CAMBRIDGE FIRERESEARCH

REPORT NUMBER CFR1603041

FIRE RESISTANCE TEST IN ACCORDANCE WITH BS EN 1634-1:2014

Sponsor:	Exitex Limited
Address:	Mountpleasant Dundalk County Louth Ireland
Date of test:	4th March 2016

Results:

Test duration:	41 minutes (discontinued at the request of the sponsor)
Integrity:	
Cotton pad:	34 minutes
Gap gauge:	41 minutes no failure the test having been discontinued
Sustained flaming:	34 minutes
Insulation:	
Discrete area 1 (leaves):	34 minutes
Discrete area 2 (glazing):	2 minutes

Summary of test specimen:

Single acting partially glazed Strebord timber based double leaf doorset, tested unlatched glazed with Pyroguard C730.
Doorset size (mm): 2439 high x 2071 wide
Left hand leaf:
Leaf size (mm): 2400 high x 1000 wide x 44 thick

Right hand leaf:
Leaf size (mm): 2400 high x 1000 wide x 44 thick
Glazed aperture (mm): 1025 high x 625 wide

Cambridge Fire Research Ltd Brewery Road Pampisford Cambridge CB22 3HG
Tel. +44 (0) 1223 834752 **Fax.** +44 (0) 1223 837208 **Email.** testing@cambridge-fire.co.uk

UKAS TESTING 4319

Registered in England No. 5602112 Registered Office 5 High Green, Great Shelford, Cambridge, CB22 5EG

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1 PREPARATION FOR TESTING

1.1 Specimen conditioning

The specimen components were at Cambridge Fire Research for 3 days before the test and during this time they were stored, surveyed and prepared for testing. For this duration the temperature and relative humidity were measured and recorded within the range of 8 to 13°C and 47 to 80% respectively.

1.2 Supporting construction

Cambridge Fire Research installed a standard flexible wall supporting construction in accordance with EN1363-1:2012 (intended fire resistance EI30, Group B). This provided an aperture of 2445 mm high x 2087 mm wide to accommodate the specimen.

Both vertical edges of the supporting construction had a free edge. In accordance with the test standard, continuity of the floor was simulated by the installation of a solid non-combustible floor extension by Cambridge Fire Research, such that the extension was flush with the threshold onto which the frame was positioned.

1.3 Specimen construction

The specimen was constructed by the sponsor.

1.4 Specimen verification

Cambridge Fire Research carried out a detailed survey of the specimens to verify the information provided by the 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 specimen into the supporting construction and Peter Morgan from IFC Certification witnessed the installation. The specimen was asymmetrical and fitted such that the leaves opened towards the heating conditions of the test. The bolts of the right hand leaf were engaged and the left hand leaf was unlatched prior to the start of the test.

The specimen was affixed to the supporting construction as described in Appendix 1.

1.6 Specimen selection

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

The sponsor declared that all Exitex 15 x 4 intumescent strip was sampled by Certifire

2 PRE-TEST MEASUREMENTS AND SETTING

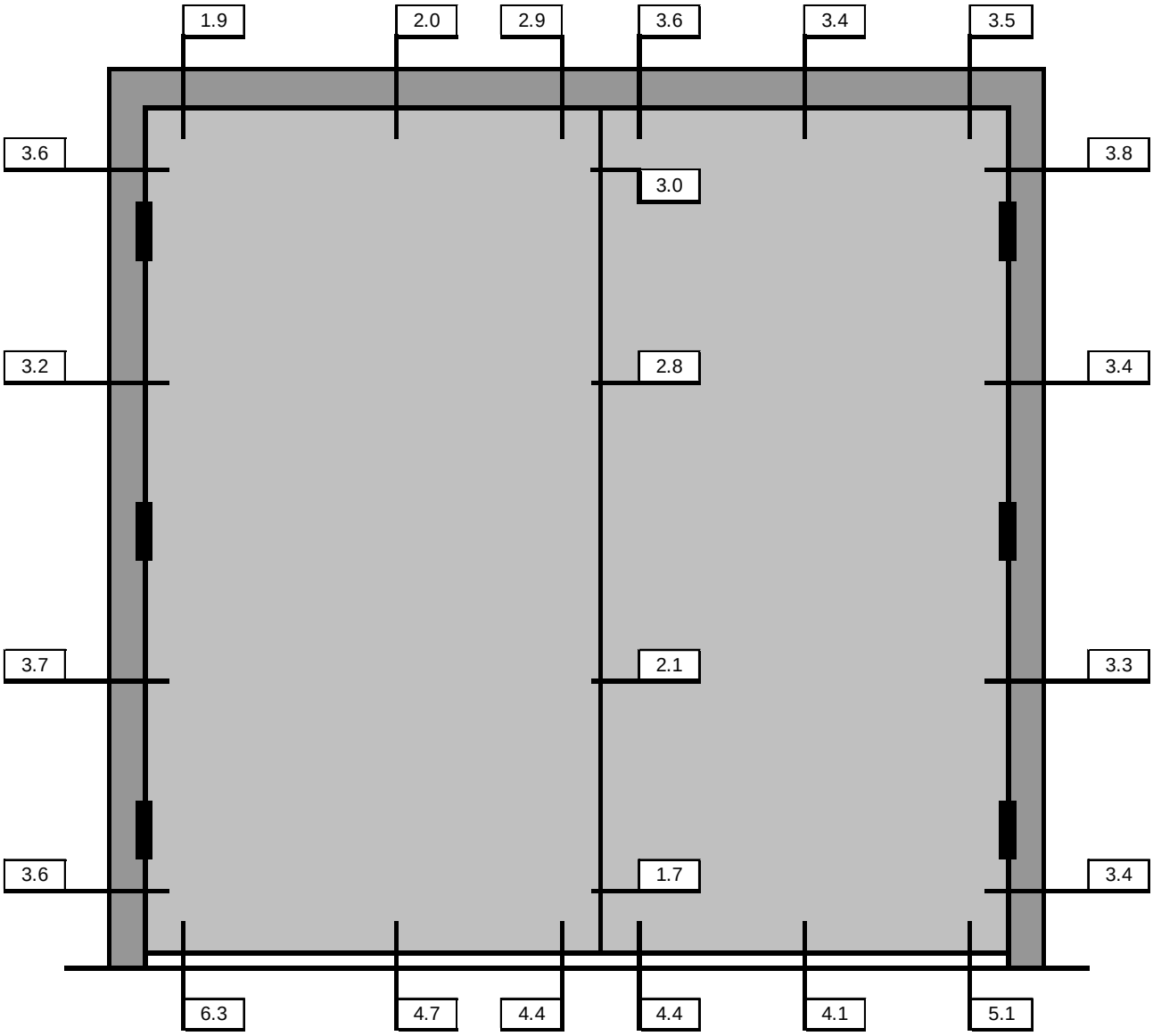
2.1 Mechanical pre-test conditioning

Mechanical pre-test conditioning was carried out in accordance with BS EN 14600:2005. This included fully opening each leaf for 25 cycles to check operability and checking that the closing speed was within the required parameters. It was also verified that the leaf would fully close from 10° open.

2.2 Gap measurements

Leaf edge to frame gap
The primary gaps between the leaf edges and the frame, between the meeting stiles and between the base of the leaf and the floor were 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.

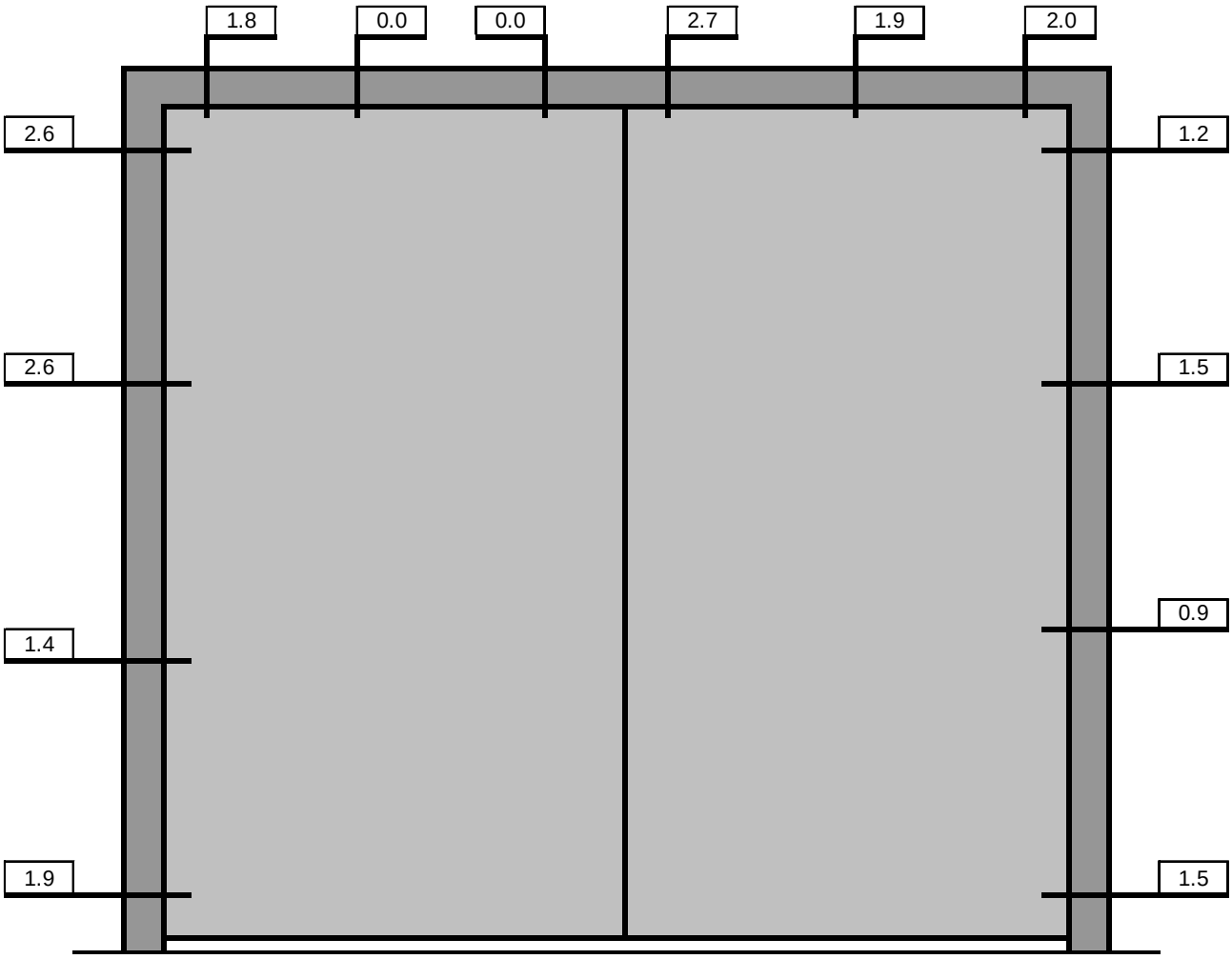


Maximum gaps in practice
The maximum permitted gaps in practice are (EN 1634-1:2014 sect 13.3.3.2.5):

Primary gap region	Gap width (mm)
Head	5
Jambs	5.5
Threshold	7.5
Meeting stiles	4.5

Leaf face to stop gap
The gap between the face of the leaves and the stop of the frame was also measured on the unexposed 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.



2.3 Retention force measurement

The retention force was measured in accordance with the test standard. The measured force to open the left hand leaf with the force gauge operating against the direction of closing was 41.3 N. The measured force to open the right hand leaf with the force gauge operating against the direction of closing was 46.1 N. The handle position for both leaves was taken as 950mm from the centreline of the hinge

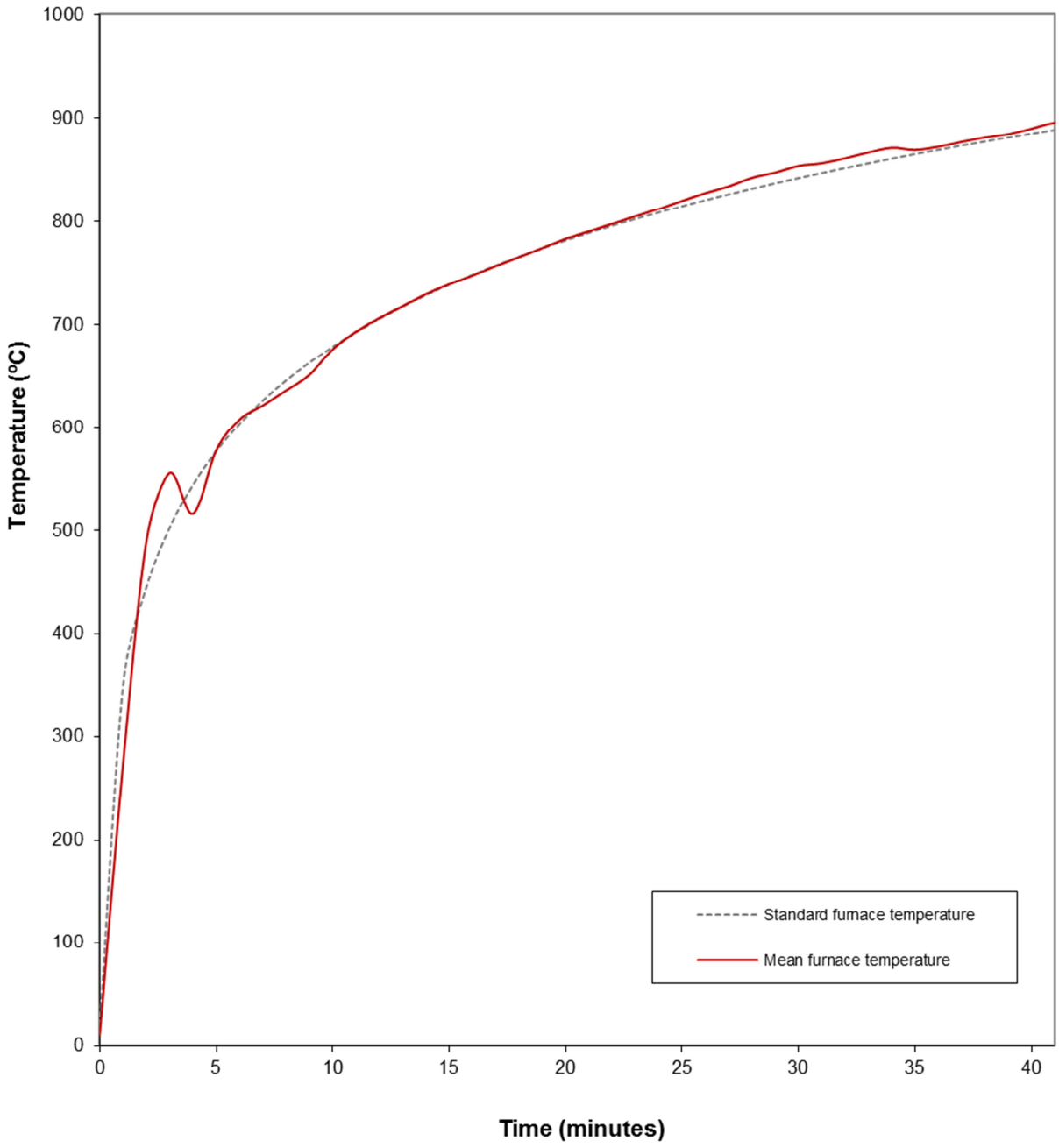
2.4 Final setting

Prior to the start of the fire test, the doorsets were subjected to a final closing involving opening the leaves to a distance of approximately 300 mm and allowing them to close by the closing devices.

3 TEST CONDITIONS, INSTRUMENTATION AND MEASURING

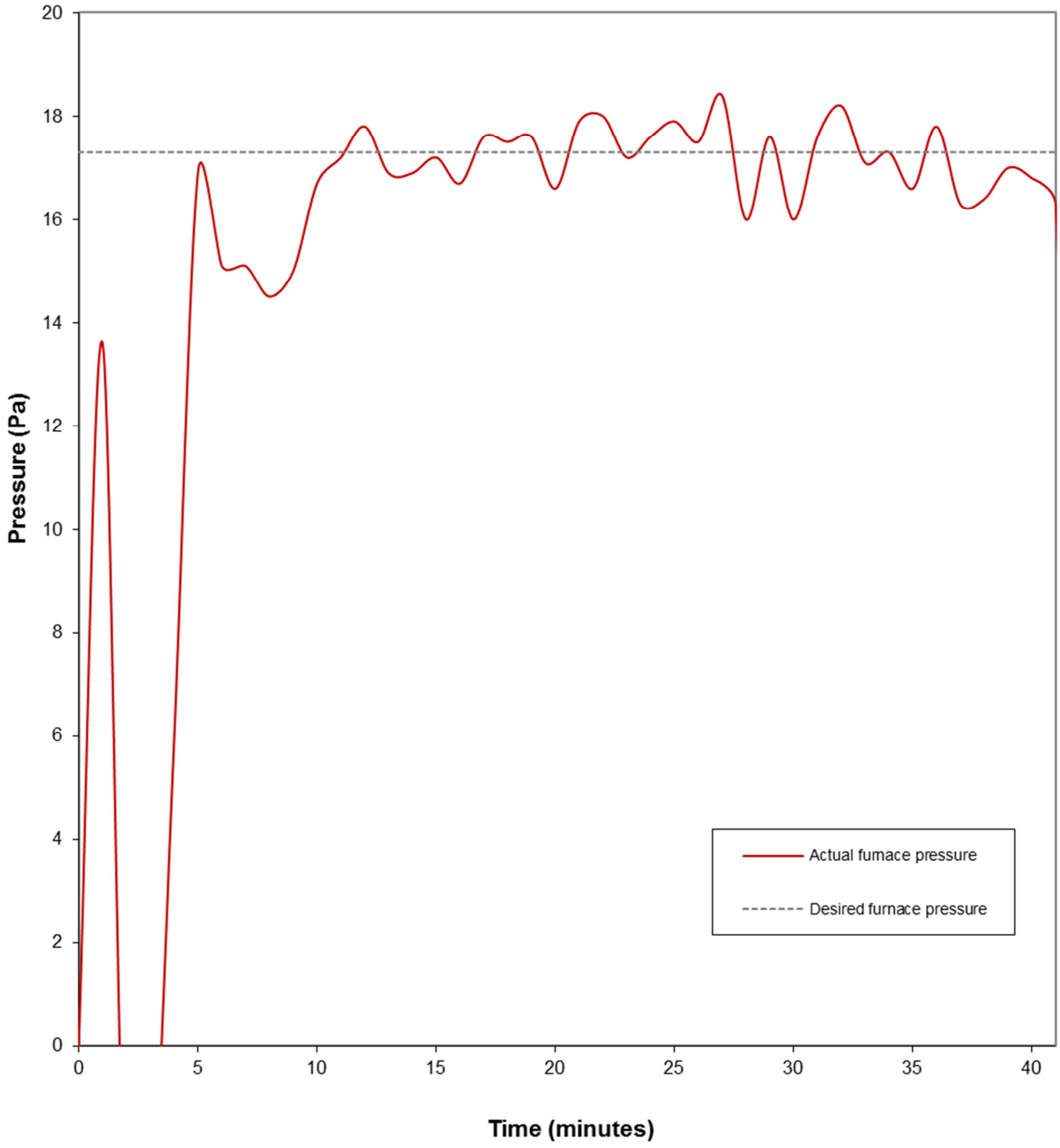
3.1 Furnace temperature

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 + 17.3 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 0.5 m above the notional floor level. The furnace pressure was controlled within the tolerances permitted in the test standard. 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 10°C.
Ambient temperature remained at 10°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:

Discrete area 1

Doorset:		
Leaves	Channels 16 to 20	(mean and maximum)
Leaves	Channels 21 to 27	(maximum only)
Frame	Channels 28 to 32	(maximum only)

Discrete area 2

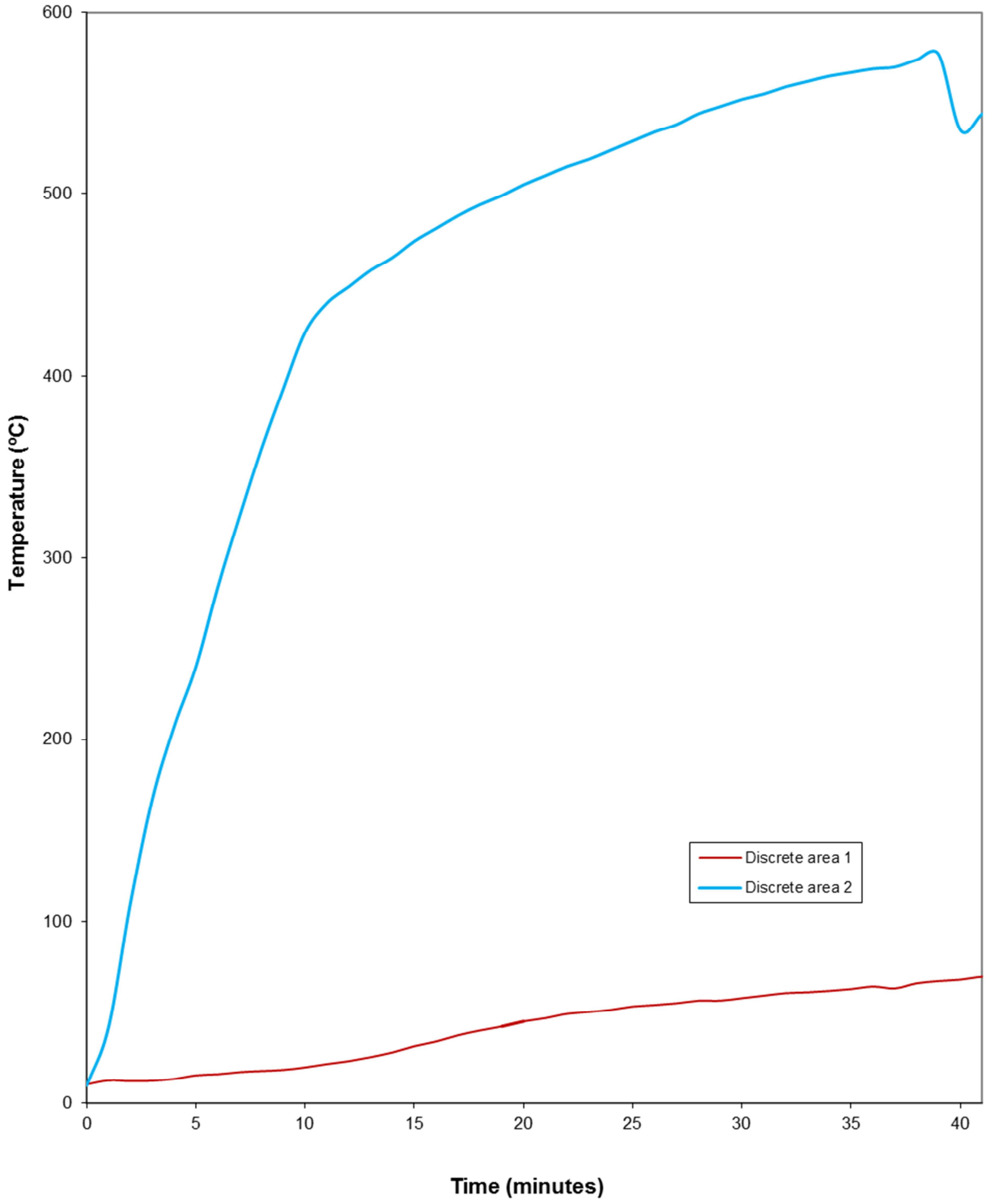
Glazing panel	Channels 33	(mean and maximum)
Glazing panel	Channels 34 to 37	(maximum only)

The positions of these thermocouples are shown in Appendix 3.

A roving thermocouple was available for measurement of any specific hotspots. Any instances of the use of the roving thermocouple are noted in the observations in Section 4.

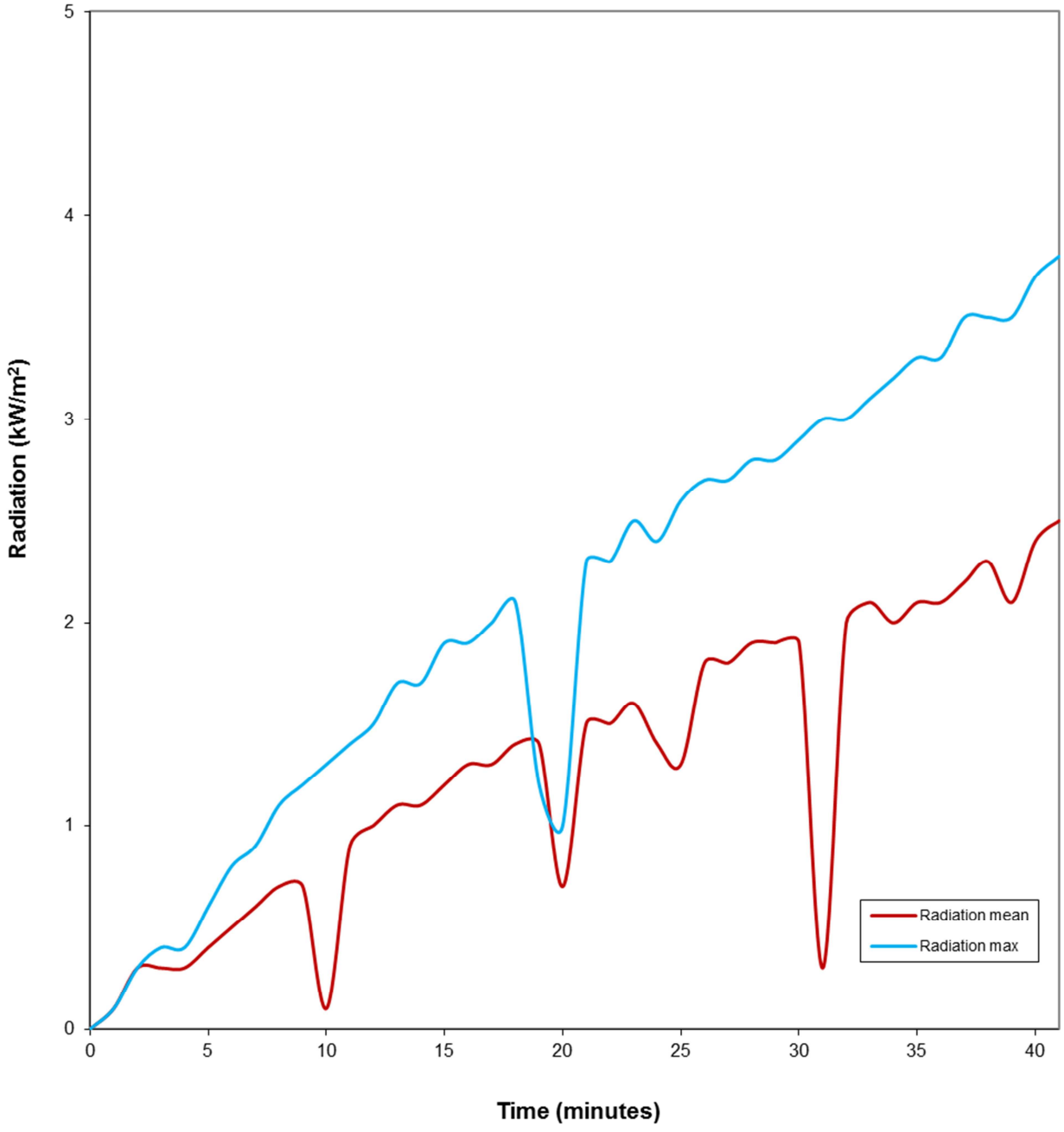
The recorded data of all individual thermocouples is shown in the tables in Appendix 4.

The following time/temperature graph shows the mean discrete areas' temperatures.



3.5 Radiation

Radiation from the unexposed face was monitored during the test. A 180° field of view water cooled heat flux meter was positioned with its target 1m from and parallel to the unexposed face of the specimen and at the geometric centre of the doorset. This location represents the average radiation level. A further 180° field of view water cooled heat flux meter was positioned with its target 1m from and parallel to the unexposed face of the specimen and at the geometric centre of the glazing pane, the point of expected maximum heat flux. The following graph shows the recorded radiation/time data for both heat flux meters.

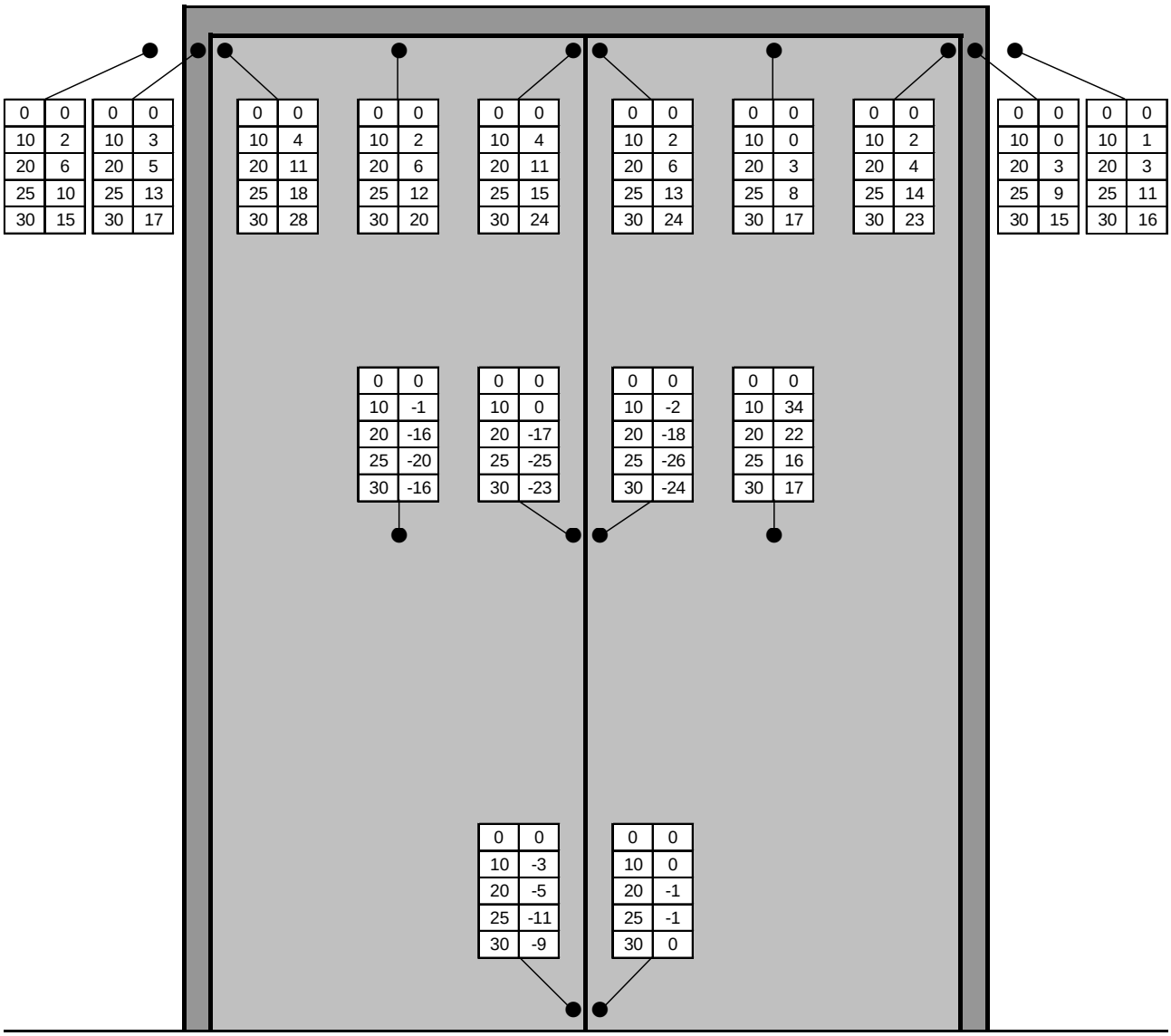


It should be noted that the recorded value of radiation drops when the field of view is physically interrupted during the measurement of deflection.

The measured radiation did not exceed the heat flux level of 5 kW/m^2 during the test.

3.6 Deflection

Taut stainless steel wires were anchored horizontally across the unexposed face of the specimens such that any deflection experienced by the test construction 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 floor. The following figures show 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**.**



4 TEST OBSERVATIONS

Photographs taken during the test are shown in Appendix 2.

TEST OBSERVATIONS (E = Exposed face: U = Unexposed face)		
Time	Face	Observation
(min:sec)		
00:00		Start of the test.
00:41	U	The glazing pane starts cracking.
02:00	U	**INSULATION FAILURE OF DISCRETE AREA 2** due to the mean temperature rise criterion.
02:18	U	Gap at head of meeting stiles opens slightly.
03:11	U	Glazing interlayer discolours.
04:42	U	Intumescent activating at meeting stiles.
05:45	U	Chips of glass ejected from glazing pane.
08:41	U	Smoke/steam issuing from head, jambs, meeting stiles and cracks in glass.
13:35	U	Intumescent activity at meeting stiles continues. Meeting stile gap is tight at head and open at bottom.
15:58	U	A cotton pad is applied at the centre of the glazing pane (no failure).
18:08	U	Smoke/steam issuing at centre hinge position of right hand leaf.
21:33	U	A cotton pad is applied at a hole at the centre of the glazing pane (no failure).
22:23	E	Closer detaches.
23:06	U	Section of glazing intumescent nominally 500mm long detaches from top bead
28:36	U	A cotton pad is applied at a hole at the centre of the glazing pane (no failure).
32:04	U	Glow at left hand hanging stile/head corner and at top of meeting stiles.
32:45	U	A cotton pad is applied at the left hand hanging stile/head corner (no failure).
33:00	U	Glow at latch position.
33:46	U	Flash at meeting stiles adjacent to latch.
34:02	U	A cotton pad is applied to the meeting stiles adjacent to the latch.
34:03	U	Flaming commenced at meeting stiles adjacent to latch
34:05	U	**INTEGRITY FAILURE** due to ignition of cotton pad. **INSULATION FAILURE OF DISCRETE AREA 1** due to integrity failure.
34:13	U	**INTEGRITY FAILURE** due to sustained flaming.
35:15	U	Glow at top bead of glazing pane.
36:28	U	A cotton pad is applied to the top bead of the glazing pane (no failure).
37:47	U	A cotton pad is applied at the left hand hanging stile/head corner.

38:17	U	**Further integrity failure** due to ignition of the cotton pad.
39:08	U	Flaming commences at the top of the meeting stiles.
39:18	U	**Further integrity failure** due to sustained flaming.
41:32		The test is terminated.

5 LIMITATIONS

1. 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 procedure outlined in EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

2. 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.

3. The results relate only to the behaviour of the specimen 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.

4. The specimen was asymmetrical and was 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 heating conditions are from the other side.

Report prepared by:

E Southern

Report checked by:

E Wilson

Report issued: **8th September 2016**

APPENDIX 1 SPECIMEN CONSTRUCTION

The item numbers listed in Appendix 1 Table 1 and 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 1

Item	Component	Information
1	**Door frame**	
	Supplier:	Exitex Limited.
	Description:	A 3 sided MDF frame with 10 high rebated joints at the top corners fixed with 2 No. Ø4.7 x 70 countersunk woodscrews at 50 centres.
	Fixing to supporting construction:	5 No. No.10 x 3" equally spaced countersunk woodscrews set 100 from top and 100 from bottom on the jambs. At the head 1No. No.10 x 3" countersunk woodscrew.
	Overall size (h x w x d x t):	2439 x 2071 x 101 x 30
	Cross section size (h x d):	30 x 101
	Photo(s):	2.1.1, 2.1.2, 2.1.5, 2.1.7, 2.1.8 and 2.1.13
2	**Stops**	
	Supplier:	Exitex Limited.
	Description:	MDF stops affixed to frame with pneumatically fired pins 1.6 x 1.4 x 50 long at 150* centres.
	Overall size (w x d):	40 x 12
	Photo(s):	2.1.1, 2.1.5, 2.1.7 and 2.1.8
3	**Architrave**	
	Supplier:	Exitex Limited.
	Description:	MDF architraves affixed to frame on the exposed face and on the unexposed face with pneumatically fired pins 1.6 x 1.4 x 50 long at 150* centres.
	Overall size (w x d):	68 x 18 exposed face 60 x 18 unexposed face
	Photo(s):	2.1.1, 2.1.2, 2.1.11 and 2.1.13
4	**Left Hand Leaf**	
	Supplier:	Exitex Limited.
	Description:	Timber based particleboard core with lipping on the vertical edges.
	Overall size (h x w x t):	2400 x 1000 x 44
	Weight (kg):	65
	Sub-components:	
	Core:	
	Type:	Strebord**

Item	Component	Information
4 cont	Overall size((h x w x t):	2400 x 980 x 44
	Lipping:	
	Description:	Beech lipping adhered to vertical edges of the leaf using PVA adhesive**.
	Overall size (w x t):	44 x 10
	Density (kg/m^3):	776**
	Photo(s):	2.1.1 to 2.1.6 and 2.1.13
5	**Right Hand Leaf**	
	Supplier:	Exitex Limited.
	Description:	Timber based particleboard core with lipping on the vertical edges.
	Overall size (h x w x t):	2400 x 1000 x 44
	Weight (kg):	59 (with glazing)
	Sub-components:	
	Core:	
	Type:	Strebord**
	Overall size((h x w x t):	2400 x 980 x 44
	Lipping:	
	Description:	Beech lipping adhered to vertical edges of the leaf using PVA adhesive**.
	Overall size (w x t):	44 x 10
	Density (kg/m^3):	776**
	Glazing aperture:	The glazing aperture is positioned 688 below the head of the leaf and 187 from the hanging stile.
	Overall size (h x w):	1015 x 615
	Photo(s):	2.1.7 to 2.1.13
6	**Leaf glazing pane**	
	Supplier:	Fireglass UK Ltd.
	Reference:	Pyroguard C730
	Description:	A multi-layered insulating glass pane set in the aperture in the leaf.
	Overall / sight size (h x w):	1000 x 600**/ 970 x 570
	Thickness (t):	7*
	Photo(s):	2.1.9 and 2.1.13
7	**Leaf glazing beads**	
	Supplier:	Exitex Limited.
	Description:	Mitre jointed bolection beads of foil wrapped MDF.
	Density (kg/m^3):	746**
	Overall size (h x d):	30 x 21
	Splay angle (°):	17
	Bolection (h x d)	6 x 6
	Fixings (l):	Pins 18swg x 50
	Centres:	100 max
	Photo(s):	2.1.9 and 2.1.13
8	**Hinges**	
	Supplier:	Eclipse Architectural Hardware
	Type:	Arrone butt hinge AR8582-SSS** Grade 13.

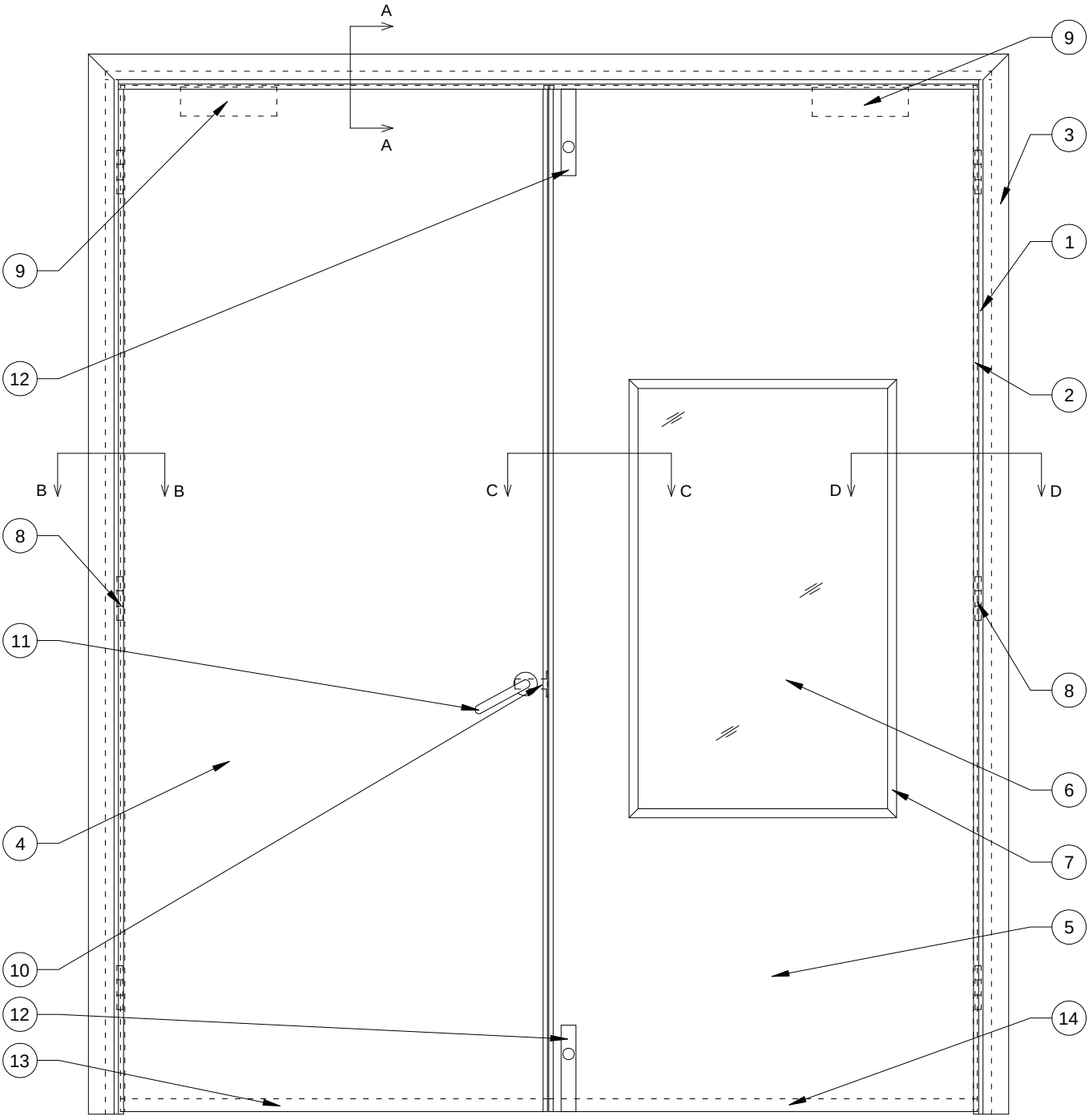
Item	Component	Information
8 cont	Material: Number: Location: Blade size (h x w x t): Knuckle size (Ø): Fixings to frame (Ø x l): Fixings to door (Ø x l): Photo(s):	Stainless Steel. 3 Set at 152, 1149 and 2059 from the top of the leaf to the top of the blade. 102 x 30 x 3. 14. 4 No Ø5.4 x 31 countersunk steel wood screws per blade. 4 No Ø5.4 x 31 countersunk steel wood screws per blade. 2.1.1, 2.1.7 and 2.1.13
9	**Closer** Manufacturer: Reference: Description: Overall size (l x h x d): Photo(s):	 Hoppe. Arrone AR 450-SE** 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 using 2No. Ø5.4 x 23long steel pan head screws to the frame and 4No.Ø5.75 x 30 long steel countersunk screws to the leaf. 248 x 45 x 52 body 255 x 68 x 57 cover 2.1.1, 2.1.7 and 2.1.13
10	**Latch** Manufacturer: Part number: Description: Fixings: Overall size: Body (h x w x d): Forend (h x d x t): Strike box (h x d x t): Strike (h x d x t): Photo(s):	 Hoppe AR8019-76 SC/EB** A steel cylinder tubular latch fitted central to the leaf thickness such that the centreline of the spindle is 1000 above the base of the left hand leaf. The strike tongue was fitted the wrong way round. 2No. steel countersunk woodscrews in forend and strike. 23 x 15 x 74 60 x 25 x 2 28 x 20 x 15 plastic 65 x 41 x 1.3 including a 31 x 16 tongue. 2.1.4 and 2.1.10
11	**Handleset** Manufacturer: Reference: Description: Overall Size: Handle (Ø x l): Rose (Ø x d):	 Hoppe E11382/849N round rose handle** Curved lever handle, aluminium with steel subcomponents. 20 x 144 55 x 2

Item	Component	Information
11	Photo(s):	2.1.3, 2.1.4 and 2.1.13
12	**Flat bolts** Manufacturer: Reference: Description: Overall Size (h x w x d): Photo(s):	 Hoppe Arrone AR421B-SC 2 No. stainless steel slide bolts face fixed to unexposed side of right hand door leaf. 202 x 35 x 11 2.1.8, 2.1.12 and 2.1.13
13	**Automatic Door Bottom left hand leaf** Supplier: Reference: Description: Size (h x d x l) Fixings Photo(s)	 Exitex Limited Concealex A8100** Aluminium body with brass and steel components and a polymeric seal. 20 x 12 x 996 1No steel woodscrew positioned 40 from meeting stile end. 2.1.5
14	**Automatic Door Bottom right hand leaf** Supplier: Reference: Description: Size (h x d x l) Fixings Photo(s)	 Exitex Limited Concealex A8100 Superior ** Aluminium body with brass and steel components and a polymeric seal. 35 x 14.2 x 1000 2No steel woodscrews positioned 148 from hanging stile end and 225 from meeting stile end. 2.1.11 and 2.1.12
15	**Intumescent – frame** Manufacturer: Reference: Description: Location: Overall Size: Photo(s):	 Exitex Limited Exitex 15 x 4** A graphite-based intumescent in a PVC casing with self-adhesive tape on one side and fully interrupted at the hinges. Set 13 from the exposed face of the head and jambs. 15 x 4 2.1.1, 2.1.5, 2.1.7 and 2.1.8
16	**Intumescent – left hand leaf meeting stile** Manufacturer: Reference: Description: Location:	 Exitex Limited Exitex 15 x 4** A graphite-based intumescent in a PVC casing with self-adhesive tape on one side and fully interrupted at the strike and uninterrupted by the automatic door bottom. Set 13 from the exposed face of the left hand meeting stile.

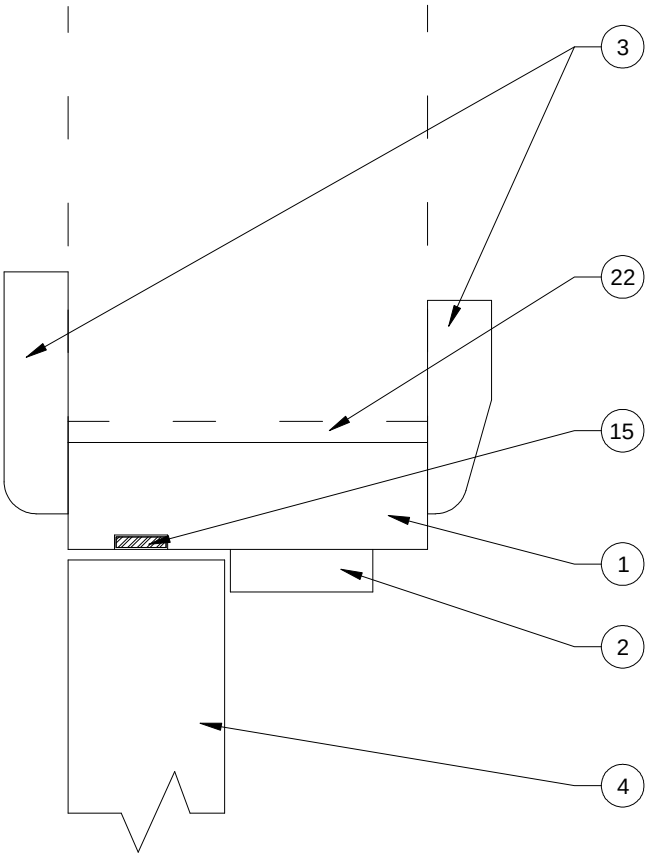
Item	Component	Information
16 cont	Overall Size: Photo(s):	15 x 4 2.1.2, 2.1.4 and 2.1.6
17	**Intumescent – hinge** Supplier: Reference: Description: Overall size (t):	 Exitex Limited Exi-Fire hinge pads** A graphite based intumescent fitted beneath each blade 1
18	**Intumescent – latch** Supplier: Reference: Description: Overall size (t):	 Exitex Limited Exi-Fire intumescent latch protection** A graphite based intumescent wrapped around body of latch 1
19	**Intumescent – strike and forend** Supplier: Reference: Description: Thickness (t):	 Exitex Limited Exi-Fire intumescent latch protection** A graphite based intumescent placed beneath strike and around strike box. 1
20	**Intumescent – glazing 1** Supplier: Reference: Description: Overall size (w x t): Photo(s):	 Exitex Limited Exi-Glaze 30** A compressible seal with double sided self-adhesive tape to one face. Fitted between the glass and bead face. 9 x 4 2.1.9
21	**Intumescent – glazing 2** Supplier: Reference: Description: Overall size (w x t):	 Exitex Limited Exitex Intumescent/acoustic acrylic** A bead of mastic was applied around the perimeter of the glass. 7 x 7
22	**Fire stopping installation detail** Supplier: Reference: Description:	 Craylon Limited Blue 60** The 7mm gaps between the frame and the associated construction were filled with Craylon Blue 60 expanding foam in conjunction with Craylon Blue 60 fire rated packers (1,3 and 5mm thick) at the fixing points..

Key:
* Nominal value
** Sponsor declared value or detail, not verified by laboratory

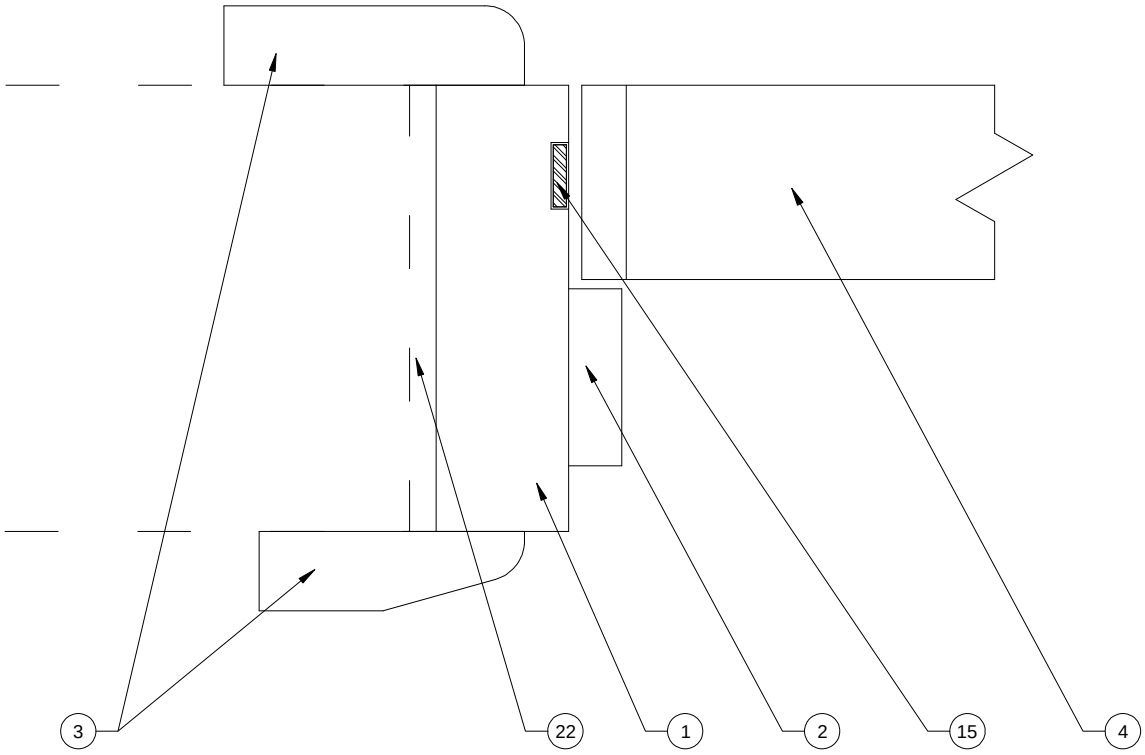
Appendix 1 Figure 1 – Doorset elevation – unexposed face including hidden detail



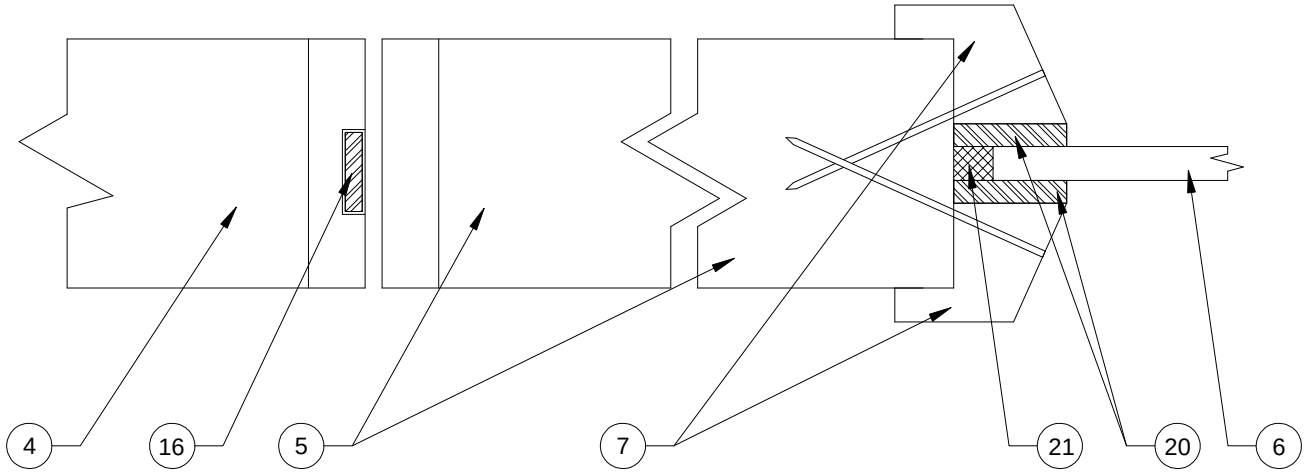
Appendix 1 Figure 2 – Section A – A



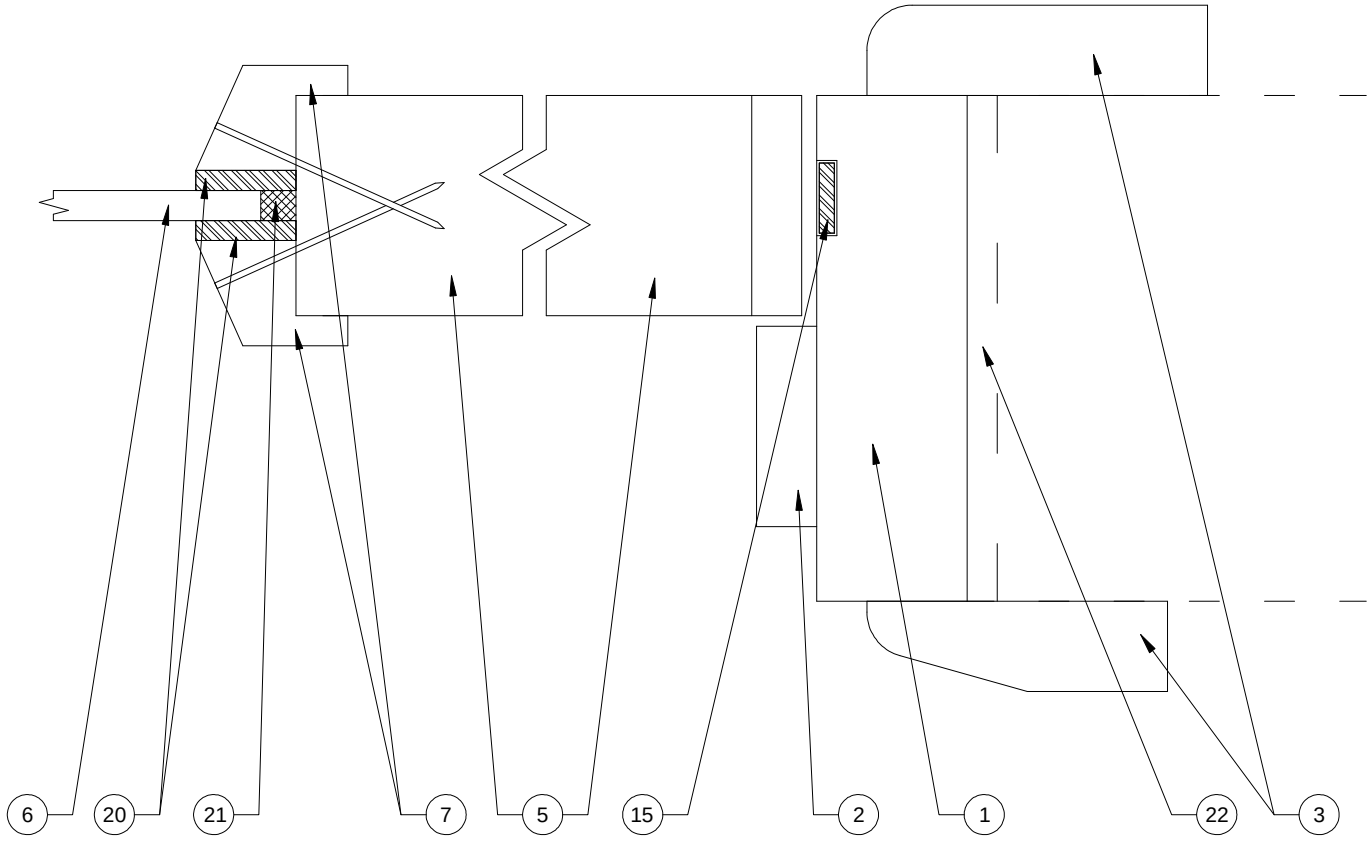
Appendix 1 Figure 3 – Section B – B



Appendix 1 Figure 4 – Section C – C



Appendix 1 Figure 5 – Section D – D



APPENDIX 2 PHOTOGRAPHS

Appendix 2.1 Pre-test photos

Photo 2.1.1 - Left hand leaf

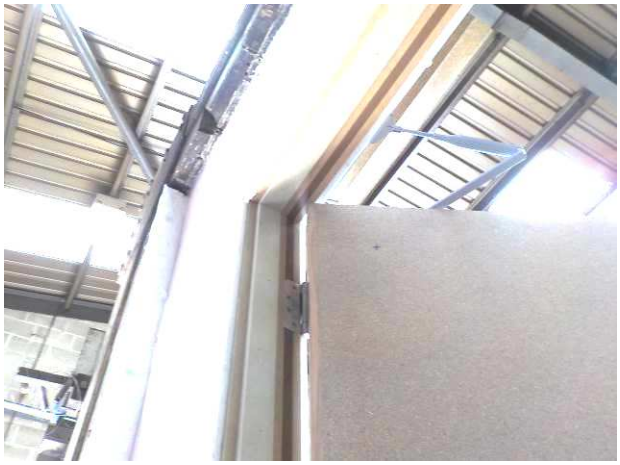


Photo 2.1.2 - Left hand leaf

Photo 2.1.3 - Left hand leaf

Photo 2.1.4 - Left hand leaf

Photo 2.1.5 - Left hand leaf

Photo 2.1.6 - Left hand leaf

Photo 2.1.7 - right hand leaf

Photo 2.1.8 - right hand leaf

Photo 2.1.9 - right hand leaf

Photo 2.1.10 - right hand leaf

Photo 2.1.11 - right hand leaf

Photo 2.1.12 - right hand leaf

Photo 2.1.13

Appendix 2.2 During test photos

Photo 2.2.1

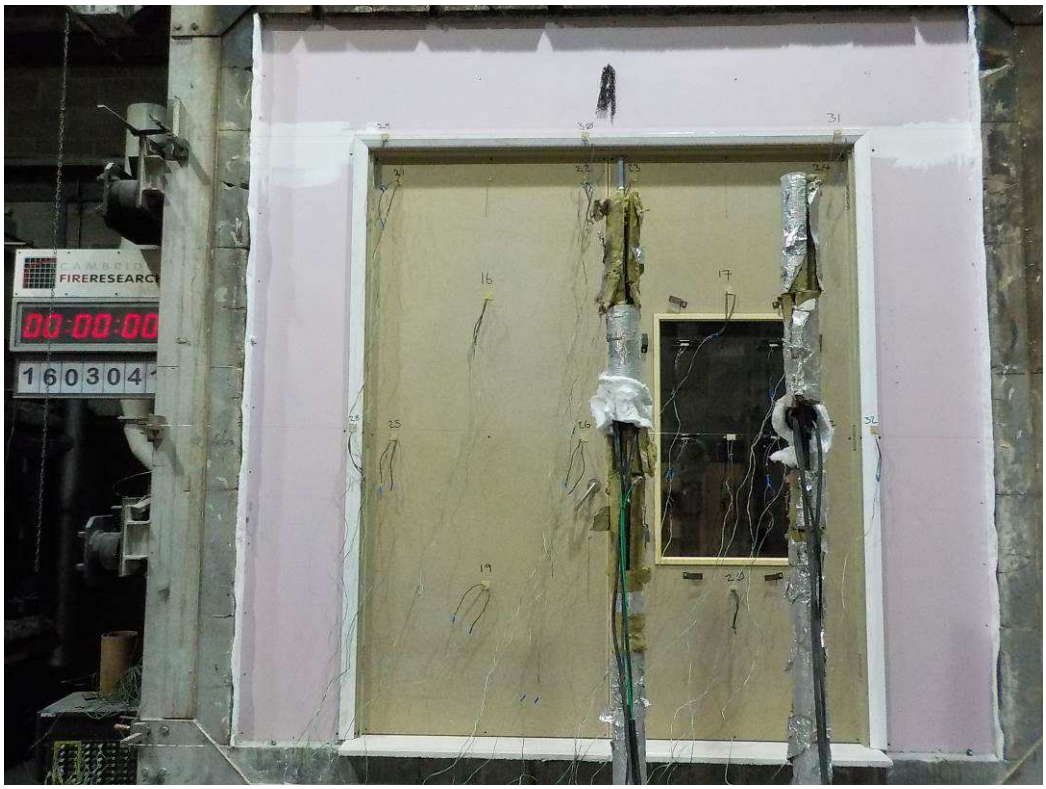


Photo 2.2.2

|Photo 2.2.3

Photo 2.2.4

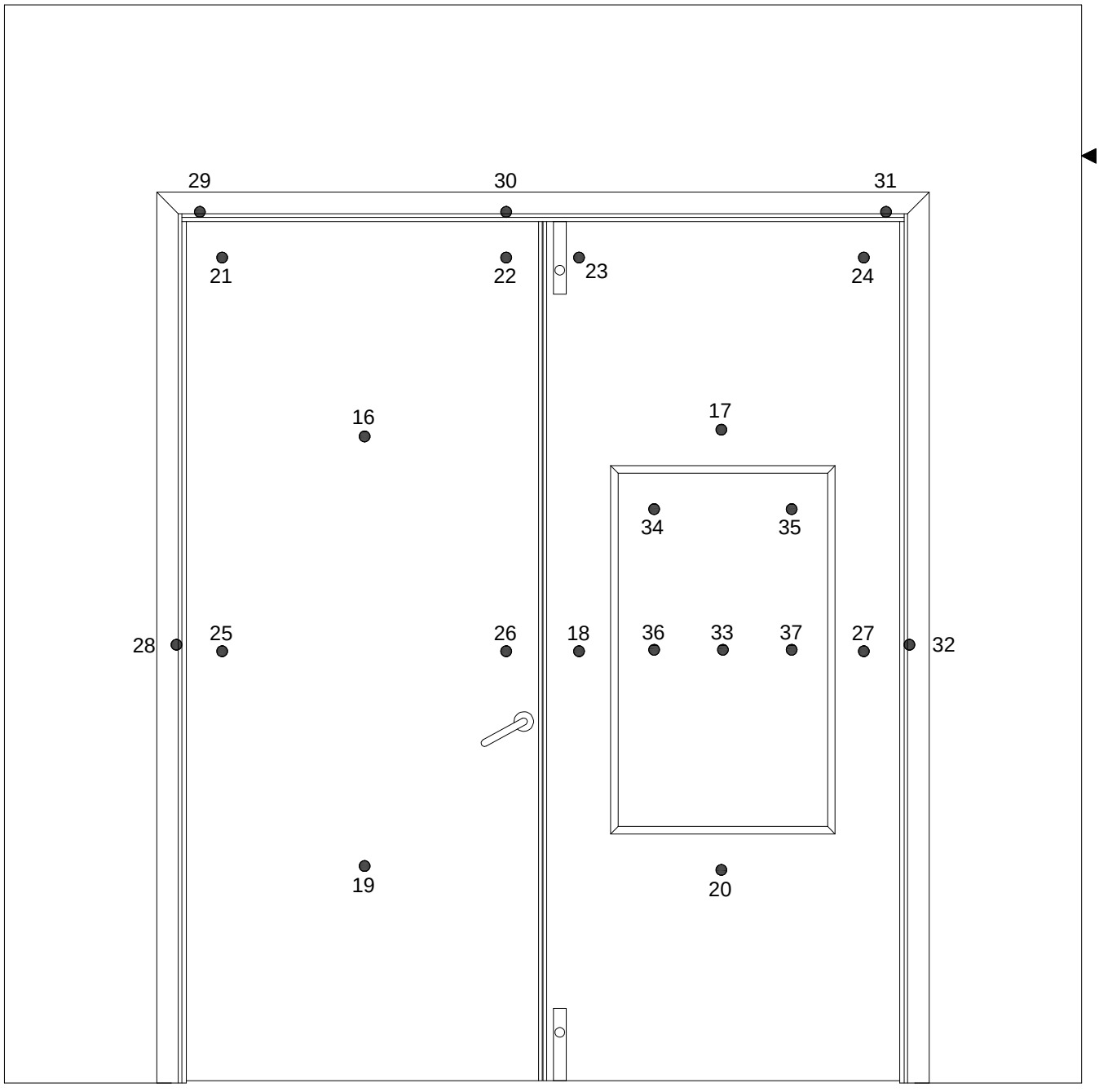
Photo 2.2.5

Photo 2.2.6

Appendix 2.3 Post test photos

Photo 2.3.1

APPENDIX 3 POSITIONING OF INSTRUMENTATION



● Unexposed face specimen thermocouple
◀ Furnace pressure measurement position

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APPENDIX 4 RECORDED THERMOCOUPLE DATA

Time	Chan 16	Chan 17	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Chan 23
min	°C	°C	°C	°C	°C	°C	°C	°C
0	10	11	11	11	10	11	11	11
1	16	13	12	12	11	31	13	21
2	12	15	12	12	11	24	12	18
3	11	19	11	11	11	20	12	16
4	11	24	11	11	11	23	12	18
5	11	28	17	11	11	41	15	24
6	11	33	15	11	11	31	14	20
7	11	38	15	12	11	27	14	19
8	12	41	14	12	11	25	14	18
9	11	43	15	12	12	23	14	18
10	11	47	17	12	13	22	14	18
11	12	52	18	13	14	23	15	19
12	12	56	19	14	16	24	16	21
13	12	60	21	16	19	27	18	24
14	13	64	24	18	22	32	22	27
15	14	69	27	22	26	38	26	31
16	14	73	30	24	30	43	30	35
17	16	76	34	28	34	48	35	39
18	16	80	37	31	37	52	40	43
19	16	81	40	35	40	55	45	47
20	18	84	43	38	43	58	49	50
21	18	86	45	41	45	59	53	52
22	19	89	47	44	48	61	56	54
23	19	89	49	46	49	62	59	56
24	18	90	51	48	51	63	61	58
25	20	92	53	50	52	64	62	59
26	20	92	54	52	53	65	63	60
27	21	93	55	53	54	65	64	61
28	21	96	56	55	55	66	65	62
29	19	95	57	56	56	66	65	63
30	21	97	58	57	57	66	66	64
31	22	99	60	58	58	67	67	65
32	22	103	61	59	59	68	68	66
33	21	104	61	60	60	70	73	67
34	22	105	62	61	60	72	91	68
35	20	107	65	62	61	75	115	114
36	22	110	65	63	62	80	144	76
37	22	103	65	64	63	95	170	81
38	24	112	66	65	64	106	178	68
39	23	116	67	66	65	122	203	77
40	24	117	68	66	66	124	235	59
41	22	123	69	68	67	131	220	73

CAMBRIDGE FIRERESEARCH

Time	Chan 24	Chan 25	Chan 26	Chan 27	Chan 28	Chan 29	Chan 30	Chan 31
min	°C	°C	°C	°C	°C	°C	°C	°C
0	11	11	11	11	11	11	11	11
1	26	20	12	16	11	13	15	15
2	20	17	11	14	11	17	14	16
3	18	15	11	14	11	15	13	15
4	19	14	11	13	11	23	17	22
5	32	19	12	16	11	30	23	26
6	26	17	12	14	11	40	22	37
7	23	16	12	14	11	41	22	32
8	21	15	12	13	11	41	22	33
9	21	15	12	13	11	42	23	27
10	21	15	13	14	11	42	28	26
11	21	16	15	15	12	41	28	25
12	22	18	18	16	12	41	25	24
13	24	21	21	18	12	40	23	23
14	26	25	23	21	12	41	22	23
15	29	31	26	24	12	41	22	25
16	32	36	30	27	12	41	22	26
17	35	41	33	31	13	41	22	25
18	38	45	37	34	13	42	23	25
19	41	48	41	37	13	42	23	25
20	44	51	45	40	14	42	24	27
21	46	54	48	42	14	43	24	28
22	49	56	51	45	14	42	25	31
23	50	57	53	47	14	42	26	31
24	52	58	55	49	15	42	28	31
25	54	60	57	51	15	42	28	32
26	56	61	58	52	15	42	29	32
27	58	61	59	54	15	43	30	34
28	59	62	60	55	16	44	30	36
29	60	63	61	57	16	46	31	35
30	62	63	62	58	16	49	35	35
31	63	64	63	60	17	54	40	37
32	65	65	64	61	17	62	46	38
33	66	65	64	62	18	72	46	38
34	67	66	65	63	18	92	50	41
35	68	66	66	64	18	118	67	42
36	70	67	66	65	19	129	67	45
37	72	68	67	66	19	115	67	56
38	74	68	68	67	20	119	66	77
39	77	69	69	68	20	126	65	105
40	81	70	70	69	21	131	69	126
41	86	71	71	70	21	137	81	138

CAMBRIDGE FIRERESEARCH

Time	Chan 32	Chan 33	Chan 34	Chan 35	Chan 36	Chan 37
min	°C	°C	°C	°C	°C	°C
0	11	10	11	10	10	10
1	11	42	41	40	42	45
2	11	110	107	101	109	107
3	11	167	173	161	161	162
4	11	207	212	208	207	210
5	12	240	241	237	243	244
6	12	284	282	279	288	285
7	12	323	320	320	338	326
8	12	360	352	355	380	362
9	12	393	387	389	406	396
10	13	424	413	410	426	420
11	13	440	428	424	441	432
12	14	449	440	437	454	442
13	14	458	449	448	463	451
14	14	465	457	459	471	460
15	15	474	465	467	478	468
16	15	481	471	473	483	475
17	16	488	476	480	488	481
18	16	494	481	485	492	487
19	16	499	485	491	497	492
20	17	505	490	495	500	498
21	18	510	494	499	506	504
22	18	515	498	505	509	509
23	19	519	502	352	513	515
24	19	524	506	245	519	520
25	20	529	510	375	524	526
26	20	534	514	340	529	532
27	20	538	518	528	534	537
28	21	544	522	503	536	543
29	22	548	526	209	542	549
30	22	552	529	192	545	554
31	22	555	533	181	549	558
32	23	559	538	185	553	563
33	23	562	543	197	556	567
34	24	565	547	192	558	571
35	25	567	550	195	561	574
36	25	569	552	195	562	576
37	25	570	557	199	564	579
38	25	574	558	207	566	582
39	26	577	561	211	496	585
40	28	535	564	212	533	588
41	28	544	402	218	368	593

* Thermocouple malfunction