



Report Number BTC 13481F

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 AND GYPFRAME RB1 RESILIENT BAR, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

Test Date: 7th September 2004

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

Customer: **British Gypsum Limited**

BTC 13481F: Page 1 of 41



0296

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 AND GYPFRAME RB1 RESILIENT BAR, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

TABLE OF CONTENTS

FOREWORD	4
REPORT AUTHORISATION	4
TEST CONSTRUCTION	5
TEST MATERIALS	7
Gyproc SoundBloc	7
Metal components	7
Insulation	7
Fasteners	8
Miscellaneous components	8
TEST PROCEDURE	8
TEST RESULTS	9
LIMITATIONS	9
TEST DATA	10
Observations	10
Furnace Temperature Graph	15
Furnace Pressure Graph	16
Unexposed Face Temperature Graph	17
Unexposed Face Thermocouple Layout	18
Unexposed Face Standard Five Thermocouple Data	19
Additional Unexposed Face Temperature Data	23
Additional Unexposed Face Temperature Data	27
Internal Thermocouple Data at 1500mm height	31
Specimen Lateral Deflection	34
PHOTOGRAPHS	37

Customer: British Gypsum Limited

BTC 13481F: Page 2 of 41



0296

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 19th and 20th August 2004. British Gypsum Limited designed the partition system and selected the materials for the test specimen.

The test was carried out on the 7th 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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Customer: **British Gypsum Limited**

BTC 13481F: Page 4 of 41

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 both sides 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 was lined both sides 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.

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 coincided with the Gypframe RB1 Resilient Bar positions.

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

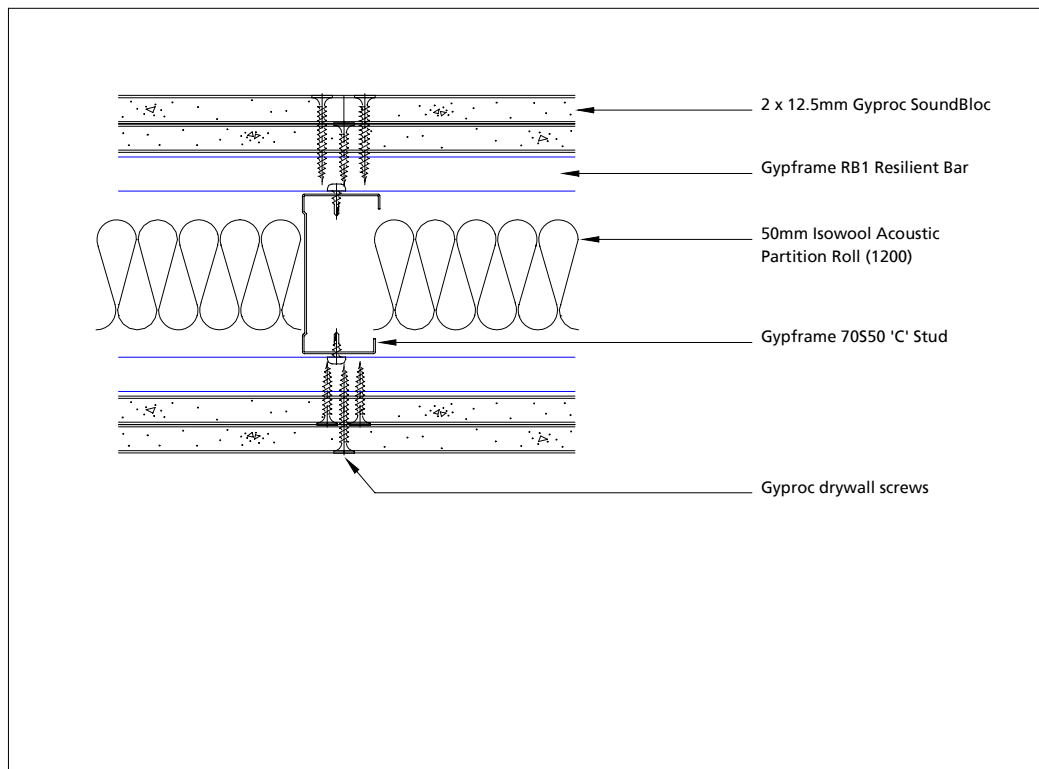


Figure 1. Cross-section of partition specimen.

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.

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:	13.97kg/m ³
Measured surface density:	0.70kg/m ²

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

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

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

The ambient temperature at the commencement of the test was 21°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 16.

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.

Customer: **British Gypsum Limited**

BTC 13481F: Page 8 of 41

TEST RESULTS

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

Integrity:	Sustained flaming	119 minutes (no failure test discontinued at the request of the customer)
	25mm Gap gauge	119 minutes
	6mm Gap gauge	119 minutes
	Cotton pad	117 minutes
Insulation:		101 minutes

The test was terminated at 119 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 2-3mm.
	20	All board joints had opened to approximately 6-8mm.
	25	All board joints had opened to approximately 10mm.
	30	All board joints had opened to approximately 10-12mm. 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	The left-hand vertical joint had opened to approximately 10-12mm. The right-hand vertical joint had opened to approximately 10-12mm. The horizontal joint had opened to approximately 12-15mm.
	40	No visible change to the specimen.
	45	All board joints had opened to approximately 15mm.
	50	The lower centre board had peeled into the furnace adjacent to the left-hand vertical joint. 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 and horizontal joint. The lower left-hand board had peeled into the furnace by approximately 70mm adjacent to the horizontal joint.
1	00	A section of the outer layer lower centre board approximately 900mm x 1200mm had fallen into the furnace. The inner layer right-hand vertical joint had opened to approximately 20mm (where exposed).
1	05	A section of the outer layer lower left-hand board approximately 900mm x 1200mm had fallen into the furnace.
1	10	A section of the outer layer lower centre board approximately 600mm x 1200mm had fallen into the furnace. The inner layer left-hand vertical joint had opened to approximately 15-20mm (where exposed). The inner layer right-hand vertical joint had opened to approximately 25-30mm (where exposed).
1	15	A section of the outer layer lower left-hand board approximately 1600mm x 1200mm had fallen into the furnace. The entire outer layer upper left-hand board had fallen into the furnace. Visibility was poor inside the furnace.
1	20	A section of the inner layer upper centre board approximately 1200mm x 1200mm had fallen into the furnace.
1	21	<i>Unexposed face</i> The free end had buckled out of the furnace at mid-height.
1	25	Sections of the inner layer upper left-hand, centre and right-hand boards had fallen into the furnace. Visibility had further deteriorated inside the furnace.





Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
1	26	<i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the left-hand vertical joint at approximately 1800-2400mm height.
1	28	<i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the right-hand vertical joint at approximately 1200-1800mm height.
1	29	<i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the horizontal joint.
1	30	Sections of the inner layer upper left-hand, centre and right-hand boards had fallen into the furnace. No further exposed face observations were possible due to poor visibility.
1	31	<i>Unexposed face</i> The jointing material had discoloured at the screw head positions on the left-hand vertical joint at approximately 1200-2400mm height. The jointing material had discoloured at the screw head positions on the right-hand vertical joint at approximately 1200-2400mm height.
1	35	<i>Unexposed face</i> The jointing material had discoloured at the screw head positions within the fields of all boards.
1	40	<i>Unexposed face</i> Discolouration had developed on the left-hand vertical joint at approximately 2400mm height. Discolouration had developed on the centre line of the lower centre board at approximately 1500-1800mm height.
1	41	<i>Unexposed face</i> INSULATION FAILURE. The temperature rise of the roving thermocouple exceeded 180°C on the centre line of the lower centre board at approximately 1600mm height.



Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
1	43	<i>Unexposed face</i> Discolouration had developed on the top right-hand corner of the lower left-hand board. Discolouration had developed on the top left-hand corner of the lower centre board.
1	47	<i>Unexposed face</i> Discolouration had developed on the left-hand vertical joint at approximately 1800-2700mm height. Discolouration had developed on the right-hand vertical joint at approximately 1800-2400mm height. Discolouration had developed on the centre line of the lower centre board at approximately 1100-2300mm height. Discolouration had developed on the centre line of the lower left-hand board at approximately 1500-1800mm height.
1	51	<i>Unexposed face</i> Discolouration had developed on the left-hand vertical joint at approximately 1200-2700mm height. Discolouration had developed on the right-hand vertical joint at approximately 1200-2700mm height. Discolouration had developed on the centre line of the lower centre board at approximately 600-2500mm height. Discolouration had developed on the centre line of the lower left-hand board at approximately 1200-2400mm height.
1	52	<i>Unexposed face</i> Discolouration had developed on the top half of the lower centre board.
1	54	<i>Unexposed face</i> A slight glow was visible on the left-hand vertical joint at approximately 1800mm height. A cotton pad was used on the above location but did not glow or ignite.





Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
1	56	<i>Unexposed face</i> A glow was visible at the head at approximately mid-width of the specimen. A cotton pad was used on the above location but did not glow or ignite.
1	57	<i>Unexposed face</i> INTEGRITY FAILURE. The cotton pad glowed when used at the head at approximately mid-width of the specimen.
1	58	<i>Unexposed face</i> A glow was visible on the left-hand vertical joint at approximately 1500-2400mm height. A glow was visible at the head of the specimen from approximately mid-width to the free end.
1	59	<i>Unexposed face</i> FURTHER INTEGRITY FAILURE. The 6mm x 150mm gap gauge would have entered the furnace through left-hand vertical joint at approximately 1500mm height. FURTHER INTEGRITY FAILURE. The 25mm gap gauge would have entered the furnace through left-hand vertical joint at approximately 1500mm height. The right-hand half of the specimen collapsed. TEST TERMINATED at the request of the customer.



Furnace Temperature Graph

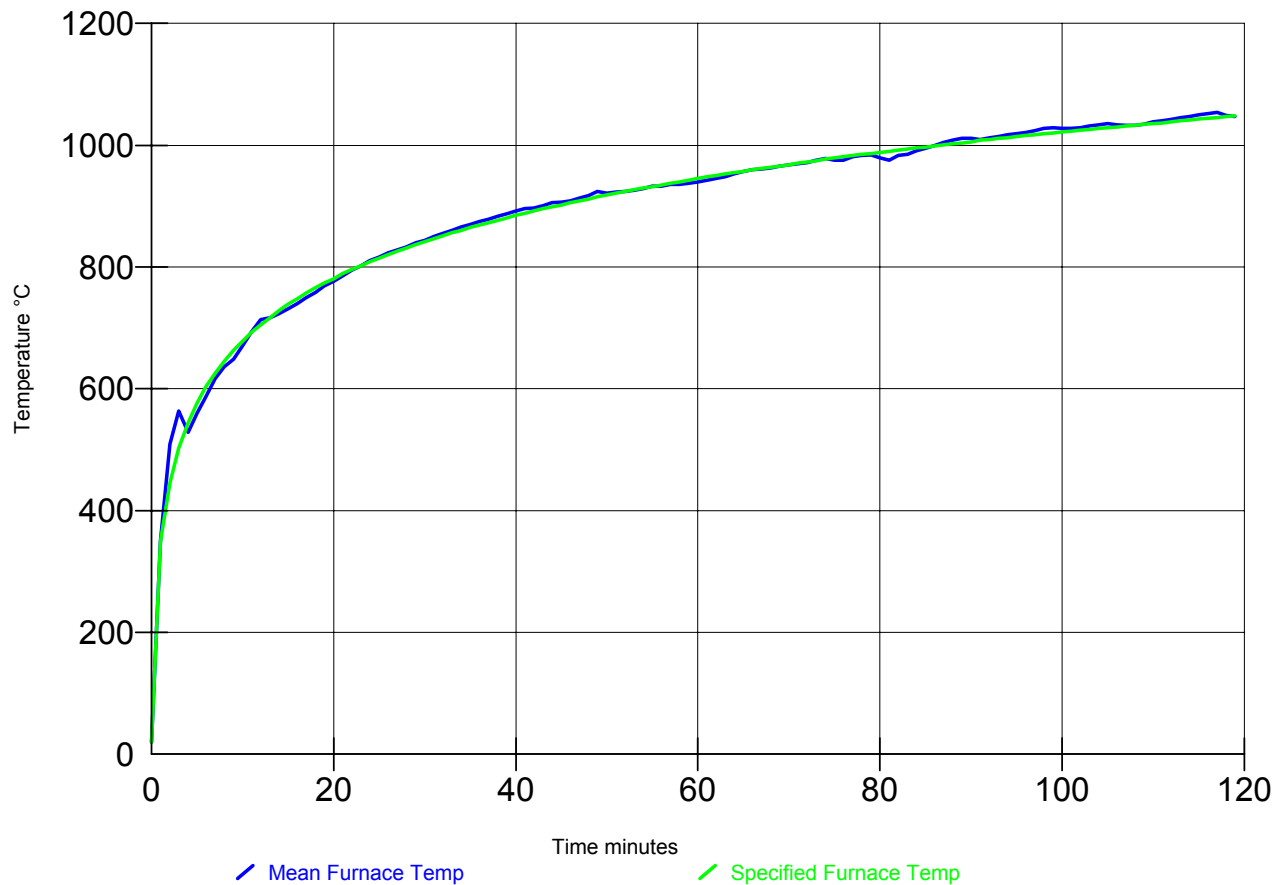


Figure 2. Furnace temperature graph.

Furnace Pressure Graph

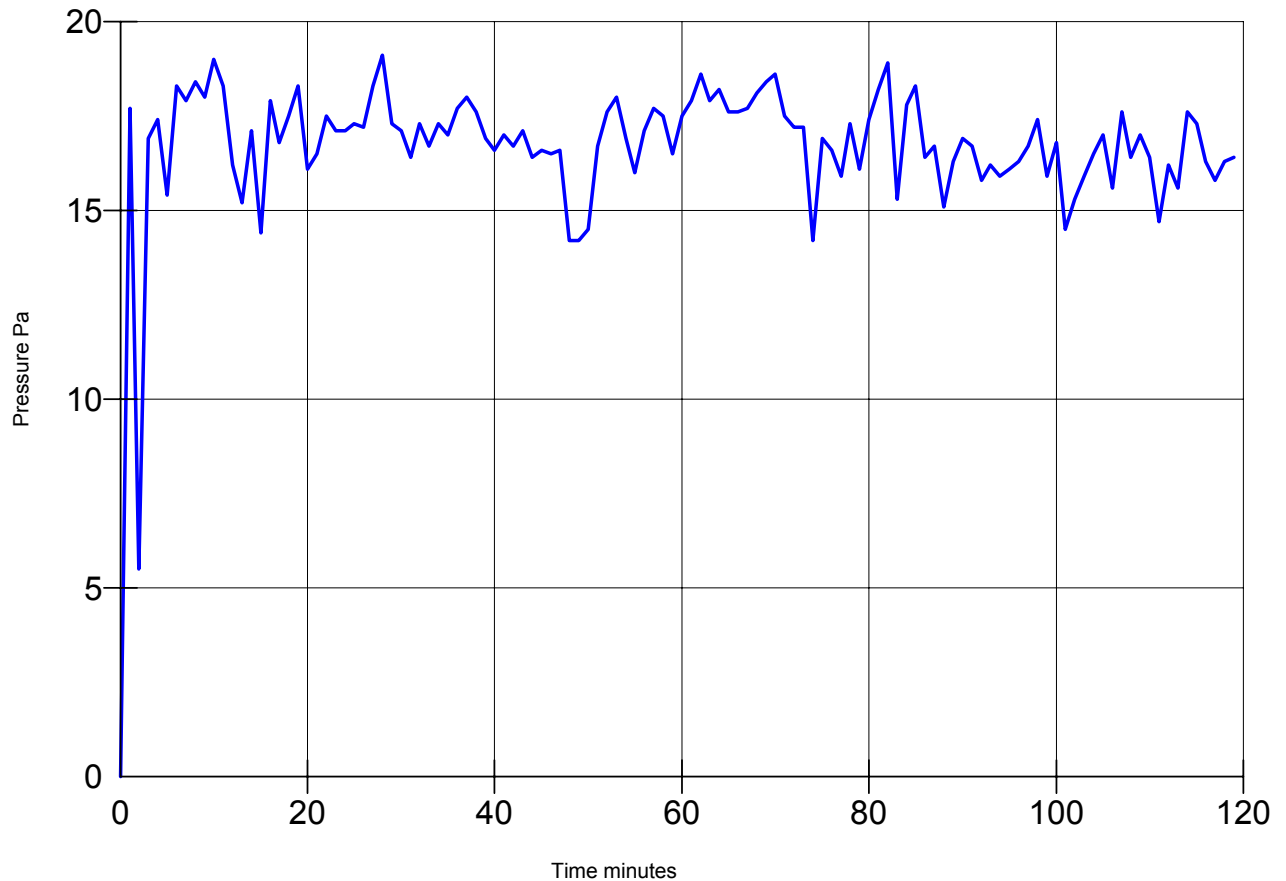


Figure 3. Furnace pressure graph.

The furnace pressure was outside of the allowable tolerance at 15, 48-50, 74, 101 and 111 minutes.

Unexposed Face Temperature Graph

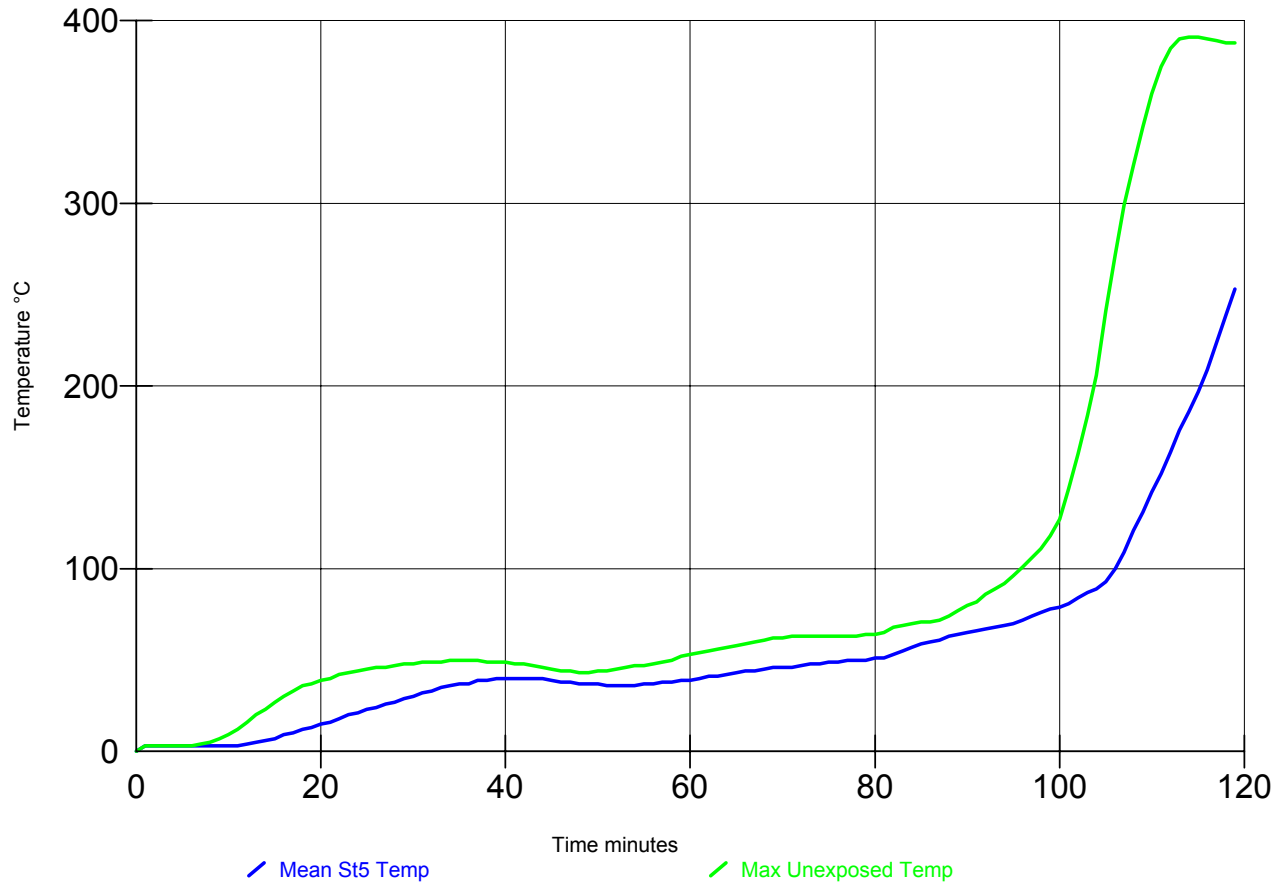


Figure 4. Unexposed face temperature graph.

Unexposed Face Thermocouple Layout

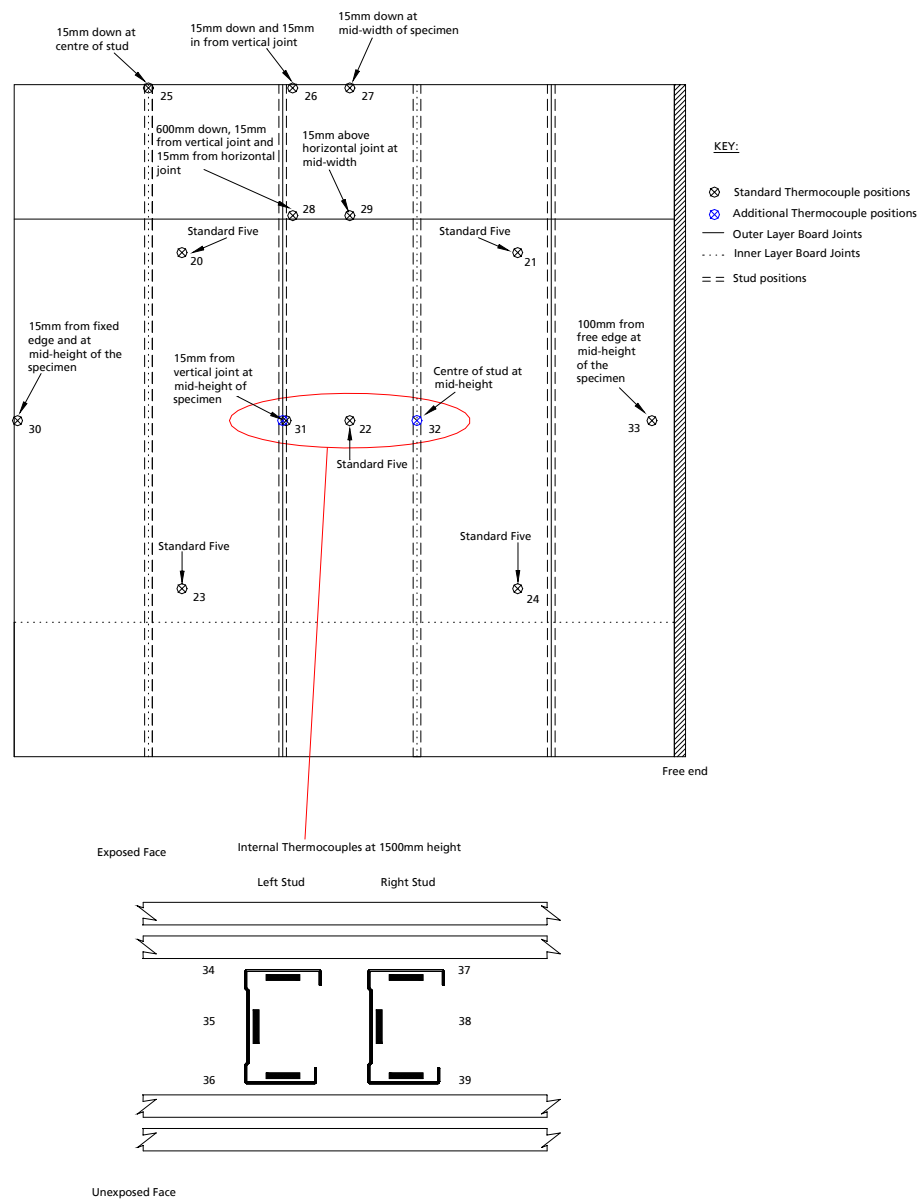


Figure 5. Unexposed face thermocouple layout.

Customer: British Gypsum Limited



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



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

Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24
71	55	50	45	43	41
72	55	51	45	44	41
73	55	52	46	45	42
74	56	52	46	46	42
75	57	53	47	47	43
76	57	53	47	47	43
77	57	53	48	48	44
78	57	54	48	48	45
79	57	55	49	48	45
80	57	55	49	49	46
81	58	55	50	49	47
82	61	55	54	50	48
83	64	56	57	50	49
84	65	60	58	50	53
85	66	65	59	51	58
86	67	66	59	52	59
87	68	68	59	53	60
88	69	68	63	55	60
89	70	70	67	57	60
90	71	71	68	58	59
91	71	72	68	59	60
92	72	73	69	59	64
93	73	73	70	60	66
94	74	74	71	62	67
95	76	74	72	64	67
96	80	76	72	66	68
97	85	78	72	67	69
98	88	85	73	68	69
99	89	88	74	69	70
100	91	90	75	70	71
101	93	92	80	71	72
102	96	95	86	72	73
103	100	99	89	74	74
104	105	104	90	75	75
105	112	110	92	76	78
106	123	121	95	79	83
107	138	137	99	85	86

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BTC 13481F: Page 21 of 41



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24
108	162	163	104	88	88
109	184	185	110	89	89
110	201	204	126	90	92
111	215	218	140	92	96
112	228	232	170	94	100
113	240	244	193	98	105
114	250	254	211	103	113
115	259	263	227	110	128
116	268	271	242	119	148
117	276	281	255	136	176
118	285	289	268	159	196
119	292	298	280	183	214

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	3	3	3	3	3
2	3	3	3	3	3
3	3	3	3	3	3
4	3	3	3	3	3
5	3	3	3	3	3
6	3	3	3	3	3
7	3	4	3	3	3
8	3	5	3	3	3
9	4	7	4	3	3
10	5	9	6	4	4
11	6	12	9	4	4
12	8	16	12	5	6
13	10	20	16	6	7
14	13	23	20	8	9
15	15	27	24	10	11
16	17	30	27	12	13
17	20	33	30	14	15
18	22	36	33	16	17
19	23	37	35	18	19
20	25	39	37	20	21
21	27	40	39	22	23
22	28	42	40	24	25
23	30	43	42	26	27
24	32	44	43	27	29
25	34	45	44	29	30
26	36	46	45	31	32
27	38	46	45	32	34
28	40	47	46	34	35
29	41	48	47	35	36
30	43	48	47	36	37
31	44	49	48	37	38
32	45	49	48	38	40
33	45	49	49	39	40



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



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
71	52	60	49	63	55
72	53	60	49	63	56
73	54	61	49	63	56
74	54	61	49	63	57
75	55	62	50	63	58
76	55	62	50	63	59
77	55	63	51	63	60
78	55	63	51	63	60
79	55	64	52	63	61
80	55	64	52	63	61
81	56	65	52	65	62
82	56	66	53	68	61
83	56	67	53	69	61
84	56	67	53	70	61
85	56	69	53	71	62
86	57	70	53	71	62
87	58	72	53	72	63
88	59	74	54	73	63
89	61	77	54	74	64
90	62	80	56	75	66
91	64	82	57	77	67
92	65	86	58	79	68
93	67	89	58	83	69
94	68	92	60	91	70
95	69	96	62	96	71
96	70	99	64	101	71
97	72	103	66	106	72
98	73	106	67	111	72
99	74	109	69	118	72
100	76	113	70	127	73
101	77	116	72	144	74
102	80	121	73	163	75
103	83	127	74	184	77
104	86	135	75	204	81
105	88	145	76	222	88
106	90	155	78	240	93
107	91	166	79	256	98

Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
108	92	178	83	269	103
109	94	193	88	281	109
110	97	209	91	300	117
111	102	224	92	321	130
112	107	239	94	339	152
113	113	255	95	357	176
114	122	271	98	369	198
115	138	288	102	363	218
116	155	306	107	358	237
117	176	327	114	356	254
118	196	352	123	354	271
119	216	374	140	354	291

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



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





Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
71	36	45	45	41
72	37	46	45	42
73	37	47	46	42
74	38	48	46	43
75	38	49	47	44
76	39	50	47	44
77	39	51	48	45
78	40	52	49	45
79	40	54	49	46
80	41	54	50	46
81	41	55	52	46
82	42	57	57	47
83	42	59	60	47
84	43	59	61	48
85	43	60	62	49
86	44	60	64	50
87	44	63	66	51
88	45	66	69	52
89	46	69	71	54
90	46	71	72	55
91	47	71	74	57
92	48	72	74	58
93	49	72	74	59
94	50	73	75	59
95	50	73	76	58
96	51	73	77	61
97	51	72	78	64
98	53	73	80	66
99	55	73	94	67
100	57	74	105	68
101	59	80	117	70
102	61	88	135	71
103	62	92	168	72
104	64	95	206	73
105	65	100	241	74
106	65	104	272	75
107	66	107	299	76



Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
108	67	116	321	80
109	68	138	342	85
110	70	159	360	88
111	71	186	375	89
112	72	208	385	90
113	74	229	390	92
114	75	246	391	94
115	76	263	391	99
116	78	278	390	104
117	81	292	389	110
118	85	307	388	119
119	90	319	388	138

See figure 5 for the locations of the thermocouples.

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	28	27	26	28	26	24
1	30	29	28	30	29	27
2	31	29	28	30	29	27
3	41	36	36	32	29	27
4	49	47	46	37	32	29
5	55	53	51	46	41	35
6	62	60	58	56	55	46
7	68	66	63	73	67	57
8	72	70	68	80	76	67
9	75	74	72	85	83	73
10	77	76	75	85	84	74
11	78	77	76	86	85	76
12	79	78	77	86	84	77
13	80	79	77	87	84	77
14	81	79	78	85	83	78
15	82	80	78	85	83	78
16	83	81	80	85	83	79
17	85	83	81	87	84	80
18	87	84	82	88	85	81
19	89	85	83	92	87	82
20	91	87	84	96	89	84
21	93	89	85	101	91	85
22	95	91	86	103	93	86
23	98	93	87	99	95	88
24	100	95	89	102	97	89
25	102	98	91	104	99	91
26	104	100	93	107	101	92
27	105	102	96	108	103	94
28	106	103	98	110	104	96
29	108	105	101	111	105	97
30	110	107	103	112	107	99
31	113	110	105	114	108	100



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	118	112	107	116	110	101
33	123	115	109	119	111	103
34	133	119	112	145	114	104
35	144	123	114	147	118	106
36	156	128	117	141	122	108
37	167	134	120	152	128	111
38	179	142	124	164	136	114
39	194	154	129	177	146	118
40	210	165	134	194	157	121
41	229	176	141	214	170	125
42	249	191	149	236	187	131
43	271	211	158	260	206	136
44	296	233	170	316	227	145
45	321	256	184	325	248	155
46	347	277	199	343	269	165
47	369	294	212	363	287	174
48	389	310	220	379	302	181
49	408	324	226	391	314	187
50	424	337	234	407	331	195
51	441	350	246	422	350	207
52	456	361	257	435	368	223
53	467	372	266	448	383	239
54	478	382	277	460	396	253
55	487	390	287	465	407	265
56	494	397	294	472	417	275
57	500	403	299	480	426	283
58	506	407	303	488	434	289
59	512	411	307	495	440	294
60	520	413	307	501	443	296
61	525	407	300	504	440	294
62	528	398	292	502	433	291
63	530	386	283	498	428	287
64	533	381	278	495	424	285
65	536	377	275	490	420	283
66	566	379	274	487	418	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	851	388	278	483	417	281
68	-	410	287	483	418	282
69	-	443	306	486	421	284
70	-	475	328	494	428	289
71	-	518	357	504	438	297
72	-	554	387	515	450	307
73	-	581	414	525	462	318
74	-	600	441	537	474	330
75	-	616	469	549	489	344
76	-	626	493	563	503	357
77	-	637	519	577	519	371
78	-	650	551	590	537	387
79	-	661	583	606	559	410
80	-	872	849	919	902	870
81	-	-	-	-	-	-
82	-	-	-	-	-	-

See figure 5 for the locations of the thermocouples.

Thermocouple No. 34 did not work after 67 minutes.
 Thermocouple No. 35 did not work after 80 minutes.
 Thermocouple No. 36 did not work after 80 minutes.
 Thermocouple No. 37 did not work after 80 minutes.
 Thermocouple No. 38 did not work after 80 minutes.
 Thermocouple No. 39 did not work after 80 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	3	0
2	3	0
3	4	0
4	3	0
5	3	0
6	3	0
7	5	0
8	5	0
9	6	0
10	6	0
11	6	0
12	6	0
13	6	0
14	5	0
15	5	0
16	5	0
17	5	0
18	4	0
19	5	0
20	5	0
21	5	0
22	5	0
23	5	0
24	5	0
25	6	0
26	6	0
27	6	0
28	7	0
29	7	0
30	7	0
31	7	0
32	7	0
33	7	0
34	7	0



Time (mins)	Deflection at centre of the specimen (mm)	Deflection 50mm from free end of the specimen (mm)
35	7	0
36	8	0
37	9	0
38	10	0
39	12	0
40	14	0
41	16	1
42	18	1
43	22	1
44	24	2
45	27	2
46	29	3
47	32	3
48	36	4
49	36	4
50	37	4
51	40	4
52	42	4
53	44	4
54	46	4
55	50	4
56	50	4
57	50	4
58	52	4
59	54	4
60	55	4
61	56	4
62	57	4
63	57	4
64	57	4
65	58	4
66	60	4
67	60	4
68	61	3
69	61	3
70	62	1
71	63	1
72	63	0



Time (mins)	Deflection at centre of the specimen (mm)	Deflection 50mm from free end of the specimen (mm)
73	64	0
74	65	-1
75	65	-1
76	66	-1
77	68	-3
78	69	-3
79	70	-4
80	72	-6
81	72	-7
82	70	-9
83	70	-10
84	69	-11
85	68	-11
86	68	-15
87	68	-16
88	67	-18
89	67	-23
90	67	-24
91	67	-25
92	67	-25
93	67	-25
94	67	-25
95	67	-25
96	67	-25
97	67	-25
98	67	-25
99	65	-25

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 99 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).

Customer: **British Gypsum Limited**



PHOTOGRAPHS



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



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



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

Customer: **British Gypsum Limited**

BTC 13481F: Page 38 of 41



0296



Photograph 3. View of the unexposed face at 101 minutes (after insulation failure).



Photograph 4. View of the unexposed face at 117 minutes (after integrity failure).

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 154mm).
- (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