CAMBRIDGE FIRERESEARCH

REPORT NUMBER CFR1707121

FIRE RESISTANCE TEST
IN ACCORDANCE WITH BS476: Part 22: 1987

Sponsor:	Exitex Limited
Address:	Mountpleasant Dundalk County Louth Ireland
Date of test:	12th July 2017

Results:

Left hand doorset

Test duration:	33 minutes (test discontinued at the request of the sponsor)
Integrity:	33 minutes
Insulation:	33 minutes

Right hand doorset

Test duration:	65 minutes
Integrity:	64 minutes
Insulation:	36 minutes

Summary of test specimen:

Two single acting single leaf doorsets comprising chipboard door blanks, tested as insulated doorsets unlatched.

Left hand leaf size:
2040 high x 927 wide x 44 thick overall

Right hand leaf size:
2041 high x 1200 wide x 54 thick overall

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1 PREPARATION FOR TESTING

1.1 Specimen conditioning

The specimen components were at Cambridge Fire Research for a total period of 2 days. During this period the temperature and relative humidity were measured and recorded to be within the range of 21 to 26°C and 47 to 71% respectively.

1.2 Associated construction

Cambridge Fire Research constructed a timber stud partition with 2 No. layers of 12.5 British Gypsum FireLine board to the exposed face and 1 No. layer of 12.5 British Gypsum FireLine board to the unexposed face. This provided a left hand aperture of 2094 mm high x 1040 mm wide and a right hand aperture of 2094 mm high x 1310 mm wide.

In accordance with Fire Test Study Group Resolution No. 51 continuity of the threshold was simulated by the installation of a solid non-combustible threshold extension by Cambridge Fire Research, such that the extension was flush with the threshold onto which the specimen was positioned.

1.3 Specimen construction

The specimens were supplied complete by the sponsor.

1.4 Specimen verification

Cambridge Fire Research carried out a detailed survey of the specimens to verify the information provided by Sponsor. This included verifying the weight, densities, materials and dimensions of construction components wherever possible.

Details and drawings of the construction are shown in Appendix 1.

Photographs of details of the construction taken before the test are shown in Appendix 2.

1.5 Specimen installation and fixity

The sponsor installed the specimens into the associated construction. The specimens were asymmetrical and fitted such that the doors opened towards the heating conditions of the test. The doorsets were unlatched prior to the start of the test.

1.6 Specimen selection

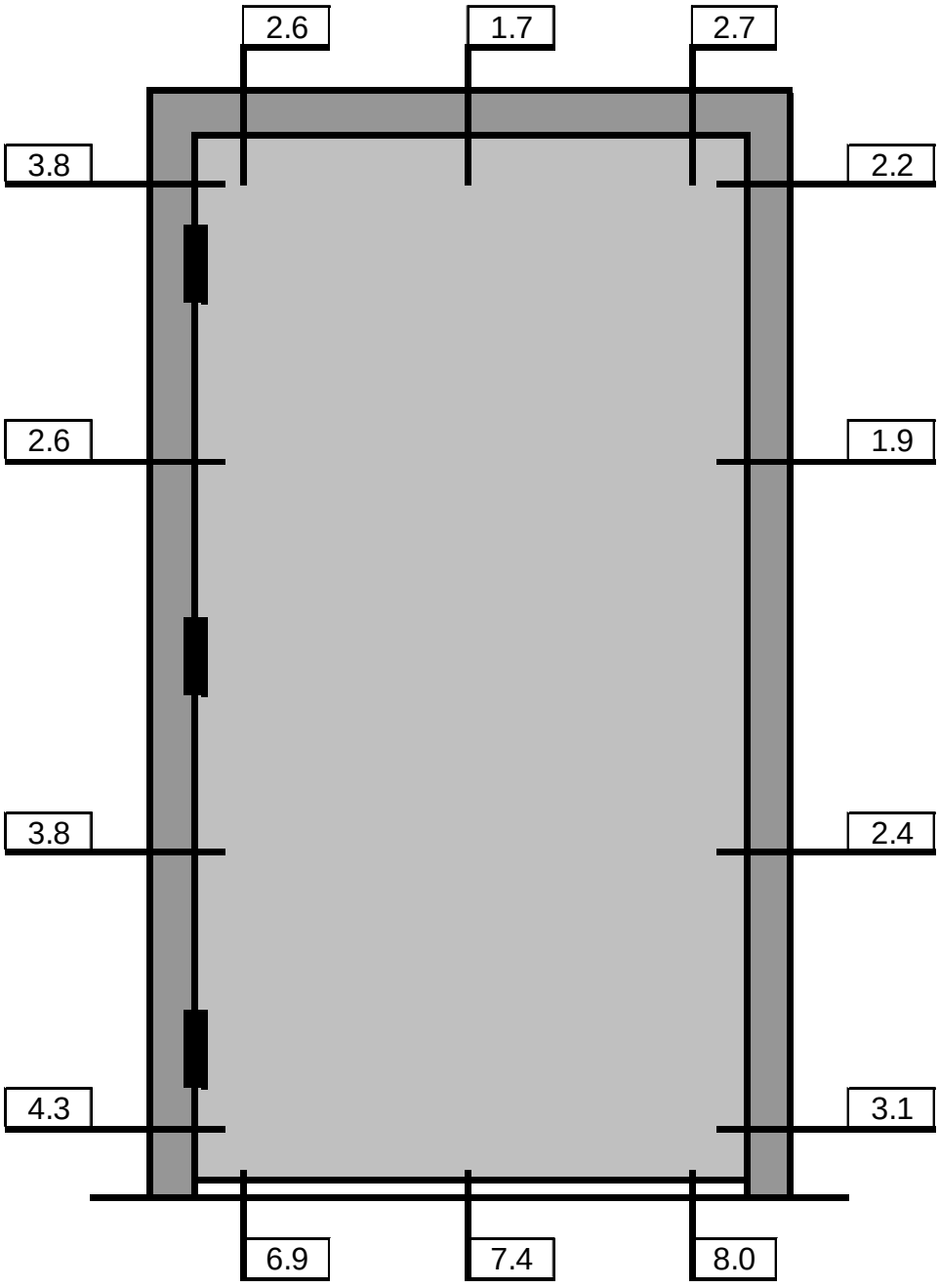
Cambridge Fire Research was not involved in any selection or sampling procedures for the tested specimen.

2 PRE-TEST MEASUREMENTS AND SETTING

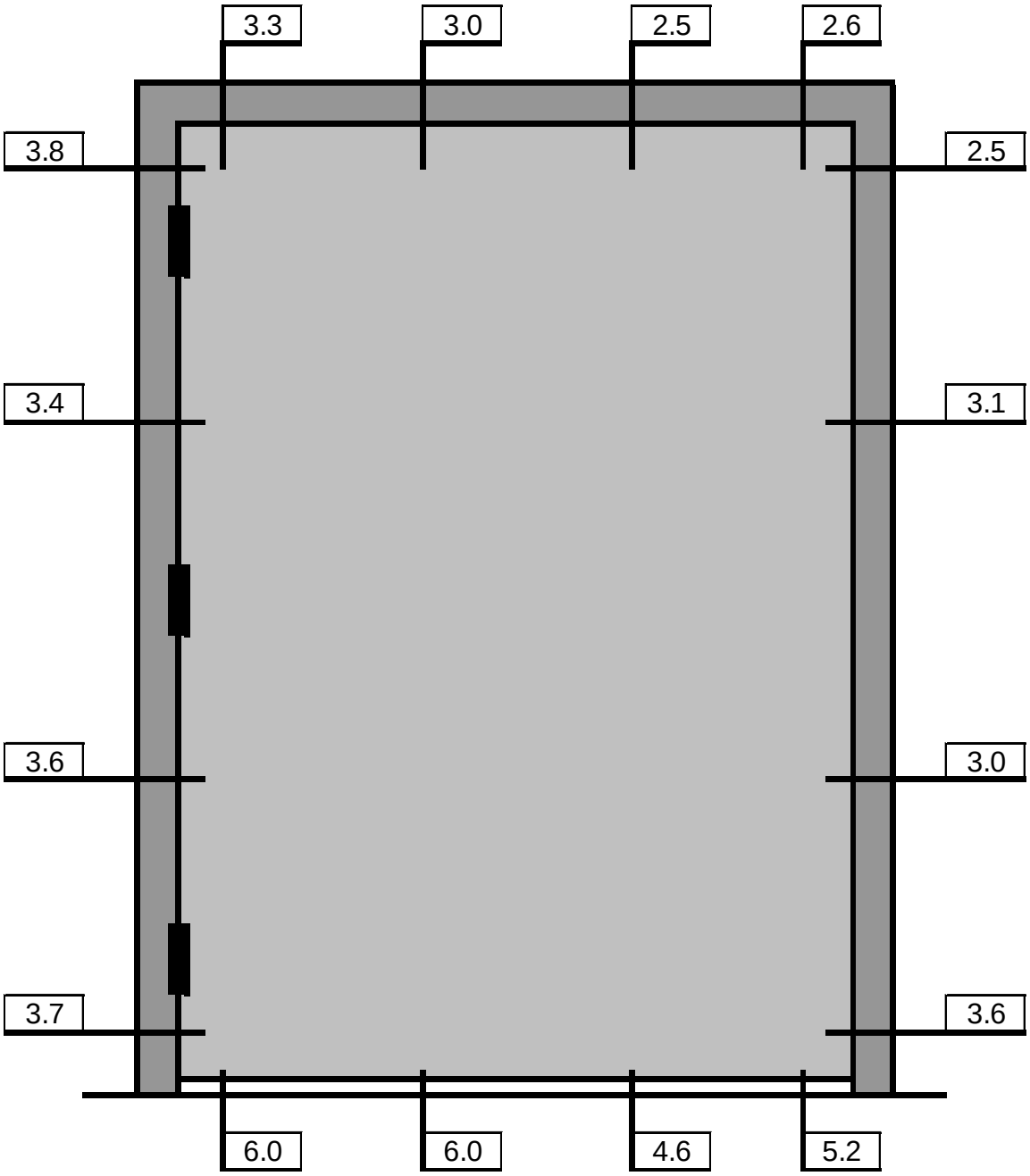
2.1 Gap measurements

The gap between the leaf edges and the frame and at the threshold was measured on the exposed face prior to the start of the test. The following figures show the position at which the measurements were made and the recorded gap (mm) at those positions.

Left hand doorset:



Right hand doorset:



2.2 Closer force measurement

The door opening and closing forces for both leaves were measured in accordance with Fire Test Study Group Resolution No. 63 and the calculated moments are shown in the following tables.

Left hand doorset:

Direction	Closing force (N)	Closing moment (Nm)	Opening force (N)	Opening moment (Nm)
Opening towards heating conditions	39.3	29.5	79.4	59.6

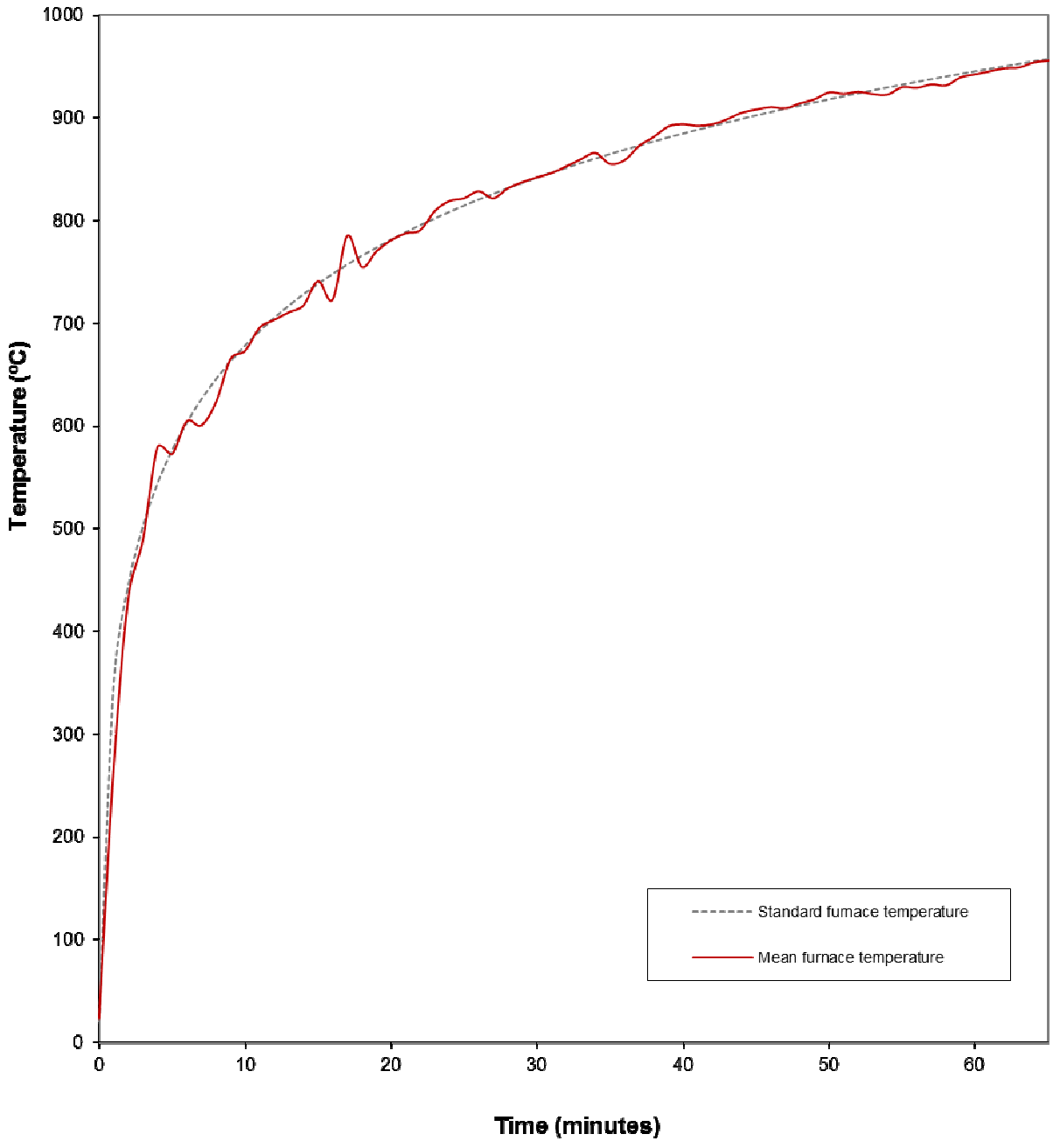
Right hand doorset:

Direction	Closing force (N)	Closing moment (Nm)	Opening force (N)	Opening moment (Nm)
Opening towards heating conditions	43.0	32.3	78.6	59.0

3 TEST CONDITIONS, INSTRUMENTATION AND MEASURING

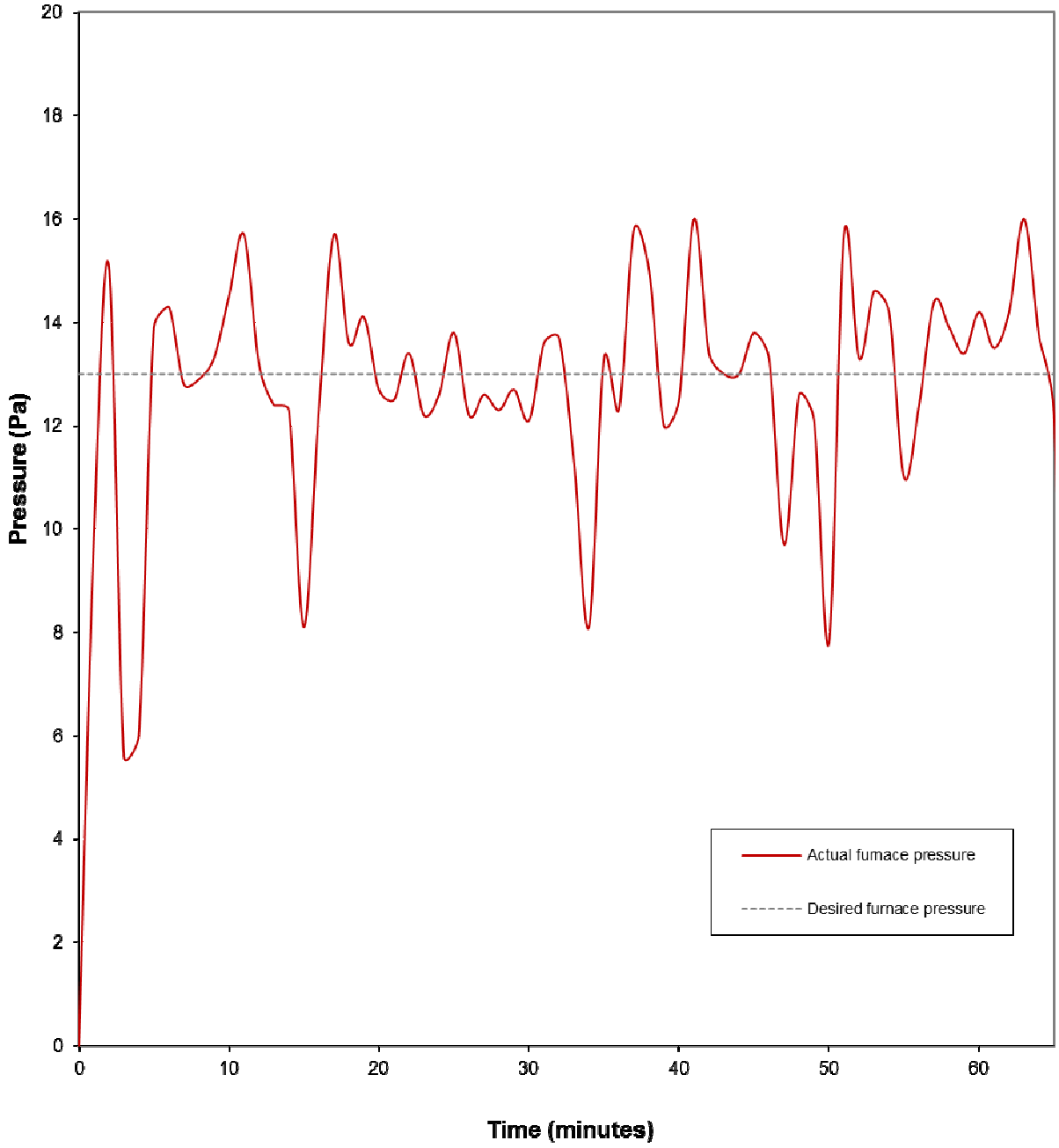
3.1 Furnace temperature

Furnace temperature was controlled so as to follow the standard temperature/time curve defined in the test standard and within the tolerances permitted. The furnace mean temperature was calculated from the output recorded using nine furnace thermocouples of the design specified in the test standard. The following graph shows the standard and mean furnace temperature/time data.



3.2 Furnace pressure

Furnace pressure was maintained for the duration of the test at a nominal + 13.0 Pa measured at the pressure sensing head. When a linear pressure gradient of 8.5 Pa/m is applied this equates to + 0 Pa at 1 m above the notional floor level. The furnace pressure was controlled within the tolerances permitted in the test standard except for 10 instantaneous occasions which were transient events. The following graph shows the actual and desired furnace pressure/time data.



3.3 Ambient temperature

Ambient temperature at the start of the test was 22°C.
Ambient temperature ranged between 20°C and 22°C during the test.

3.4 Unexposed face specimen thermocouples

Surface temperature measuring thermocouples of the design specified in the test standard were affixed to the unexposed face of the specimens to monitor the temperature rise as follows:

Left hand doorset:

Leaf	Channels 16 to 20	(mean & maximum)
Ventilator cover	Channel 21	(maximum only)
Frame	Channels 22 to 24	(maximum only)

Right hand doorset:

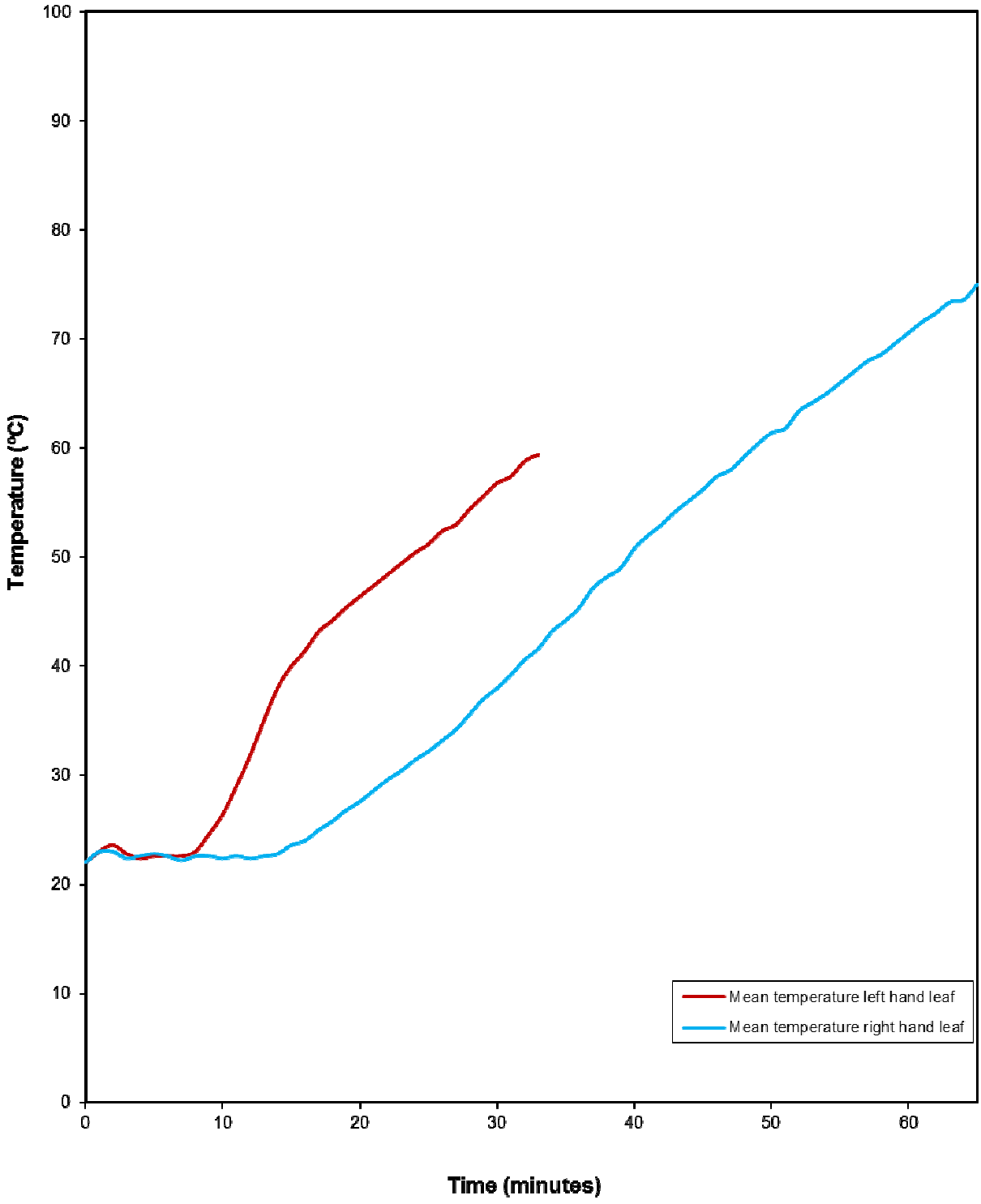
Leaf	Channels 25 to 29	(mean & maximum)
Ventilator cover	Channel 30	(maximum only)
Frame	Channels 31 to 33	(maximum only)

The positions of these thermocouples are shown in Appendix 3.

A roving thermocouple was available for measurement of any specific hotspots.

The recorded data of all individual thermocouples is shown in the tables in Appendix 4.

The following time/temperature graph shows the mean leaf temperatures.


Temperature (ºC)
Time (minutes)
Mean temperature left hand leaf
Mean temperature right hand leaf
0
10
20
30
40
50
60
70
80
90
100

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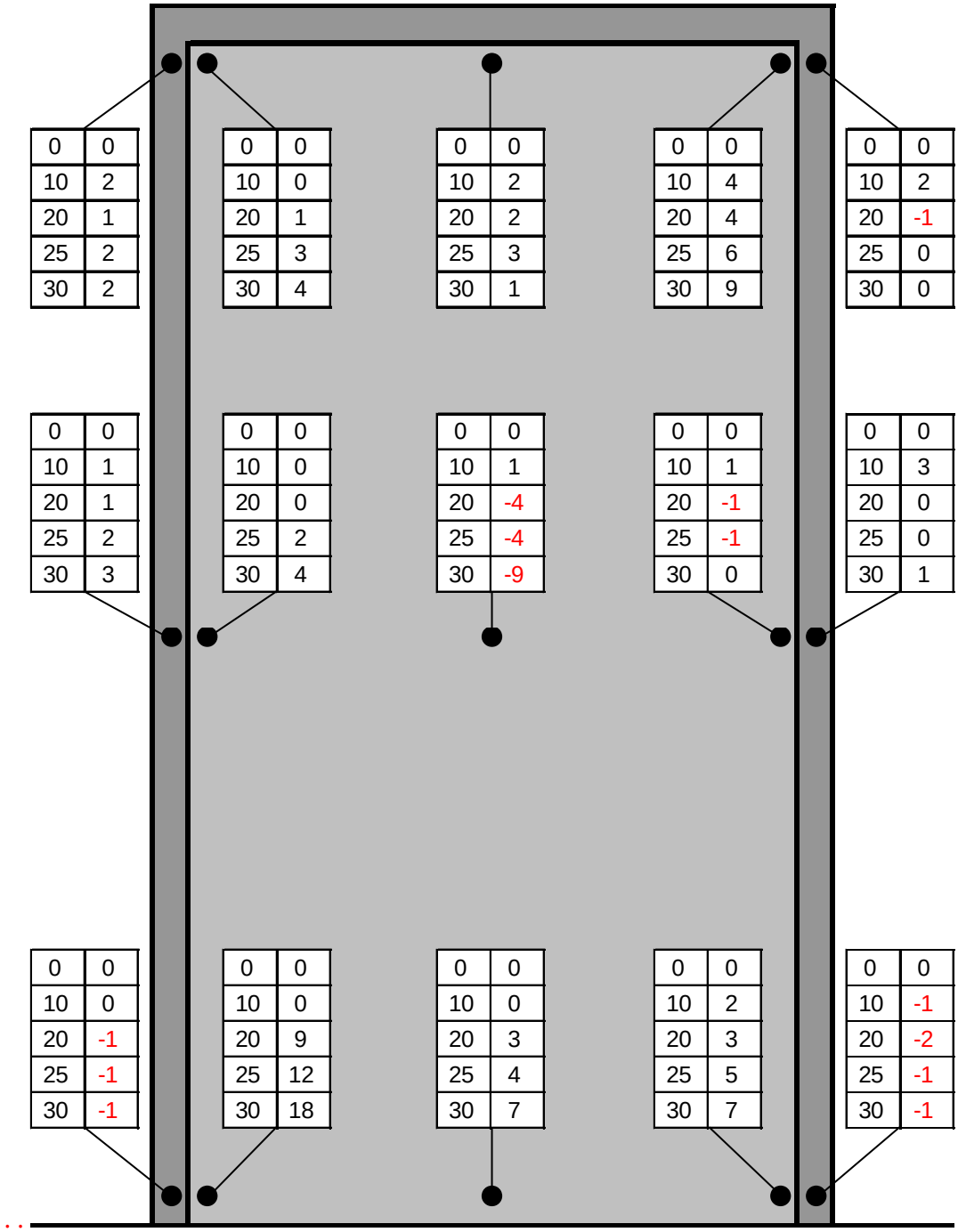
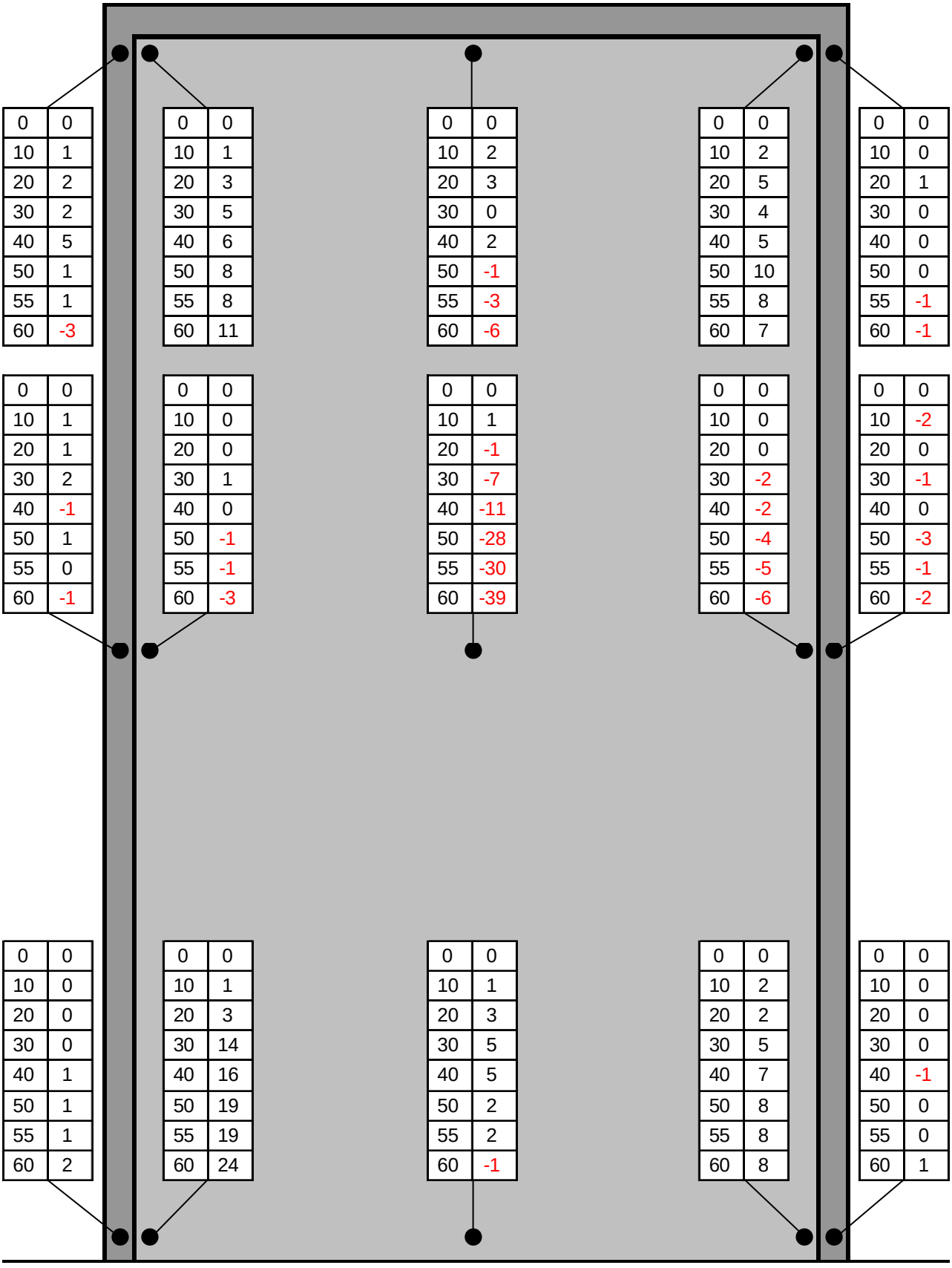
3.5 Deflection

Taut stainless steel wires were anchored horizontally across the unexposed face of the specimens such that any deflection experienced by the test specimens could be measured. One wire was positioned 10 mm vertically below the head of the leaves, the second at mid-height and the third 10 mm vertically above the threshold. The following figure shows these positions with the elapsed time (minutes) in the left hand column and the recorded deflection (mm) in the right hand column. Positive values indicate deflection towards the heating conditions of the test**.**

Left hand doorset:



Right hand doorset:



0	0
10	1
20	2
30	2
40	5
50	1
55	1
60	-3

0	0
10	1
20	3
30	5
40	6
50	8
55	8
60	11

0	0
10	2
20	3
30	0
40	2
50	-1
55	-3
60	-6

0	0
10	2
20	5
30	4
40	5
50	10
55	8
60	7

0	0
10	0
20	1
30	0
40	0
50	0
55	-1
60	-1

0	0
10	1
20	1
30	2
40	-1
50	1
55	0
60	-1

0	0
10	0
20	0
30	1
40	0
50	-1
55	-1
60	-3

0	0
10	1
20	-1
30	-7
40	-11
50	-28
55	-30
60	-39

0	0
10	0
20	0
30	-2
40	-2
50	-4
55	-5
60	-6

0	0
10	-2
20	0
30	-1
40	0
50	-3
55	-1
60	-2

0	0
10	0
20	0
30	0
40	1
50	1
55	1
60	2

0	0
10	1
20	3
30	14
40	16
50	19
55	19
60	24

0	0
10	1
20	3
30	5
40	5
50	2
55	2
60	-1

0	0
10	2
20	2
30	5
40	7
50	8
55	8
60	8

0	0
10	0
20	0
30	0
40	-1
50	0
55	0
60	1

4 TEST OBSERVATIONS

Left hand doorset:
Photographs taken during the test are shown in Appendix 2.

(E = Exposed face: U = Unexposed face)		
Time	Face	Observation
(min:sec)		
00:00		Start of the test.
05:00	U	Medium smoke/steam issuing at closing stile above mid height. Heavy smoke/steam at hanging stile/head corner.
06:30	E	Ventilator intumescent not activated.
06:45	U	Medium smoke/steam issuing at hanging stile above mid height
08:00	E	Leaf face flaming above ventilator.
15:00	U	Medium smoke/steam issuing at top hinge position and at hanging stile/head corner.
20:00	E	Ventilator louvre in position..
21:00	E	Handle/rose missing.
21:45	E	Ventilator louvre partly detached. Ventilator intumescent starting to activate.
24:30	E	Leaf core fissured and flaming.
33:20		The test is terminated at the request of the sponsor.

Key
Light smoke/steam – faint wispy
Medium smoke/steam – partially obscuring specimen
Heavy smoke/steam – completely obscuring specimen

Right hand doorset
Photographs taken during the test are shown in Appendix 2.

(E = Exposed face: U = Unexposed face)		
Time	Face	Observation
(min:sec)		
00:00		Start of the test.
05:25	U	Medium smoke/steam issuing at jambs above mid height and at head of leaf.
10:00	E	Leaf face flaming.
11:20	U	Light smoke/steam issuing at centre hinge position.
17:53	E	Closer detached.
20:40	E	Molten aluminium ejected at threshold.
24:12	U	Intumescent activity in ventilator.
26:34	U	Intumescent expanded to fill nominally 50% of ventilator.
28:13	E	Handleset and escutcheon missing.
31:19	U	Intumescent fully seals ventilator.
32:50	U	Light smoke/steam issuing from ventilator.
36:00	U	**INSULATION FAILURE** due to thermocouple 21 exceeding the maximum criteria.
36:53	U	Expanded intumescent protruding through louvre on ventilator.
39:30	U	Leaf rests on threshold.
53:20	U	Glow at closing stile/bottom corner.
59:26	U	Expanded intumescent visible at both top corners.
60:14	U	Lipping eroding at closing stile/bottom corner.
60:52	U	Flash at ventilator.
62:12	U	Glow at closing stile/head corner
63:10	U	A cotton pad is applied to the face of the leaf 50mm above the ventilator, no failure.
63:46	U	Glow at both top corners.
64:11	U	A cotton pad is applied at the head of the leaf 100mm from closing stile, no failure.
64:32	U	Flaming commences at head of leaf.
64:42	U	**INTEGRITY FAILURE** due to sustained flaming.
65:04		The test is terminated.

Key
Light smoke/steam – faint wispy
Medium smoke/steam – partially obscuring specimen
Heavy smoke/steam – completely obscuring specimen

5 LIMITATIONS

1. The test results relate only to the specimens tested. Appendix A of BS476: Part 22: 1987 provides guidance information on the application of fire resistance tests and the interpretation of test data. Application of the results to specimens of different dimensions, orientation or incorporating different components should be the subject of a design appraisal or further testing.

2. The results relate only to the behaviour of the specimens 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.

3. The doorsets were asymmetrical and were tested such that the door leaves opened towards the heating conditions of the test. The test results may not be appropriate to situations where the door leaves open away from the heating conditions.

Report prepared by:

E Southern
Deputy Head of Testing

Report checked by:

B Richardson

Report issued: **9th August 2017**

APPENDIX 1 SPECIMEN CONSTRUCTION

The item numbers listed in Appendix 1 Table 1 are shown in the figures in Appendix 1 refer to the components of the specimen construction. Any photo numbers refer to those in Appendix 2.

Please note that unless otherwise indicated the following applies:

a) All dimensions and materials of construction were verified by the laboratory.
b) Figures are not to scale.
c) All dimensions are given in mm.

Appendix 1 Table 1a Left hand Leaf

Item	Component	Information
1L	**Door frame**	
	Supplier:	Exitex Limited.
	Description:	A 3 sided MDF frame with 10 high rebated joints at the top corners fixed with 2No. Ø5 x 80 countersunk woodscrews at 58 centres and PVA adhesive**.
	Fixing to supporting construction:	5 No. No.10 x 3" countersunk woodscrews set 225 from top and 250 from bottom with the remaining 3 No equally spaced on the jambs.
	Overall size (h x w x d):	2079 x 992 x 100
	Cross section size (h x d):	30 x 100
	Density (kg/m^3):	720**
2L	**Stops**	
	Supplier:	Exitex Limited.
	Description:	MDF stops affixed to frame with pneumatically fired pins 16swg x 50 long at 100 to 180* centres.
	Overall size (w x d):	12 x 31
3L	**Leaf**	
	Supplier:	Exitex Limited
	Description:	Timber based particleboard core with lippings on the vertical edges.
	Overall size (h x w x t):	2040 x 927 x 44
	Weight (kg):	52.8
	Sub-components:	
	Core:	
	Supplier:	Egger**
	Type:	Particle board.
	Description:	Contains an aperture 300 x 300 for ventilator and is lined with sapele** 10 x 44 positioned 397 above the leaf bottom and at mid width.
	Overall size((h x w x t):	2040 x 907 x 43
	Lipping:	
	Description:	Sapele** lipping adhered to vertical edges of the leaf using PU adhesive**.
	Overall size (w x t):	44 x 10

Item	Component	Information
3L cont	Density (kg/m^3): Facing Description ….Overall size (t)	640** Laminate facing** 0.5
4L	**Hinges** Manufacturer: Type: Material: Number: Location: Blade size (h x w x t): Knuckle size (Ø): Fixings to frame (Ø x l): Fixings to door (Ø x l):	 Tuff Butt hinge with bearings. Stainless steel. 3 Set at 155, 933 and 1712 from the top of the leaf to the top of the blade. 102 x 31 x 3 13 4No Ø4.7 x 30 countersunk stainless steel wood screws per blade. 4No Ø4.7 x 30 countersunk stainless steel wood screws per blade.
5L	**Latch** Supplier: Type: Description: Overall size: Body (h x w x d): Forend (h x d x t): Strike (h x d x t):	 Arrone Eurocylinder mortise latch A mainly steel cylinder mortice latch fitted central to the leaf depth such that the centre line of the spindle is 1000 above the bottom of the leaf and affixed through the steel forend using 2No. stainless steel countersunk woodscrews. A steel strike was fitted to the jamb to suit the position of the latch and affixed using 2No. steel raised countersunk woodscrews. 165 x 85 x 15 235 x 20 x 2.5 170 x 40 x 1.5, including a tongue of 54 x 16
6L	**Eurocylinder** Supplier: Type: Description: Escutcheon cover (Ø x d x t)	 Eurospec CYL71370 NP/FS Nickel plated brass with thumbturn 30/10/30 and plastic escutcheon and aluminium cover. 51 x 10 x 1.1
7L	**Handleset** Manufacturer: Reference: Description: Overall Size: Handle (Ø x l): Rose (Ø x d): Rose cover (Ø x d x t):	 Arrone** 14406** D shaped tubular lever handle, aluminium. Affixed to leaf through plastic rose with aluminium cover 19 x 135 51 x 9 54 x 11.5 x 1
8L	**Closer**	

Item	Component	Information
8L cont	Manufacturer: Reference: Description: Fixings to frame: Fixings to leaf Overall size (l x h x d): Cover size (l x h x d)	Eclipse 28987 93 series A scissor arm closer with mild steel arms and aluminium body incorporating steel components fitted to the exposed face of both leaves positioned in accordance with the manufacturer's instructions. 2No. Ø5.6 x 20 long steel pan head steel screws. 4No.Ø5.6 x 30 long steel countersunk screws 248 x 42 x 52 251 x 46 x 54
9L	**Louvred Ventilator** Supplier: Reference: Description: Overall Size (h x w x t): Louvred cover (h x w x t):	 Exitex Limited Exi-Grille The core consists of eight sub-units (four each side) with a steel frame and integral steel channels to retain the intumescent strips. The sub-units are held together with spring clips between corresponding front and back elements (2 per side of each sub-unit) 300 x 300 x 42 (sub-unit 150 x 150 x 16) 340 x 345 x 7
10L	**Intumescent – frame** Manufacturer: Reference: Description: Location: Overall Size:	 Exitex Limited FO154 A strip of graphite-based intumescent in a PVC casing with self-adhesive tape on one side. It is fully interrupted at the strike and at the hinges. Set 15 from the exposed face of the head and jambs. 15 x 4
11L	**Intumescent – hinge** Supplier: Reference: Description: Thickness (t):	 Exitex Limited Exi-Fire hinge pads A graphite based intumescent fitted beneath each blade 1
12L	**Intumescent – latch** Supplier: Reference: Description: Overall size (t):	 Exitex Limited Exi-Fire latch protection A graphite based intumescent wrapped around body and under forend. 1
13L	**Intumescent – strike and forend** Supplier: Reference: Description: Thickness (t):	 Exitex Limited Exi-Fire A graphite based intumescent under the strike and lining rebate. 1

Item	Component	Information
14L	**Fire stopping installation detail** Supplier: Reference: Description: Frame gap (w):	 Craylon Limited Blue 60** The seal between the frame and the associated construction was Craylon Blue 60 Expanding foam in conjunction with Craylon Blue 60 fire rated packers. 24* at head, 24* to 30* at jambs

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Appendix 1 Table 1b Right hand Leaf

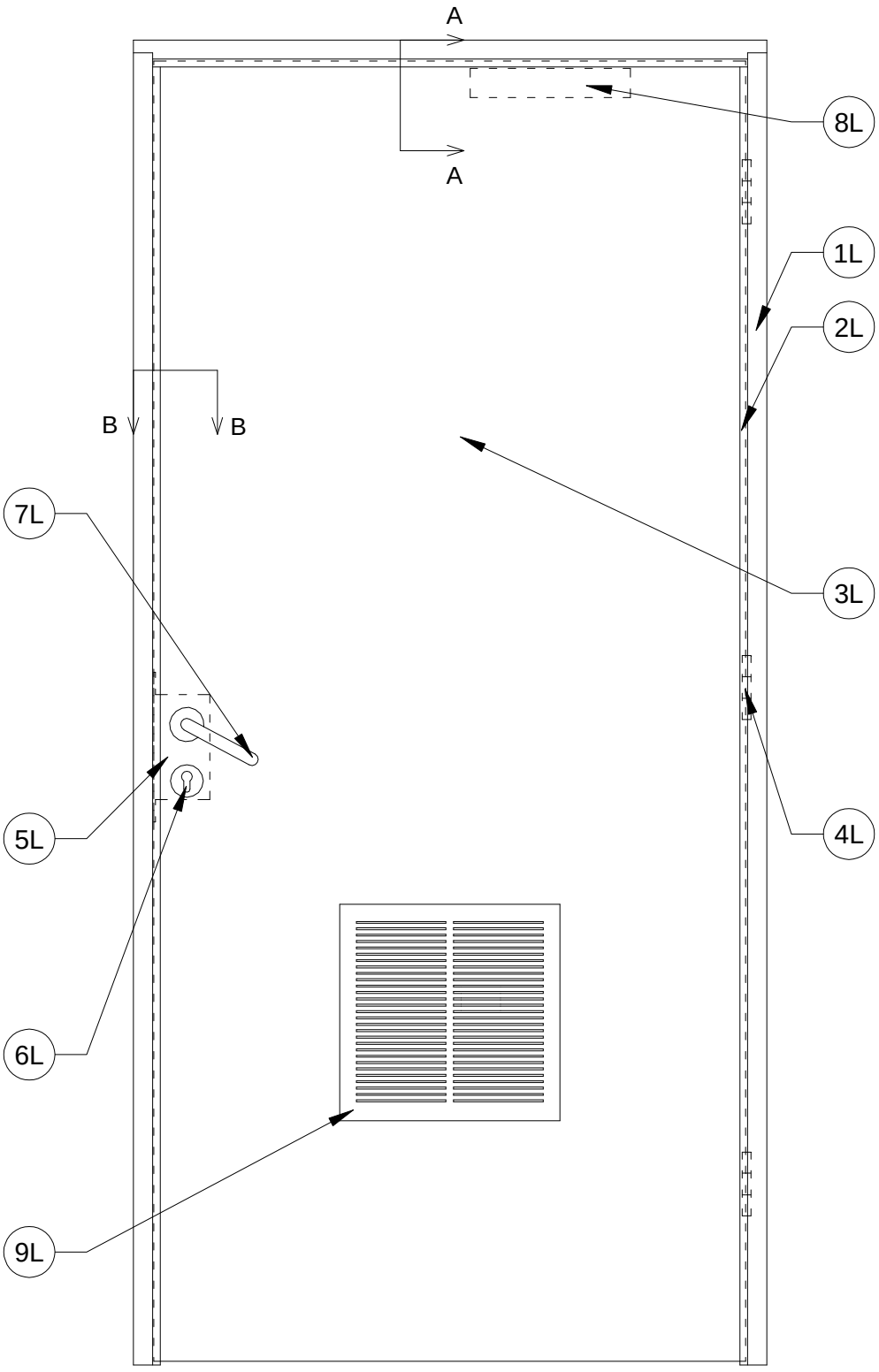
Item	Component	Information
1R	**Door frame**	
	Supplier:	Exitex Limited.
	Description:	A 3 sided sapele frame with 10 high rebated joints at the top corners fixed with 2No. Ø5 x 80 countersunk woodscrews at 55 centres and PVA adhesive**.
	Fixing to supporting construction:	5 No. No.10 x 3" countersunk woodscrews set 240 from top and 240 from bottom with the remaining 3 No equally spaced on the jambs. At the head 1No. No.10 x 3" countersunk woodscrew at mid width.
	Overall size (h x w x d):	2081 x 1270 x 100
	Cross section size (h x d):	32 x 100
	Density (kg/m^3):	640**
2R	**Stops**	
	Supplier:	Exitex Limited.
	Description:	Sapele stops affixed to frame with pneumatically fired pins 16swg x 50 long at 100 to 180* centres.
	Overall size (w x d):	12 x 32
3R	**Leaf**	
	Supplier:	Falcon Panel Products Ltd.**
	Description:	Timber based particleboard core with lippings on the vertical edges.
	Overall size (h x w x t):	2040 x 1180 x 54
	Weight (kg):	83.3
	Sub-components:	
	Core:	
	Type:	Strebord**
	Description:	Contains an aperture 300 x 300 for ventilator and is lined with sapele 10 x 44 positioned 397 above the leaf bottom and at mid width.
	Overall size (h x w x t):	2041 x 1180 x 54
	Lipping:	
	Description:	Sapele** lipping adhered to vertical edges of the leaf using PU adhesive**.
	Overall size (w x t):	54 x 10
	Density (kg/m^3):	640**
4R	**Hinges**	
	Manufacturer:	Tuff
	Type:	Butt hinge with bearings.
	Material:	Stainless steel.
	Number:	3
	Location:	Set at 155, 933 and 1712 from the top of the leaf to the top of the blade.
	Blade size (h x w x t):	102 x 31 x 3
	Knuckle size (Ø):	13
	Fixings to frame (Ø x l):	4No Ø4.7 x 30 countersunk stainless steel wood

Item	Component	Information
		screws per blade.
	Fixings to door (Ø x l):	4No Ø4.7 x 30 countersunk stainless steel wood screws per blade.
5R	**Latch**	
	Supplier:	Arrone
	Type:	Eurocylinder mortise latch
	Description:	A mainly steel cylinder mortice latch fitted central to the leaf depth such that the centre line of the spindle is 1000 above the bottom of the leaf and affixed through the steel forend using 2No. stainless steel countersunk woodscrews. A steel strike was fitted to the jamb to suit the position of the latch and affixed using 2No. steel raised countersunk woodscrews.
	Overall size:	
	Body (h x w x d):	165 x 85 x 15
	Forend (h x d x t):	235 x 20 x 2.5
	Strike (h x d x t):	170 x 40 x 1.5, including a tongue of 54 x 16
6R	**Eurocylinder**	
	Supplier:	Eurospec
	Type:	CYL71370 NP/FS
	Description:	Nickel plated brass with thumbturn 30/10/30 and plastic escutcheon and aluminium cover.
	Escutcheon cover (Ø x d x t)	51 x 10 x 1.1
7R	**Handleset**	
	Manufacturer:	Arrone**
	Reference:	14406**
	Description:	D shaped tubular lever handle, aluminium. Affixed to leaf through plastic rose with aluminium cover
	Overall Size:	
	Handle (Ø x l):	19 x 135
	Rose (Ø x d):	51 x 9
	Rose cover (Ø x d x t):	54 x 11.5 x 1
8R	**Closer**	
	Manufacturer:	Eclipse
	Reference:	28987 93 series
	Description:	A scissor arm closer with mild steel arms and aluminium body incorporating steel components fitted to the exposed face of both leaves positioned in accordance with the manufacturer's instructions.
	Fixings to frame:	2No. Ø5.6 x 20 long steel pan head steel screws.
	Fixings to leaf	4No.Ø5.6 x 30 long steel countersunk screws
	Overall size (l x h x d):	248 x 42 x 52
	Cover size (l x h x d)	251 x 46 x 54
9R	**Louvred Ventilator**	
	Supplier:	Exitex Limited
	Reference:	Exi-Grille
	Description:	The core consists of eight sub-units (four each side)

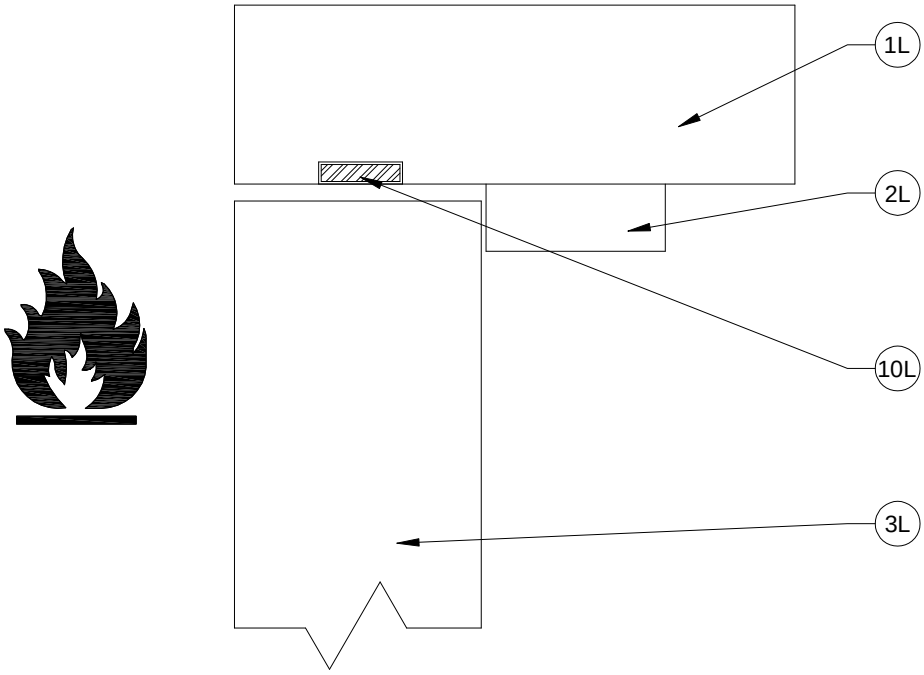
Item	Component	Information
9R cont		with a steel frame and integral steel channels to retain the intumescent strips. The sub-units are held together with spring clips between corresponding front and back elements (2 per side of each sub-unit)
	Overall Size (h x w x t):	300 x 300 x 42 (sub-unit 150 x 150 x 16)
	Louvred cover (h x w x t):	340 x 345 x 7
10R	**Intumescent – frame**	
	Manufacturer:	Exitex Limited
	Reference:	FO154
	Description:	2 strips of graphite-based intumescent in a PVC casing with self-adhesive tape on one side. Ex strip fully interrupted at the hinges and partially at the strike with 33% remaining, ux strip partially at the strike with approximately 50% remaining.
	Location:	Set 7 and 31 from the exposed face of the head and jambs.
	Overall Size:	15 x 4
11R	**Intumescent – hinge**	
	Supplier:	Exitex Limited
	Reference:	Exi-Fire hinge pads
	Description:	A graphite based intumescent fitted beneath each blade
	Overall size (t):	1
12R	**Intumescent – latch**	
	Supplier:	Exitex Limited
	Reference:	Exi-Fire latch protection
	Description:	A graphite based intumescent wrapped around body and under forend.
	Thickness (t):	1
13R	**Intumescent – strike and forend**	
	Supplier:	Exitex Limited
	Reference:	Exi-Fire
	Description:	A graphite based intumescent under the strike and lining rebate.
	Thickness (t):	1
14R	**Fire stopping installation detail**	
	Supplier:	Craylon Limited
	Reference:	Blue 60**
	Description:	The seal between the frame and the associated construction was Craylon Blue 60 Expanding foam in conjunction with Craylon Blue 60 fire rated packers.
	Frame gap (w):	25* at head, 24* to 32* at jambs

Key:
* Nominal value: ** Sponsor declared value or detail, not verified by laboratory
‡ Constructional details omitted at the request of the Sponsor. Full details are held on file by the laboratory

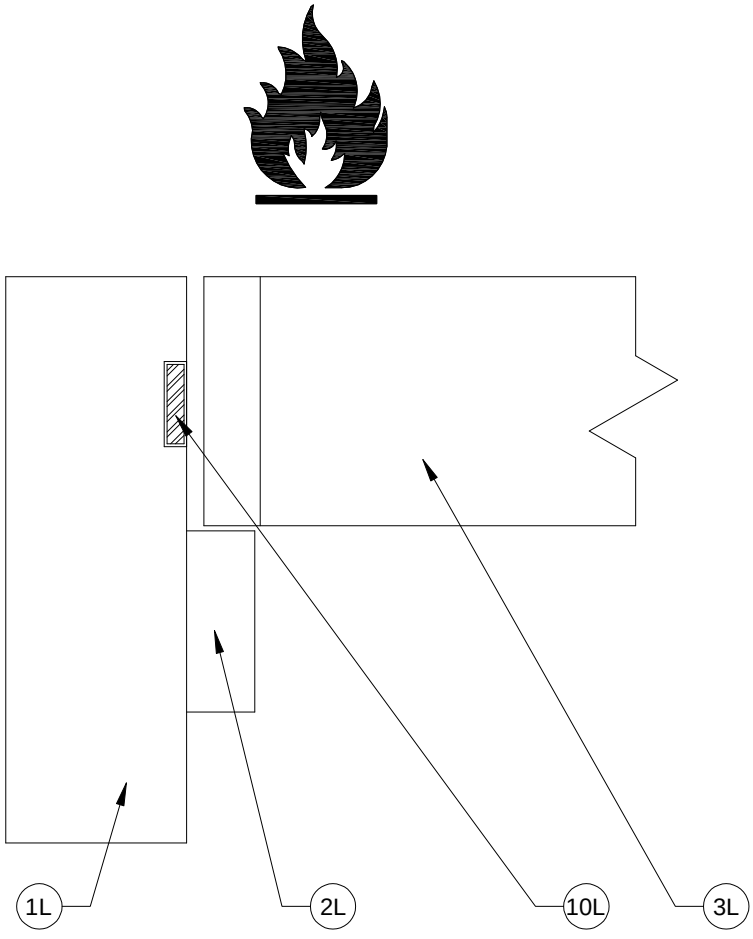
Appendix 1 Figure 1 – Elevation left hand doorset – unexposed face inc. hidden detail



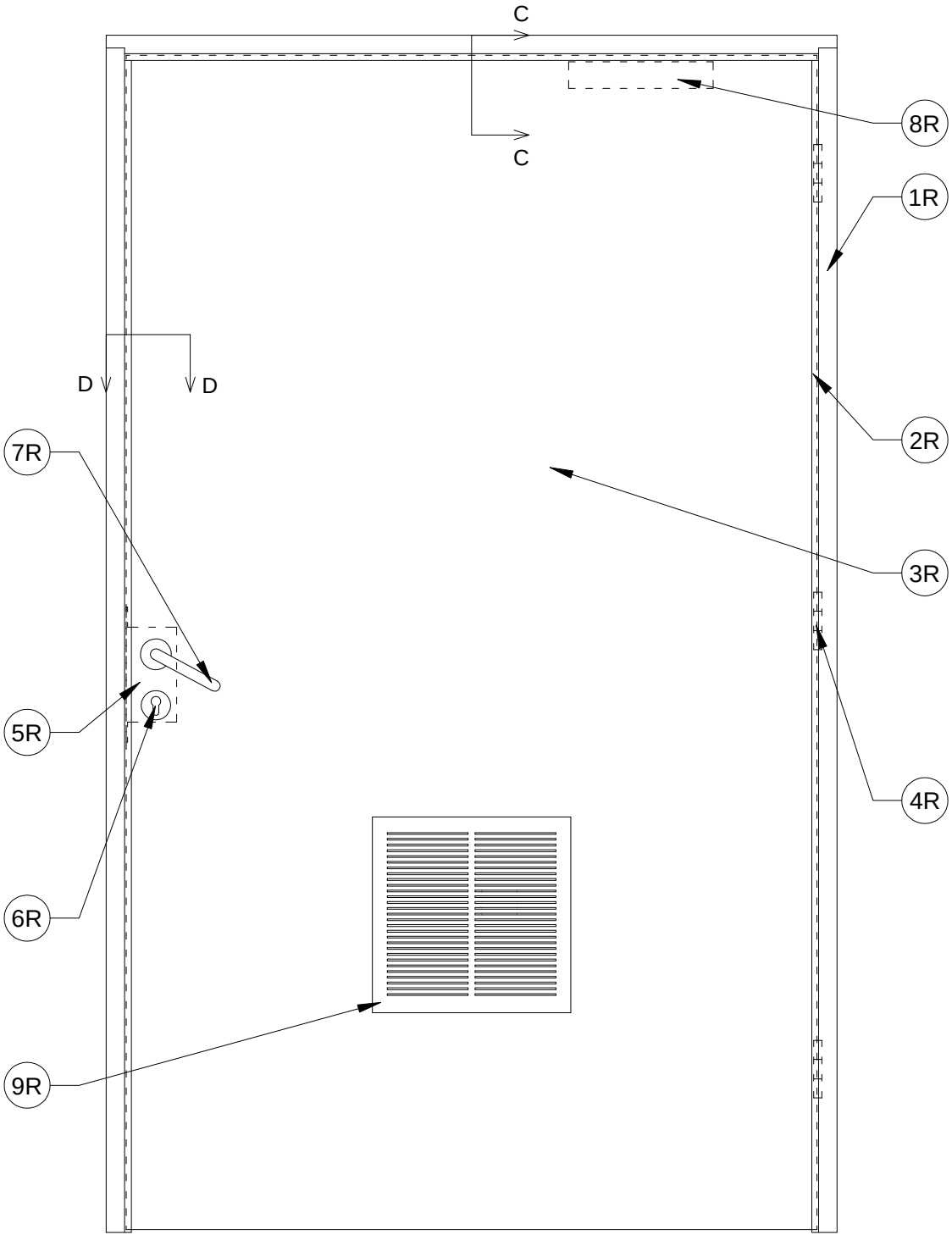
Appendix 1 Figure 2 – Section A – A



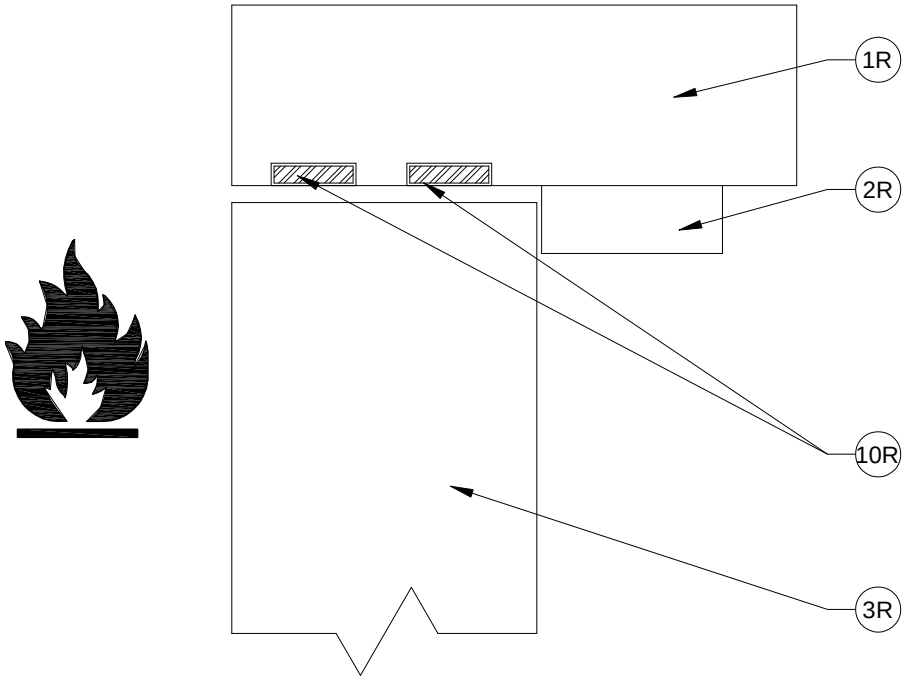
Appendix 1 Figure 3 – Section B – B



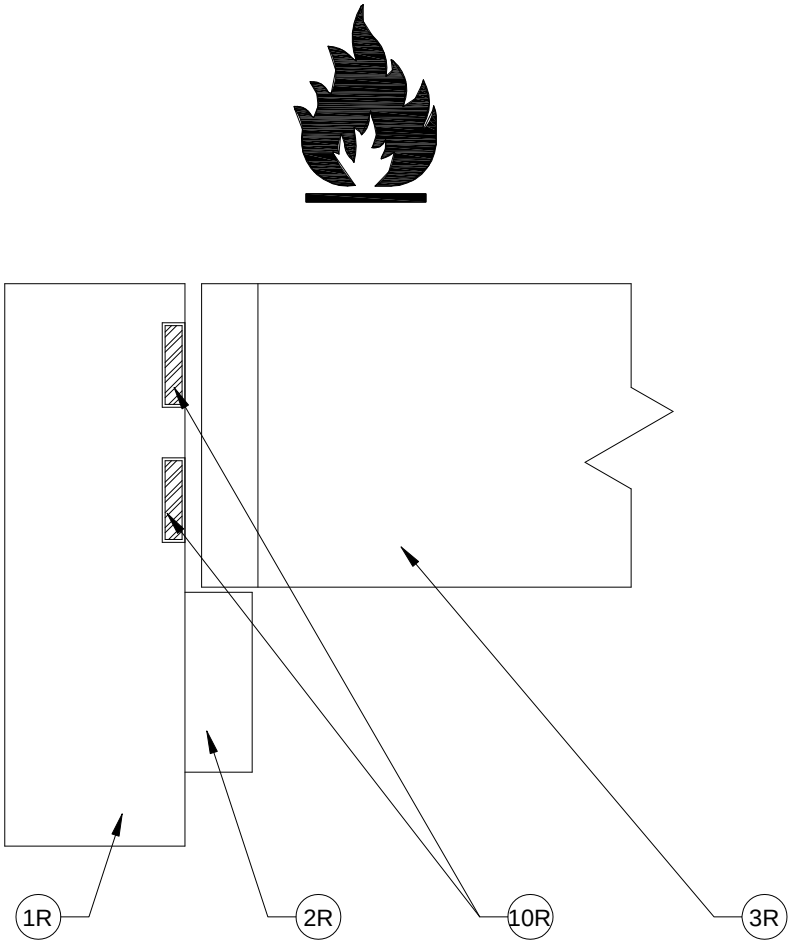
Appendix 1 Figure 4 – Elevation right hand doorset – unexposed face inc. hidden detail



Appendix 1 Figure 5 – Section C – C



Appendix 1 Figure 6 – Section D – D



APPENDIX 2 PHOTOGRAPHS

Appendix 2.1 Pre-test photos

Photo 2.1.1 – Left hand doorset

Photo 2.1.2 – Left hand doorset

Photo 2.1.3 – Left hand doorset

Photo 2.1.4 – Left hand doorset

Photo 2.1.5 – Left hand doorset

Photo 2.1.6 – Left hand doorset

Photo 2.1.7 – Right hand doorset

Photo 2.1.8 – Right hand doorset

Photo 2.1.9 – Right hand doorset

Photo 2.1.10 – Right hand doorset

Photo 2.1.11 – Right hand doorset

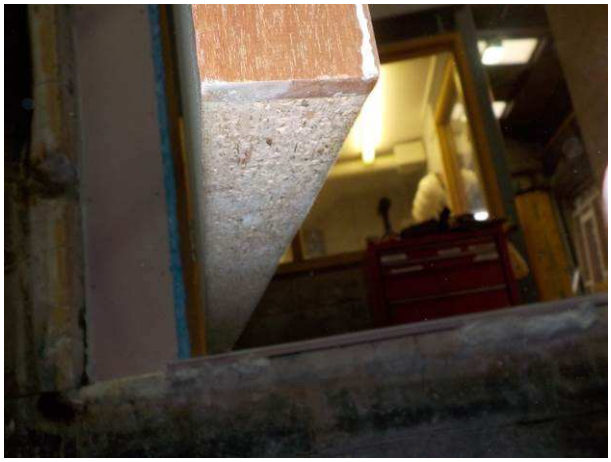


Photo 2.1.12 – Right hand doorset

Photo 2.1.13 – Right hand doorset

Photo 2.1.14 – Right hand doorset

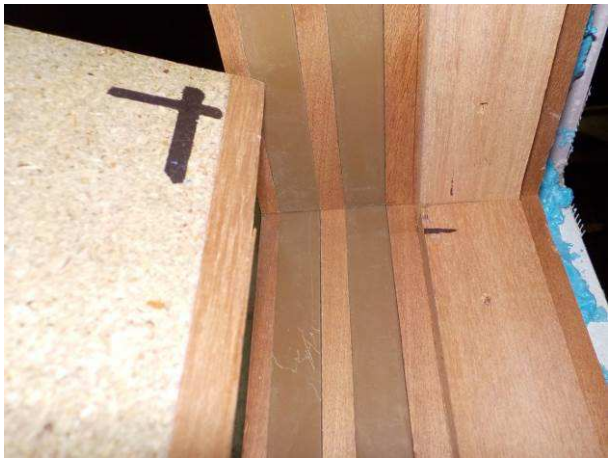


Photo 2.1.15

Appendix 2.2 During test photos

Photo 2.2.1

Photo 2.2.2

Photo 2.2.3

Photo 2.2.4

Photo 2.2.5. - Right hand door after 55 minutes

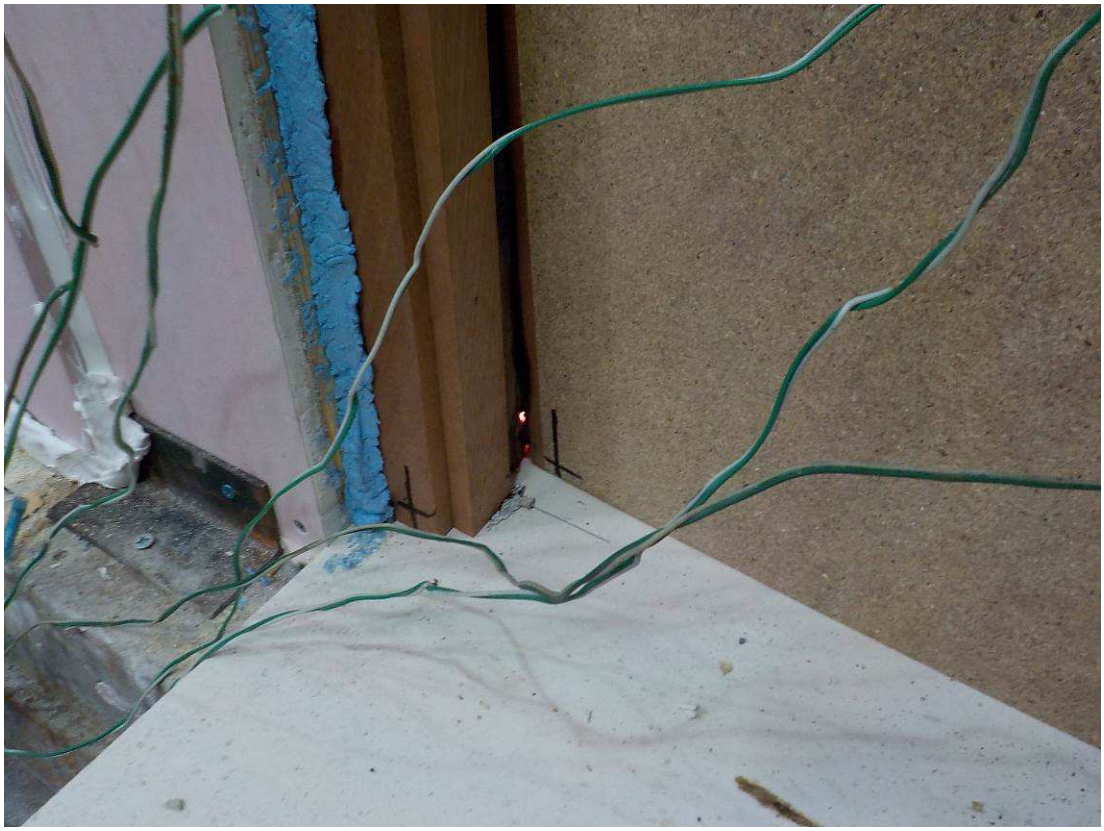


Photo 2.2.6

Photo 2.2.7 – after 63 minutes

Photo 2.2.8 - after 63 minutes

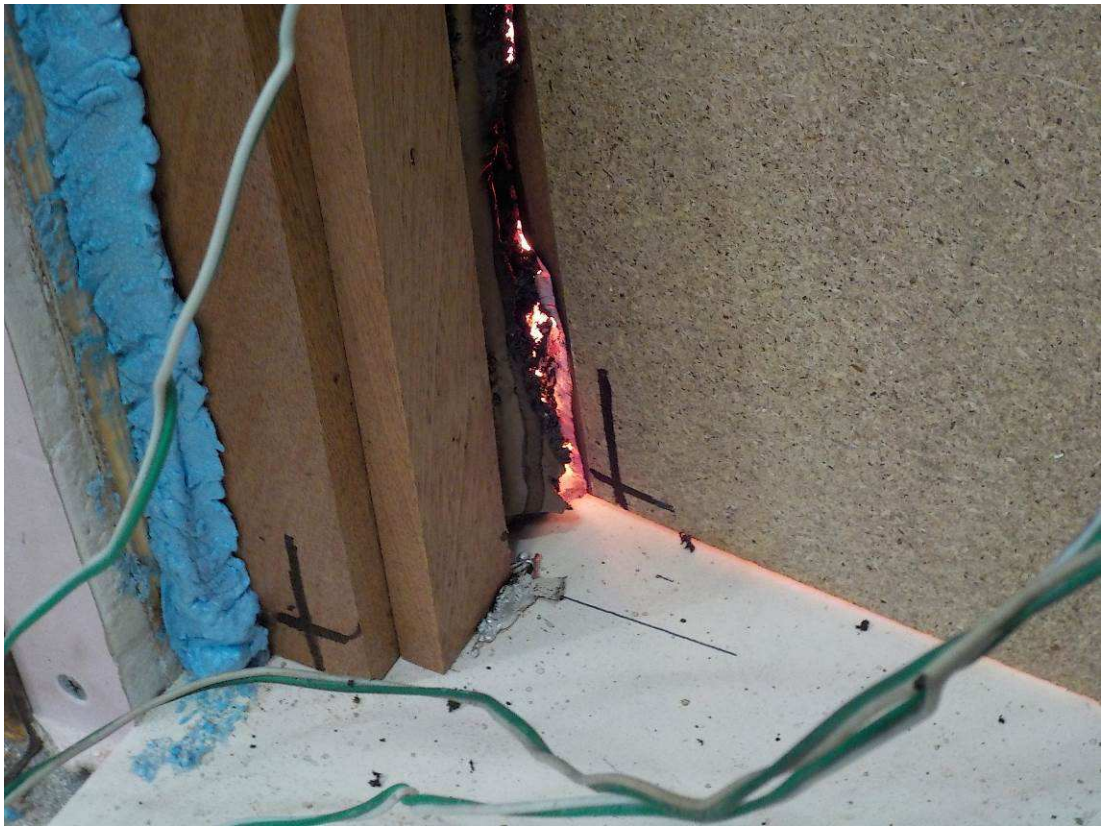
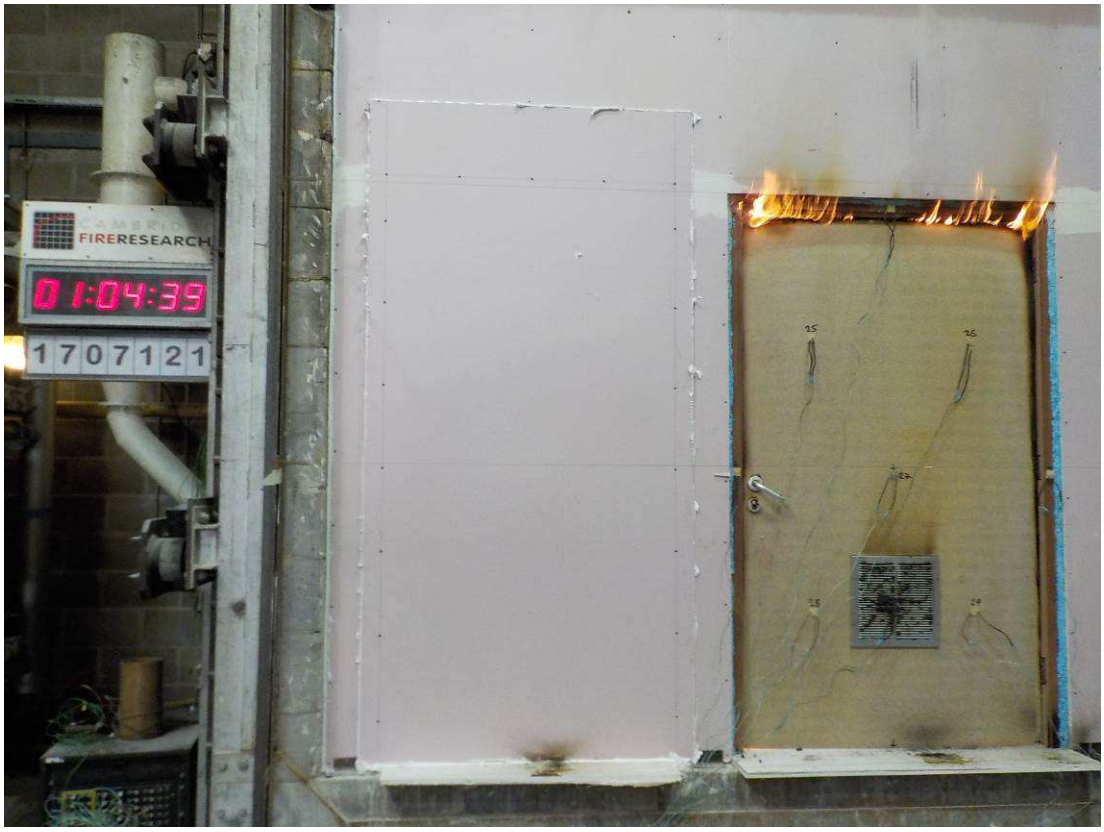


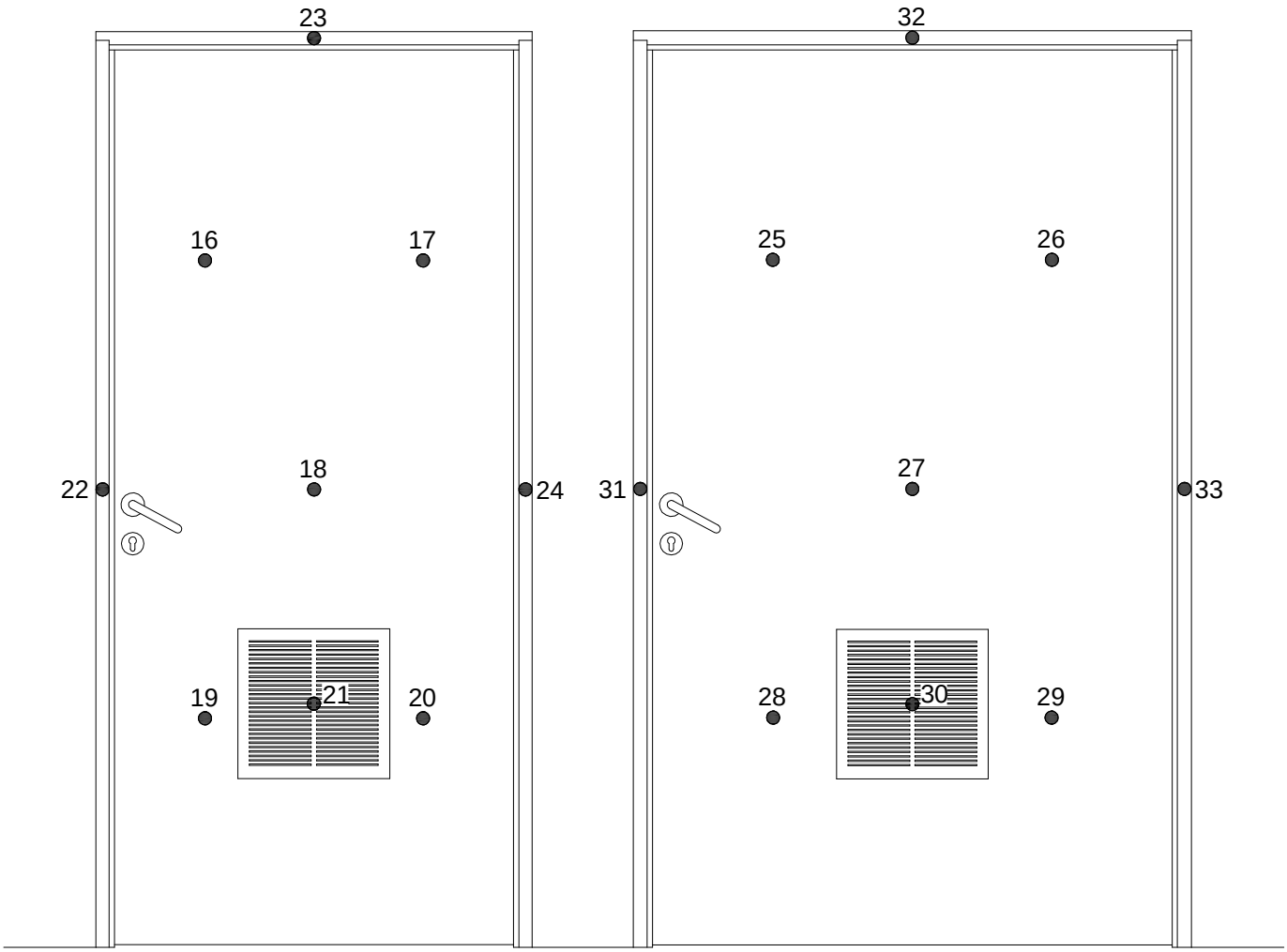
Photo 2.2.9



Appendix 2.3 Post test photos

Photo 2.3.1

APPENDIX 3 POSITIONING OF INSTRUMENTATION



● Unexposed face specimen thermocouple

CAMBRIDGE FIRERESEARCH

APPENDIX 4 RECORDED THERMOCOUPLE DATA

Time	Chan 16	Chan 17	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22
min	°C	°C	°C	°C	°C	°C	°C
0	22	22	22	22	22	22	22
1	23	23	23	23	23	86	22
2	23	23	26	23	23	76	22
3	22	23	24	23	22	37	22
4	22	23	23	22	22	23	22
5	23	23	23	22	22	22	22
6	23	23	23	22	22	22	22
7	23	23	23	22	22	22	22
8	24	24	23	22	22	22	22
9	26	26	27	22	22	23	22
10	28	29	31	22	22	24	22
11	31	31	35	24	24	24	22
12	32	32	37	28	30	25	22
13	34	33	39	35	34	24	22
14	36	35	41	40	38	25	22
15	38	36	43	43	40	27	22
16	39	37	44	45	42	26	22
17	41	39	46	46	44	28	22
18	42	40	47	47	45	29	23
19	44	41	48	48	46	31	23
20	45	42	49	49	47	30	23
21	46	43	50	50	48	30	23
22	48	44	51	50	49	29	23
23	49	45	52	51	50	30	23
24	50	46	53	52	51	32	23
25	51	47	53	53	52	32	24
26	52	49	54	54	53	32	24
27	53	50	55	54	53	32	24
28	55	51	56	55	55	33	24
29	56	53	57	56	56	34	25
30	57	54	59	57	57	34	25
31	58	55	59	58	57	35	25
32	59	57	61	59	58	35	26
33	60	58	61	59	59	35	26

CAMBRIDGE FIRERESEARCH

Time	Chan 23	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29
min	°C	°C	°C	°C	°C	°C	°C
0	22	22	22	22	22	22	22
1	23	23	23	24	23	22	23
2	24	22	23	24	22	22	24
3	23	22	22	23	22	22	23
4	23	22	23	23	22	22	23
5	23	23	23	23	23	22	23
6	23	22	23	23	22	22	23
7	23	22	22	23	22	22	22
8	27	22	23	23	22	22	23
9	29	22	23	23	23	22	22
10	28	22	23	23	22	22	22
11	27	22	23	23	22	22	23
12	26	22	23	23	22	22	22
13	26	22	23	23	23	22	22
14	26	22	23	23	23	22	23
15	26	22	24	24	24	22	24
16	25	22	25	24	24	23	24
17	26	22	26	25	25	24	25
18	26	22	27	25	26	25	26
19	26	22	28	26	27	26	27
20	26	23	29	26	28	27	28
21	27	23	30	27	29	28	29
22	27	23	31	28	30	29	30
23	28	23	32	28	31	30	31
24	28	23	33	29	33	31	31
25	29	23	34	30	33	32	32
26	30	23	35	30	35	33	33
27	31	23	36	31	36	34	34
28	33	24	37	33	37	36	35
29	35	24	38	34	39	37	37
30	37	25	39	35	40	38	38
31	39	25	41	36	41	39	39
32	41	25	42	38	43	40	40
33	43	26	42	39	45	41	41
34			44	41	47	42	42
35			45	42	48	43	43
36			46	43	50	44	44
37			47	45	53	45	46
38			48	46	55	46	46
39			49	47	55	47	47
40			51	49	57	48	49
41			52	51	58	49	50
42			53	52	59	50	51
43			54	54	60	51	52
44			55	55	61	52	53
45			56	56	62	53	54

Time	Chan 23	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29
min	°C	°C	°C	°C	°C	°C	°C
46			57	58	63	54	55
47			58	59	64	54	55
48			59	60	65	55	57
49			60	62	66	56	58
50			61	63	67	57	59
51			61	64	67	57	60
52			63	66	69	58	61
53			63	67	70	59	62
54			64	68	70	60	63
55			65	69	71	61	64
56			66	70	72	62	65
57			67	71	73	63	66
58			68	72	73	63	67
59			69	73	74	64	68
60			70	74	75	65	69
61			71	75	76	66	70
62			71	76	77	67	71
63			72	77	78	68	72
64			72	77	78	68	73
65			74	78	79	70	74

Time	Chan 30	Chan 31	Chan 32	Chan 33
min	°C	°C	°C	°C
0	22	22	23	22
1	87	23	24	23
2	78	22	23	23
3	39	22	23	23
4	24	22	23	23
5	22	23	23	23
6	22	22	23	23
7	22	22	23	22
8	23	22	23	23
9	24	22	23	22
10	24	22	23	22
11	25	23	24	22
12	26	22	25	22
13	25	22	26	22
14	25	22	28	22
15	25	22	28	22
16	25	22	29	22
17	27	22	31	22
18	27	22	32	22
19	29	22	33	22
20	28	22	33	22
21	35	22	32	22
22	41	23	31	22
23	42	23	30	22
24	44	22	30	22
25	41	23	30	22
26	35	23	30	22
27	32	23	30	22
28	31	23	30	22
29	33	23	31	22
30	42	23	31	23
31	61	23	31	23
32	98	24	31	23
33	135	24	31	23
34	161	24	32	24
35	181	24	32	23
36	199	24	32	23
37	215	25	33	24
38	228	25	34	24
39	243	25	33	24
40	257	26	34	25
41	272	26	34	25
42	288	27	35	25
43	304	27	35	26
44	320	27	35	26
45	333	28	35	26

Time	Chan 30	Chan 31	Chan 32	Chan 33
min	°C	°C	°C	°C
46	343	28	36	27
47	351	28	37	27
48	357	28	37	27
49	362	28	38	28
50	365	29	38	28
51	368	29	38	28
52	370	30	38	29
53	372	30	39	29
54	372	30	39	29
55	373	31	40	30
56	373	31	40	31
57	374	32	40	31
58	375	33	41	31
59	375	33	41	32
60	376	34	42	33
61	376	34	42	33
62	377	35	43	33
63	378	35	43	34
64	379	36	44	34
65	380	37	47	35

* Thermocouple malfunction