

# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

Report Number: **BTC 21558F**

A FIRE RESISTANCE TEST ON A GYPWALL STAGGERED METAL STUD PARTITION WITH 60 MM GYPFRAME I STUD FRAMEWORK CLAD EACH SIDE WITH A DOUBLE LAYER OF 12.5 MM GYPROC SOUNDBLOC AND 25 MM ISOVER ACOUSTIC PARTITION ROLL IN THE CAVITY, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 2015.

Test Date: 3<sup>rd</sup> November 2020

Report Issue Date: 4<sup>th</sup> November 2020  
Report Amendment Date: 5<sup>th</sup> November 2020

[www.btconline.co.uk](http://www.btconline.co.uk)

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



# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

## TABLE OF CONTENTS

<b>FOREWORD .....</b>	<b>4</b>
<b>REPORT AUTHORISATION .....</b>	<b>4</b>
<b>TEST REPORT AMENDMENTS .....</b>	<b>5</b>
<b>TEST CONSTRUCTION.....</b>	<b>6</b>
<b>Description of Construction .....</b>	<b>6</b>
<b>Test Construction Drawings.....</b>	<b>7</b>
Horizontal Cross Section .....	7
Exposed Face Elevation .....	8
Unexposed Face Elevation .....	9
<b>TEST MATERIALS.....</b>	<b>10</b>
<b>Plasterboard .....</b>	<b>10</b>
<b>Metal Components .....</b>	<b>10</b>
<b>Fasteners .....</b>	<b>10</b>
<b>Miscellaneous Components .....</b>	<b>10</b>
<b>Insulation .....</b>	<b>11</b>
<b>TEST PROCEDURE.....</b>	<b>12</b>
<b>TEST RESULTS .....</b>	<b>13</b>
<b>LIMITATIONS .....</b>	<b>13</b>
<b>TEST DATA.....</b>	<b>14</b>
<b>Observations .....</b>	<b>14</b>
<b>Furnace Temperature Graph .....</b>	<b>17</b>
<b>Furnace Pressure Graph.....</b>	<b>18</b>
<b>Unexposed Face Temperature Graph .....</b>	<b>19</b>
<b>Unexposed Face Thermocouple Layout.....</b>	<b>20</b>
<b>Unexposed Face Standard Five Temperature Data.....</b>	<b>21</b>
<b>Additional Unexposed Face Temperature Data.....</b>	<b>24</b>
<b>Additional Unexposed Face Temperature Data.....</b>	<b>27</b>
<b>Internal Temperature Data at 1500 mm Height.....</b>	<b>30</b>
<b>Specimen Lateral Deflection.....</b>	<b>34</b>
<b>PHOTOGRAPHS.....</b>	<b>37</b>
<b>Exposed Face Prior to Test .....</b>	<b>37</b>
<b>Unexposed Face Prior to Test .....</b>	<b>38</b>

Customer: **British Gypsum**

BTC 21558F: Page 2 of 43



0296

# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

---

<b>Unexposed Face at 30 Minutes</b> .....	<b>39</b>
<b>Unexposed Face at 1 Hour</b> .....	<b>40</b>
<b>Unexposed Face at 1 Hour, 30 Minutes</b> .....	<b>41</b>
<b>Unexposed Face at 1 Hour, 55 Minutes, at Test Termination</b> .....	<b>42</b>
<b>FIELD OF DIRECT APPLICATION</b> .....	<b>43</b>
<b>General</b> .....	<b>43</b>
<b>Extension of Width</b> .....	<b>43</b>
<b>Extension of Height</b> .....	<b>43</b>

### FOREWORD

This test report details a fire resistance test conducted on a metal stud partition clad on each face with a double layer of Gyproc SoundBloc incorporating 25 mm Isover Acoustic Partition Roll in the cavity.

The test sponsor was British Gypsum.

The test specimen was installed by PVR Joinery. The construction of the specimen took place between the 28<sup>th</sup> and 29<sup>th</sup> October 2020. The Building Test Centre played no role in the design or selection of materials comprising the test specimen.

The test was conducted on the 3<sup>rd</sup> November 2020.

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedures outlined in EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, constructional details, loads, stresses, edge of 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.” (BS EN 1363-1: 2012, section 12.1)

### REPORT AUTHORISATION

Report Author



**Ryan Skilton MRSC CSci.**  
MSci. (Hons) Ph.D.  
Scientist

Authorised by



**Paul Miller**  
BSc. (Hons.)  
Fire Test Manager

*The Building Test Centre will not discuss the content of this report without written permission from the test sponsor. The Building Test Centre retains ownership of the test report content but authorises the test sponsor to reproduce the report as necessary in its entirety only.*

# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

## TEST REPORT AMENDMENTS

Page	Amendments	Date
1	Report amendment date added to title page	5/11/20
5	Amendments table completed	5/11/20
30 - 33	Hot and cold data for the right internals were the wrong way around. This was corrected and the footer completed	5/11/20

Report Amendments Author



**Ryan Skilton**  
Scientist

Amendments Authorised by



**Paul Miller**  
Fire Test Manager

### TEST CONSTRUCTION

#### Description of Construction

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

Gypframe 72FEC50 Folded Edge Standard Floor and Ceiling Channels were fixed to the head and base of the test aperture at 600 mm centres using 60 mm fire resistant fixings.

Gypframe 60I70 I Studs were positioned at 300 mm staggered centres between the head and base channels. Gypframe SC1 Spacer Clips were used at the head and base of the studs to stagger the studs either side of the centre line of the channels.

The right hand stud viewed from the unexposed face was not fixed to the perimeter of the test frame, and the gap between the stud and the frame lining was filled with a 25 mm thick rock mineral fibre gasket.

At the left-hand edge, a Gypframe 70S50 'C' Stud was fixed the partition to the test frame, using 60 mm fire resistance fixings at 600 mm centres.

Thermocouples were added to the studs at mid height on the web, hot and cold flanges of the central two exposed face studs.

A layer of 25 mm Isover Acoustic Partition Roll (APR 1200) was positioned the in the stud cavity.

Both the unexposed face and the exposed face of the specimen were clad with a double layer of 12.5 mm Gyproc SoundBloc.

The inner layer boards were fixed with 25 mm British Gypsum Jack-Point Screws at 300 mm centres around the perimeter of the boards.

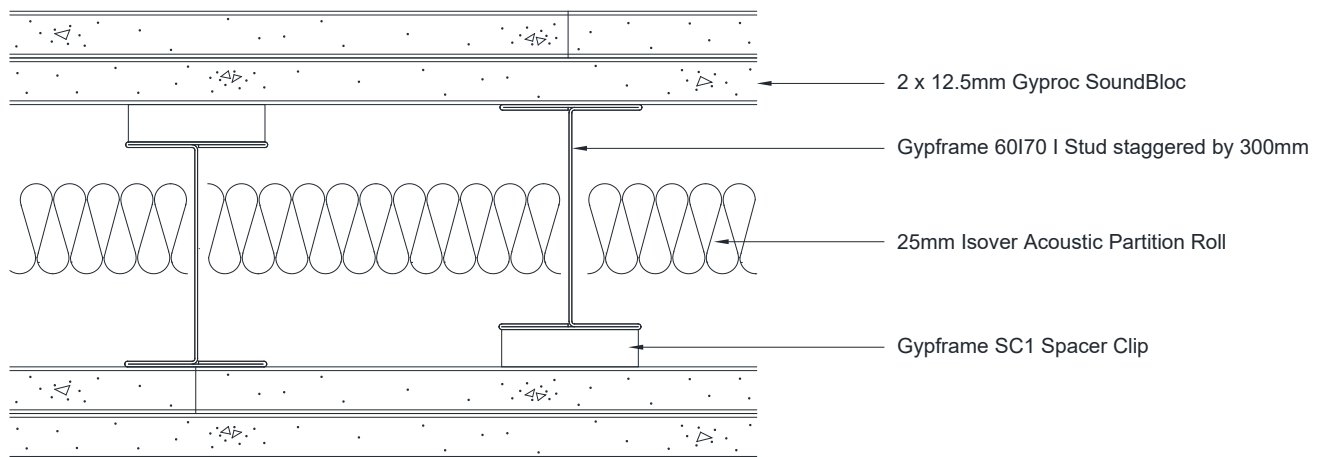
The outer layer boards were fixed with 35 mm British Gypsum Jack-Point Screws at 300 mm centres around the perimeter and within the field of the boards.

All vertical joints were staggered between layers, with a full board at the free end of the exposed face. A horizontal joint was positioned at 2400 mm from the base on the outer layer boards and at 600 mm from the base on the inner layer boards, on both faces of the specimen. A Gypframe GFS1 Fixing Strap was used behind the horizontal outer layer board joint.

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

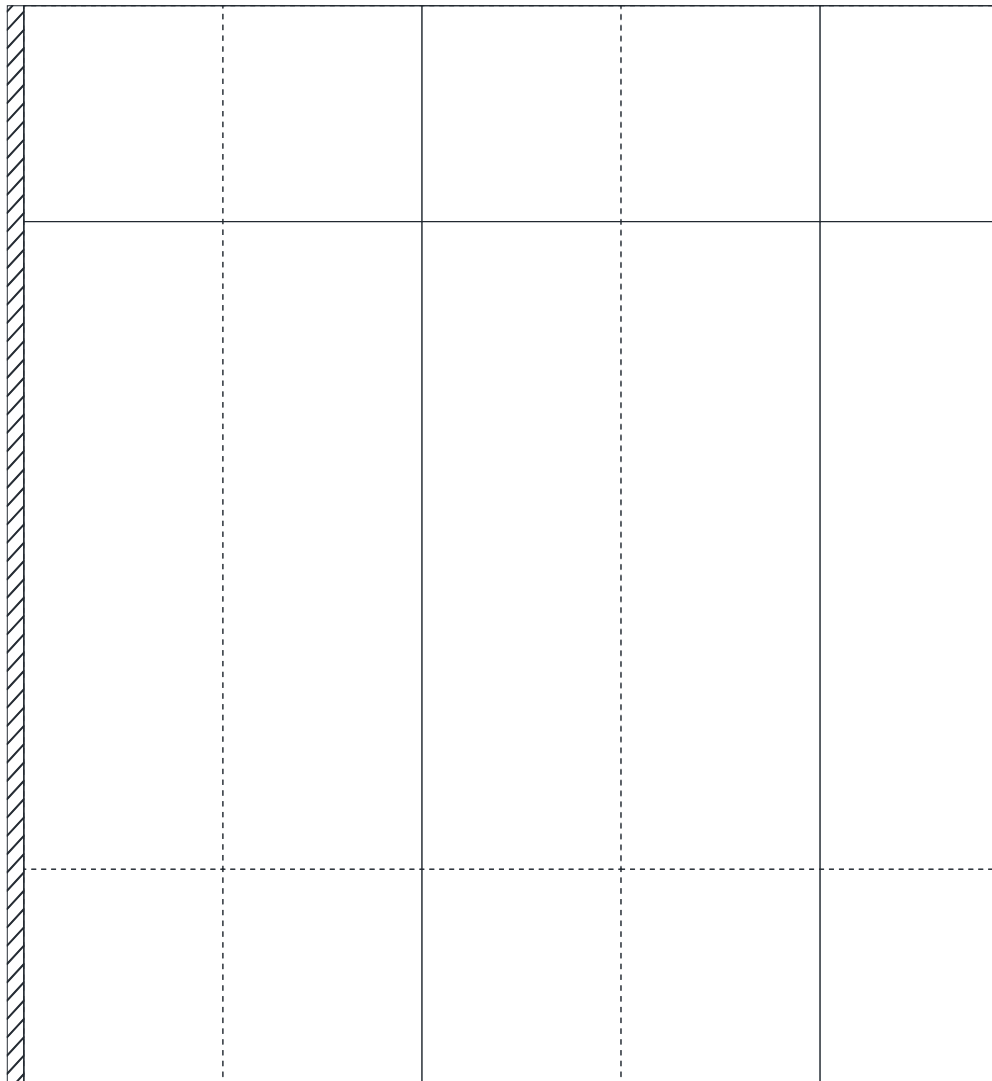
### Test Construction Drawings

#### Horizontal Cross Section



**Figure 1** – Cross sectional view through the test specimen.

### Exposed Face Elevation



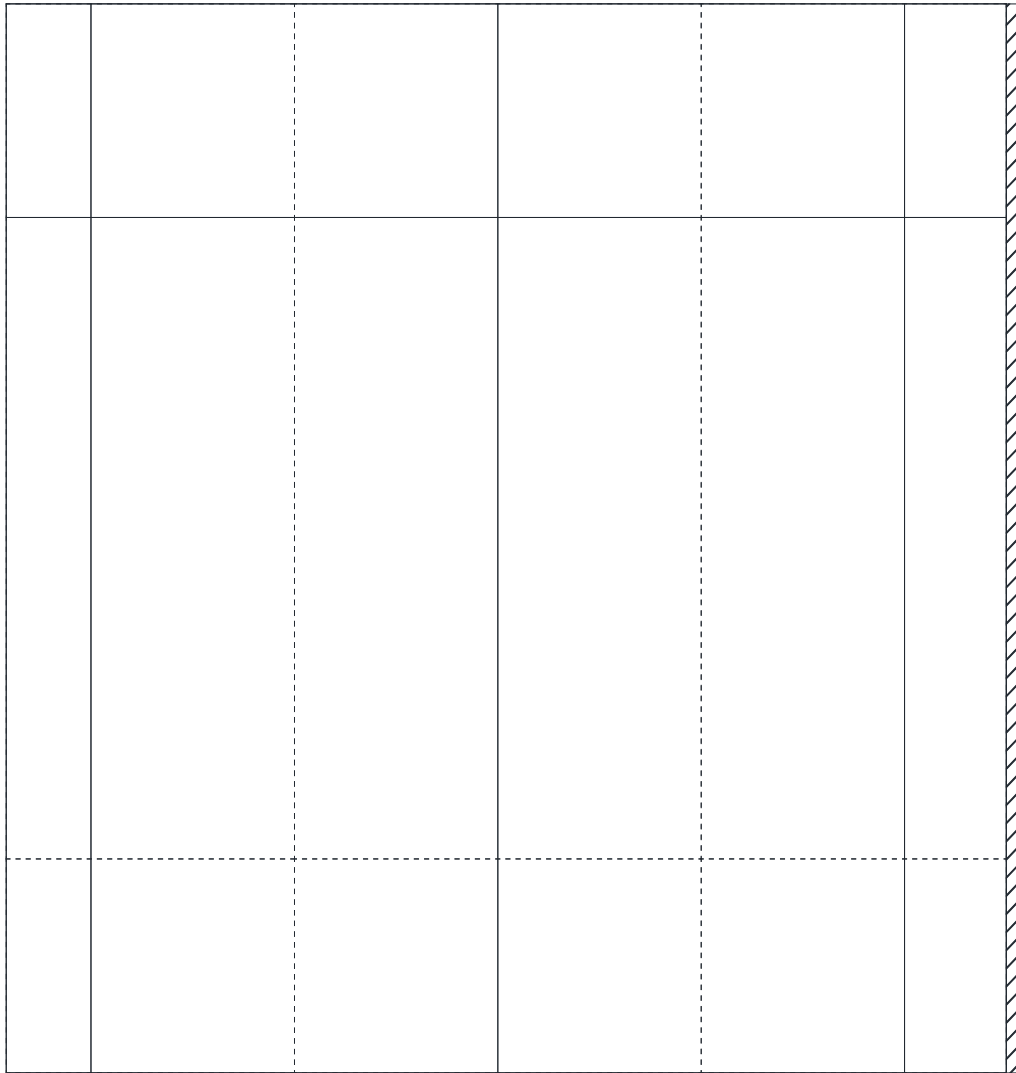
----- Inner layer board layout

————— Outer layer board layout

**Figure 2** – Exposed face elevation.



### Unexposed Face Elevation



- Inner layer board layout
- Outer layer board layout

**Figure 3** – Unexposed face elevation.

### TEST MATERIALS

#### Plasterboard

- i) Nominally, 2400 mm (long) x 1200 mm (wide) x 12.5 mm (thick), Gyproc SoundBloc (TE), manufactured and supplied by British Gypsum, ex East Leake.

Measured mass per unit area:	11.8 kg/m <sup>2</sup>
Measured thickness:	12.2 mm
Board identification numbers:	16 199 19 07:31
	16 199 19 07:31
	16 199 19 07:31
Measured moisture content:	2.04 %

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

Material dimensions were supplied by British Gypsum.

#### Metal Components

- ii) Gypframe 72FEC50 Standard Folded Edge Floor & Ceiling Channels, supplied by The Building Test Centre.
- iii) Gypframe 60I70 Studs, supplied by British Gypsum.
- iv) Gypframe 70S50 'C' Studs, supplied by The Building Test Centre.
- v) Gypframe GFS1 Fixing Strap, supplied by The Building Test Centre.
- vi) Gypframe SC1 Spacer Clips, supplied by British Gypsum.

#### Fasteners

- vii) 25 mm British Gypsum Jack-Point Screws, supplied by The Building Test Centre.
- viii) 35 mm British Gypsum Jack-Point Screws, supplied by The Building Test Centre.
- ix) 60 mm fire resistant fixings, supplied by The Building Test Centre.

#### Miscellaneous Components

- x) Gyproc Paper Joint Tape, supplied by The Building Test Centre.
- xi) Gyproc Joint Filler, supplied by The Building Test Centre.
- xii) Rock mineral fibre gasket, supplied by The Building Test Centre.

### Insulation

- xiii) Nominally 25 mm (thick) APR 1200 (Acoustic Partition Roll), manufactured by Saint-Gobain Isover and supplied by British Gypsum.

Measured surface density: 0.453 kg/m<sup>2</sup>

*Where measurements could not be taken and were provided by the customer or the manufacturer e.g. from material labelling, or where mass and dimension measurements were provided by the customer or the manufacturer e.g. customer has completed material dimension forms the results only apply to the sample as received.*

*All data and materials supplied by the customer or manufacturer are clearly identified.*

*Material information was sampled and recorded according to procedure AP070 vs. 1.1.*

### TEST PROCEDURE

The test was conducted fully in accordance with BS EN 1364-1: 2015. The specimen was subjected to fire from one side, as specified in BS EN 1364-1: 2015.

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 3.

The ambient temperature at the commencement of the test was 17 °C.

The furnace pressure was set to control at  $18 \pm 2$  Pa positive with respect to atmosphere, at the top of the specimen. Furnace pressure data is shown in **Figure 5**.

The test conditions did not meet the full requirements of BS EN 1363-1: 2012 as the test frame stiffness did not fully comply.

The specimen and associated construction were not conditioned in accordance with clause 8 of BS EN 1363-1: 2012.

### TEST RESULTS

The requirement of the standard was satisfied for the following periods:

<b>Integrity</b>	<b>Sustained Flaming</b>	<b>115minutes, no failure.</b>
	<b>6 mm Gap Gauge</b>	<b>115 minutes, no failure.</b>
	<b>25 mm Gap Gauge</b>	<b>115 minutes, no failure.</b>
	<b>Cotton Pad</b>	<b>114 minutes.</b>
<b>Insulation</b>		<b>98 minutes.</b>
<b>Test Terminated</b>		<b>115 minutes, at the request of the sponsor.</b>

### LIMITATIONS

The scope of the Field of Direct Application of the results and construction details in this test report is explained in BS EN 1364-1: 2015, section 13.

### TEST DATA

#### Observations

All observations refer to the exposed face unless stated.

Observers: Unexposed face: Ryan Skilton  
Exposed face: Denis Bradshaw and Eric Chee

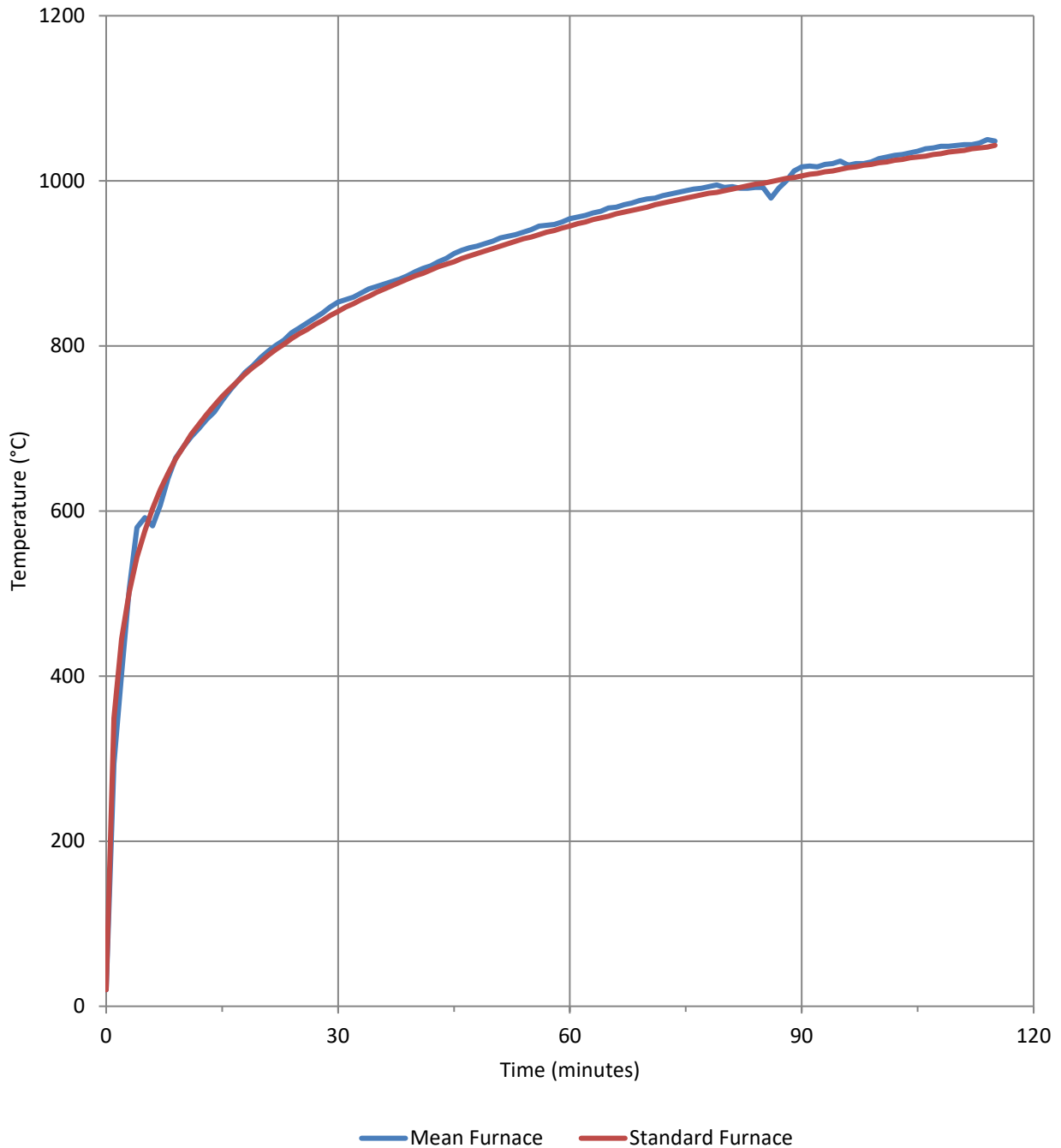
Time		Observations
Hours	Minutes	
0	00	Test started.
0	10	Jointing material was flaking away. Face papers had charred.
0	20	Left-hand vertical joint had opened up to approximately 3-4 mm. Right-hand vertical joint had opened up to approximately 3-4 mm. Horizontal joint had opened up to approximately 3-4 mm.
0	30	Left-hand vertical joint had opened up to approximately 9-10 mm. Right-hand vertical joint had opened up to approximately 8 mm. Horizontal joint had opened up to approximately 9-10 mm. Lower left-hand and centre boards had cracks down the centre of the boards had opened up to approximately 7 mm.  <i>Unexposed face</i> No visible change.
0	40	Right-hand vertical joint had opened up to approximately 7 mm. Horizontal joint had opened up to approximately 11 mm. Lower left-hand and centre board cracks had opened up to approximately 8 mm. Right-hand board cracks had opened up to approximately 6 mm.
0	50	Left-hand vertical joint had opened up to approximately 11-12 mm. Horizontal joint had opened up to approximately 12 mm. Lower left-hand and centre board cracks had opened up to approximately 9-10 mm. Right-hand board cracks had closed up to approximately 4-5 mm. All upper boards had formed cracks down the centre of the boards up to approximately 6-7 mm.

Time		Observations
Hours	Minutes	
1	00	Lower left-hand board had fallen into the furnace. Lower-centre board had fallen into the furnace.  <i>Unexposed face</i> No visible change.
1	07	Lower right-hand board had fallen into the furnace.
1	10	Second layer lower left-hand board cracks had opened up to approximately 9-10 mm. Second layer lower centre board cracks had opened up to approximately 20-22 mm. Second layer lower right-hand board cracks had opened up to approximately 8 mm. Approximately 80% of first layer boards had fallen into the furnace.
1	20	Second layer lower centre board had fallen into the furnace. All visible studs had warped. Insulation had burned away.
1	21	<i>Unexposed face</i> A crack was visible on the jointing material of the centre vertical joint from approximately 600 – 2400 mm height.
1	22	<i>Unexposed face</i> Screw heads had discoloured on the centre vertical joint at approximately 1800 mm height.
1	27	Second layer lower right-hand board had fallen into the furnace.
1	28	<i>Unexposed face</i> Deflection transducer became detached. Screw heads had discoloured on central vertical joint at approximately 600 mm up to 2400 mm height.
1	30	Approximately 50% of second layer boards had fallen into the furnace.
1	32	<i>Unexposed face</i> Screw heads were discoloured at the centre of the lower left-hand full board from approximately 1200 – 2400 mm height.

Time Hours	Time Minutes	Observations
1	38	<i>Unexposed face</i> <b>INSULATION FAILURE.</b> The temperature rise at a point approximately 1900 mm from the base of the specimen in the centre of the lower left-hand full board, exceeded 180 °C (roving thermocouple).
1	40	Second layer lower left-hand board had fallen into the furnace.  <i>Unexposed face</i> Cotton pad attempt, centre of lower left-hand full board approximately 1800 mm height – no failure. Centre of the lower left-hand full board had blackened from approximately 1200 - 2400 mm height.
1	42	<i>Unexposed face</i> The mean temperature rise of the standard five thermocouples exceeded 140 °C.
1	43	<i>Unexposed face</i> Centre of the lower right-hand full board had discoloured from approximately 600 – 2100 mm height.
1	44	<i>Unexposed face</i> Screw heads on the right-hand vertical joint had discoloured from approximately 600 – 2400 mm height.
1	47	<i>Unexposed face</i> Cotton pad attempt, centre of the lower left-hand full board approximately 1800 mm height – no failure.
1	50	Approximately 90% of second layer boards had fallen into the furnace.
1	53	<i>Unexposed face</i> Cotton pad attempt, head of specimen approximately 400 mm from the free edge – no failure.
1	54	<i>Unexposed face</i> <b>INTEGRITY FAILURE.</b> The cotton pad ignited (glowed) when placed on the head of the specimen approximately 400 mm from the free edge.
1	55	<b>TEST TERMINATED</b> at the request of the sponsor.

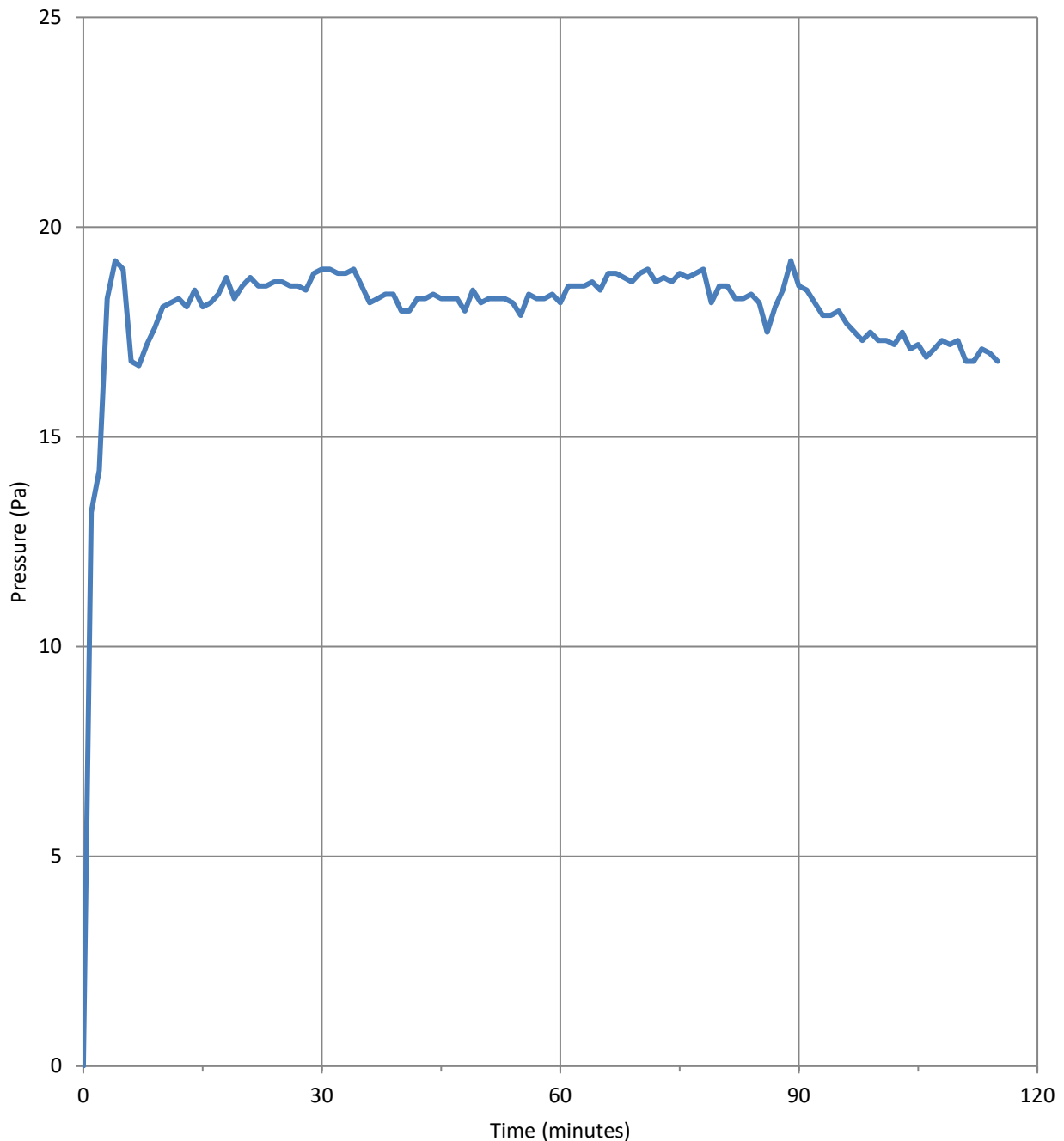


## Furnace Temperature Graph



**Figure 4** – Furnace temperature graph.

## Furnace Pressure Graph



**Figure 5** – Furnace pressure graph.

## Unexposed Face Temperature Graph

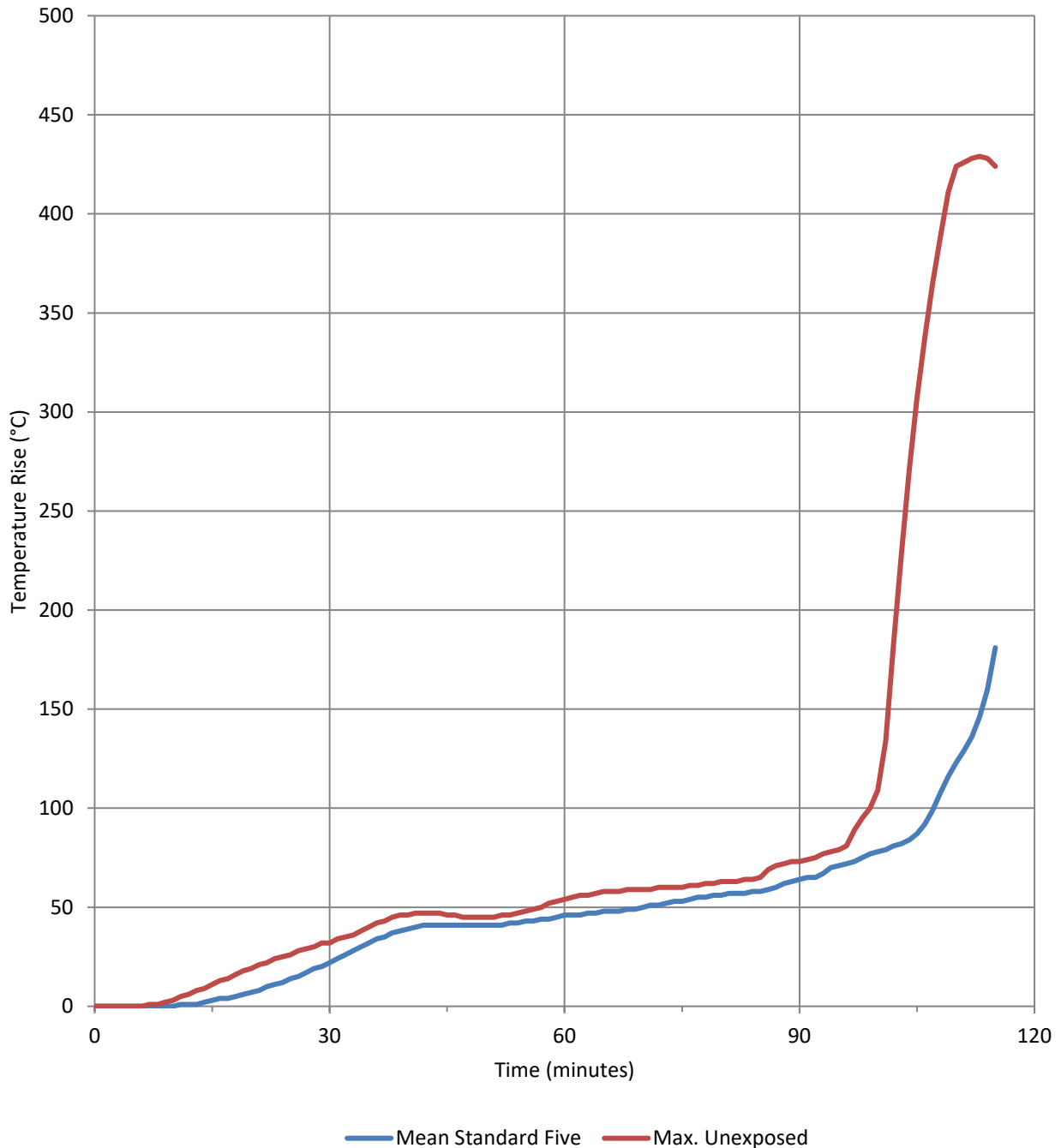
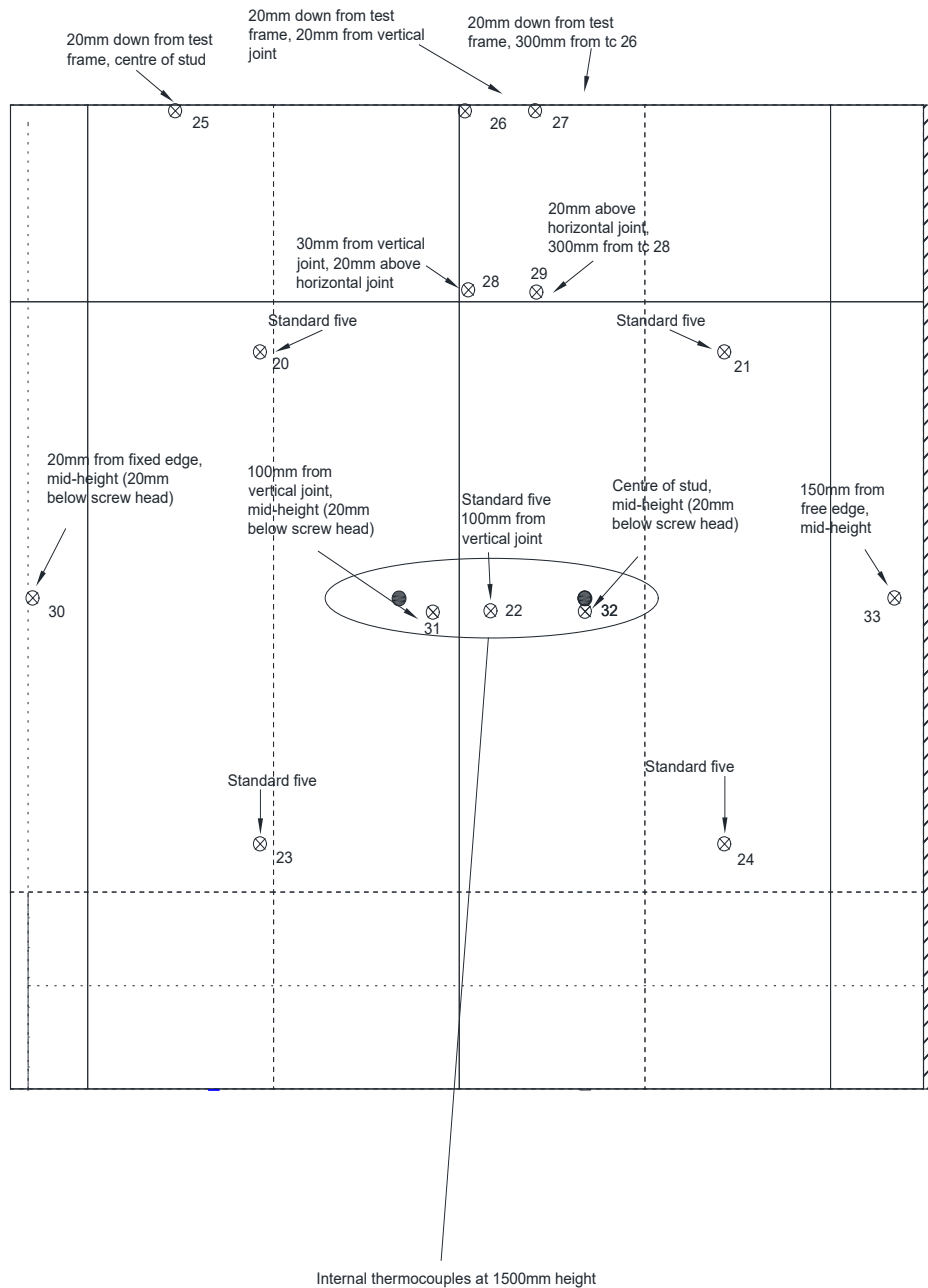


Figure 6 – Unexposed face temperature graph.

### Unexposed Face Thermocouple Layout



**Figure 7** – Unexposed face thermocouple layout.

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

### Unexposed Face Standard Five Temperature Data

Time (minutes)	Temperature Rise (°C)					Mean Standard Five
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	1	0	1	0
11	1	1	1	1	1	1
12	1	1	1	1	1	1
13	1	2	2	1	1	1
14	2	3	2	1	2	2
15	3	4	3	1	2	3
16	4	5	4	2	3	4
17	4	6	5	2	3	4
18	5	7	6	3	4	5
19	7	9	7	3	5	6
20	8	10	9	3	6	7
21	9	11	10	4	7	8
22	11	13	11	5	8	10
23	13	14	13	5	9	11
24	14	16	14	6	10	12
25	17	18	16	7	11	14
26	18	19	17	8	12	15
27	21	21	19	9	13	17
28	24	23	21	10	15	19
29	26	25	23	11	16	20
30	28	26	25	12	18	22
31	31	28	27	14	20	24
32	33	30	29	15	21	26
33	36	32	31	17	23	28
34	38	34	33	19	25	30
35	40	35	35	21	27	32
36	42	37	37	23	29	34
37	43	38	39	25	31	35
38	45	39	40	28	32	37

Customer: **British Gypsum**

BTC 21558F: Page 21 of 43



0296

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Temperature Rise (°C)					Mean Standard Five
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	
39	46	40	41	30	34	38
40	46	40	43	32	35	39
41	47	40	43	33	37	40
42	47	41	44	35	38	41
43	47	40	44	36	38	41
44	47	40	44	37	39	41
45	46	40	43	38	39	41
46	46	40	43	38	39	41
47	45	39	43	38	39	41
48	45	39	43	38	39	41
49	45	38	43	39	39	41
50	45	38	43	39	39	41
51	45	39	43	39	39	41
52	46	39	43	39	40	41
53	46	40	44	39	40	42
54	47	40	44	40	40	42
55	48	41	44	40	41	43
56	49	42	45	40	41	43
57	50	43	45	41	41	44
58	50	44	46	41	41	44
59	51	44	46	41	41	45
60	52	45	47	42	42	46
61	52	46	48	42	43	46
62	52	46	48	42	43	46
63	52	47	49	43	44	47
64	53	47	49	43	44	47
65	53	47	50	44	45	48
66	53	47	50	44	46	48
67	53	48	50	45	46	48
68	53	49	50	46	47	49
69	53	50	50	47	47	49
70	53	51	51	48	48	50
71	53	52	51	49	48	51
72	54	52	53	50	48	51
73	54	53	54	50	49	52
74	54	54	55	51	50	53
75	54	55	57	51	50	53
76	54	55	58	52	51	54
77	55	56	59	53	52	55
78	55	56	60	54	52	55
79	55	56	60	55	53	56

Customer: **British Gypsum**

BTC 21558F: Page 22 of 43



0296

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Temperature Rise (°C)					
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	Mean Standard Five
80	55	56	61	56	53	56
81	55	57	62	56	54	57
82	55	57	63	57	54	57
83	55	57	64	57	54	57
84	56	57	64	58	54	58
85	56	57	64	58	54	58
86	56	56	68	59	55	59
87	57	56	71	60	58	60
88	57	57	72	61	62	62
89	58	59	73	62	64	63
90	60	62	73	62	64	64
91	62	64	74	61	63	65
92	65	65	75	60	62	65
93	68	66	76	62	64	67
94	70	66	77	67	68	70
95	71	67	77	69	70	71
96	72	68	78	71	71	72
97	73	69	80	72	72	73
98	74	70	87	73	73	75
99	75	71	91	73	74	77
100	76	71	94	74	75	78
101	77	73	97	75	75	79
102	78	74	100	76	76	81
103	79	77	103	76	77	82
104	80	80	106	77	78	84
105	85	83	112	78	79	87
106	92	85	123	79	81	92
107	96	88	142	82	87	99
108	99	90	171	88	91	108
109	102	93	198	92	95	116
110	103	96	220	96	99	123
111	105	99	240	99	102	129
<b>112</b>	109	106	259	103	105	<b>136</b>
113	116	118	278	107	110	146
114	129	135	300	116	118	160
115	150	162	323	134	136	181

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

See **Figure 7** for the location of the thermocouples.

Customer: **British Gypsum**

BTC 21558F: Page 23 of 43



0296

### Additional Unexposed Face Temperature Data

Time (minutes)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
0	0	0	-	0	0
1	0	0	-	0	0
2	0	0	-	0	0
3	0	0	-	0	0
4	0	0	-	0	0
5	0	0	-	0	0
6	0	0	-	0	0
7	0	1	-	0	0
8	0	1	-	0	0
9	1	2	-	0	0
10	1	3	-	0	1
11	2	5	-	1	1
12	3	6	-	1	2
13	4	8	-	2	3
14	5	9	-	3	4
15	7	11	-	4	5
16	8	13	-	5	7
17	10	14	-	6	8
18	11	16	-	7	9
19	12	18	-	9	11
20	13	19	-	10	12
21	15	21	-	11	13
22	16	22	-	12	15
23	17	24	-	14	16
24	18	25	-	15	18
25	18	26	-	17	19
26	19	28	-	18	21
27	20	29	-	20	22
28	21	30	-	21	24
29	22	32	-	23	26
30	23	32	-	24	27
31	24	34	-	26	29
32	25	35	-	27	31
33	26	36	-	29	33
34	28	37	-	30	34
35	30	39	-	31	36
36	31	40	-	32	37
37	33	41	-	34	38
38	35	42	-	34	39



# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
39	37	42	-	35	39
40	38	43	-	36	40
41	38	43	-	36	40
42	39	43	-	36	40
43	39	43	-	37	40
44	39	43	-	37	40
45	39	43	-	37	40
46	38	42	-	37	40
47	38	42	-	37	40
48	37	42	-	37	40
49	37	42	-	37	40
50	36	42	-	37	41
51	36	42	-	37	42
52	36	43	-	38	43
53	36	44	-	38	43
54	36	46	-	39	44
55	37	47	-	39	45
56	38	49	-	40	45
57	39	50	-	41	45
58	41	52	-	42	45
59	43	53	-	42	46
60	44	54	-	43	46
61	45	55	-	44	46
62	46	56	-	44	47
63	47	56	-	45	47
64	48	57	-	45	48
65	49	58	-	46	48
66	49	58	-	47	48
67	49	58	-	47	49
68	50	59	-	48	49
69	50	59	-	48	50
70	50	59	-	48	50
71	51	59	-	48	51
72	51	60	-	48	51
73	51	60	-	48	52
74	52	60	-	48	52
75	52	60	-	48	53
76	52	61	-	48	54
77	53	61	-	49	55
78	53	61	-	49	56
79	53	62	-	50	57

Customer: **British Gypsum**

BTC 21558F: Page 25 of 43



0296

Time (minutes)	Temperature Rise (°C)				
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29
80	54	62	-	50	59
81	54	62	-	50	60
82	54	62	-	51	61
83	55	63	-	52	63
84	55	63	-	52	64
85	55	63	-	54	65
86	55	64	-	55	66
87	55	64	-	56	67
88	56	65	-	56	68
89	56	65	-	57	69
90	57	66	-	59	71
91	57	66	-	62	72
92	58	67	-	65	74
93	58	68	-	68	75
94	59	68	-	69	76
95	59	69	-	69	77
96	60	70	-	70	79
97	60	71	-	71	80
98	61	72	-	72	81
99	62	73	-	72	83
100	62	74	-	74	84
101	64	75	-	75	86
102	65	77	-	77	87
103	66	79	-	79	89
104	67	81	-	81	90
105	69	84	-	83	92
106	71	88	-	85	93
107	72	91	-	88	95
108	73	95	-	91	97
109	75	98	-	93	100
110	77	102	-	96	104
111	78	105	-	99	109
112	81	109	-	101	118
113	85	114	-	106	137
114	92	119	-	110	153
115	97	125	-	117	180

- Thermocouple broken due to equipment failure.

See **Figure 7** for the location of the thermocouples.

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

### Additional Unexposed Face Temperature Data

Time (minutes)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	1	1	1	1
11	1	1	1	1
12	1	1	1	1
13	2	2	1	2
14	2	2	2	3
15	3	3	3	5
16	3	4	3	6
17	4	5	4	7
18	4	6	5	8
19	5	7	6	10
20	6	8	7	11
21	7	9	8	13
22	8	10	10	14
23	9	12	11	16
24	10	13	12	17
25	11	15	14	19
26	13	16	15	20
27	14	18	17	22
28	16	20	19	24
29	17	22	20	25
30	19	24	22	27
31	21	26	24	29
32	23	29	26	31
33	24	31	28	32
34	26	33	29	34
35	28	35	31	36
36	30	37	33	37
37	32	39	34	39
38	33	41	36	40

Customer: **British Gypsum**

BTC 21558F: Page 27 of 43



0296

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
39	34	42	37	41
40	35	43	38	42
41	35	44	38	42
42	36	44	39	43
43	36	45	39	43
44	36	44	39	43
45	36	44	39	42
46	37	44	40	42
47	37	43	40	42
48	37	43	40	42
49	37	43	40	41
50	38	43	41	41
51	38	43	42	40
52	39	43	43	40
53	40	43	44	40
54	40	44	46	40
55	41	44	47	40
56	41	45	48	40
57	41	46	49	41
58	42	46	50	41
59	42	47	50	42
60	42	48	51	43
61	43	49	52	44
62	43	49	52	44
63	44	50	53	45
64	44	50	53	46
65	45	50	53	47
66	45	50	54	47
67	46	50	54	48
68	46	50	54	49
69	47	50	55	49
70	48	50	55	50
71	48	51	55	50
72	49	52	56	50
73	49	53	56	50
74	50	55	56	50
75	50	57	57	50
76	51	59	57	51
77	51	60	57	51
78	52	62	57	51
79	52	62	57	52

Customer: **British Gypsum**

BTC 21558F: Page 28 of 43



0296

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Temperature Rise (°C)			
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33
80	52	63	57	52
81	53	63	58	52
82	53	63	58	52
83	53	64	59	53
84	53	64	59	53
85	53	65	60	53
86	53	69	62	53
87	53	70	64	54
88	53	72	67	54
89	54	73	70	54
90	53	73	72	54
91	53	74	74	55
92	54	75	75	55
93	54	75	77	56
94	54	76	78	56
95	55	77	79	57
96	55	78	81	57
97	56	80	89	58
98	57	86	95	59
99	58	91	100	59
100	58	94	109	61
101	59	98	134	62
102	60	101	182	64
103	61	105	228	69
104	62	112	271	72
105	62	125	307	73
106	62	145	338	73
107	63	178	365	74
108	64	205	389	76
109	63	230	411	77
110	63	252	424	79
111	63	274	426	81
112	63	299	428	86
113	63	325	429	91
114	63	351	428	95
115	63	378	424	97

See **Figure 7** for the location of the thermocouples.

Customer: **British Gypsum**

BTC 21558F: Page 29 of 43



0296

### Internal Temperature Data at 1500 mm Height

Time (minutes)	Actual Temperature (°C)					
	Left stud			Right stud		
	Hot Flange Thermocouple No. 34	Web Thermocouple No. 35	Cold Flange Thermocouple No. 36	Hot Flange Thermocouple No. 37	Web Thermocouple No. 38	Cold Flange Thermocouple No. 39
0	25	24	22	26	17	22
1	27	24	22	27	17	22
2	29	24	22	29	17	22
3	35	24	22	32	17	22
4	66	30	22	36	17	22
5	87	48	23	43	17	23
6	94	64	27	53	17	25
7	96	75	34	69	38	31
8	99	81	42	80	17	42
9	100	84	49	86	17	52
10	102	83	53	90	17	58
11	103	81	55	93	17	60
12	103	80	56	95	17	61
13	104	79	57	97	17	62
14	104	78	58	98	17	62
15	104	78	60	100	17	63
16	105	78	62	101	17	64
17	107	79	64	102	17	66
18	109	80	66	103	17	68
19	110	82	69	105	18	70
20	110	84	72	108	18	72
21	107	86	75	112	87	74
22	106	87	78	117	89	75
23	106	89	80	122	90	77
24	107	91	82	128	92	79
25	109	93	84	133	93	81
26	111	95	86	137	95	83
27	114	97	87	141	97	84
28	119	98	89	145	99	86
29	128	100	90	150	101	88
30	139	102	92	154	103	90
31	147	104	93	158	106	92
32	156	106	94	162	108	94
33	166	109	95	168	110	95
34	177	112	96	173	113	97
35	190	116	97	181	116	99
36	204	120	97	190	119	101

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Actual Temperature (°C)					
	Left stud			Right stud		
	Hot Flange Thermocouple No. 34	Web Thermocouple No. 35	Cold Flange Thermocouple No. 36	Hot Flange Thermocouple No. 37	Web Thermocouple No. 38	Cold Flange Thermocouple No. 39
37	220	126	97	202	124	103
38	237	134	97	216	131	106
39	254	145	99	232	140	108
40	273	158	100	251	152	111
41	294	175	102	270	168	115
42	318	196	108	291	187	121
43	345	223	112	312	207	130
44	371	252	121	335	229	140
45	397	280	134	357	251	155
46	422	305	151	377	272	169
47	445	322	168	395	289	181
48	465	335	182	410	301	187
49	476	346	191	423	309	186
50	486	357	198	435	316	179
51	495	368	205	445	322	175
52	502	377	211	453	328	174
53	508	385	216	461	334	174
54	514	392	222	467	340	176
55	520	399	228	474	346	179
56	525	405	235	480	351	184
57	531	411	244	486	357	189
58	536	415	254	492	363	195
59	532	405	265	499	369	202
60	523	398	274	508	377	210
61	517	398	283	517	387	219
62	515	400	290	527	397	228
63	516	404	298	536	407	237
64	519	409	306	545	417	246
65	525	414	315	553	423	256
66	576	432	330	559	427	263
67	669	476	366	566	431	270
68	720	522	403	574	437	276
69	745	564	440	583	445	282
70	753	587	469	594	458	291
71	758	599	487	604	470	302
72	758	603	496	613	482	313
73	760	599	501	620	491	323
74	769	612	513	625	499	333
75	779	633	537	630	505	346



# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Actual Temperature (°C)					
	Left stud			Right stud		
	Hot Flange Thermocouple No. 34	Web Thermocouple No. 35	Cold Flange Thermocouple No. 36	Hot Flange Thermocouple No. 37	Web Thermocouple No. 38	Cold Flange Thermocouple No. 39
76	790	656	570	634	511	360
77	797	680	600	640	519	378
78	811	698	634	647	529	406
79	821	715	663	655	541	449
80	894	879	794	772	769	974
81	918	908	878	869	891	800
82	930	902	914	892	907	860
83	942	977	944	890	895	872
84	945	1000	1014	918	903	885
85	920	988	959	951	937	914
86	919	908	898	899	935	905
87	937	939	931	930	940	923
88	933	939	915	930	927	919
89	908	911	895	903	897	896
90	899	899	894	897	890	896
91	896	893	900	892	889	896
92	899	893	899	892	894	898
93	895	890	886	882	886	891
94	892	887	877	877	882	883
95	873	864	860	855	866	861
96	922	899	927	891	921	921
97	931	913	939	891	937	925
98	965	964	973	955	968	959
99	940	972	1000	1052	981	976
100	960	976	1005	1041	973	986
101	956	989	1020	-	986	994
102	953	-	1030	-	993	1009
103	955	-	-	-	994	1009
104	942	-	-	-	972	1023
105	977	-	-	-	1016	1043
106	952	-	-	-	1020	-
107	944	-	-	-	1034	-
108	950	-	-	-	-	-
109	948	-	-	-	-	-
110	940	-	-	-	-	-
111	934	-	-	-	-	-
112	926	-	-	-	-	-
113	922	-	-	-	-	-
114	936	-	-	-	-	-





# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: btc.testing@saint-gobain.com

Time (minutes)	Actual Temperature (°C)					
	Left stud			Right stud		
	Hot Flange Thermocouple No. 34	Web Thermocouple No. 35	Cold Flange Thermocouple No. 36	Hot Flange Thermocouple No. 37	Web Thermocouple No. 38	Cold Flange Thermocouple No. 39
115	938	-	-	-	-	-

- Thermocouple broken due to equipment failure.

See **Figure 7** for the location of the thermocouples.

## Specimen Lateral Deflection

Time (minutes)	Deflection (mm)
	Centre
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	1
8	3
9	3
10	4
11	4
12	4
13	4
14	4
15	4
16	4
17	4
18	4
19	4
20	4
21	4
22	4
23	4
24	4
25	4
26	4
27	4
28	4
29	4
30	4
31	4
32	4
33	4
34	4
35	4
36	4
37	4
38	4

# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre

British Gypsum

East Leake

Loughborough

Leics. LE12 6NP

Tel: (0115) 945 1564

Email: btc.testing@saint-gobain.com

Time (minutes)	Deflection (mm)
	Centre
39	6
40	7
41	9
42	12
43	15
44	19
45	23
46	28
47	33
48	36
49	40
50	43
51	46
52	49
53	51
54	54
55	56
56	58
57	60
58	63
59	65
60	67
61	69
62	71
63	73
64	75
65	76
66	79
67	82
68	85
69	88
70	91
71	93
72	96
73	98
74	100
75	102
76	104
77	105
78	106
79	108

Customer: **British Gypsum**

BTC 21558F: Page 35 of 43



0296

Time (minutes)	Deflection (mm)
	Centre
80	109
81	109
82	111
83	114
84	115
85	116
86	117
87	119
88	121
89	-

The deflection was recorded at the approximate centre of the specimen. Positive readings indicate deflection into the furnace.

- The transducer fell off after 88 minutes and was not re-attached.

# The Building Test Centre

Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

## PHOTOGRAPHS

Exposed Face Prior to Test



Customer: **British Gypsum**

BTC 21558F: Page 37 of 43



0296



# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

### Unexposed Face Prior to Test



Customer: **British Gypsum**

BTC 21558F: Page 38 of 43



0296

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

### Unexposed Face at 30 Minutes



Customer: **British Gypsum**

BTC 21558F: Page 39 of 43



0296



# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

### Unexposed Face at 1 Hour



Customer: **British Gypsum**

BTC 21558F: Page 40 of 43



0296



# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

### Unexposed Face at 1 Hour, 30 Minutes



Customer: **British Gypsum**

BTC 21558F: Page 41 of 43



0296

# The Building Test Centre

## Fire Acoustics Structures

The Building Test Centre  
British Gypsum  
East Leake  
Loughborough  
Leics. LE12 6NP  
Tel: (0115) 945 1564  
Email: [btc.testing@saint-gobain.com](mailto:btc.testing@saint-gobain.com)

Unexposed Face at 1 Hour, 55 Minutes, at Test Termination



Customer: **British Gypsum**

BTC 21558F: Page 42 of 43



0296

### 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 3000 mm.
- ii) Increase in the thickness of the wall.
- iii) Increase thickness of component materials (minimum Gypframe stud depth 70 mm, minimum Gypframe stud gauge 0.60 mm).
- iv) Decrease in the linear dimensions of the boards but not thickness ( $\leq 2400$  mm (long) x  $\leq 1200$  mm (wide) Gyproc SoundBloc).
- v) Decrease stud spacing from 300 mm.
- vi) Decrease in fixing centres from 300 mm.
- vii) Increase in the number of horizontal joints, of the type tested, when tested with one joint not more than  $(500 \pm 150)$  mm from the top edge.

#### Extension of Width

For test specimens tested without a supporting construction, the width of an identical construction may be increased as the specimen was tested at nominally 3000 mm wide with one vertical edge without restraint.

#### Extension of Height

The height of the construction may be increased by 1000 mm under the following conditions:

30 minutes	60 minutes
$\leq 100$ mm	$\leq 100$ mm