



CONFIDENTIAL

Report: Chilt/RF09047

**A fire resistance test performed on a
loadbearing partition wall system**

**Test conducted in accordance with BS
476: Part 20/21: 1987**

Test date: 3rd July 2009

Page 1 of 11



committed to excellence

www.chilternfire.co.uk

www.chilterndynamics.co.uk

www.qmark.info

**Prepared for: Resistant Building Products
Tradewood and Co
M2 Business Park
122-130 Duncrue Street
Belfast
N Ireland BT3 9AQ**



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1 Introduction

The specimen wall was manufactured and supplied for test by the client and delivered on 25th June 2009. Chiltern International Fire Ltd (CIFL) installed the specimen into the refractory lined steel restraint frame.

2 Specimen verification

From the unexposed face: 12.5mm thick British Gypsum Fireline coated with Cova ST PVC with plastic T-section trims fitted covering the board joints

Thermasheet foil membrane

35mm wide x 95mm deep C16 grade softwood timber studs, head and base tracks and noggins (510 kg/m³ nominal density)

Rockwool RWA45 insulation

9mm thick Resistant Multi Pro XS magnesium silicate board bonded with Plastisol coated 0.5mm thick steel sheet with Plastisol wrapped T-section trims covering the board joints

3 Supporting construction

The specimen was installed within a refractory lined steel restraint frame. The specimen was mounted on top of a timber spreader beam (overall size 88mm deep x 3000mm long). The specimen was loaded central to its thickness. The loading conditions were applied in accordance with BS 476: Part 21: 1987.

4 Description of specimen

Details of the specimens are shown in Figures 1 to 4.

The wall measured 2700mm high x 2948mm wide x nominally 117mm thick.

5 Method of installation

The specimen was lifted into the restraint frame using the laboratory crane and fork lift. The specimen was held in place with wedges after it had been adjusted so it was central to the spreader beam and in line with the restraint frame. The edges between the partition and the restraint frame were filled with mineral wool, nominal density 27kg/m³, to prevent flames coming around the specimen whilst allowing free movement of the partition.

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6 Test conditions

6.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 27°C. The ambient temperature for the duration of the test has been recorded in Appendix 2

6.2 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at 0 ± 5 Pa and after 10 minutes was maintained at 0 ± 2 Pa with respect to atmosphere, at a point 1m from the notional floor level, which equates to a recorded reading of 19 Pa at the head of the wall

6.3 Loading conditions and deflection

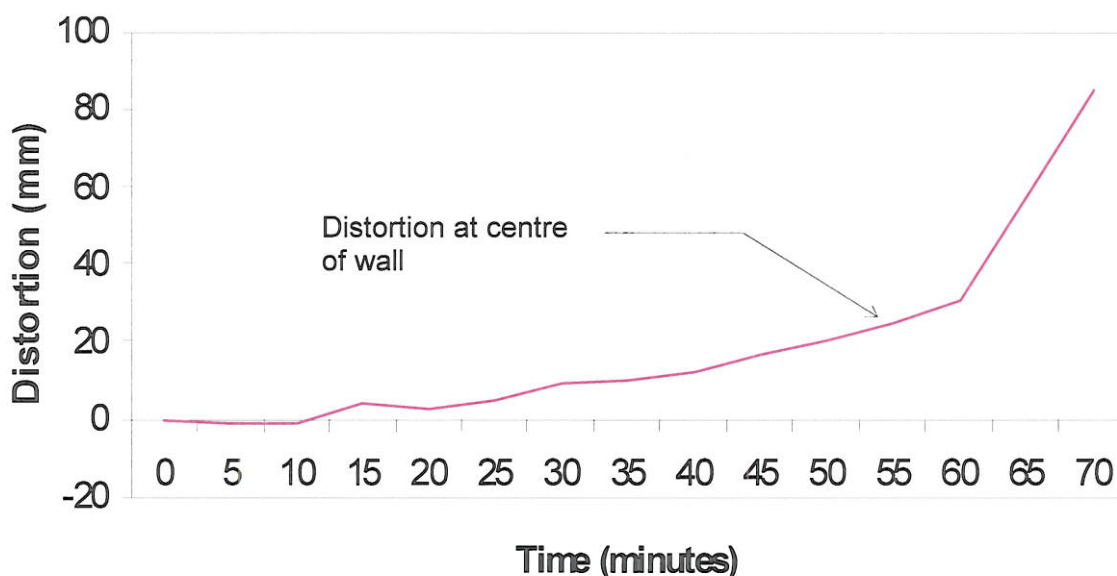
The partition was loaded from below using 3No hydraulic jacks located at 500mm, 1500mm and 2500mm from the right of the specimen. The load was transferred to the specimen using a spreader beam. The specimen was loaded along the centre line to the equivalent of 7kN/m (21kN total imposed load) in accordance with the client's request. The deflection was measured using a laser line. The horizontal deflections at mid height in the centre of the wall, and mid height on the left edge of the wall were measured.

The specimen was loaded 15 minutes before the test and the wedges holding the partition in place were removed.

Horizontal - deflection

A negative measurement represents distortion in towards the furnace.

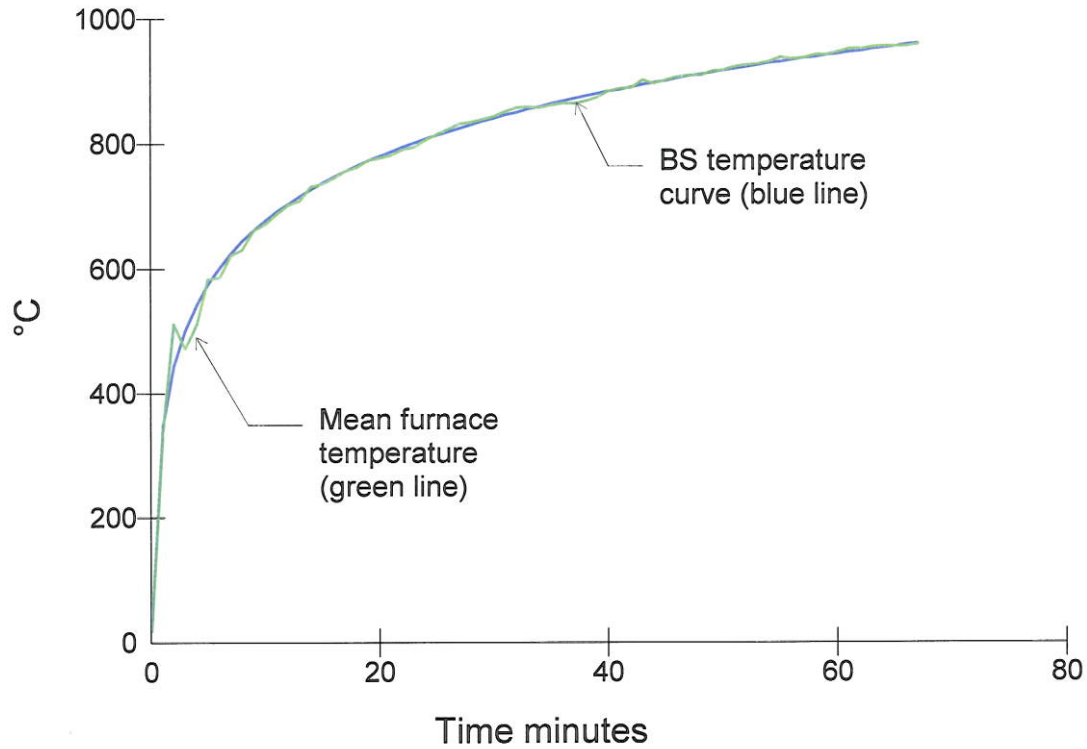
A positive measurement represents distortion away from the furnace.



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6.4 Furnace temperature

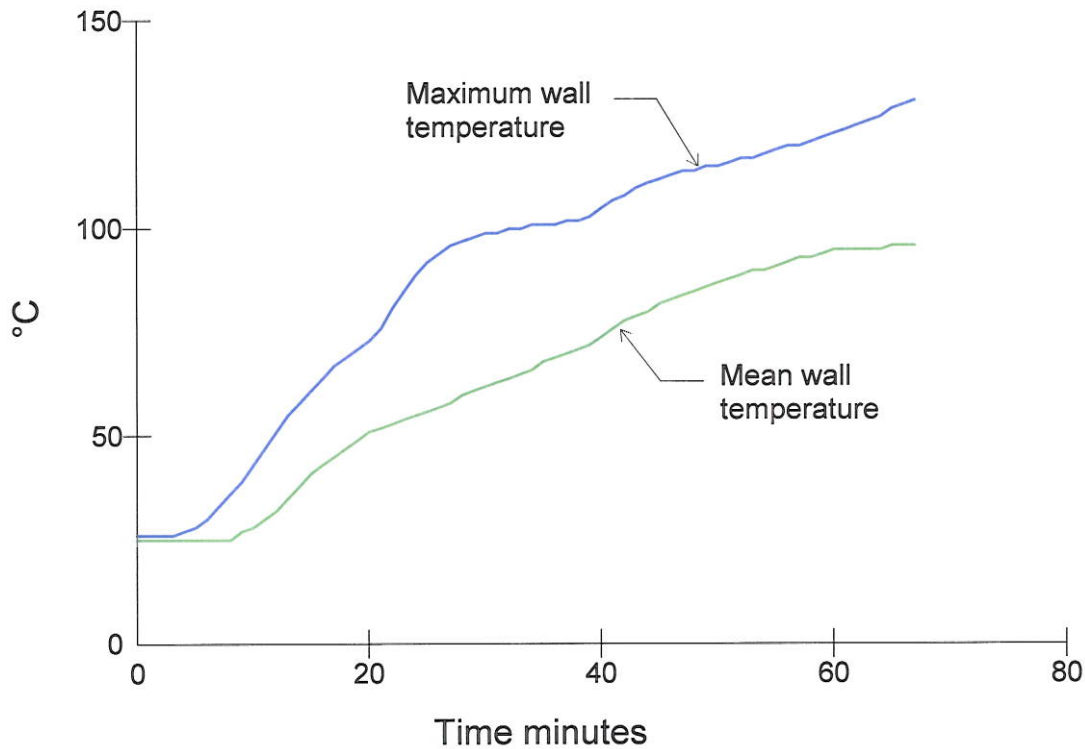
The furnace was controlled to follow the temperature/time relationship specified in BS 476: Part 20: 1987 as closely as possible, using the average of six thermocouples suitably distributed within the furnace. The temperatures recorded have been tabulated in Appendix 2 and are shown graphically below:



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6.5 Unexposed face temperatures

The temperature of the unexposed face was monitored by means of four thermocouples measuring maximum temperature rise and five thermocouples measuring mean temperature rise:



The location of the thermocouples are shown in Figure 4. The temperatures recorded have been tabulated in Appendix 2.

7 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00.00	Test started.
02.20	The plastic coating on the exposed face has melted away.
31.40	An air bubble has appeared at the top of the centre of the unexposed board.
35.50	Further bubbles have appeared at the top of the centre and right hand side of the unexposed board.
41.00	There is an increase in the size of the air bubbles.
54.54	The T section on the right hand side of the board has started to distort/melt at the top of the board.
62.00	The joints between the board on the unexposed face are approximately 20mm.
63.44	New air bubbles are appearing on all the unexposed boards.
67.00	The right hand side of the partition has cracked in the centre, causing continuous flaming, a 25mm gap gauge failure and a 6mm gap gauge failure thereby constituting integrity failure .
68.00	Test terminated.

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8 Expression of results


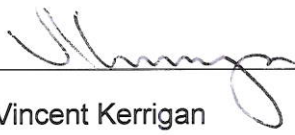
When tested in accordance with BS 476: Part 21: 1987, the requirements of the standard were satisfied for the following periods:

Integrity	67 (sixty seven) minutes
Insulation	67 (sixty seven) minutes
Loadbearing capacity	67 (sixty seven) minutes

9 Limitations

The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

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. CILF 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.

Signature:		
Name:	Mark Cummings	Vincent Kerrigan
Title:	Head of Section – Fire Resistance	Technical Manager
Date of issue:	7/4/10	12-04-2010

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10 Description of construction

(refers to Figures 1 to 4)

The wall internal framework comprised 95mm deep x 35mm wide C16 grade softwood timber head and base plates with 95mm deep x 35mm wide C16 grade softwood timber studs fitted between them at 600mm centres. The two centre studs were doubled up (see figure 2). 95mm deep x 35mm wide C16 grade softwood timber noggins were fitted midway up from the foot of the wall. (See Figure 1) The studwork was fixed with 100mm long ring shank steel nails (2 each end of the stud and noggin)

Rockwool RWA45 rock fibre insulation was friction fitted between the studs.

The unexposed face was clad with 12.5mm thick British Gypsum Fireline plasterboard (9.8kg/m²) fixed to the internal timber frame work with 30mm long Gyproc nails at a 300mm centres and Polycropolene adhesive. The Fireline board was faced with a coating of Cova ST PVC.

The exposed face was clad with a laminate faced Resistant Multi Pro XS wallboard fixed to the internal framework with 30mm long Gyproc nails at nominally 300mm centres and Polycropolene adhesive. The board was faced with Plastisol coated 0.5mm thick steel sheet

The boards were fitted with staggered joints (board locations and joints shown in Figure 1). T section plastic trim was fitted covering the board joints on the unexposed face (see figure 2).

11 Key to Figures

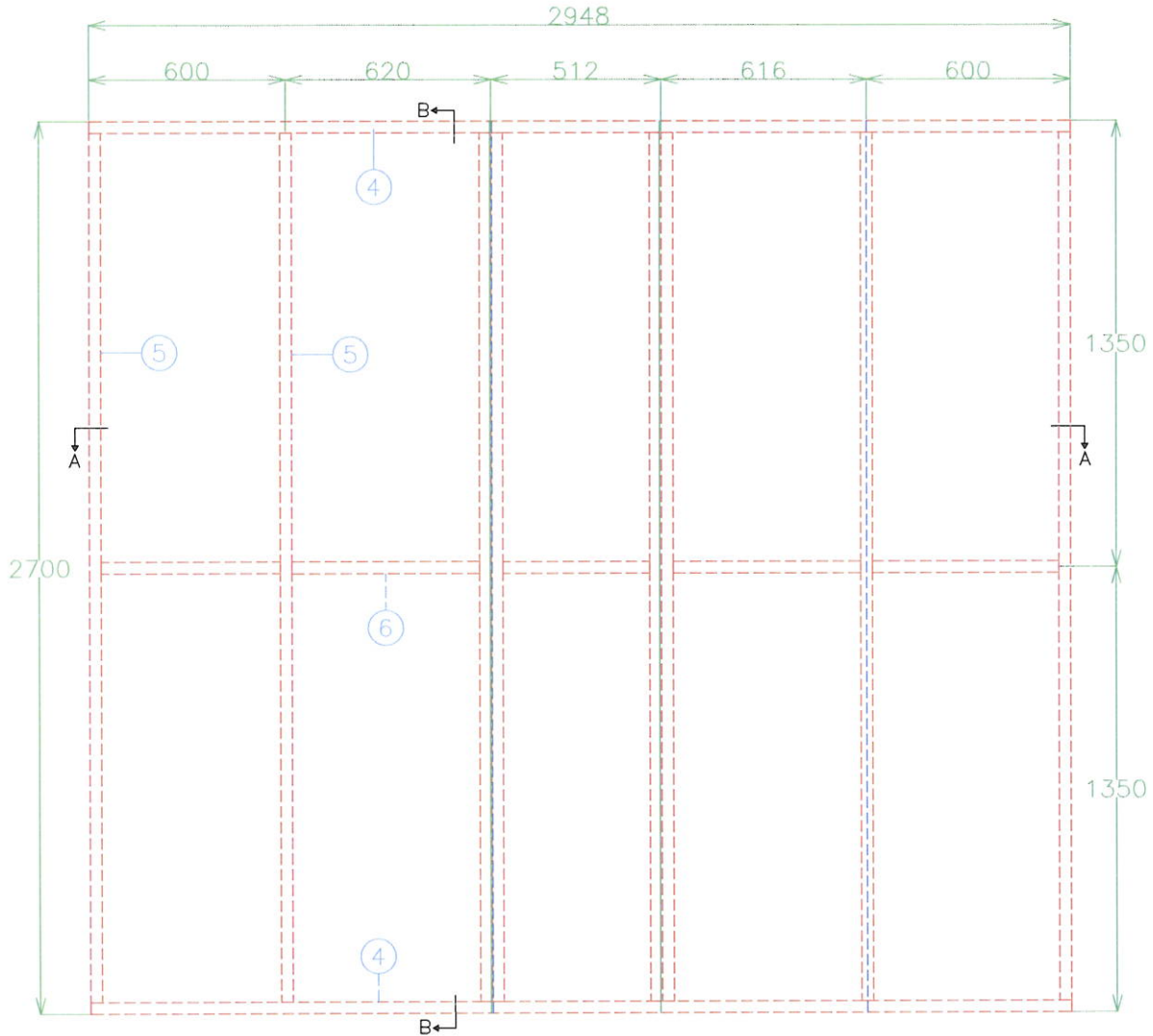
1. 12.5mm thick British Gypsum Fireline plasterboard with Cova ST PVC covering
2. Thermasheet foil membrane
3. Plastic T-section trim
4. 95mm x 35mm C16 grade softwood timber head and base plate
5. 95mm x 35mm C16 grade softwood timber studs
6. 95mm x 35mm C16 grade softwood timber noggins
7. 30mm long nails
8. 9mm thick Resistant Multi Pro XS wall board
9. 0.5mm thick steel sheet with Plastisol finish
10. Rockwool TWA45 insulation

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Appendix 1 – figures 1 - 4

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12.5mm thick British Gypsum Fireline board joint
on unexposed face= ----- (dash)

9mm thick Resistant Multi Pro XS board joint
on exposed face= _____ (solid)



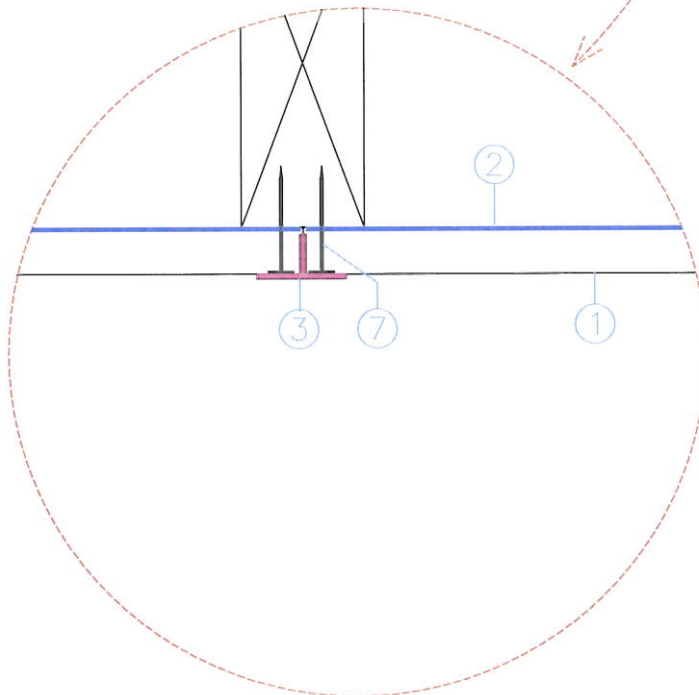
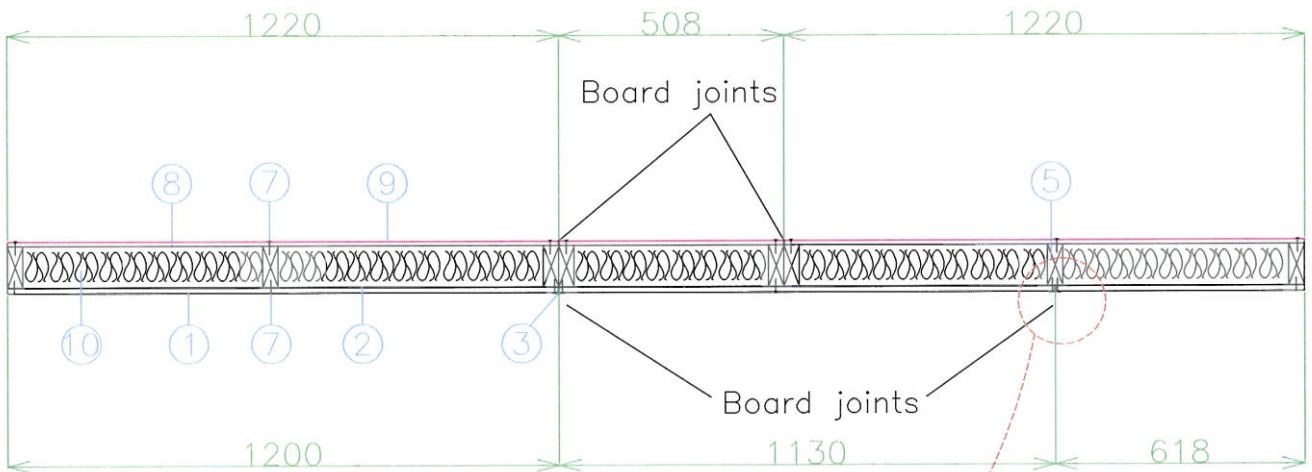
Chiltern House, Stocking Lane, Hughenden Valley
High Wycombe, Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title Front elevation showing
face board joints and
timber frame studwork
(All dimensions in mm)

Date Drawn 30/07/09	Drawn By ARD	Scale NTS
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Project No. Chilt/RF09047	Appendix 1
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Section A-A



Chiltern House, Stocking Lane, Hughenden Valley
 High Wycombe, Buckinghamshire, HP14 4ND, UK.
 Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Horizontal cross section A-A
 (All dimensions in mm)

Date Drawn
 30/07/09

Drawn By
 ARD

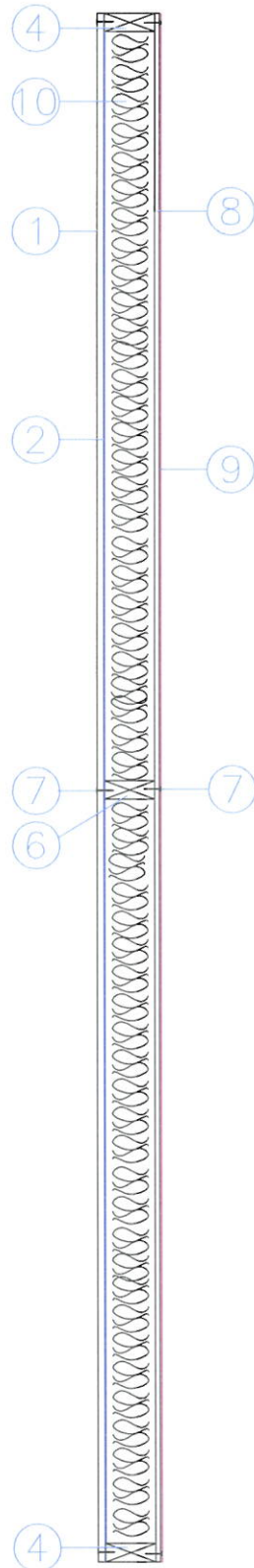
Scale
 NTS

Project No.

Chilt/RF09047

Appendix 1

Section B-B



Chiltern House, Stocking Lane, Hughenden Valley
 High Wycombe, Buckinghamshire, HP14 4ND, UK.
 Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Cross sections
 (All dimensions in mm)

Date Drawn
 30/07/09

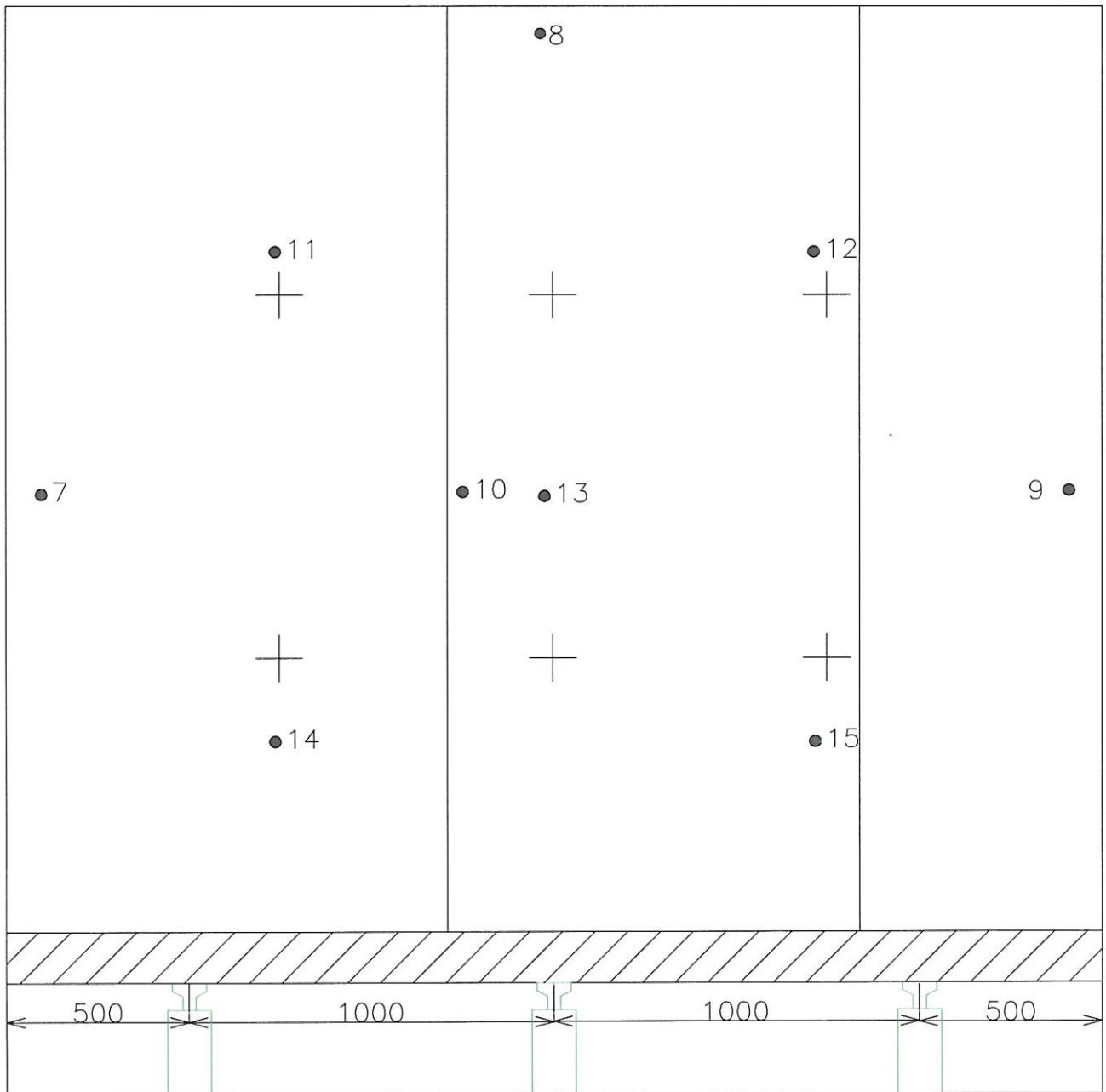
Drawn By
 ARD

Scale
 NTS

Project No.

Chilt/RF09047

Appendix 1



+ : Furnace Thermocouples
 ● : Unexposed Face Thermocouples

Viewed From Unexposed Face



Chiltern House, Stocking Lane, Hughenden Valley
 High Wycombe, Buckinghamshire, HP14 4ND, UK.
 Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title Thermocouple positions
 and hydraulic jack positions
 (All dimensions in mm)

Date Drawn
 30/07/09

Drawn By
 ARD

Scale
 NTS

Project No.

Chilt/RF09047

Appendix 1



Appendix 2 - raw test data

(see Figure 4 of Appendix 1 for channel locations)

Time	Chan 0	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9	Chan 10	Chan 11	Chan 12	Chan 13	Chan 14	Chan 15	Chan 16
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	0	28	29	39	29	30	30	25	26	25	25	25	25	25	25	25	27
1	-4.5	205	193	92	444	434	425	25	26	25	25	25	25	25	25	25	27
2	-1	395	391	136	624	570	588	25	26	25	25	25	25	25	25	25	27
3	-2.2	417	382	74	553	490	523	25	26	26	25	25	25	25	25	25	26
4	2.4	437	436	188	586	552	556	25	27	26	25	25	25	25	25	25	26
5	1.6	501	527	510	656	614	622	25	28	26	25	25	25	25	25	25	26
6	2.7	533	534	1042	657	608	605	26	30	26	25	25	26	25	25	25	26
7	0.5	571	585	-999999	700	639	622	26	33	26	25	25	26	25	25	26	26
8	1.1	589	619	-999999	699	637	620	26	36	27	25	25	26	25	25	27	26
9	0.8	617	658	-999999	726	660	657	26	39	27	25	26	27	26	26	30	27
10	1	621	679	-999999	740	661	666	26	43	29	26	27	28	26	26	34	27
11	1.1	630	696	-999999	748	680	694	27	47	32	28	29	29	27	27	40	27
12	-0.3	652	704	-999999	742	710	709	28	51	35	30	32	30	28	28	46	27
13	0.9	656	716	-999999	776	700	706	29	55	39	32	37	32	30	29	51	27
14	1	671	728	-999999	774	747	745	31	58	41	34	42	34	33	30	54	27
15	-0.1	678	745	-999999	789	730	746	32	61	43	36	47	37	35	31	57	27
16	-0.1	694	749	-999999	797	738	754	33	64	44	39	51	39	37	33	59	27
17	-0.1	702	762	-999999	811	747	764	35	67	46	41	54	41	39	34	60	27
18	0.5	718	752	-999999	812	766	775	36	69	47	42	57	43	41	36	62	27
19	0.5	723	788	-999999	818	775	775	36	71	50	44	59	44	43	37	63	27
20	0.5	733	782	-999999	814	778	786	37	73	51	45	61	46	45	39	64	27
21	0.4	741	788	-999999	831	772	787	38	76	52	47	62	48	46	40	65	27

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Time	Chan 0	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9	Chan 10	Chan 11	Chan 12	Chan 13	Chan 14	Chan 15	Chan 16
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
22	0.4	753	781	-999999	836	787	803	40	81	53	47	63	49	48	42	66	27
23	1	760	776	-999999	835	796	813	42	85	53	49	64	50	49	43	67	27
24	0.9	767	805	-999999	838	813	812	43	89	53	49	65	52	50	45	67	27
25	0.7	776	814	-999999	853	824	815	45	92	53	50	66	53	51	46	68	27
26	0.8	786	815	-999999	853	829	837	47	94	53	50	66	55	52	47	68	27
27	0.5	796	828	-999999	857	844	843	49	96	52	51	66	57	53	48	69	27
28	-0.1	794	834	-999999	869	838	844	49	97	52	52	67	60	54	48	71	27
29	-0.7	803	832	-999999	863	852	854	49	98	53	52	67	63	55	48	73	27
30	-0.3	804	853	-999999	885	848	838	50	99	53	52	67	66	56	49	74	27
31	-0.2	814	836	-999999	886	869	859	50	99	54	53	68	69	57	49	74	27
32	-0.7	821	851	-999999	887	869	867	50	100	54	53	68	73	57	49	74	27
33	-0.6	823	862	-999999	899	858	861	49	100	53	53	68	77	58	50	74	27
34	-0.9	823	866	-999999	896	859	854	50	101	54	53	69	82	58	50	73	27
35	-0.1	828	861	-999999	899	873	856	50	101	54	54	69	89	59	50	73	27
36	-1	834	870	-999999	893	876	857	50	101	54	55	70	93	60	51	73	27
37	-0.9	839	863	-999999	903	873	851	50	102	55	55	71	95	61	51	73	27
38	-0.7	841	864	-999999	906	876	862	51	102	56	56	73	96	63	52	73	27
39	0.6	846	875	-999999	911	883	863	51	103	56	56	75	96	64	55	74	27
40	0.3	849	896	-999999	921	892	867	52	105	57	57	77	96	66	59	74	27
41	0.7	855	884	-999999	929	905	874	52	107	58	57	79	96	68	64	75	27
42	0.8	860	894	-999999	926	903	875	52	108	58	58	79	96	70	68	77	27
43	0	866	920	-999999	938	912	882	53	110	59	59	79	96	72	71	78	27
44	-0.4	868	905	-999999	922	912	880	53	111	59	59	80	96	74	73	80	27
45	0.1	870	902	-999999	940	919	884	53	112	60	60	82	96	76	75	81	27
46	-0.2	875	920	-999999	938	918	891	54	113	60	61	83	96	78	77	83	27
47	0	879	925	-999999	946	911	891	54	114	61	62	84	96	79	79	85	27
48	-0.2	881	910	-999999	944	922	894	55	114	61	63	85	96	80	81	86	27
49	0	887	916	-999999	952	936	896	55	115	62	64	87	96	80	83	88	27

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Time	Chan 0	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 8	Chan 9	Chan 10	Chan 11	Chan 12	Chan 13	Chan 14	Chan 15	Chan 16
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
50	0.2	890	911	-999999	958	935	903	56	115	63	65	88	96	81	84	89	27
51	-0.1	893	932	-999999	954	932	917	56	116	63	66	89	96	82	86	89	27
52	0.5	895	938	-999999	961	936	909	56	117	64	67	90	97	82	87	90	27
53	0.3	902	917	-999999	960	948	919	57	117	65	68	91	97	83	89	91	27
54	0.1	905	937	-999999	964	944	916	58	118	65	68	91	97	84	90	91	27
55	0.7	906	953	-999999	974	949	917	59	119	66	70	92	97	86	91	91	27
56	-0.5	910	944	-999999	970	941	923	59	120	67	71	93	97	88	93	92	27
57	-0.3	912	944	-999999	967	948	923	61	120	68	74	93	97	89	94	93	27
58	-0.3	916	953	-999999	979	944	926	62	121	69	77	94	97	90	95	93	27
59	-0.5	919	948	-999999	970	959	926	63	122	70	79	94	97	91	96	94	27
60	-0.4	922	951	-999999	980	958	930	64	123	71	80	95	97	92	97	94	27
61	-0.3	925	969	-999999	982	955	934	66	124	73	81	96	97	92	97	95	27
62	-0.3	929	958	-999999	984	959	937	67	125	75	82	96	97	92	98	95	28
63	-0.2	933	965	-999999	987	959	940	69	126	77	83	96	97	92	98	96	28
64	-0.2	937	960	-999999	984	969	941	71	127	79	83	96	97	92	98	96	28
65	-1	937	965	-999999	980	961	942	72	129	80	84	96	97	93	98	97	28
66	-0.7	939	964	-999999	984	959	946	74	130	82	83	97	97	93	98	97	28
67	-0.6	940	963	-999999	986	964	948	77	131	84	82	97	97	93	98	97	28
68	-5.9	770	782	-999999	528	532	538	58	128	52	60	82	61	61	72	58	28

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