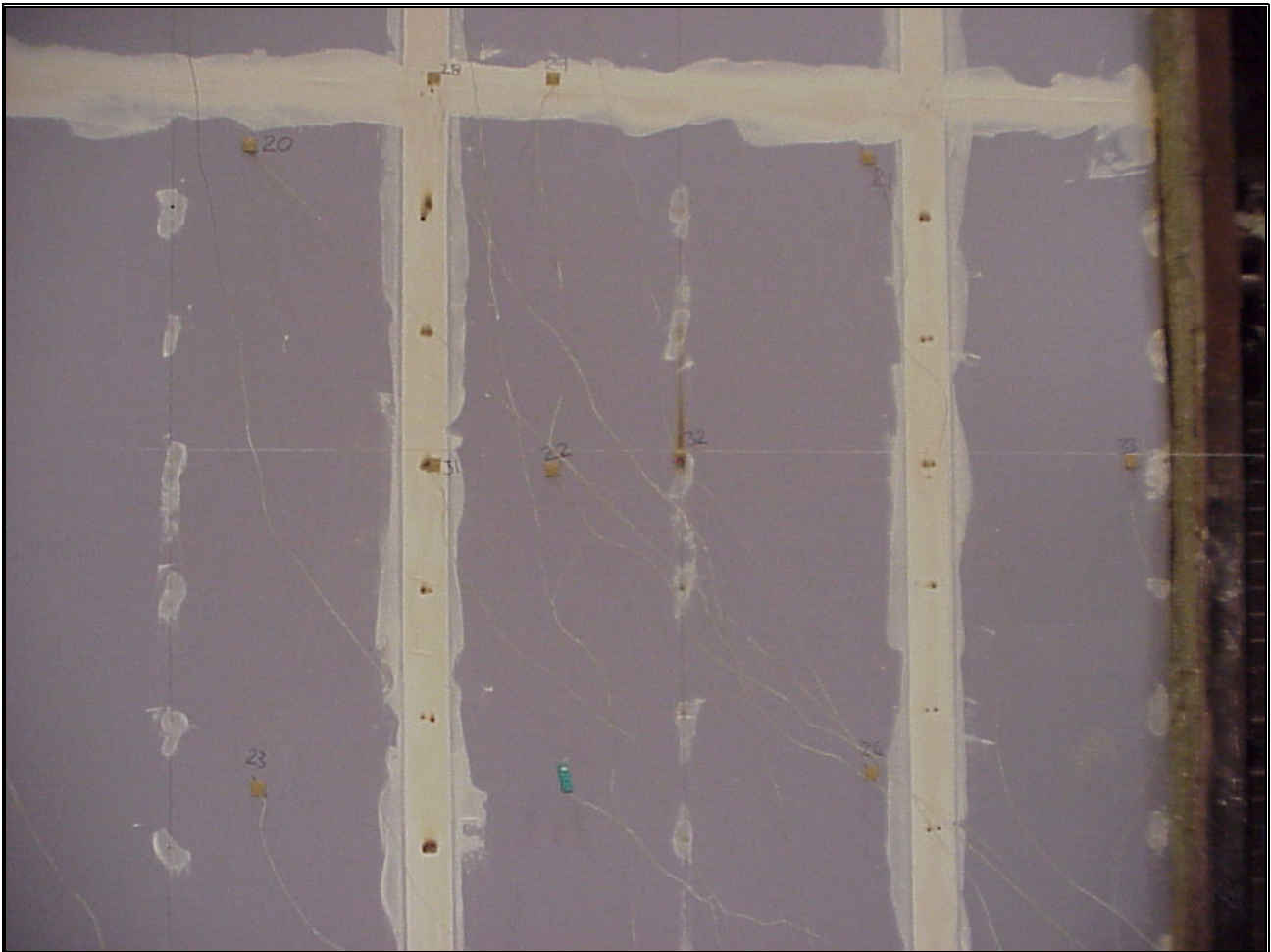
PHOTOGRAPHS



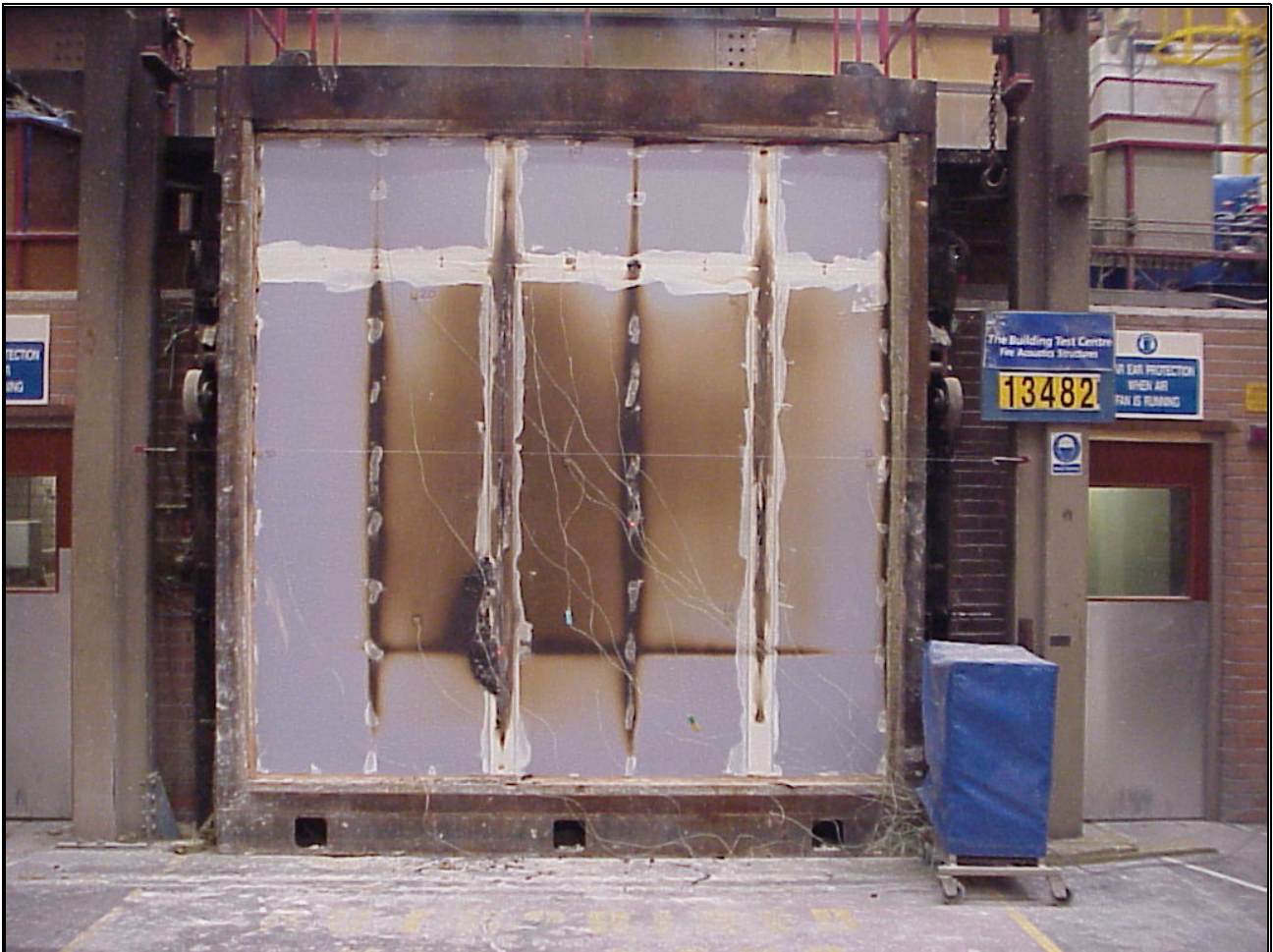
Photograph 1. View of the exposed face prior to test.



Photograph 2. View of the unexposed face prior to test.



Photograph 3. View of the unexposed face at 96 minutes (after insulation failure).



Photograph 4. View of the unexposed face at 120 minutes (after integrity failure).



Photograph 5. View of the unexposed face at test termination (125 minutes).

FIELD OF DIRECT APPLICATION

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 138mm).
- (iii) Increase thickness of component materials (minimum Gypframe stud depth 70mm, minimum Gypframe 'C' stud gauge 0.5mm).
- (iv) Decrease in the linear dimensions of the boards but not thickness ($\leq 2400\text{mm}$ long $\times \leq 1200\text{mm}$ 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.

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.

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
<100mm, ∴ 4000mm	<100mm, ∴ 4000mm	<100mm, ∴ 4000mm