



The Building Test Centre

Fire Acoustics Structures

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A FIRE RESISTANCE TEST ON A 4.8m (HIGH) x 3m (WIDE) BRITISH GYPSUM GYPWALL PARTITION CLAD WITH A DOUBLE LAYER OF 12.5mm GYPROC FIRELINE BOARD EACH SIDE OF GYPFRAME 70S50 STUDS, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

Test Date: 2nd July 2003

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BTC 12732F: Page 1 of 34



0296



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TABLE OF CONTENTS

FOREWORD	3
REPORT AUTHORISATION	3
TEST CONSTRUCTION	4
TEST MATERIALS	7
Gyproc FireLine	7
Metal components	7
Fasteners	7
Miscellaneous components	8
TEST PROCEDURE	8
TEST RESULTS	9
LIMITATIONS	9
TEST DATA	10
Observations	10
Furnace Temperature Graph	12
Furnace Pressure Graph	13
Unexposed Face Temperature Graph	14
Unexposed Face Thermocouple Layout	15
Unexposed Face Standard Five Thermocouple Data	16
Additional Unexposed Face Temperature Data	19
Additional Unexposed Face Temperature Data	22
Internal Thermocouple Data at 3600mm height	25
Internal Thermocouple Data at 2400mm height	28
Specimen Lateral Deflection	31
FIELD OF DIRECT APPLICATION	34



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 on the 25th June 2003. British Gypsum Limited designed the partition system and selected the materials for the test specimen.

The test was carried out on the 2nd July 2003.

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

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BTC 12732F: Page 3 of 34



0296

TEST CONSTRUCTION

The specimen was constructed in a refractory concrete lined steel restraint frame having an opening of 5000mm high x 3000mm wide.

The height of the test frame was reduced to nominally 4800mm by constructing a false floor at the base of the test frame. Four 3000mm long x 195mm wide x 38mm thick softwood joists were positioned on the base of the test frame level with the unexposed face edge. The bottom joist was screw fixed to the frame using 100mm fire resistant fixings at alternate 200mm centres either side of the centreline of the joist. The next joist was screw fixed to the lower joist using 60mm wood screws at alternate 200mm centres either side of the centreline of the joist. The remaining timber joists were fixed in position using the same method.

The exposed face and upper surface of the false floor were clad in four layers of 10mm Glasroc MultiBoard screw fixed at 300mm centres using 50mm Gyproc drywall screws. All board joints were staggered and filled with fire resistant mastic.

A Gypframe 72DC60 Deep Flange Floor & Ceiling Channel was fixed to the head of the test aperture at 600mm centres with 60mm fire resistant fixings. A Gypframe 72DC60 Deep Flange Floor & Ceiling Channel was fixed to the centreline of the false floor timber joists at 600mm centres with 100mm wood screws.

Gypframe 70S50 studs were positioned at 600mm centres between the channels. Each 4800mm length of stud comprised of one full 3000mm length plus a second length 2400mm long, overlapped by 600mm and fixed together using two Gypframe Wafer Head Jack-Point Screws, two to each flange. The right hand stud viewed from the unexposed face was not fixed to the perimeter test frame, but the gap between the stud and the lining was filled with a 50mm 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.

The framework was lined both sides with a double layer of 12.5mm Gyproc FireLine 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.

Full width boards were positioned on the outer layer on the exposed face adjacent to the free edge. All vertical board joints were staggered between layers.

Horizontal joints were positioned 3000mm from the base for the outer layer on both the exposed and unexposed faces of the construction. Horizontal joints were positioned 2000mm and 4700mm from the base for the inner layers on both the exposed and unexposed faces of

the construction. Gypframe GFS1 fixing strap was used behind the horizontal board joints on the outer layers.

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

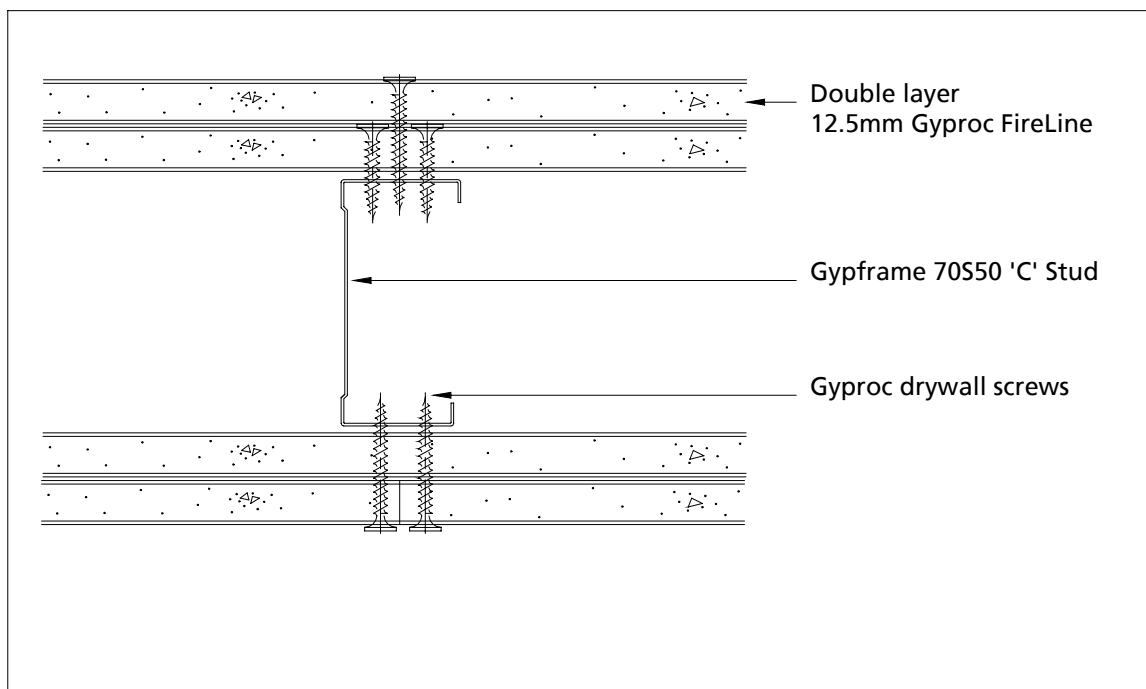


Figure 1. Cross section of the specimen.

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 FireLine

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

Actual surface density:	9.82kg/m ² .
Actual thickness:	12.81mm.
Board identification numbers:	16 120 3 09:59
Actual moisture content:	0.30%.

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 72DC50 Deep Flange Floor & Ceiling Channel manufactured from galvanised mild steel using the 'Ultrasteel' process.
- iii) Gypframe GFS1 Fixing Strap.

All metal components supplied by 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 Gypframe Wafer Head Jack-Point Screws supplied by British Gypsum Limited.
- iv) 60mm fire resistant fixings.
- v) 100mm wood screws.

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 20°C.

The furnace pressure head was located at a height of 3 metres and the pressure was set to control at 1 ± 2 Pa positive with respect to the atmosphere, except during the first 5 minutes of the test.

This equated to 18 ± 2 Pa positive with respect to the atmosphere, at the top of the specimen.

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 13.

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.



TEST RESULTS

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

Integrity:	Sustained flaming	98 minutes (no failure test discontinued)
	25mm Gap gauge	98 minutes (no failure test discontinued)
	6mm Gap gauge	98 minutes (no failure test discontinued)
	Cotton pad	98 minutes (no failure test discontinued)
Insulation:		98 minutes (no failure test discontinued)

The test was terminated at 98 minutes at the request of the laboratory.

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 R Evans
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 backing paper had started to char.
	10	The jointing material and backing paper continued to char (approximately 50% had fallen into the furnace).
	15	All joints had opened to approximately 2-3mm.
	20	The left-hand vertical joint had opened to approximately 6mm. The right-hand vertical joint had opened to approximately 5mm. The horizontal joint had opened to approximately 4mm.
	25	All joints had opened to approximately 7-8mm.
	30	The left-hand vertical joint had opened to approximately 10-11mm. The right-hand vertical joint had opened to approximately 10mm. The horizontal joint had opened to approximately 15mm.
	35	The left-hand vertical joint had opened to approximately 12mm. The right-hand vertical joint had opened to approximately 12mm. The horizontal joint had opened to approximately 20mm. The lower left-hand and lower centre boards had pulled away from their fixings adjacent to the horizontal joint.
	40	No visible change to the specimen.



Time		Observations
hrs	mins	
		All observations refer to exposed face unless otherwise stated.
	45	The left-hand vertical joint had opened to approximately 15mm. The right-hand vertical joint had opened to approximately 15mm. The horizontal joint had opened to approximately 20-25mm. The lower left-hand and lower centre boards had detached from the majority of their fixings adjacent to the horizontal joint.
	50	No visible change to the specimen.
	55	The left-hand vertical joint had opened to approximately 15-20mm. The right-hand vertical joint had opened to approximately 15-20mm. The horizontal joint had opened to approximately 25-30mm.
1	00	No visible change to the specimen.
1	05	The left-hand vertical joint had opened to approximately 20-25mm. The right-hand vertical joint had opened to approximately 20-25mm. The horizontal joint had opened to approximately 30-35mm.
1	38	TEST TERMINATED at the request of the laboratory for safety reasons.



Furnace Temperature Graph

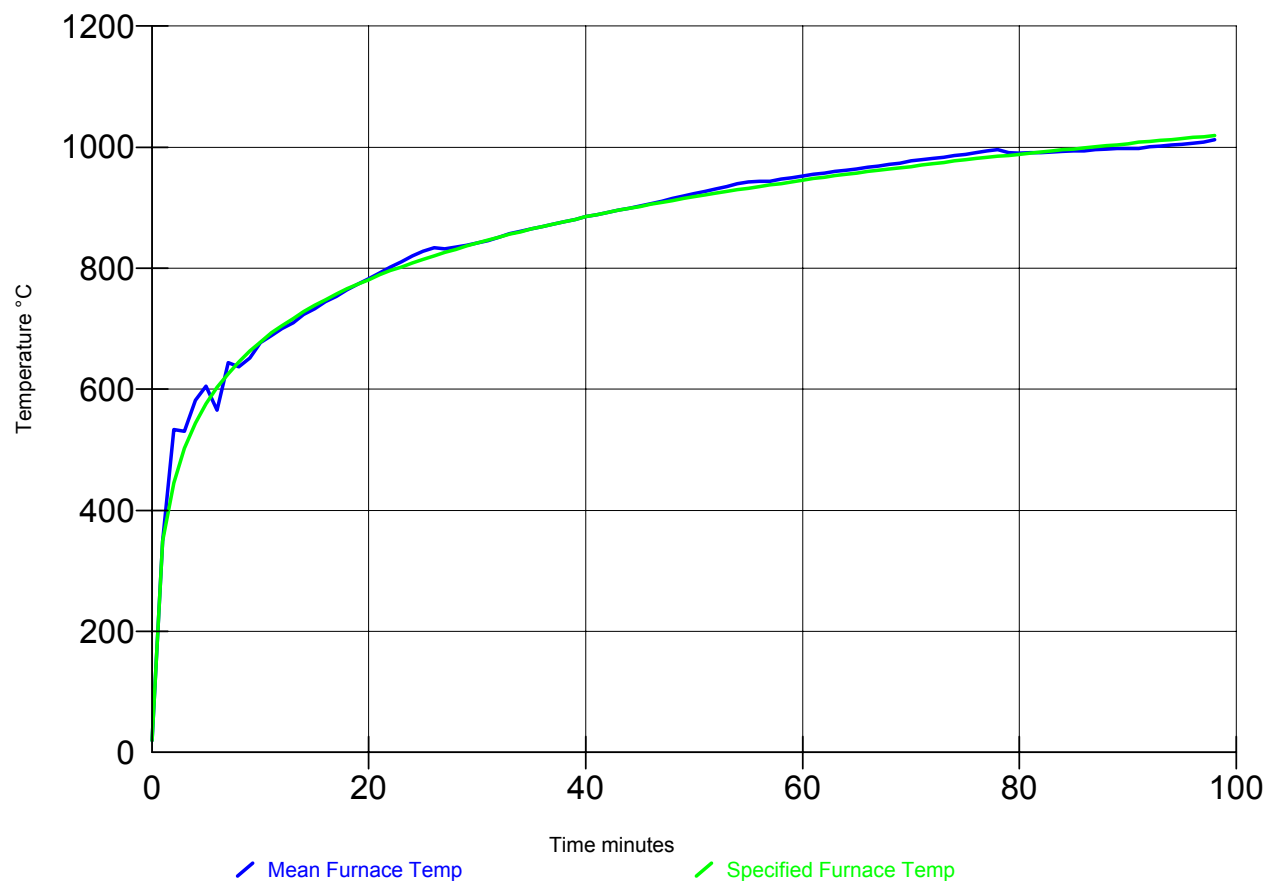


Figure 2. Furnace temperature graph.



Furnace Pressure Graph

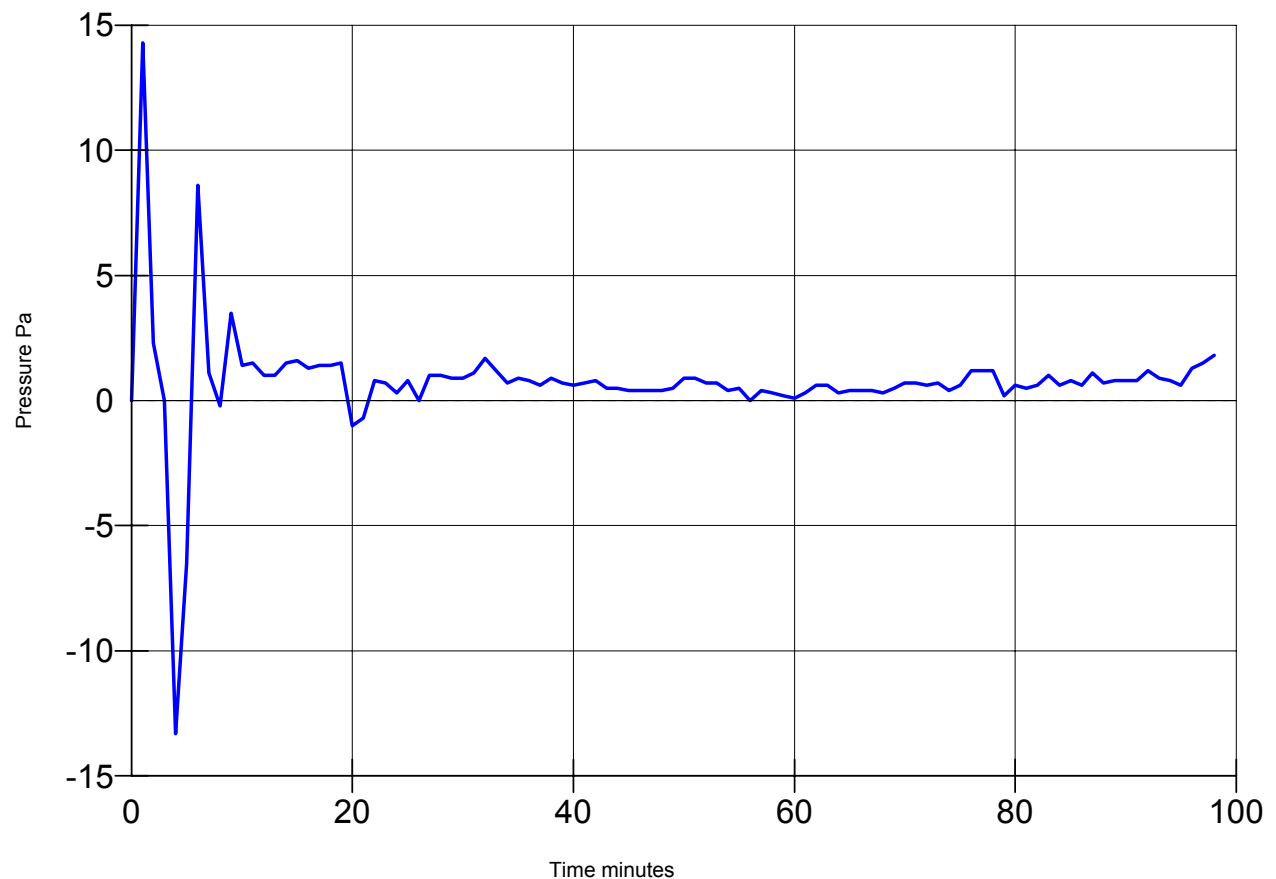


Figure 3. Furnace pressure graph.

The pressure was above the allowable tolerance at 6 minutes.



Unexposed Face Temperature Graph

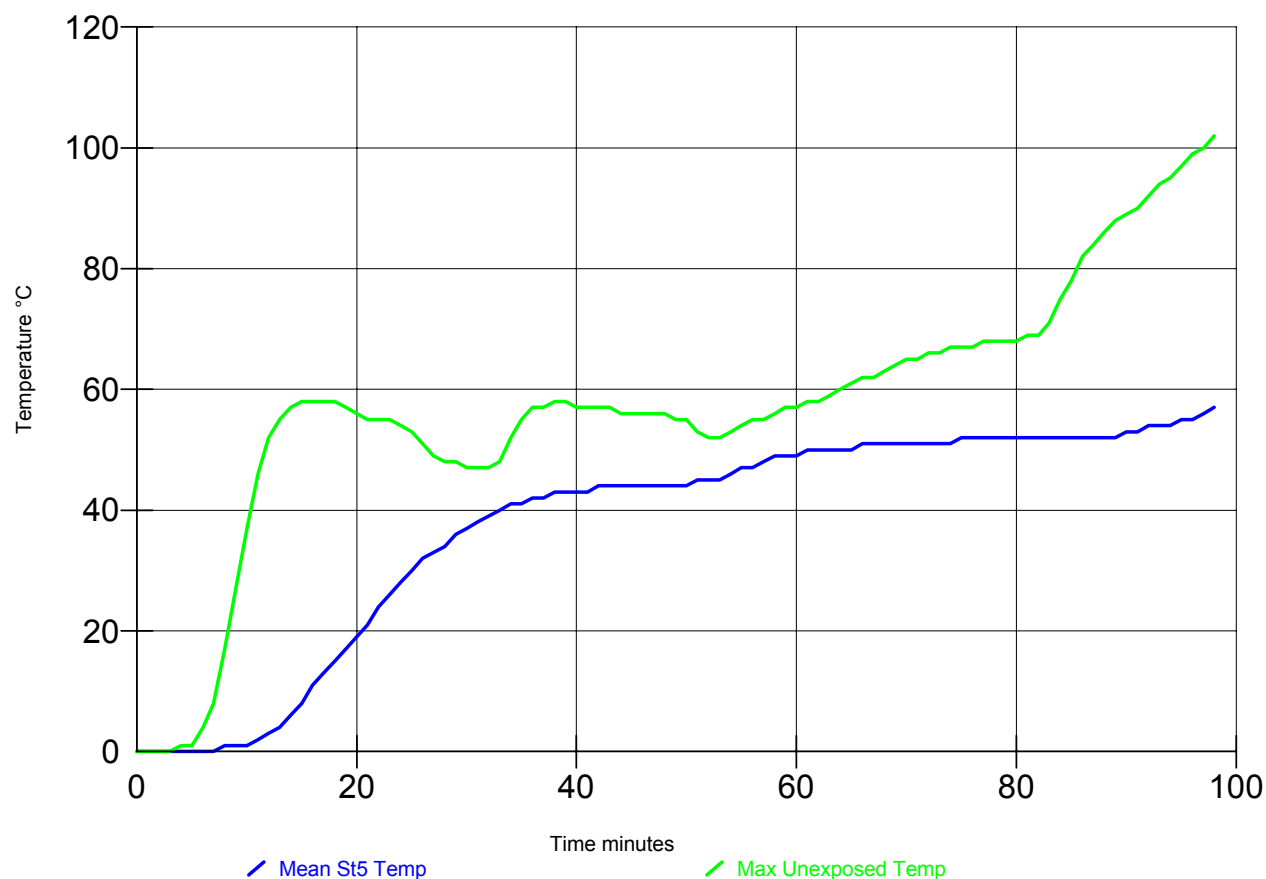


Figure 4. Unexposed face temperature graph.



Unexposed Face Thermocouple Layout

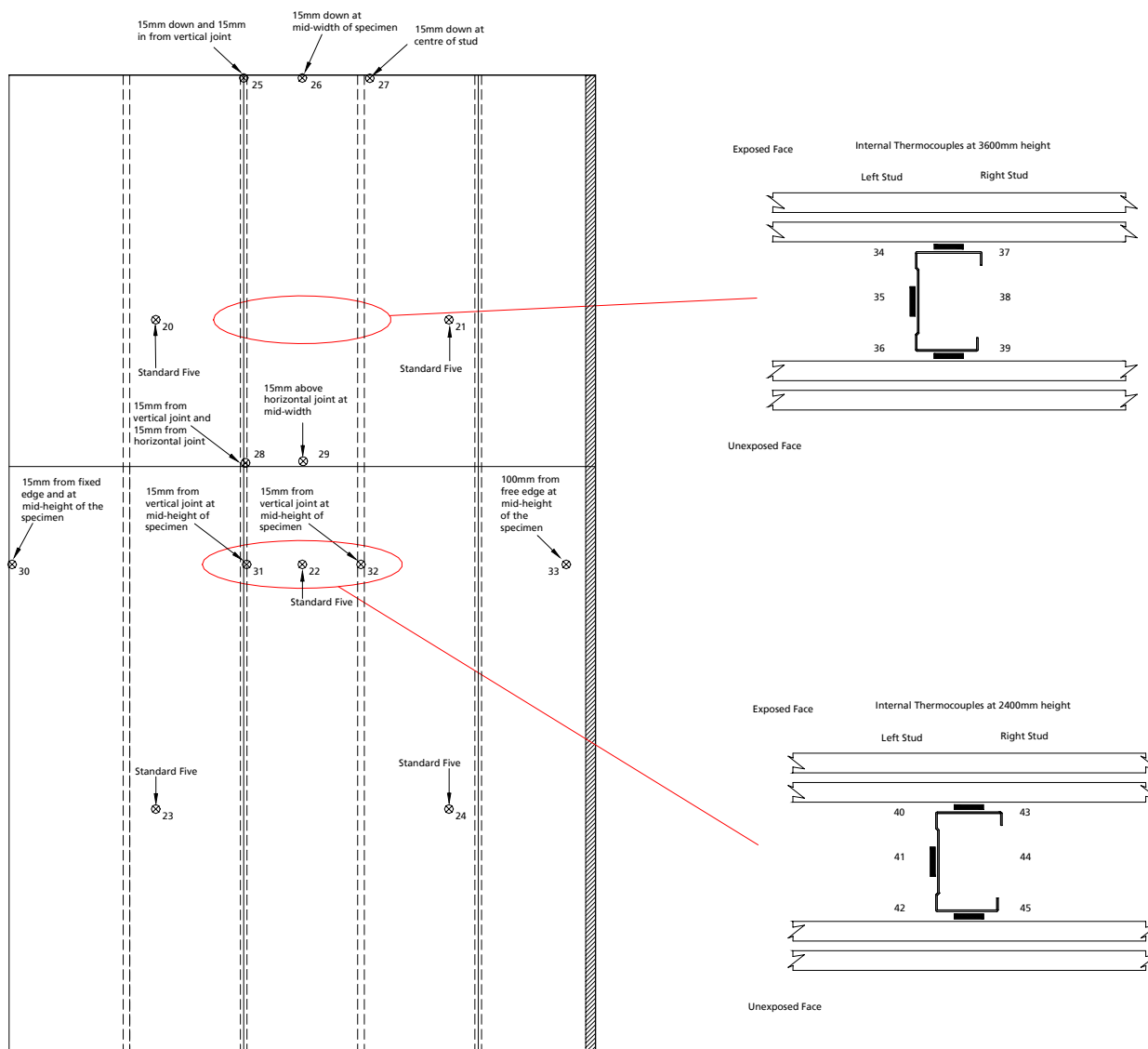


Figure 5. Unexposed face thermocouple layout.



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

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

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BTC 12732F: Page 17 of 34



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24
71	48	53	52	51	54
72	48	53	52	51	53
73	48	53	53	52	53
74	48	53	53	51	53
75	49	53	53	52	54
76	49	53	54	52	54
77	49	53	54	51	54
78	49	53	54	51	54
79	49	53	54	51	54
80	49	53	54	51	54
81	49	53	54	51	53
82	50	53	54	51	53
83	50	53	54	51	53
84	50	53	54	51	54
85	49	53	53	51	54
86	49	53	53	51	54
87	49	53	54	51	55
88	49	53	54	51	55
89	49	53	54	51	57
90	49	53	53	51	59
91	50	53	54	51	61
92	50	53	54	52	61
93	50	54	54	52	61
94	50	54	54	53	60
95	51	54	55	55	60
96	51	55	54	57	60
97	52	55	55	59	61
98	54	56	55	59	61

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	1	0	0
5	1	0	1	0	0
6	1	0	4	0	0
7	2	1	8	0	1
8	4	2	17	1	1
9	7	3	27	1	1
10	10	5	37	1	2
11	14	9	46	2	3
12	18	13	52	4	4
13	23	18	55	5	6
14	27	23	57	7	8
15	31	27	58	9	10
16	35	31	58	11	13
17	38	35	58	14	15
18	41	37	58	16	17
19	43	39	57	18	19
20	44	41	56	21	21
21	44	41	55	23	23
22	44	42	55	25	25
23	45	43	55	26	27
24	45	44	54	28	28
25	46	44	53	30	30
26	46	45	51	31	31
27	46	45	49	32	32
28	46	46	48	33	33
29	46	46	48	35	34
30	46	46	47	36	35
31	47	46	47	37	36
32	47	47	47	38	37
33	47	47	48	39	37



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



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
71	62	56	65	52	51
72	62	55	66	53	52
73	62	56	66	53	52
74	63	56	67	53	53
75	64	56	67	53	53
76	64	56	67	54	53
77	64	57	68	54	53
78	65	57	68	54	53
79	66	58	68	54	53
80	67	59	68	54	53
81	67	60	69	55	53
82	68	60	69	54	53
83	69	61	71	55	52
84	70	62	75	55	53
85	71	63	78	55	52
86	72	63	82	55	53
87	73	64	84	55	53
88	75	65	86	55	53
89	76	65	88	55	53
90	77	66	89	55	54
91	79	66	90	55	55
92	80	67	92	56	56
93	82	68	94	56	58
94	83	69	95	57	59
95	84	70	97	57	61
96	86	72	99	59	61
97	87	74	100	60	62
98	88	77	102	62	63

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	0	0	0
6	0	0	0	0
7	1	1	0	0
8	1	1	1	1
9	1	2	1	1
10	2	2	1	2
11	3	4	2	3
12	5	6	4	4
13	7	8	6	6
14	9	10	8	8
15	11	13	11	10
16	14	16	14	13
17	17	19	17	15
18	20	22	20	18
19	23	24	22	20
20	25	26	25	23
21	28	28	27	25
22	31	30	29	27
23	33	32	30	29
24	35	34	32	31
25	37	36	34	33
26	39	37	34	35
27	40	38	35	36
28	41	39	36	37
29	43	40	37	39
30	44	41	38	40
31	45	41	39	41
32	46	42	40	41
33	46	43	40	42



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

Time (mins)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
71	50	58	55	53
72	50	58	55	53
73	50	58	54	53
74	51	58	54	54
75	51	58	55	54
76	51	58	55	54
77	51	58	55	54
78	51	58	55	54
79	51	58	55	54
80	52	58	55	54
81	52	58	55	54
82	52	58	55	54
83	52	58	55	54
84	52	58	55	54
85	52	58	55	54
86	52	58	55	54
87	53	58	55	53
88	53	58	55	53
89	53	58	55	53
90	53	58	56	53
91	53	58	56	53
92	53	59	57	53
93	53	59	58	53
94	53	59	59	53
95	54	59	60	53
96	54	59	61	53
97	54	60	62	54
98	54	60	62	54

See figure 5 for the locations of the thermocouples.



Internal Thermocouple Data at 3600mm 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	18	18	18	18	18	18
1	18	18	18	18	18	18
2	19	18	18	18	18	18
3	35	22	18	20	19	18
4	64	34	23	28	24	21
5	77	47	33	40	35	29
6	83	57	42	54	48	39
7	88	64	51	63	57	50
8	90	71	60	70	65	58
9	91	77	67	77	72	65
10	92	82	73	83	77	70
11	94	85	78	87	81	76
12	95	88	81	89	84	80
13	95	89	83	91	86	81
14	96	90	84	92	87	83
15	96	91	85	93	88	84
16	96	90	85	94	88	85
17	95	89	85	94	87	84
18	94	89	85	95	88	84
19	96	90	87	96	89	85
20	97	92	88	96	91	87
21	98	93	88	97	91	87
22	99	95	89	98	92	88
23	99	96	89	98	93	88
24	100	98	89	98	93	89
25	101	99	90	98	94	89
26	101	99	91	98	94	90
27	102	100	91	100	95	90
28	102	100	92	100	95	91
29	102	100	92	101	96	91
30	102	101	93	102	97	92
31	102	101	93	104	98	92
32	102	102	93	106	98	92
33	103	102	93	108	99	93
34	104	103	94	111	100	93



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
35	107	104	94	114	100	93
36	114	105	94	119	101	93
37	125	107	95	127	102	93
38	136	110	97	140	104	93
39	148	113	98	157	106	93
40	162	118	100	177	109	93
41	178	125	102	197	113	95
42	195	133	105	217	120	98
43	212	141	107	234	129	102
44	228	149	110	248	140	105
45	241	158	114	262	151	108
46	253	166	118	274	160	113
47	266	175	123	286	170	119
48	279	184	129	296	181	127
49	292	195	136	306	192	136
50	303	205	144	316	203	144
51	315	216	153	327	215	153
52	327	226	161	337	225	162
53	339	236	168	347	235	170
54	349	243	175	356	244	178
55	357	250	181	364	252	185
56	365	257	187	372	260	192
57	373	264	193	380	268	199
58	381	271	200	388	277	206
59	389	277	206	395	284	212
60	396	285	213	402	292	219
61	404	291	220	409	299	225
62	410	298	227	415	306	231
63	417	304	234	422	313	237
64	423	311	241	428	320	243
65	429	318	248	433	327	250
66	438	324	256	439	334	256
67	446	332	262	446	340	263
68	448	339	267	452	347	270
69	445	345	273	458	354	278
70	448	351	281	451	361	287
71	453	357	287	451	366	295
72	459	364	295	453	373	303

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
73	466	370	302	458	379	310
74	478	378	311	462	385	317
75	504	391	325	467	391	324
76	539	418	357	472	396	331
77	-	461	397	477	402	338
78	-	491	428	482	408	344
79	609	508	450	485	414	350
80	648	518	479	489	419	355
81	656	527	493	494	424	360
82	661	533	501	498	430	365
83	663	538	508	502	436	370
84	664	542	513	506	441	375
85	662	545	518	510	447	379
86	661	549	522	513	453	384
87	660	553	527	518	459	390
88	660	557	531	523	466	395
89	662	563	539	527	474	402
90	647	569	545	532	481	410
91	666	575	550	537	486	416
92	662	583	558	542	492	424
93	674	591	569	546	499	432
94	700	599	579	552	506	442
95	716	610	591	558	515	457
96	726	625	606	564	524	470
97	725	638	620	570	532	481
98	732	728	639	576	542	491

See figure 5 for the locations of the thermocouples.

Thermocouple No. 34 did not record any data at 77 & 78 minutes.



Internal Thermocouple Data at 2400mm height

Time (mins)	Actual Temperature (°C)					
	Left-hand stud			Right-hand stud		
	Hot Flange Thermocouple No. 40	Web Thermocouple No. 41	Cold Flange Thermocouple No. 42	Hot Flange Thermocouple No. 43	Web Thermocouple No. 44	Cold Flange Thermocouple No. 45
0	17	17	18	18	18	18
1	17	17	18	18	18	18
2	18	18	18	19	18	18
3	25	20	18	26	19	18
4	47	28	22	38	24	20
5	65	41	29	50	33	24
6	74	52	38	60	44	31
7	78	61	48	69	54	40
8	81	70	58	76	63	49
9	84	75	66	81	69	56
10	87	80	72	84	74	63
11	88	83	77	87	80	69
12	90	85	80	89	82	74
13	91	87	82	90	84	77
14	92	87	83	92	85	79
15	92	88	84	93	86	80
16	93	88	84	95	87	81
17	93	86	83	96	87	80
18	94	87	84	97	88	80
19	95	89	85	97	90	82
20	95	90	87	98	92	83
21	96	92	88	98	92	84
22	96	93	89	99	93	84
23	97	95	89	99	93	84
24	98	95	90	99	94	85
25	99	96	90	100	94	86
26	99	96	90	101	95	86
27	100	97	90	103	95	86
28	101	97	91	107	96	87
29	102	98	91	110	96	87
30	102	98	92	111	97	88
31	102	99	92	113	97	88
32	102	99	93	115	98	89
33	102	99	93	117	98	89
34	101	100	93	118	99	90



Time (mins)	Actual Temperature (°C)					
	Left-hand stud			Right-hand stud		
	Hot Flange Thermocouple No. 40	Web Thermocouple No. 41	Cold Flange Thermocouple No. 42	Hot Flange Thermocouple No. 43	Web Thermocouple No. 44	Cold Flange Thermocouple No. 45
35	101	100	93	121	99	90
36	102	100	93	125	100	90
37	103	101	94	131	101	91
38	104	102	94	143	102	91
39	107	103	95	157	104	92
40	117	105	97	176	107	93
41	130	108	98	192	110	95
42	143	113	100	209	116	96
43	157	119	103	224	123	98
44	173	127	107	235	134	102
45	189	135	110	249	146	106
46	203	143	115	241	158	110
47	216	152	120	278	171	115
48	229	162	127	277	183	122
49	242	173	134	274	196	131
50	257	184	142	284	207	141
51	271	196	151	298	218	153
52	284	207	160	310	228	164
53	297	218	168	321	237	173
54	308	228	176	332	246	181
55	318	237	183	340	255	188
56	326	246	190	349	263	195
57	335	254	197	357	271	202
58	343	261	204	365	279	208
59	350	269	211	373	286	215
60	358	275	217	381	292	221
61	366	282	222	388	299	227
62	373	288	228	394	306	233
63	381	293	233	400	313	239
64	388	299	239	406	320	244
65	395	305	245	412	326	250
66	403	312	251	419	333	256
67	410	318	257	424	338	262
68	417	325	263	429	344	268
69	423	332	270	435	349	274
70	429	338	276	440	354	279
71	436	345	283	446	359	285
72	442	352	290	453	364	290



Time (mins)	Actual Temperature (°C)					
	Left-hand stud			Right-hand stud		
	Hot Flange Thermocouple No. 40	Web Thermocouple No. 41	Cold Flange Thermocouple No. 42	Hot Flange Thermocouple No. 43	Web Thermocouple No. 44	Cold Flange Thermocouple No. 45
73	449	359	297	458	369	295
74	455	366	305	461	374	301
75	461	373	312	466	378	306
76	467	380	319	470	383	312
77	476	387	327	475	388	318
78	485	394	334	480	394	324
79	492	401	341	485	401	331
80	493	407	350	487	408	339
81	494	413	357	491	413	346
82	498	419	364	495	421	353
83	501	426	372	501	429	360
84	506	434	379	508	436	368
85	512	441	387	513	444	375
86	517	446	394	519	451	382
87	523	452	402	524	458	389
88	528	457	408	529	464	395
89	535	466	416	535	473	403
90	542	473	425	541	481	411
91	548	479	436	547	485	420
92	553	484	444	552	491	429
93	558	490	449	558	498	437
94	561	496	455	564	506	445
95	565	503	462	572	512	453
96	572	511	470	579	520	462
97	579	521	479	587	531	471
98	590	532	489	596	539	481

See figure 5 for the locations of the thermocouples.



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	7.9	0.8
2	8.8	0.9
3	10.5	1
4	13.5	1.3
5	15.1	1.4
6	14.9	1.5
7	15.9	1.5
8	16.4	1.5
9	16.2	1.5
10	16.1	1.5
11	16	1.4
12	15.5	1.3
13	15.1	1.3
14	14.5	1.2
15	14.1	1.1
16	13.6	1
17	13.6	1
18	13.5	1
19	12.8	0.9
20	12.7	0.8
21	13	0.7
22	13.3	0.7
23	13.5	0.7
24	14	0.6
25	14.2	0.6
26	14.7	0.6
27	15.2	0.6
28	15.8	0.6
29	16.4	0.6
30	17.1	0.6
31	17.7	0.6
32	18.1	0.6
33	18.9	0.6
34	19.6	0.6



Time (mins)	Deflection at centre of the specimen (mm)	Deflection 50mm from free end of the specimen (mm)
35	20.8	0.6
36	21.9	0.8
37	23.5	0.9
38	25.7	1.1
39	28.1	1.4
40	30.9	1.9
41	33.8	2.5
42	36.9	3.3
43	40.7	4.6
44	44.6	6.3
45	48.1	8.6
46	51.7	11.3
47	55.8	15.2
48	59.9	20.2
49	64.2	26
50	69.2	32
51	74.1	38.8
52	78.2	44.9
53	82	51.5
54	85.5	57.6
55	88.8	62.7
56	91.8	69.1
57	95.1	75.4
58	98.7	82.6
59	102	89.4
60	105.3	96.6
61	108.1	102.6
62	110.4	107
63	112.6	110.3
64	114.4	111.8
65	116	112.8
66	117.7	113.6
67	119.1	114.3
68	120.5	115.1
69	122	115.7
70	123.3	116.4
71	124.7	116.9
72	125.9	117.5



Time (mins)	Deflection at centre of the specimen (mm)	Deflection 50mm from free end of the specimen (mm)
73	127.2	118
74	128.4	118.4
75	129.1	118.8
76	129.9	119.2
77	130.6	119.6
78	131.3	120
79	132	120.3
80	132.6	120.6
81	133.1	120.8
82	133.5	121
83	133.8	121.2
84	134.2	121.3
85	134.2	121.5
86	134.3	121.5
87	134.2	121.6
88	134.1	121.5
89	133.8	121.4
90	133.7	121
91	133.4	120.7
92	133.1	120.4
93	132.7	120.1
94	132.5	119.8
95	132.3	119.6
96	131.9	119.3
97	131.6	119.1
98	131.1	119

Both deflection measurements were taken at the mid-height of the specimen.
Negative values indicate that the specimen deflected out of the furnace.



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 4800mm.
- (ii) Increase in the thickness of the wall (minimum thickness 120mm).
- (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 ($\leq 3000\text{mm}$ long $\times \leq 1200\text{mm}$ wide Gyproc FireLine).
- (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

No extension of height above 4800mm is permitted under the field of direct application.

30 minutes	60 minutes	90 minutes
4800mm	4800mm	4800mm