Chiltern House Stocking Lane Hughenden Valley
High Wycombe Buckinghamshire HP14 4ND UK
t +44 (0) 1494 569800 f +44 (0) 1494 564895
e cif@chilternfire.co.uk w www.chilternfire.co.uk

CONFIDENTIAL

Test Report : Chilt/RF08014

A fire resistance test performed on a double leaf single acting doorset with glazing

Test conducted in accordance with BSEN 1634-1: 2000 and BSEN 1363-1: 1999

Test Date: 2 April 2008

Test for :

Mann McGowan Fabrications Ltd
Unit 4, Brook Trading Estate
Deadbrook Lane
Aldershot
Hampshire
GU12 4XB

Notified laboratory number 1314

UKAS TESTING
No. 1762

Contents

1 Introduction

A double doorset was installed into a flexible supporting construction. The door was pre-cycled before the fire test. The doorset was instrumented with the standard set of thermocouples and installed opening in towards the furnace.

2 Specimen verification

The doorset was delivered to Chiltern International Fire Ltd (CIFL) during March 2008.

The component parts of the doorset were identified and, where appropriate, moisture content readings and density checks were performed on either the original specimen, or, samples provided by the sponsor. These details are outlined in the construction section of this report.

3 Description of supporting construction

The supporting construction comprised a British Gypsum steel stud partition built in accordance with Clause 7.2.2.4 of BSEN 1363: Part 1, for a flexible supporting construction. The vertical studs surrounding the apertures created for the doorsets incorporated a 67mm x 29mm softwood timber infill to facilitate the fixings for the specimens. The specimens tested are 30 minute products with an anticipated Category B performance, therefore intended fire resistance is 36 minutes and two layers of Gypsum plasterboard type F are required. The supporting construction was only fixed on the horizontal edges, the vertical edges remained free.

4 Description of specimen

Details of the specimens are shown in Figures 1 to 6 of Appendix 2.

4.1 Door leaves

Both leaves measured 2043mm high x 850mm wide x 44mm thick.

5 Pre-test measurements

5.1 Pre-cycling

Operability test of 25 manual cycles was completed on each door leaf in accordance with BSEN 14600, section 5.1.1.1. Specimen self closing of door leaf, in accordance with BSEN 14600, section 5.1.1.3 was completed prior to test.

5.2 Door perimeter gaps

The manufacturer did not declare a working range so the doors were installed to open and close freely, maintaining gaps, where possible, to a range of 2-4mm. The gaps between the edge of the doors and frame were measured prior to test. A total of 21 readings were taken. The measurements (in mm) are given in Figure 5 of Appendix 2.

5.3 Closer forces

Measured in accordance with BSEN 1634-1: 2000 Section 10.1.3.

	Opening Force (Nm)
Left leaf	48@ handle position
Right leaf	30@ handle position

5.4 Method of installation

The doorset was fixed into a pre-prepared opening. The details of the fixings and fire stopping between frame and supporting construction are outlined in the construction section and Figure 4 of Appendix 2. The exposed face of the doorset was flush with the exposed face of the supporting construction.

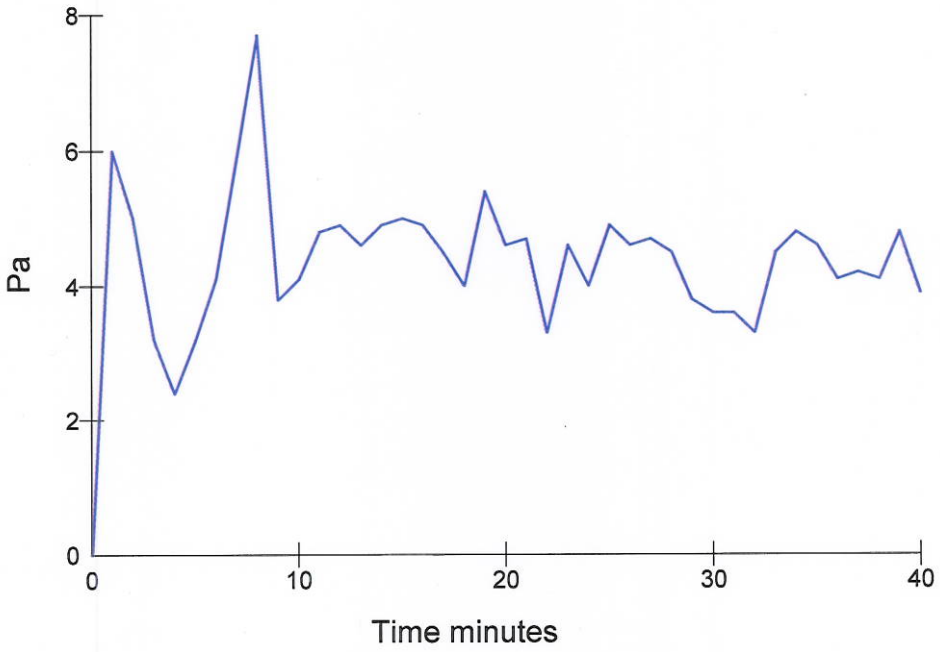
6 Test conditions

6.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 14°C. The ambient temperature for the duration of the test has been recorded in Appendix 1.

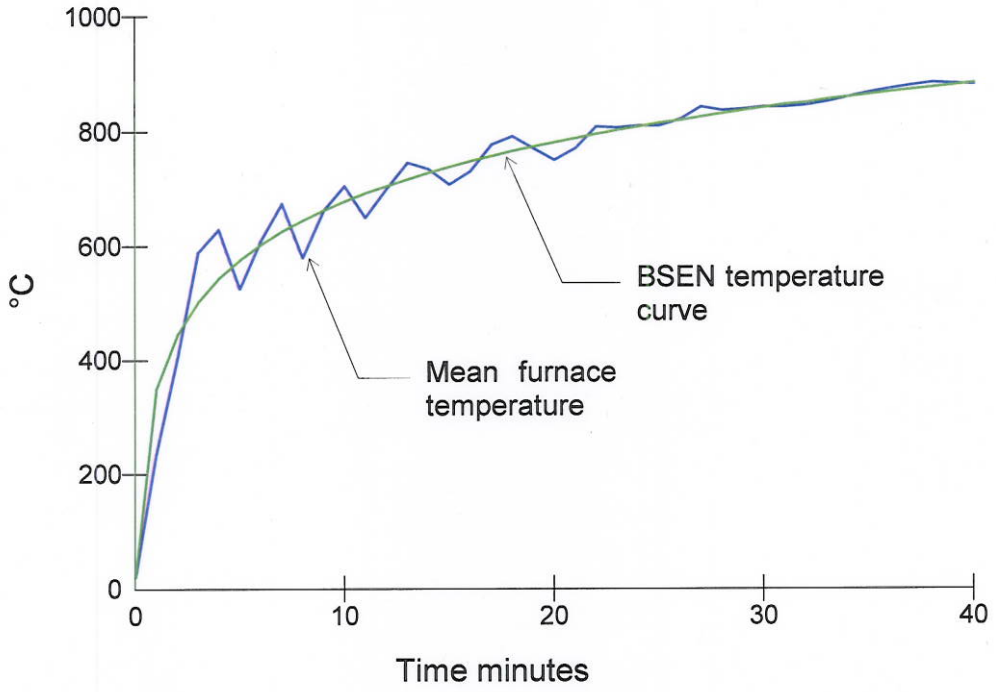
6.2 Pressure readings

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 ± 3 Pa with respect to atmosphere, at a point 0.5m from the notional floor level. (The pressure was measured at a position 1m above the notional floor level which equates to a recorded reading of +4.25 Pa to produce the desired 0 Pa at a position 0.5m lower down.) The pressure readings have been tabulated in Appendix 1 and are shown graphically below:



6.3 Furnace temperature

The furnace was controlled to follow the temperature/time relationship specified in BSEN 1363: Part 1: 1999 Section 5.1.1 as closely as possible, using the average of six plate thermometers suitably distributed within the furnace. The temperatures recorded have been tabulated in Appendix 1 and are shown graphically below:

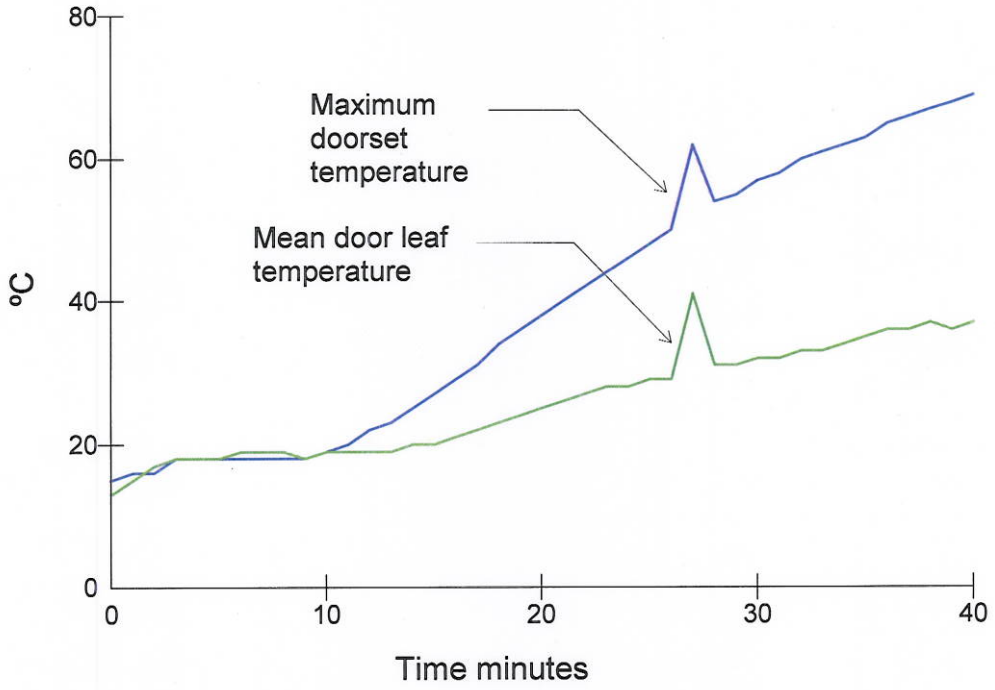


6.4 Unexposed face temperatures

The temperature of the unexposed face was monitored by means of the following thermocouples:

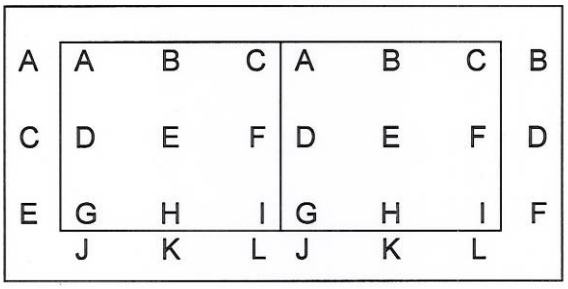
Doorset	2 discrete areas	
Leaves	Discrete area 1 (timber)	5 measuring mean temperature rise.
	Discrete area 2 (glass)	1 measuring mean and maximum temperature rise.
Frame		4 measuring maximum temperature rise.

The location of the thermocouples are shown in Figure 6 of Appendix 2. The temperatures recorded have been tabulated in Appendix 1 and are shown graphically below:


80
60
40
20
0
°C
Maximum
doorset
temperature
Mean door leaf
temperature
0
10
20
30
40
Time minutes

6.5 Door distortion data

The following tables show the distortion of the doors in mm with an accuracy of ±1mm.
A positive measurement indicates distortion towards the fire.
A negative measurement indicates distortion away from the fire.
J, K and L give vertical movement of the door, a negative reading indicates that the door has dropped.



Left hand leaf (hung on the left and opening towards the fire)

Time	A	B	C	D	E	F	G	H	I	J	K	L
10	3	2	1	3	4	3	0	0	-4	-1	0	-1
20	1	-4	1	-1	2	0	-1	-3	-4	-1	-1	-2
30	0	0	3	-2	-3	-5	-2	-5	-10	-3	-4	-4

Right hand leaf (hung on the right and opening towards the fire)

Time	A	B	C	D	E	F	G	H	I	J	K	L
10	10	3	2	-2	1	1	2	-1	0	-1	0	0
20	8	1	-5	-7	-3	-2	-4	-2	0	-2	0	0
30	11	1	1	-18	-11	-2	-12	-7	-1	-4	-2	-3

Partition

Time	A	B	C	D	E	F
10	3	3	3	0	5	0
20	1	2	1	-2	5	1
30	2	2	1	-1	4	0

7 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00.00	Test started.
01.45	There is smoke issuing from the meeting edge and both hanging edges.
02.16	The glazing has cracked and become opaque as intumescent reacted.
05.49	There is an increase in the level of smoke issuing from the meeting edge and both hanging edges.
06.31	There is discolouration at the top and middle hinge positions on both leaves.
10.00	No change.
20.00	No change.
28.19	There is smoke issuing from around the glazing bead.
33.26	The smoke continues to issue from the meeting edge and the top hanging corners of both leaves.
36.37	There is a glow visible at the top of the meeting edge.
39.00	A cotton pad integrity test was performed at the top of the meeting edge, no failure.
39.50	There is continuous flaming at the top of the meeting edge thereby constituting **integrity failure.**
40.30	Test terminated.

8 Expression of results

Doorset	Integrity – Discrete Area 1	
	Cotton pad	* minutes
	Continuous flaming	39 (thirty nine) minutes
	Gap gauges	* minutes
	Integrity – Discrete Area 2	
	Cotton pad	* minutes
	Continuous flaming	* minutes
	Gap gauges	* minutes
	Insulation	
	Discrete area 1	* minutes - average set
		* minutes – door frame (max)
	Discrete area 2	17 (seventeen) minutes

* Failure criteria was not achieved prior to initial failure.

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 results of this test were obtained using the door to frame gaps recorded in Figure 5 of Appendix 2. The fire resistance performance of doors of this design may change if substantially different gaps are employed.

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. CIFL 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	Deputy Technical Manager
Date of issue:	7/7/08	08-07-2008

Description of construction (refers to Figures 1 to 6 of Appendix 2)

Leaf

		Species/type	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Stiles and rails		None fitted	-	-	-	-
Core		Halspan FD30	44 thick	640**	10.2	1
Facings		None fitted	-	-	-	-
Adhesive	Lipping	Cascamite	-	-	-	-
Lippings – all edges		Sapele	6 thick	640**	11.5	2

* Information provided by the client and not verified by CIFL

** Nominal density

Door frame

	Species/type	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Head & jambs	European Redwood	90 deep x 44 wide including integral stop	510**	12.5	3
Stops	Integral	12 deep x 45 wide	-	-	-
Architrave	European Redwood	18 thick	-	-	-
Threshold	None combustible	-	-	-	-
Frame fixings	Steel wood screws @ 6-800 centres	No 10 x 80 long	-	-	-
Frame fire stopping	Mann McGowan Fabrications Ltd Pyromas intumescent acrylic mastic	Nominally 5-10mm wide x 10-15 deep	-	-	-

* Information provided by the client and not verified by CIFL

** Nominal density

Intumescent materials

		Make/type	Size (mm)	Location	Key to figures
Door edges	Vertical edge – right leaf only	2No Mann McGowan Pyrostrip 500 FP5A	10 x 4	Fitted centrally, 10mm apart on the meeting edge of the right leaf	4
Frame reveal	Head and jambs	Mann McGowan Pyrostrip 500 FP5A	15 x 4	Fitted centrally in the frame reveal	5
Around hinges		Fully interrupted	-	Hinge blade fully interrupts seal on frame	-
Under hinge blade		Mann McGowan Pyrostrip 300 ISA	1 thick	Fitted under the hinge blades on frame and jamb	-
Encasing latch body		Mann McGowan Pyrostrip 300 ISA	1 thick	Fitted around the body of the latch	-
Under latch forend		Mann McGowan Pyrostrip 300 ISA	1 thick	-	-
Around latch keep		Partially interrupted	-	Latch keep partially interrupts both seals leaving 5mm of each continuous	-
Under latch keep		Mann McGowan Pyrostrip 300 ISA	1 thick	Fitted under the latch keep	-
Glazing perimeter		Mann McGowan Pyroglaze 30	10 x 2	Fitted between the glass and bead on both faces	6

* Information provided by the client and not verified by CIFL

Hardware

		Make/type	Size (mm)	Location	Key to figures
Hinges		Royde and Tucker H103 Hi-Load butt type hinges	101 x 32 (blade size)	Fitted 148mm, 930mm and 1710mm from the head of the leaf	7
Closer	Left leaf	GU BKS OTS 200 overhead type closer	195 x 50 (footprint)	Fitted on the exposed face as per the manufacturers instructions	8
	Right leaf	GU BKS Swing Master DTL overhead type closer	545 x 105 (footprint)	Fitted on the exposed face as per the manufacturers instructions	9
Latch - disengaged		BKS 2450 lock/latch	235 x 20 (forend size)	Fitted 1135mm from the head of the leaf	10
Furniture		IH19-12 lever type door handle	Ø 52mm (rose size)	Fitted appropriate to the latch	11

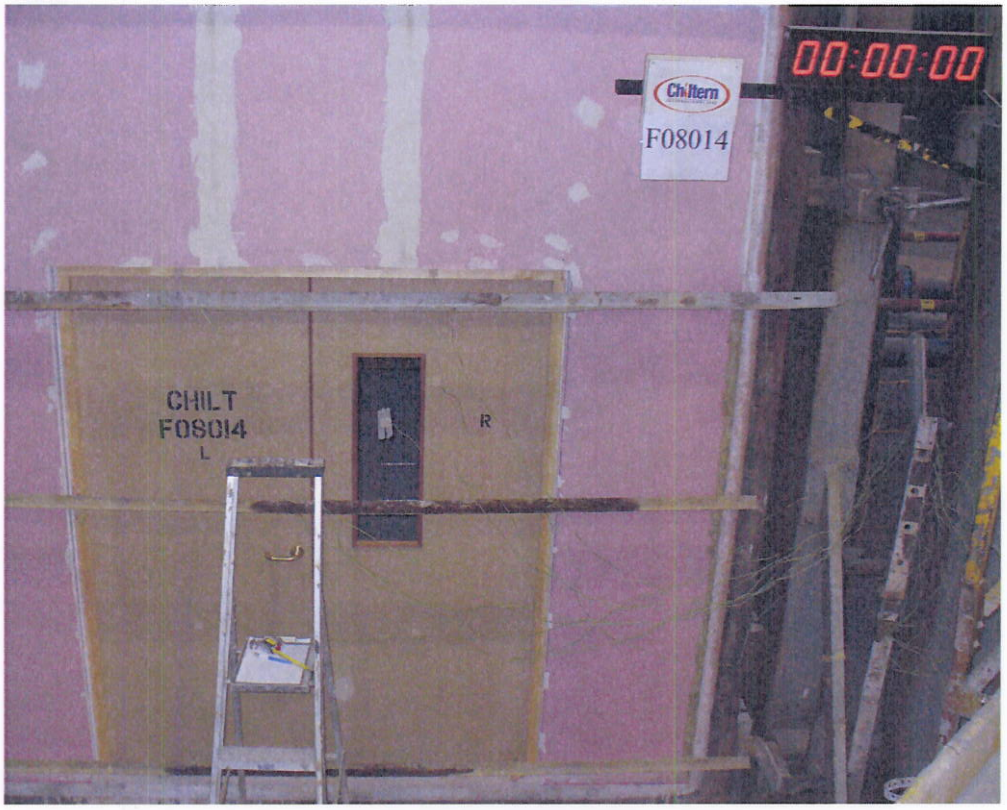
Glazing

	Make/type	Size (mm)	Location	Key to figures
Glass type	Pilkington Pyrodur Plus	7 thick	Fitted 296mm from the head and 146mm from the meeting edge of the right hand leaf	12
Sight size	-	723 high x 221 wide	-	-
Overall aperture size	-	750 high x 250 wide	-	-
Expansion allowance	-	3 all round	-	-
Beading	Sapele (density 640kg/m³, m.c. 11.5%)	19 high x 20 deep with a 5 x 5 bolection return and a 14° chamfer	Fitted around the glazing aperture on both faces	13
Beading fixings	Lost head steel nails	40 long	Fitted 50mm from corners at 150mm centres	14

* Information provided by the client and not verified by CIFL

Photographs

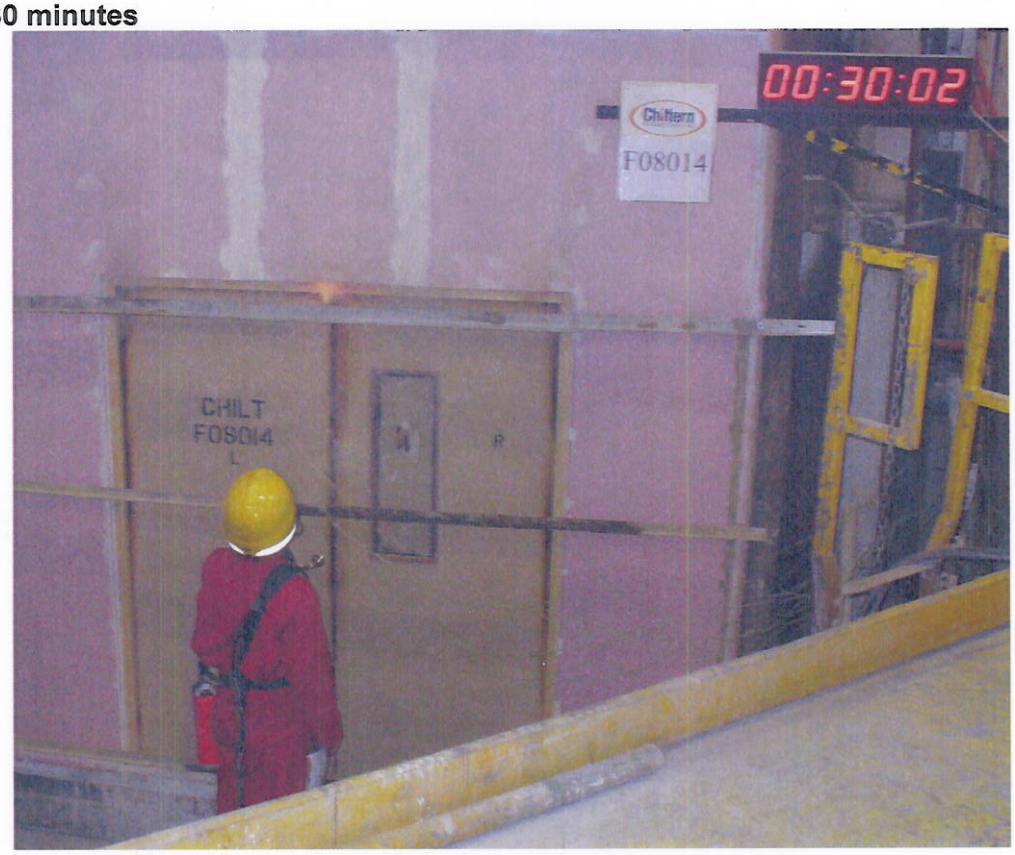
Start of test



After 10 minutes

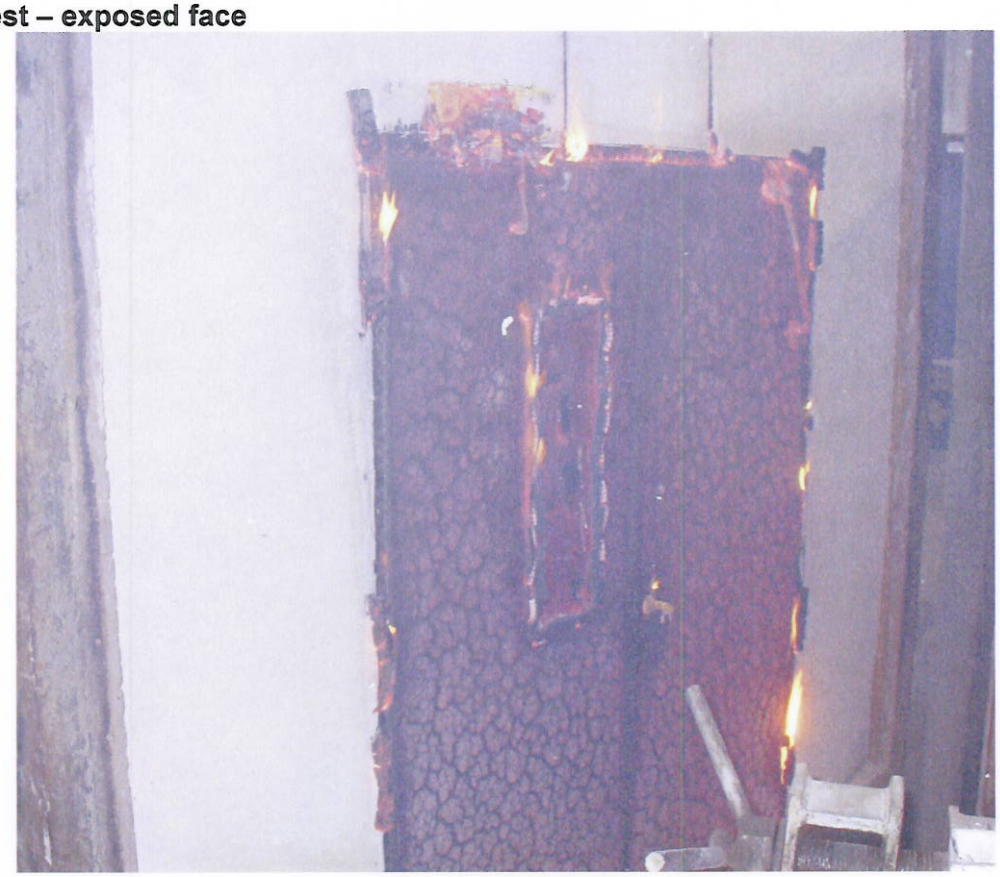
After 20 minutes

After 30 minutes



After 40 minutes

Post test – exposed face



Appendix 1 - raw test data

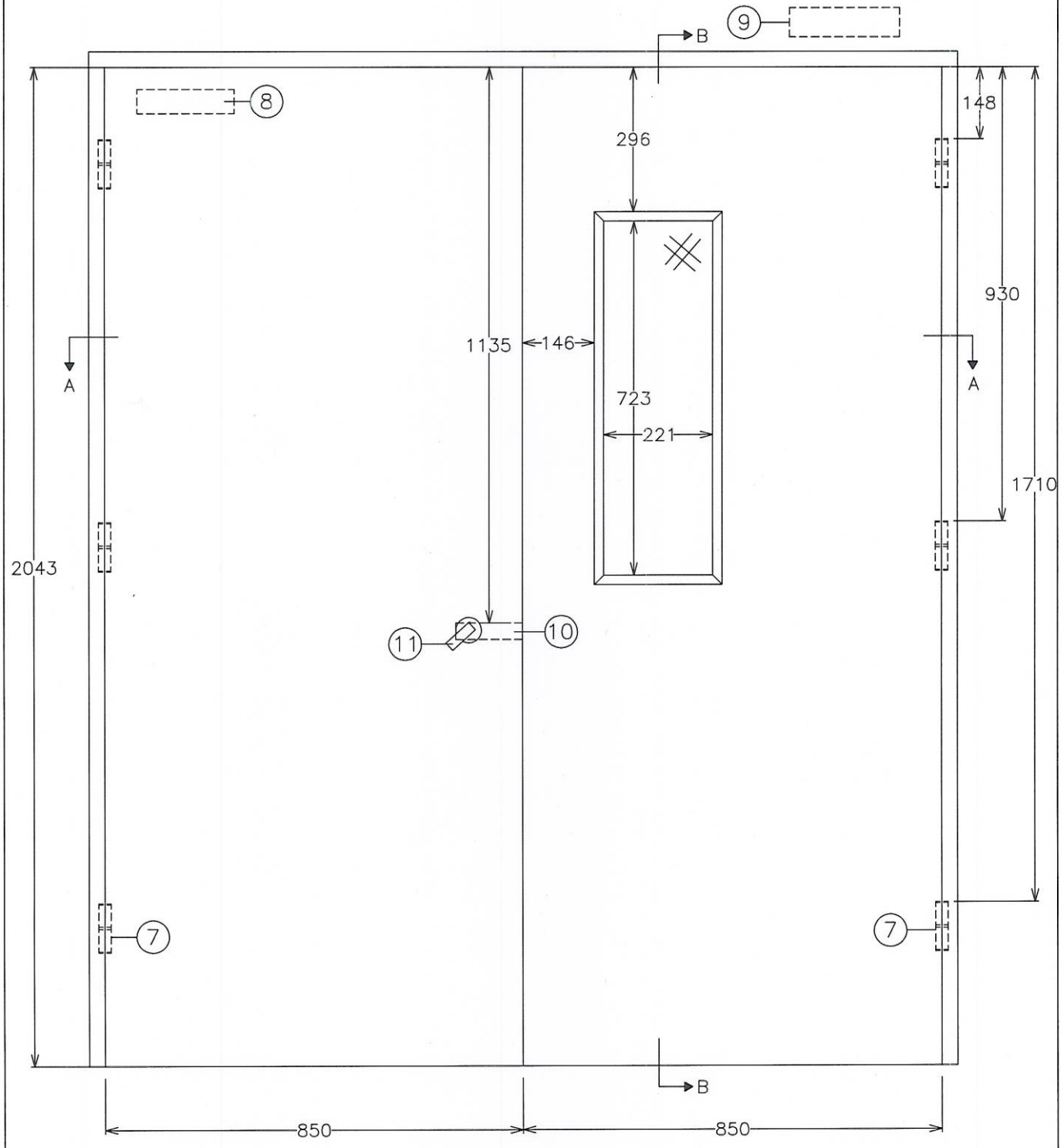
(see Figure 6 of Appendix 2 for channel locations)

Time	Chan 0	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 10	Chan 12	Chan 13	Chan 14	Chan 15	Chan 16	Chan 17	Chan 18	Chan 19	Chan 21
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	0	14	15	14	16	14	15	14	14	13	13	13	14	15	14	14	14	14
1	6	149	304	225	220	316	190	15	17	17	14	15	15	16	15	15	33	15
2	5	332	470	390	395	498	334	16	19	19	16	15	15	16	15	15	78	15
3	3.2	542	642	560	574	679	542	16	19	19	18	15	16	18	15	15	105	15
4	2.4	604	651	600	617	679	625	16	20	19	19	15	16	18	15	15	109	15
5	3.2	550	527	504	515	527	528	16	20	19	20	15	17	18	15	16	112	15
6	4.1	596	630	595	615	646	577	17	20	19	20	15	17	18	15	16	114	15
7	5.9	667	686	635	672	719	665	17	20	20	19	15	17	18	16	16	116	15
8	7.7	608	582	571	569	578	574	17	19	20	20	15	18	18	15	16	118	15
9	3.8	654	680	655	662	690	642	17	19	20	19	15	18	18	16	16	123	15
10	4.1	710	706	688	716	714	700	16	20	21	19	15	19	18	16	16	127	15
11	4.8	671	643	655	653	642	637	16	20	22	18	15	20	18	16	17	133	15
12	4.9	703	708	694	707	716	679	16	20	22	18	16	22	18	17	17	139	15
13	4.6	747	749	734	761	759	731	17	21	23	18	16	23	20	18	18	143	15
14	4.9	752	731	728	753	732	715	17	22	23	18	17	25	21	19	19	152	15
15	5	730	706	708	718	706	684	18	23	24	18	18	27	23	20	21	168	15
16	4.9	735	735	728	740	741	710	19	25	25	18	18	29	24	21	22	182	15
17	4.5	772	788	767	783	792	764	19	26	26	18	20	31	25	22	23	196	15
18	4	800	793	780	809	797	776	20	27	27	19	21	34	26	24	25	211	15
19	5.4	794	769	767	783	767	749	21	29	28	19	22	36	28	25	26	229	15
20	4.6	771	748	755	760	750	727	22	30	30	20	23	38	30	27	28	245	15
21	4.7	777	772	767	781	780	752	23	31	30	20	25	40	32	28	29	259	15
22	3.3	809	811	803	820	821	794	24	33	31	20	26	42	34	30	31	271	15
23	4.6	813	803	805	828	809	786	24	35	32	21	28	44	36	31	33	283	16
24	4	816	805	808	836	808	790	25	35	33	21	30	46	38	33	35	295	16
25	4.9	815	804	807	834	811	792	25	36	34	22	32	48	41	35	37	305	16
26	4.6	824	819	819	844	826	803	25	36	35	22	34	50	43	36	39	314	16
27	4.7	848	840	836	866	847	824	36	48	47	33	46	62	56	49	51	330	25
28	4.5	843	834	828	861	840	820	25	37	38	24	38	54	47	40	42	329	16
29	3.8	845	837	829	863	843	822	26	36	39	24	40	55	49	41	44	337	16
30	3.6	850	841	831	865	847	825	26	37	40	25	43	57	51	43	47	344	16
31	3.6	849	841	832	868	846	827	26	38	41	25	45	58	53	45	48	352	16
32	3.3	849	844	836	869	850	829	26	40	42	26	47	60	55	47	50	360	16

Time	Chan 0	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5	Chan 6	Chan 7	Chan 10	Chan 12	Chan 13	Chan 14	Chan 15	Chan 16	Chan 17	Chan 18	Chan 19	Chan 21
min	Pa	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
33	4.5	856	851	843	873	857	834	27	39	43	26	49	61	57	49	53	368	16
34	4.8	863	859	848	882	868	844	27	41	44	27	52	62	58	50	55	376	16
35	4.6	872	868	853	891	876	853	27	41	45	28	54	63	60	52	57	384	16
36	4.1	879	872	858	898	882	861	27	42	47	29	56	65	62	54	59	394	16
37	4.2	882	878	868	901	886	866	28	41	48	29	58	66	64	56	61	405	16
38	4.1	888	882	868	909	892	872	28	42	49	30	60	67	65	57	63	417	16
39	4.8	886	881	870	911	891	870	28	39	50	30	63	68	67	60	65	431	16
40	3.9	885	880	869	904	891	870	28	41	51	31	65	69	68	62	67	445	16

Appendix 2 - figures 1 to 6

Figure 1 of 6	Mann McGowan Fabrications Ltd



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

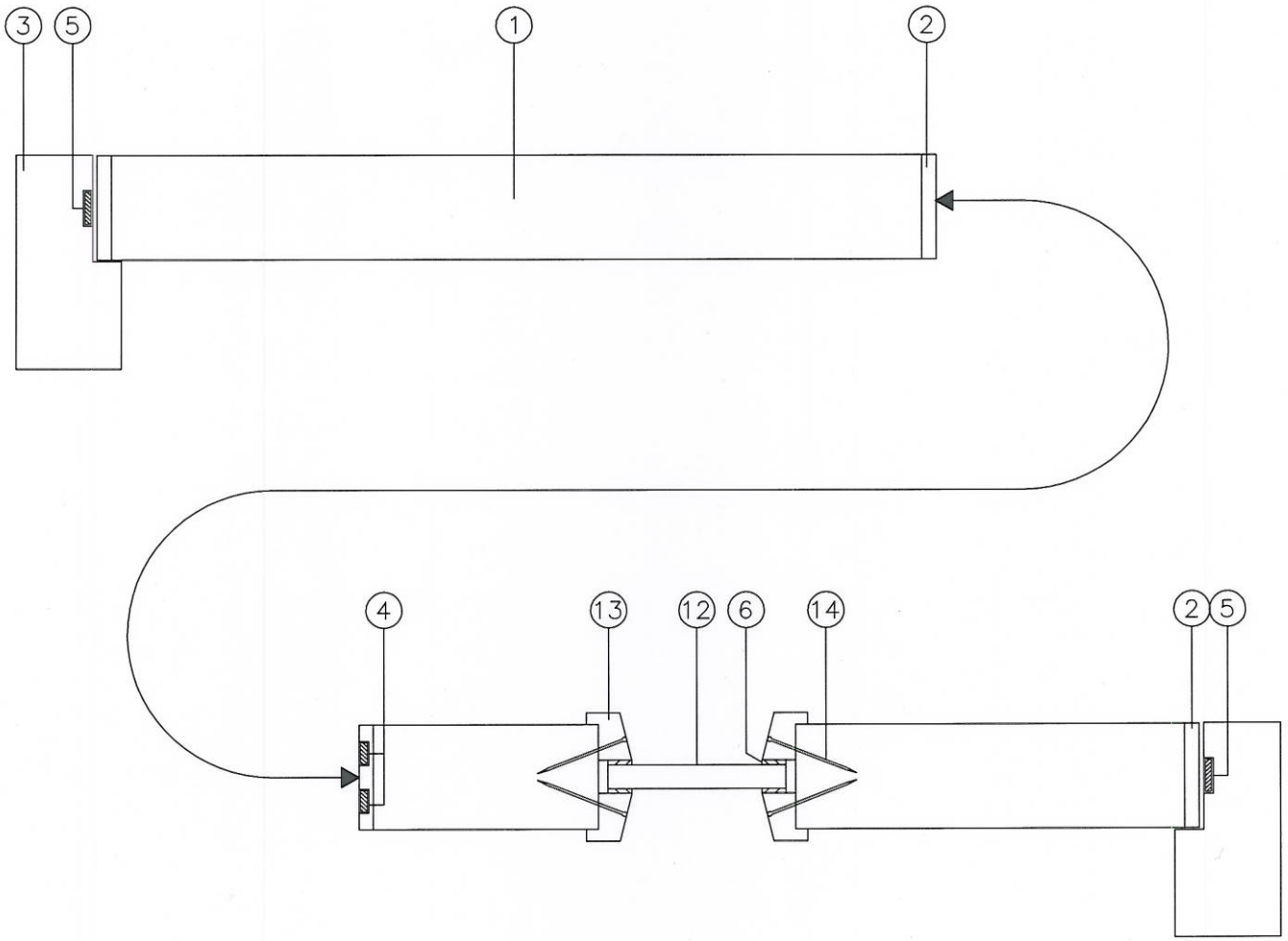
Title: Unexposed face elevation showing hardware positions
(All dimensions in mm)

Date Drawn	Drawn By	Scale
14/05/08	ARD	NTS

Project No.	
Chilt/RF08014	Appendix

Figure 2 of 6	Mann Mcgowan Fabrications Ltd

Section A–A



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High Wycombe, Buckinghamshire, HP14 4ND, UK.
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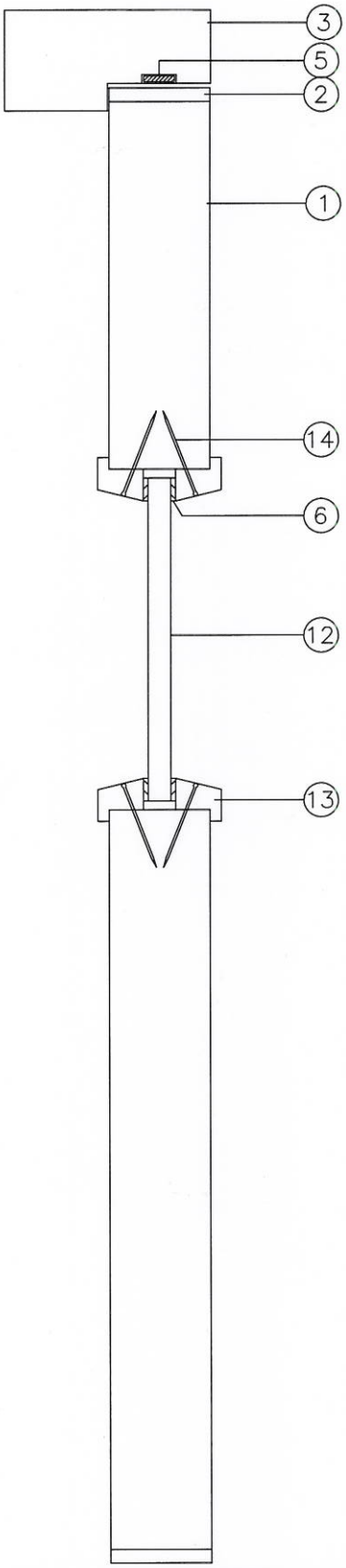
Title: Horizontal cross sections

Date Drawn	Drawn By	Scale
14/05/08	ARD	NTS
Project No. Chilt/RF08014		Appendix

Figure 3 of 6	Mann McGowan Fabrications Ltd

Section B–B



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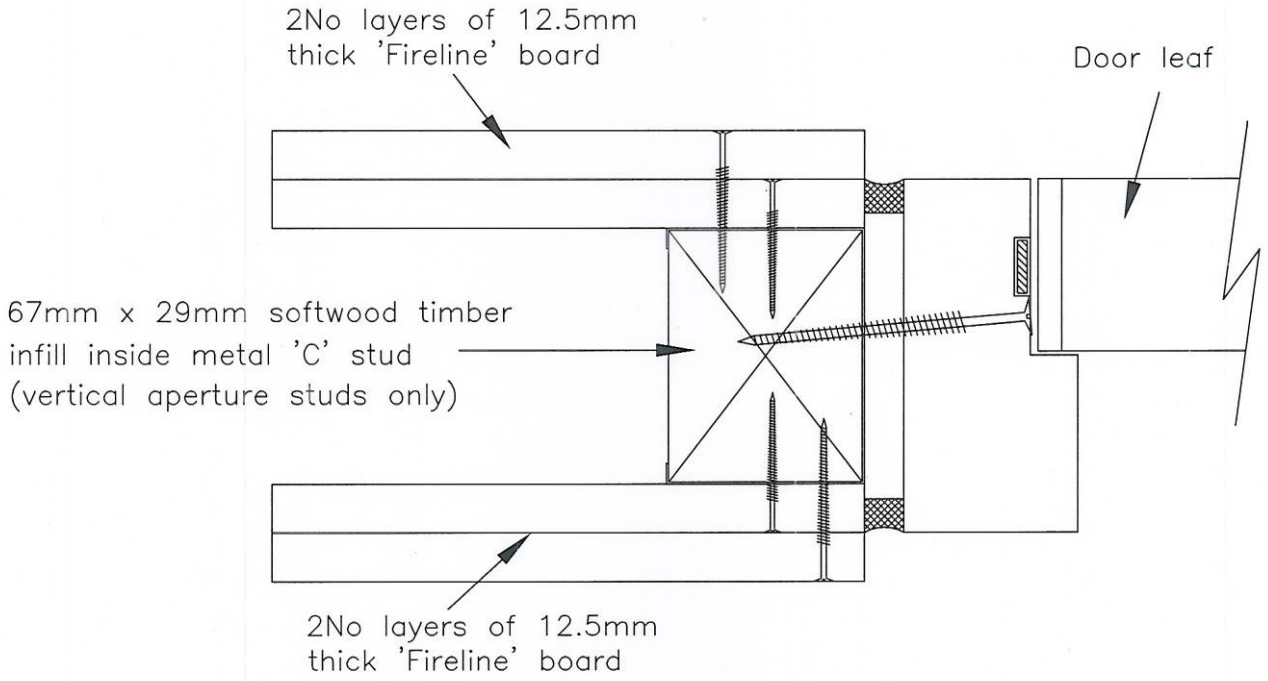
High Wycombe, Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Vertical cross sections

Date Drawn	Drawn By	Scale
14/05/08	ARD	NTS
Project No. Chilt/RF08014		Appendix

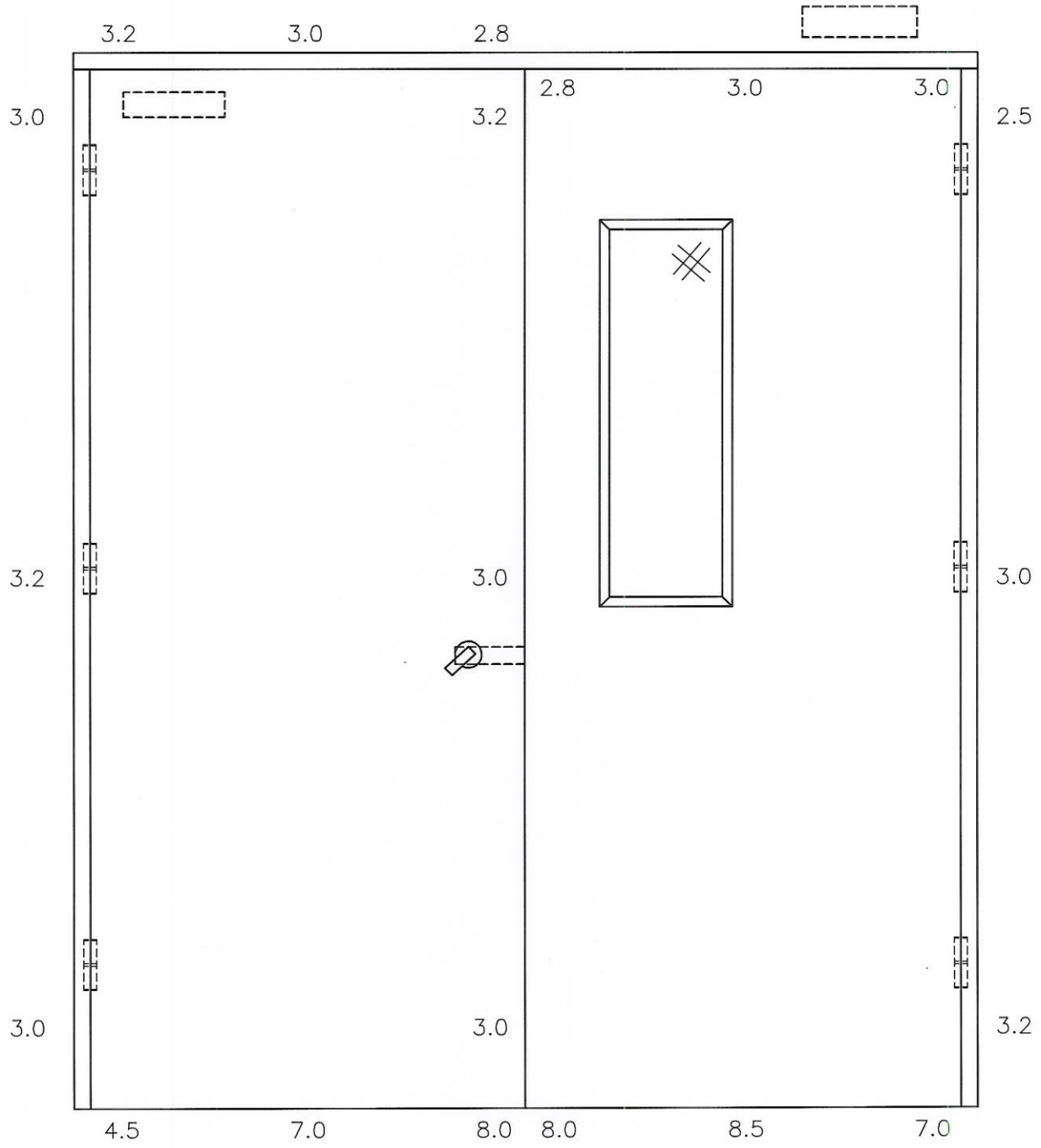
Figure 4 of 6	Mann McGowan Fabrications Ltd

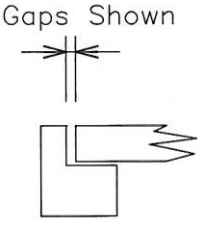


Chiltern INTERNATIONAL FIRE
Chiltern House, Stocking Lane, Hughenden Valley
High Wycombe, Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title		
30 minute flexible support		
Date Drawn: 14/05/08	Drawn By: ARD	Scale: NTS
Project No.: Chilt/RF08014		Appendix

Figure 5 of 6 | Mann McGowan Fabrications Ltd





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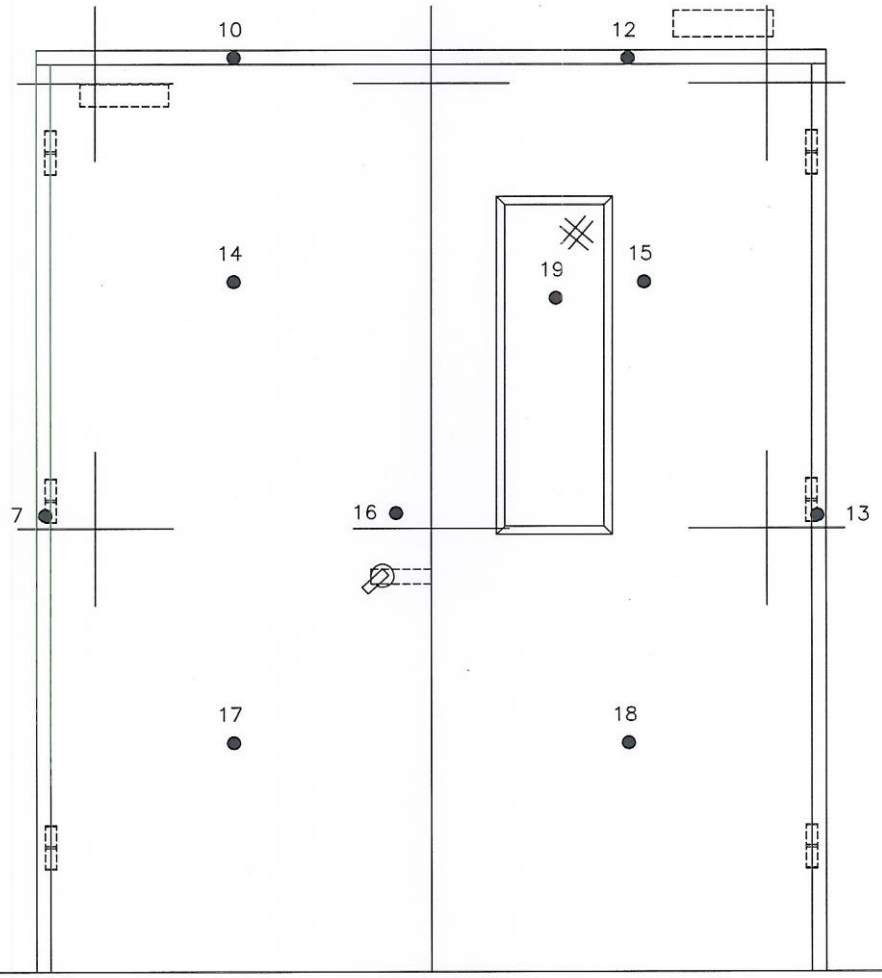
High Wycombe, Buckinghamshire, HP14 4ND, UK.
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title
Door gaps
(All dimensions in mm)

Date Drawn	Drawn By	Scale
14/05/08	ARD	NTS

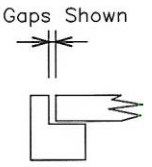
Project No.	
Chilt/RF08014	Appendix



+ : Furnace Thermocouples

• : Unexposed Face Thermocouples

Viewed From Unexposed Face



Chiltern International Fire

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 (All dimensions in mm)		
Date Drawn 14/05/08	Drawn By ARD	Scale NTS
Project No. Chilt/RF08014		Appendix 2