

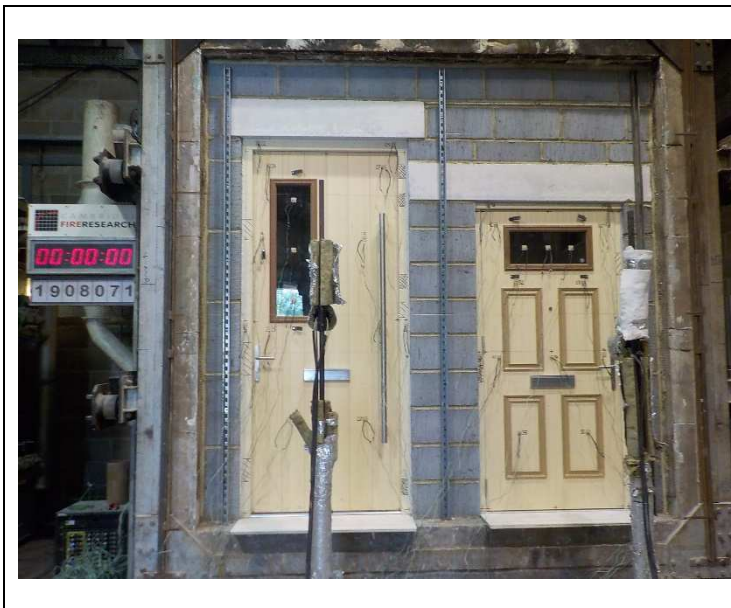
C A M B R I D G E
FIRE RESEARCH

**TEST REPORT NUMBER
 CFR1908071_B Revision 1**

**FIRE RESISTANCE TEST
 IN ACCORDANCE WITH BS EN 1634-1:2014 + A1:2018**

Sponsor:	O. H. Industri A/S
Address:	Smedevej 17 DK-7430 Ikast
Date of test:	7 th August 2019

Results:		
	<u>Left hand specimen:</u>	<u>Right hand specimen:</u>
Test duration:	36 minutes*	36 minutes*
Integrity:		
Sustained flaming:	35 minutes	36 minutes**
Gap gauge:	36 minutes**	36 minutes**
Cotton pad:	36 minutes**	36 minutes**
Insulation:		
Discrete area 1	35 minutes**	36 minutes**
Discrete area 2	15 minutes	13 minutes
	* discontinued at the request of the sponsor	
	**no failure, the test having been discontinued	



Summary of test specimen:

Two single acting single leaf doorsets with the left-hand leaf opening towards the heating conditions of the test and the right hand opening away from the heating conditions of the test. Both doorsets were tested with their automatic 3-point latch engaged.

Left hand doorset:
 Leaf size 2400 x 1000 x 44

Right hand doorset:
 Leaf size 1981 x 914 x 44

This test report is only valid when presented in full.

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1 PREPARATION FOR TESTING

1.1 Specimen conditioning

The specimens were received by Cambridge Fire Research on 05/08/2019. During the last 2 days that the specimens were on site the temperature and relative humidity were recorded to be within the range of 22 to 28°C and 41 to 58% respectively.

1.2 Supporting construction

Cambridge Fire Research installed a standard low-density rigid wall supporting construction comprising 140 mm Celcon Standard blocks and mortar in accordance with EN1363-1:2012 (intended fire resistance EI30). This provided two apertures; 2460 mm high x 1103 mm wide for the left-hand specimen, 2045 mm high x 1015 mm wide for the right-hand specimen.

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 specimens were supplied complete by the sponsor, and installed by Cambridge Fire Research following the sponsor's installation instructions.

1.4 Specimen verification

Cambridge Fire Research carried out a detailed survey of the specimens. 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 restraint

Cambridge Fire Research installed the specimens into the supporting construction. The specimens were asymmetrical and fitted such that the left-hand leaf towards the heating conditions of the test and the right-hand leaf opened away from the heating conditions of the test. Both leaves were tested with their automatic 3-point latch engaged.

The specimens were affixed to the supporting construction as described in Appendix 1.

Note: BS EN 1634-1:2014 + A1:2018 Section 13.4 indicates that a timber doorset tested opening towards the heating conditions of the furnace does not require a test of the same doorset opening away from the heating conditions of the furnace.

2 PRE-TEST MEASUREMENTS AND SETTING

2.1 Mechanical pre-test conditioning

Mechanical pre-test conditioning was carried out in accordance with BS EN 16034:2014. This included fully opening and closing for 25 cycles to check for operability.

As a closer was fitted to the right hand doorset one additional operation was carried out on this doorset comprising opening the leaf to $10^{\circ} \pm 2^{\circ}$, holding for $20 \text{ s} \pm 2 \text{ s}$ and releasing without shock. This was at a maximum mean average speed of 300 mm/s and a closed position was achieved.

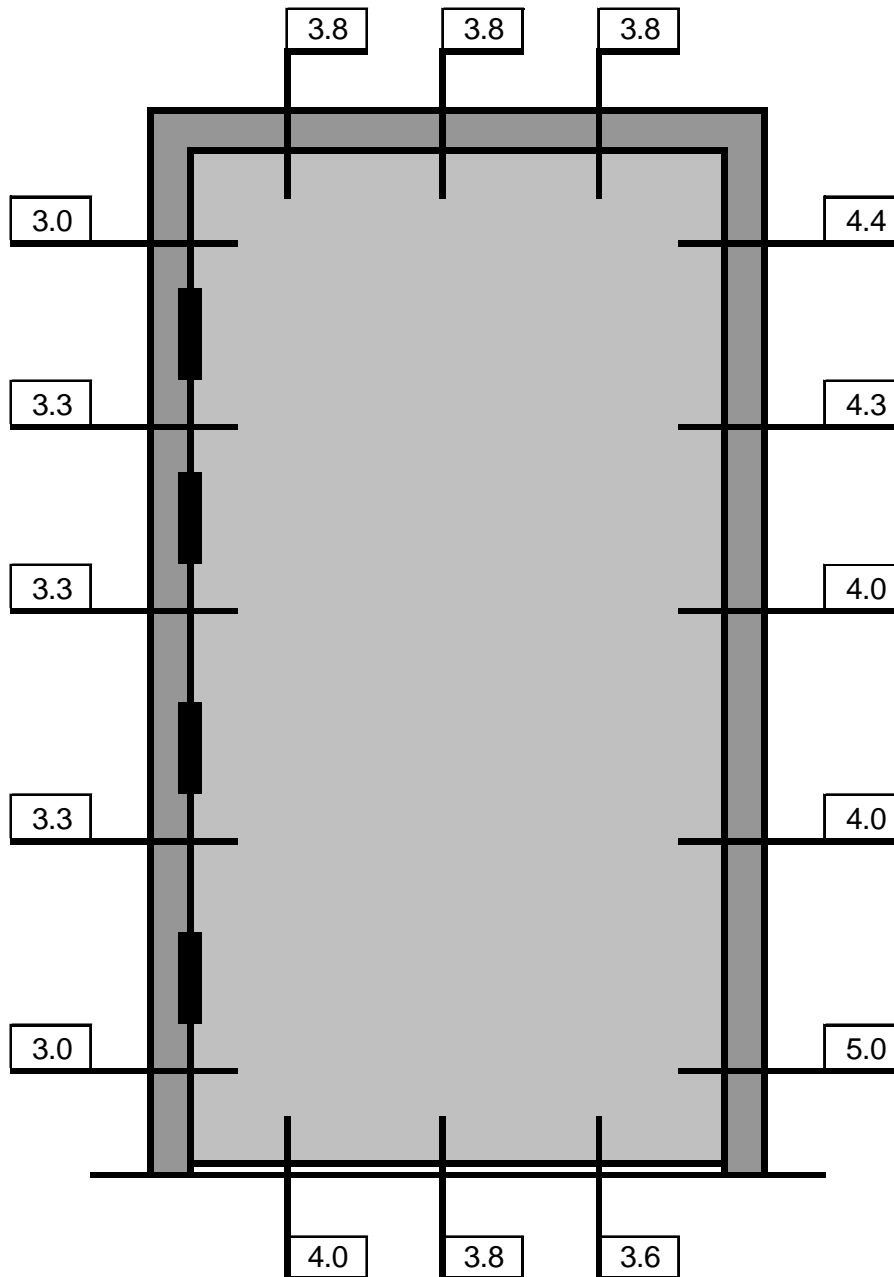
2.2 Gap measurements

Leaf to Frame gaps

The primary gaps between the leaf edges and the frame and between the base of the leaf and the floor were measured on the hinge knuckle face prior to the start of the test.

The following figures show the positions at which the measurements were made and the recorded gap (mm) at those positions.

Left hand specimen viewed from the side exposed to the heating conditions.

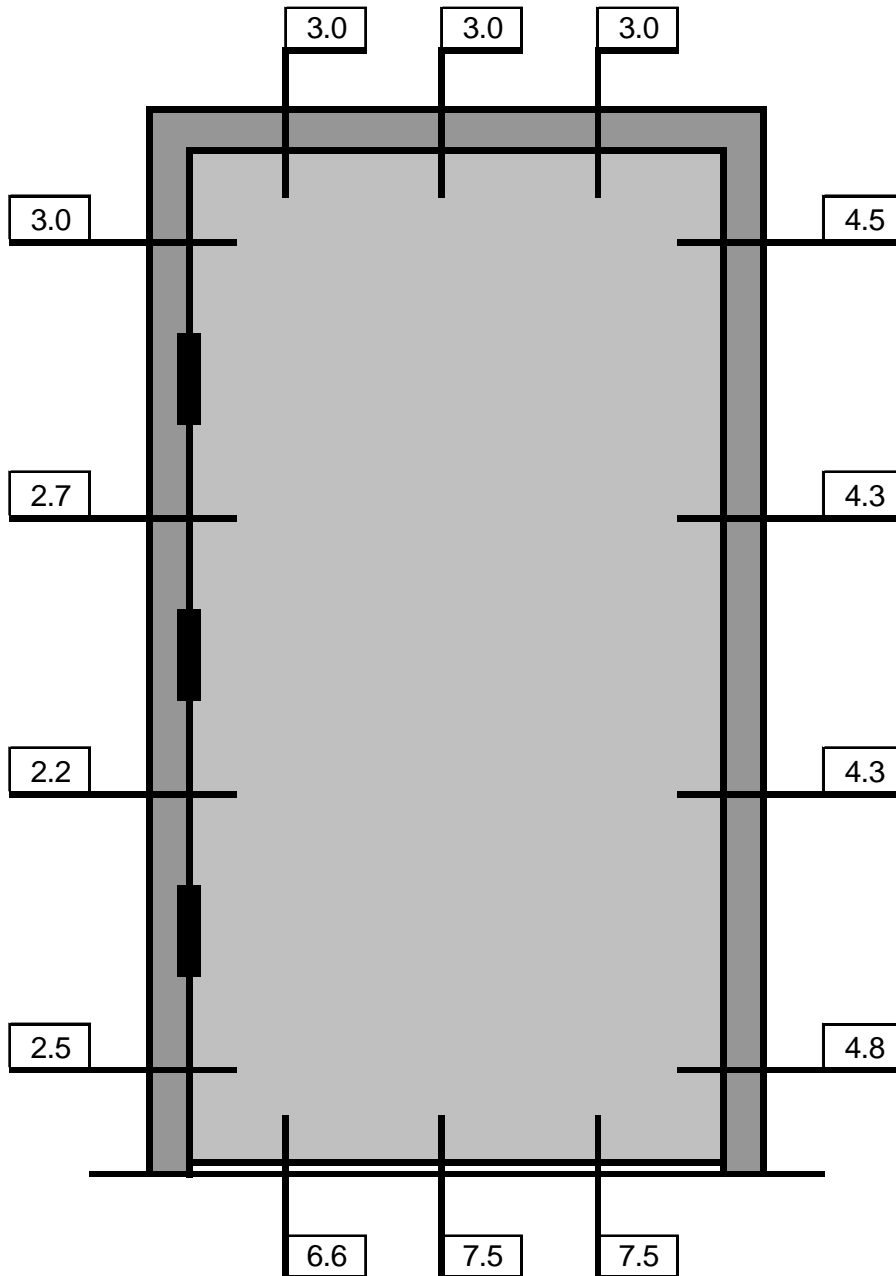


Maximum gaps in practice

The maximum permitted gaps in practice are (EN 1634-1: 2014 + A1:2018 §13.3.3.2.5):

Primary gap region	Gap width (mm)
Head	6
Hanging stile	5
Closing stile	6.5
Threshold	6

Right hand specimen viewed from the side unexposed to the heating conditions



Maximum gaps in practice

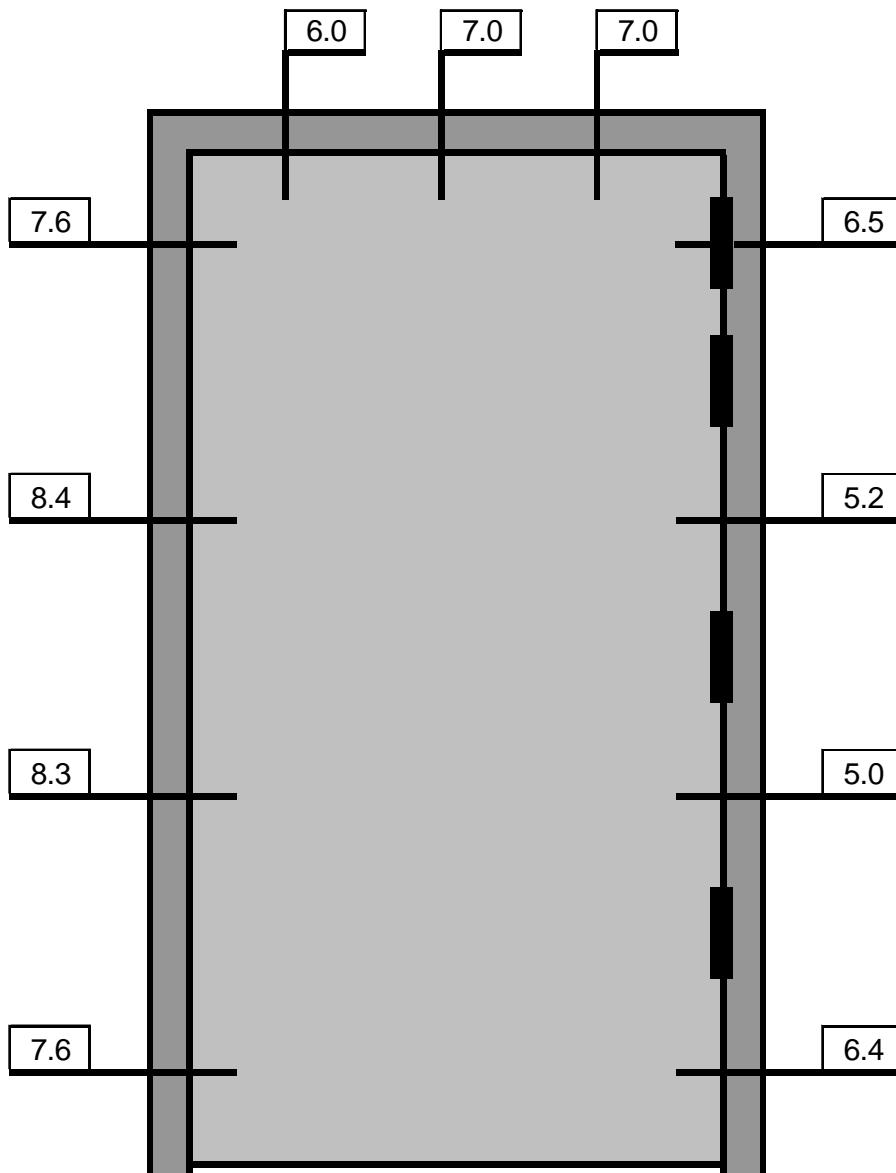
The maximum permitted gaps in practice are (EN 1634-1: 2014 + A1:2018 §13.3.3.2.5):

Primary gap region	Gap width (mm)
Head	5
Hanging stile	5
Closing stile	7
Threshold	9.5

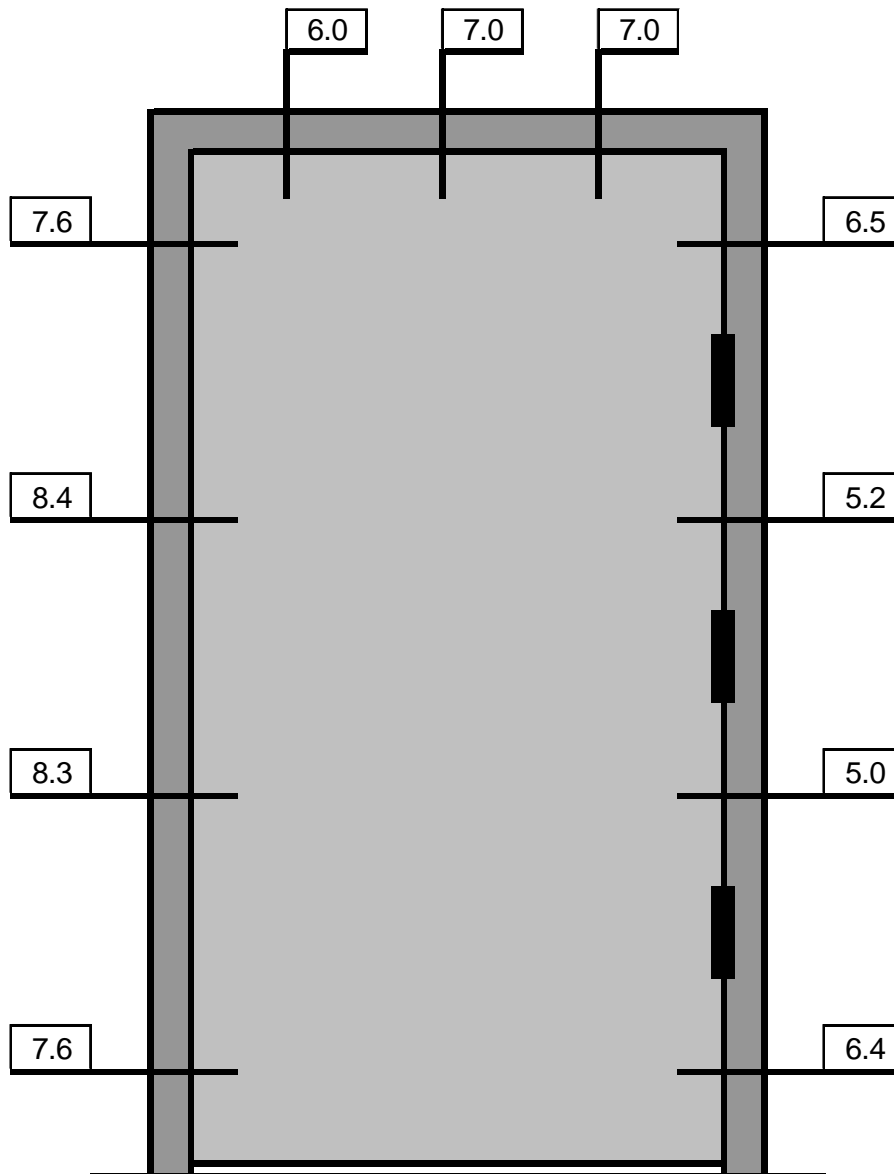
Leaf to Stop Gaps

The gap between the face of the leaf and the stop of the frame was also measured prior to the start of the test. The following figures shows the positions at which the measurements were made and the recorded gap (mm) at those positions.

Left hand specimen



Right hand specimen



2.4 Closing force measurement

Left hand doorset

The closing force was measured in accordance with the test standard. The measured force to open the leaf with the force gauge operating against the direction of closing was 55.6 N. The handle position was measured as 956 mm from the centreline of the hinge

Right hand doorset

The closing force was measured in accordance with the test standard. The measured force to open the leaf with the force gauge operating against the direction of closing was 41.4 N. The handle position was measured as 868 mm from the centreline of the hinge

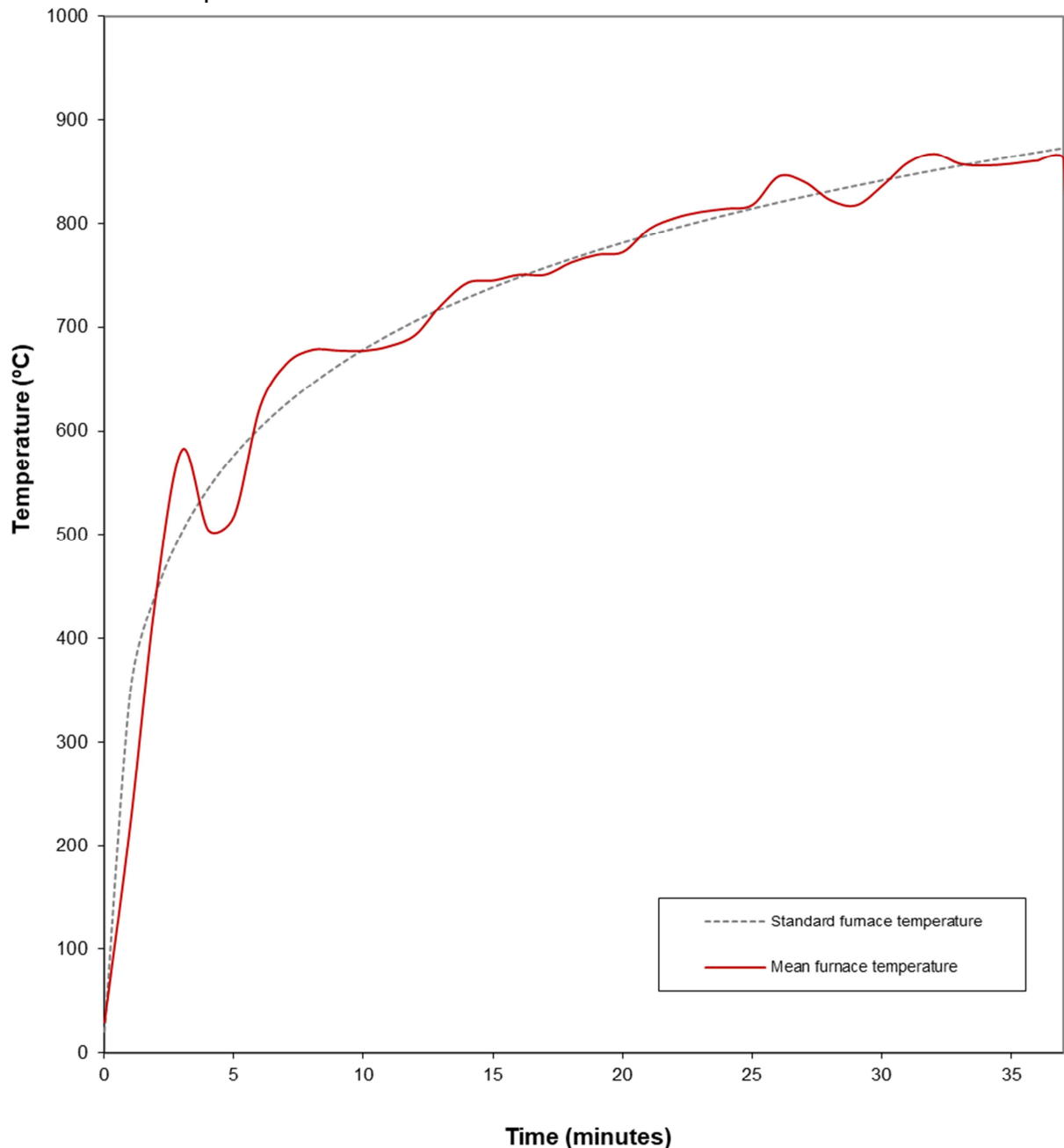
2.5 Final setting

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 300mm and closing the left-hand leaf manually and allowing the right-hand leaf to close by the closing device.

3 TEST CONDITIONS, INSTRUMENTATION AND MEASURING

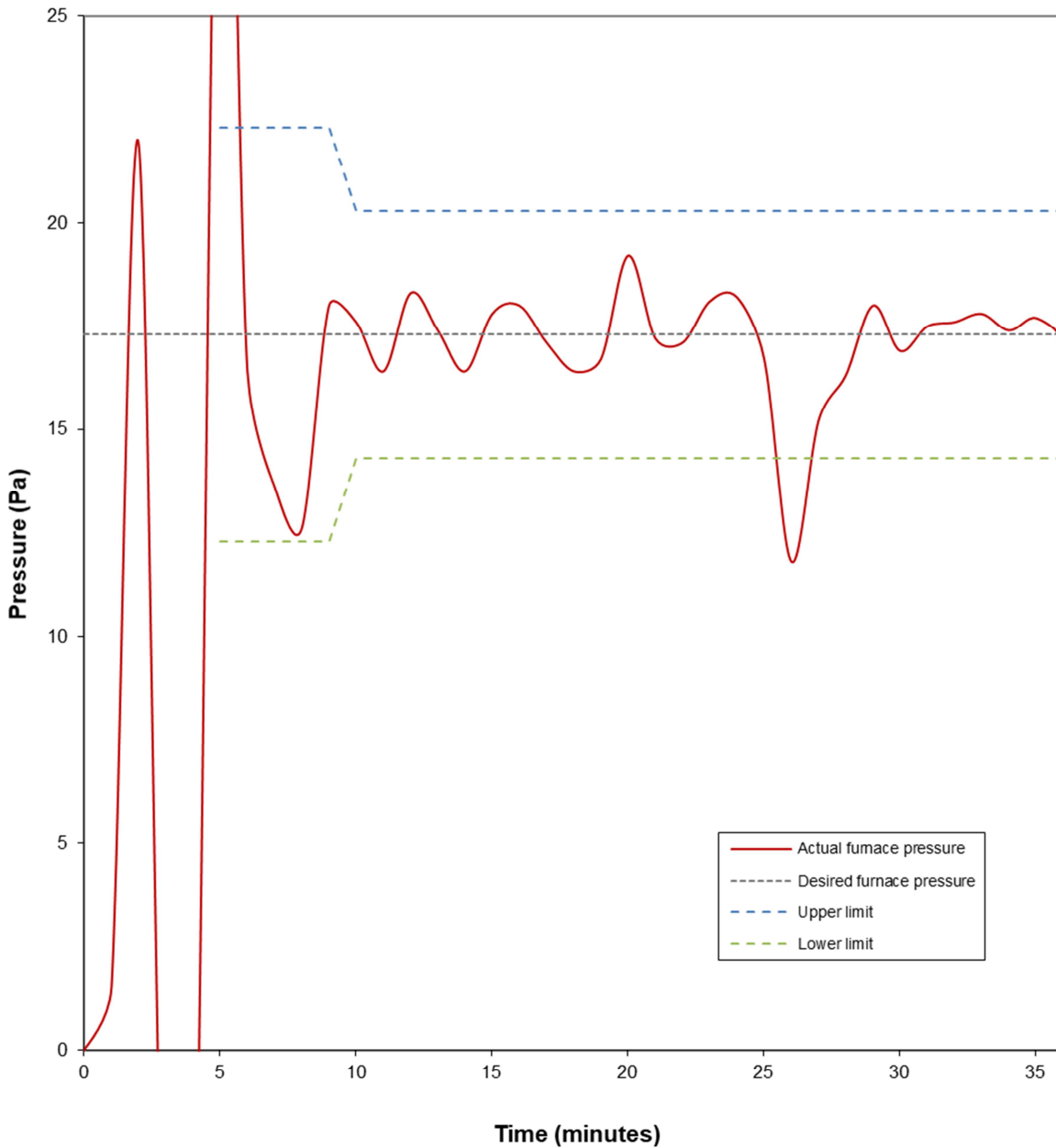
3.1 Furnace temperature

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, except for 2 instantaneous occasions which were deemed to be 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 25°C, this remained the same for the entire 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 specimen to monitor the temperature rise as follows:

Left-hand doorset

Discrete area 1 Doorset Leaf.	Channels 16 to 20 Channels 21 to 28	(mean & maximum) (maximum only)
Discrete area 2 Glazed panel	Channel 30 Channels 29 and 31	(mean & maximum) (maximum only)

Right-hand doorset

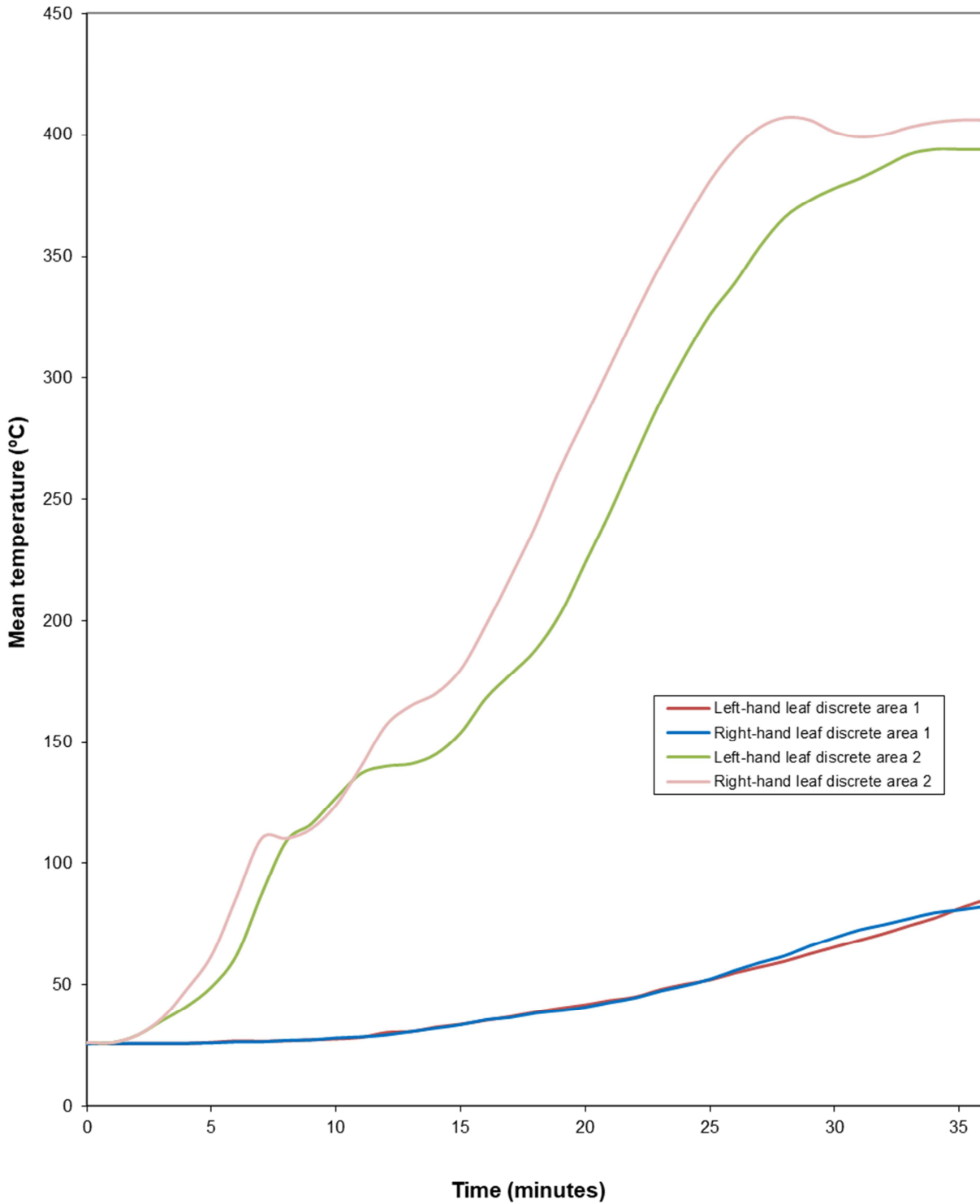
Discrete area 1 Doorset Leaf.	Channels 32 to 36 Channels 37 and 44	(mean & maximum) (maximum only)
Discrete area 2 Glazed panel	Channels 46 Channels 45 and 47	(mean & maximum) (maximum)

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.

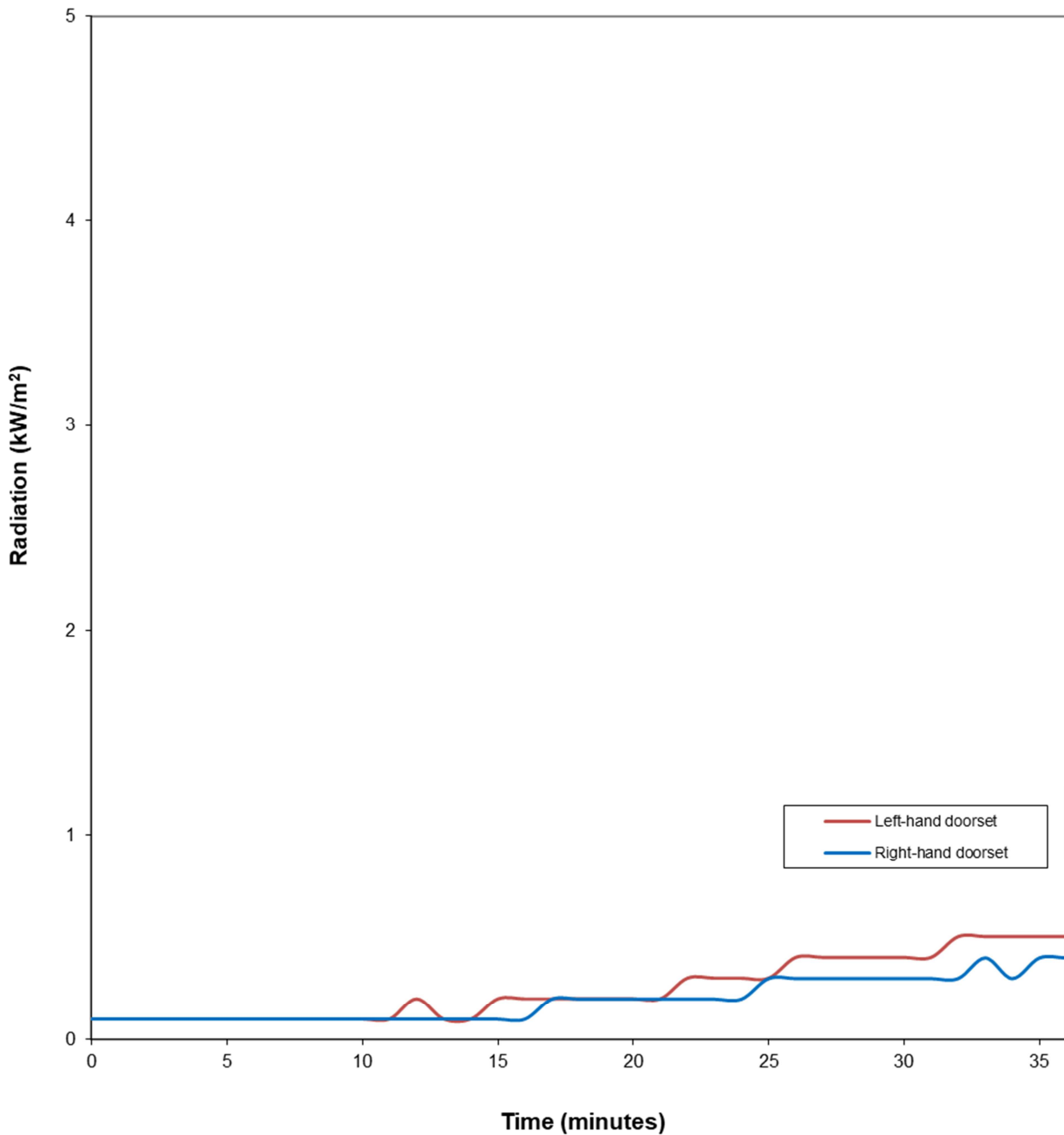
The recorded data of all individual thermocouples is shown in the tables in Appendix 4.

The following time/temperature graph shows the mean temperatures of leaves, including the discrete areas.



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 its geometric centre. The following graph shows the recorded irradiance/time data.

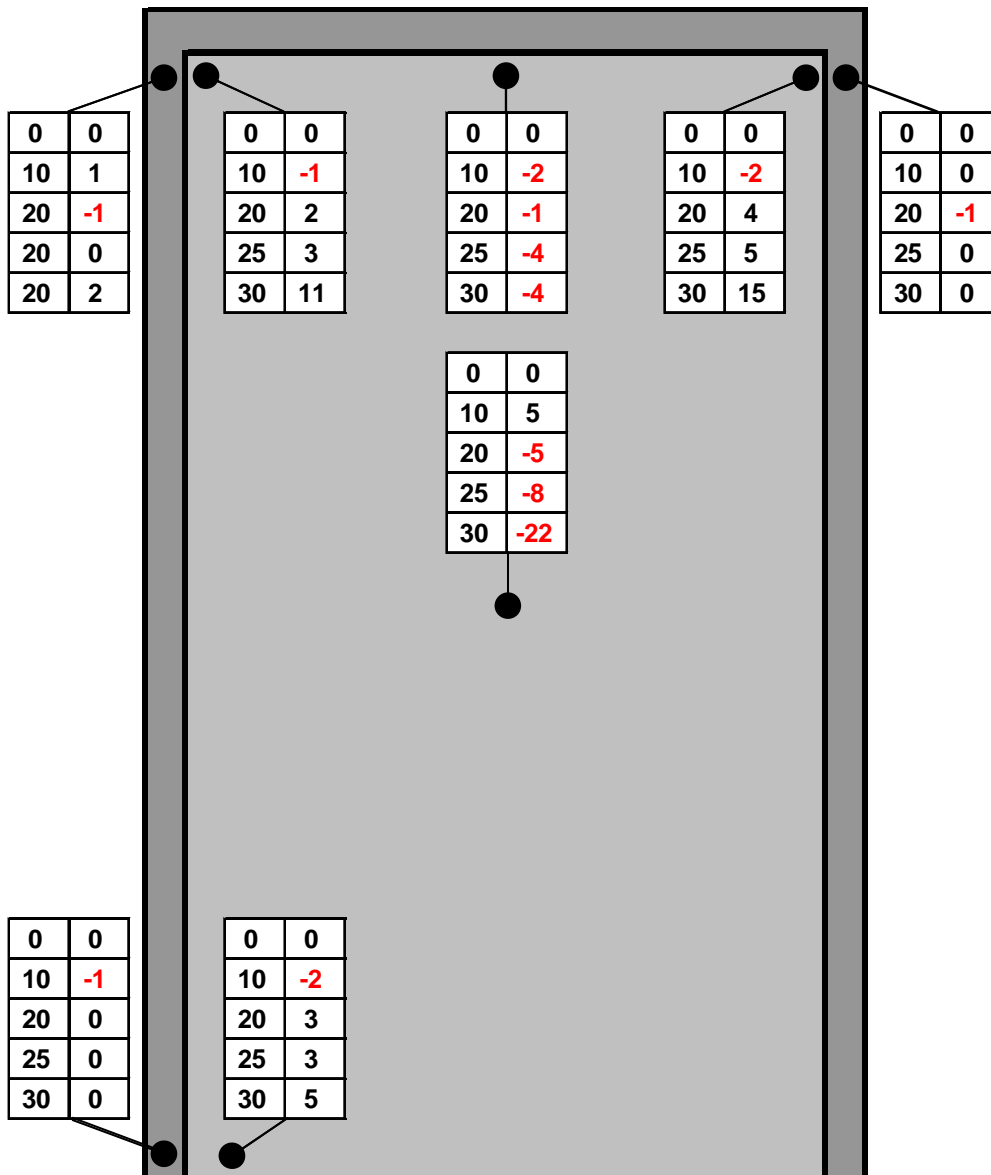


During the test the average radiation did not exceed the heat flux level of 5kW/m². It should be noted that the recorded value of radiation drops when the field of view is physically interrupted for example during the measurement of deflection

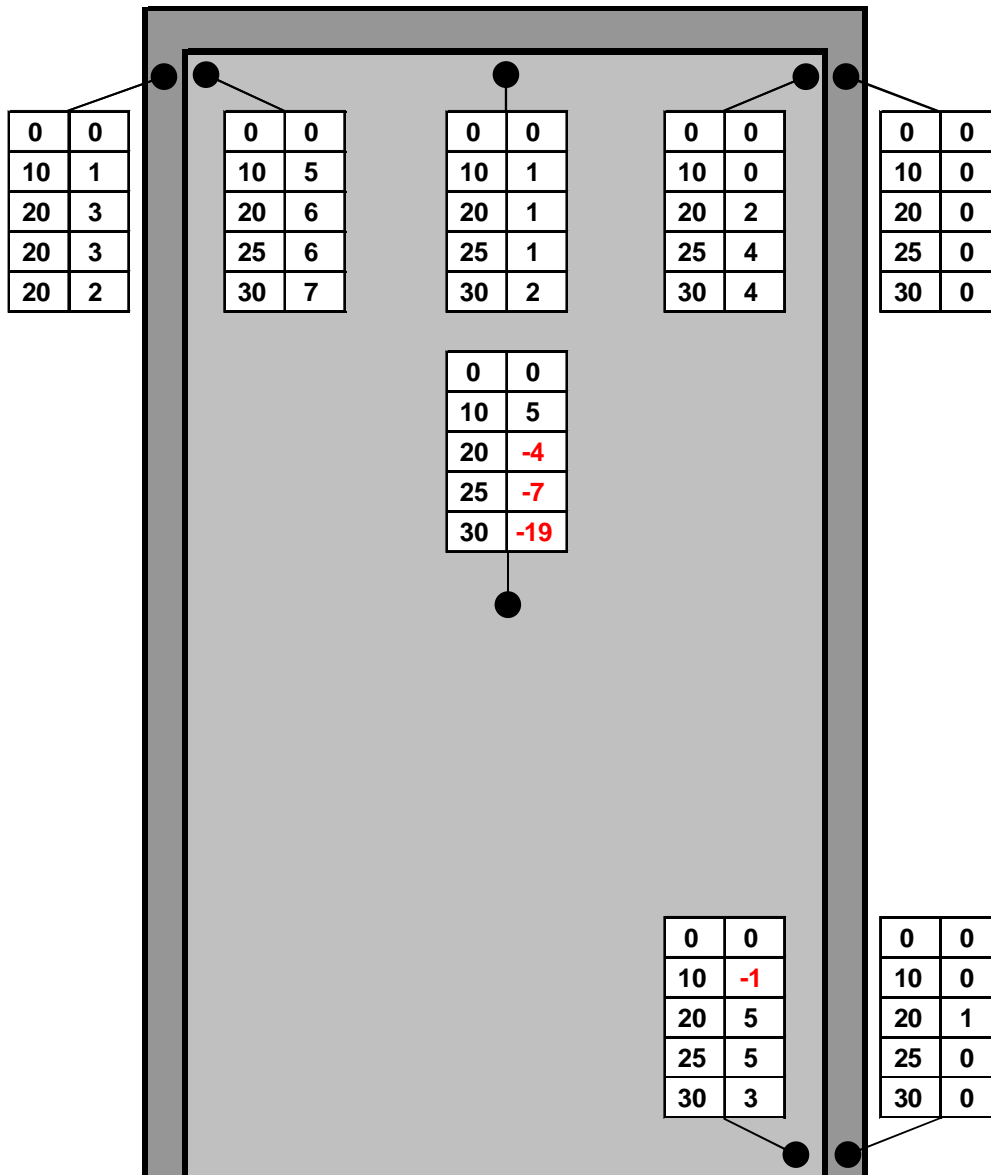
3.6 Deflection

Taut stainless-steel wires were anchored horizontally across the unexposed face of the specimen 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 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 specimen



Right hand specimen



4 TEST OBSERVATIONS

Left hand specimen

Photographs taken during the test are shown in Appendix 2.

TEST OBSERVATIONS (E = Exposed face: U = Unexposed face)		
Time (min:sec)	Face	Observation
00:00		Start of test
01:47	U	The glazing is cracking.
02:37	U	The inner layer of the glazing has cracked.
04:01	U	Smoke/steam is issuing in the double-glazed unit.
05:00	U	Medium smoke/steam is issuing at the closing stile mid-height, letterbox.
06:02	E	The exposed layer of glazing has partially detached.
06:32	U	Medium smoke/steam is issuing at the head spewing out of the leaf grooves.
06:45	U	Intumescent interlayer has begun to activate.
07:22	U	Smoke has ceased at the closing stile.
09:35	E	Facing has partially detached and fissured.
11:44	U	Intumescent is pushing the letterplate open.
12:25	U	Medium smoke/steam is issuing at the handleset.
19:07	U	A cotton pad is applied at the glazing mid-height, mid-width, no failure.
22:15	E	Beading has partially detached.
26:54	U	Medium smoke/steam is issuing at the top corners, latch and letterbox.
29:52	U	The handle has rotated 5° nominally.
31:22	E	The letterplate has detached.
32:15	U	Heavy smoke/steam is issuing at the hanging stile/head corner.
32:50	U	Flash flaming at the threshold at the hanging stile corner.
34:32	U	The glazing intumescent seal has partially dropped.
34:52	U	Flaming commences at the hanging stile/base corner.
35:02	U	INTEGRITY FAILURE due to sustained flaming. INSULATION FAILURE due to integrity failure.
35:02	U	Sealed at the failure point at request of sponsor.
35:46	U	Flash flaming at the bottom hinge position.
36:35		Test terminated.

Key

Light smoke/steam – faint wispy

Medium smoke/steam – partially obscuring specimen

Heavy smoke/steam – completely obscuring specimen

Right hand specimen

Photographs taken during the test are shown in Appendix 2.

TEST OBSERVATIONS (E = Exposed face: U = Unexposed face)		
Time (min:sec)	Face	Observation
00:00		Start of test.
02:00	U	The glazing is cracking.
03:09	U	The inner layer of the glazing has partially detached and the first interlayer has activated.
05:00	U	Medium smoke/steam is issuing at the letterbox and at the base of the leaf at the mid-width position.
05:46	U	The exposed layer of glazing has detached.
07:52	U	Medium smoke/steam is issuing at the glazing, top latch and the closer.
08:30	E	Mock beading, frame and facing have fissured.
12:40	U	Medium smoke/steam is issuing at the head mid-width, at the hanging stile/head corner, and at the latch.
15:25	U	The letterbox intumescent has activated, pushing the letterplate open.
15:40	E	The facing has detached, and the core has fissured.
17:15	U	Flash flaming at the base of the leaf, nominally 250 mm in from the hanging stile.
18:13	U	A cotton pad is applied to the glazing centrally, no failure.
20:00	U	Viewer intumescent has activated, letterplate has opened nominally 10 mm.
20:53	U	Flash flaming at the base of the leaf, nominally 250 mm from closing stile.
22:28	U	A cotton pad is applied to the base of the leaf mid-width, no failure.
26:11	U	A glow is at the base of the leaf.
27:16	U	A cotton pad is applied at the base of the leaf mid-width, no failure.
29:32	U	A cotton pad is applied at the base of the leaf mid-width, no failure.
31:20	U	Flash flaming at the bottom latch.
32:33	U	Flash flaming at the base of the hanging stile.
33:36	U	A cotton pad is applied at the base of the leaf, no failure.
34:06	U	A cotton pad is applied at the bottom latch, no failure.
36:35		Test terminated.

Key

Light smoke/steam – faint wispy

Medium smoke/steam – partially obscuring specimen

Heavy smoke/steam – completely obscuring specimen

5 LIMITATIONS

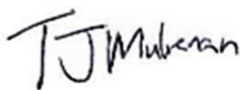
1. This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, constructional 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 doorsets were asymmetrical and were tested such that the left hand door leaf opened towards the heating conditions of the test and the right hand door leaf opened away from the heating conditions of the test.

Note: BS EN 1634-1:2014 + A1:2018 Section 13.4 indicates that a timber doorset tested opening towards the heating conditions of the furnace does not require a test of the same doorset opening away from the heating conditions of the furnace.

5. The results apply to the specimen(s) as received from the sponsor.
6. Cambridge Fire Research is not responsible for the content of this report where information has been identified (using **) as supplied by the sponsor.

This report is the property of the test sponsor and may not be reproduced or passed to a third party without their prior agreement.

Report prepared by:



**T J Mulrenan
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Report checked by:



**E Southern
Deputy Head of Testing**

Report 1 issued 19th December 2019

Report originally issued: 2nd November 2019

Please see Appendix 5 for Revision History

APPENDIX 1 SPECIMEN CONSTRUCTION

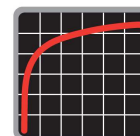
The item numbers listed in Appendix 1 Table 1 and 2 and shown in the figures in Appendix 1 refer to the components of the specimen construction. Any photo numbers refer to those in Appendix 2.

Please note that unless otherwise indicated the following applies:

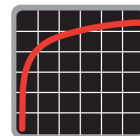
- a) All dimensions and materials of construction were verified by the laboratory.
- b) Figures are not to scale.
- c) All dimensions are given in mm.

Appendix 1 Table 1 Left hand Leaf

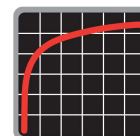
Item	Component	Information
1	Frame Supplier: No of sides: Material: Corner joints: Frame fixings: Fixings to supporting construction: Description: Overall size (h x w x d x t): Cross section size (h x d): Stop size (w x d): Rebate (h x d):	Performance Doorset Solutions 3 + threshold Timber Mortise and tenon butt joint Ø4.9 x 99 countersunk steel woodscrews set 62 in from hinge knuckle face, 15-20 in from jambs, per jamb. Fischer F10M112 Mechanical anchors set 250 up, 220 down, with 3No. equispaced. Timber finger jointed frame with an integral Stop flush with end of frame. Rebate set 25 in from hinge knuckle face to head and jambs. 2456 x 1086 x 79 x 57.5 57.5 x 79 including stop. 18 x 29 7 x 2.5
2	Threshold Supplier: Model: Material: Description: Overall size (h x d): Smoke seals (h x d):	Exitex** MXS 15/2** Aluminium Fixed to jambs using Ø5 x 59 stainless-steel countersunk woodscrews with 55 centres per jamb. Elastomeric seal across threshold. 22.5 x 102 12 x 13



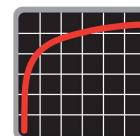
Item	Component	Information
3	<p>Leaf Supplier: Description: Overall size (h x w x t): Weight (kg): Sub-components: Core: Manufacturer: Type: Density (kg/m³): Overall size (h x w x d): Stiles: Type: Density (kg/m³): Overall size (h x w x d): Facings: Material: Adhesive: Overall size (t): Indent: Type: Indent size (w x d): Glazing aperture: Description: Aperture (h x w):</p>	<p>OH Industri A/S** Timber leaf with facings, stiles, indents, and apertures for glazing. 2400 x1000 x 44 65.7 (including frame and all doorset hardware) OH Industri A/S** 33 thick plywood** 530** 2400 x 875 x 33 Lamels, stiles mortise and tenon jointed to core. 550** 2400 x 72* x 33 1No. lightwood facing, 2No. red wood, 2No. aluminium, 1No. red wood (in order outside in). identical arrangement on both sides of core. MUF Melamine urethane hardened glue** 1* timber sheets and 0.3* aluminium. 5No. vertical indents with 1No. set 210 in from closing stile and the remaining positioned 145 in after one another. To both faces. 2.5 x 3 Aperture set 230 down from leaf head and 154 in from leaf head and 154 in from closing stile. 920 x 270</p>
4	<p>Leaf glazing pane Supplier: Reference: Description: Pane Size (h x w x t): Sight size (h x w): Setting block material:</p>	<p>FireGlass UK 70416 7MM PYRO/10/6.8 CLEAR LAM IGU LAYER 1: PYROBELITE 7 909** x 261** 876 x 227 Bead of mastic to entire perimeter of aperture.</p>
5	<p>Leaf glazing bead Supplier: Material: Overall size (h x w): Section size (h x d): Fixings:</p>	<p>Performance Doorset Solutions Sapele** 965 x 316 46 x 19 Pneumatically fired 19swg x 50 long steel pins with 200-240 centres.</p>



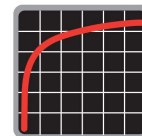
Item	Component	Information
6	Hinges Supplier: Type: Material: Number: Position (leaf head to top of blade): Blade size (h x w x t): Knuckle size (Ø): Fixings to leaf/frame:	UAP** Butt hinge with bearings Stainless-steel 3 100, 300, 850, 2200 101 x 31 x 2.8 14 4No. Ø4.4 x 29 stainless-steel countersunk woodscrews per blade.
7	Closer Manufacturer: Type: Reference: Position: Description: Body size (l x h x d): Fixings:	Astra Concealed jamb closer Astra 4000 series closer** 1046 down from leaf head, 5 in from hinge knuckle face Set in rebate to fit the closer (with an excess rebate space of Ø28 x 105). 222 x 112 x 28 6No. Ø3.9 x 39.5 steel countersunk woodscrews to frame. 6No. Ø4 x 38 steel countersunk woodscrews to leaf.
8	Latch/lock Manufacturer: Part number: Type: Description: Latch positions: Height of spindle from leaf base: Distance between forend and top of leaf: Distance of (...) from forend top: Top hook box: Automatic body: Latch body: Bottom hook box: Forend (h x d x w): Centre latch: Body (h x d x w): Strike (h x d x t): Upper/lower hook boxes: Body (h x w x d):	CRIMEBEATER SL16 3-point automatic mortice latch. Steel assembly 1000 210 40 625 845 1590 1820 x 20 x 2.5 228 x 16 x 57 208 x 39 x 2 including tongue (46 x 18.5 set 36 down from top of strike). 135 x 14 x 42



Item	Component	Information
8 cont	Keep (h x d x t): Automatic body strike size (h x d x t): Fixings:	143 x 20 x 2 50 x 30 x 2 2No. Ø3.9 x 29 stainless-steel countersunk woodscrews.
9	Euro cylinder Supplier: Type: Description:	ULTION Stainless steel with steel sub components and thumb turn. 32/10/32
10	Handleset 1 Supplier: Part number: Description: Overall size (h x w x d x t): Fixings: Handle size (Ø x w):	UAP** DH243-DUO-SSS NANOCOAST stainless steel** Aluminium lever handle with spindle fixing holes on hinge knuckle face part of handle to hold components together. set 1309 down from leaf head, 33 in from closing stile 241 x 30 x 12 x 1.4 2No. Ø4.7 x 57 stainless-steel countersunk machine screws 20 x 136
11	Handleset 2 Supplier: Part number: Description: Overall size: Fixing beam (Ø x d): Handle (Ø x h):	UAP** PH1500S-SSS-NANOCOAST straight stainless steel** Stainless-steel pull beam with 3 fixing bars, each secured to leaf using M8 x 70 stainless-steel bolts. handle set 450 down, 110 in from closing stile with the fixing beams positioned with 650 centres along the beam's height, central to beam height. Bolts covered with plastic fixing with an aluminium cover plate. 38 x 64 38 x 1500
12	Viewer Supplier: Part number: Description: Overall size (Ø x d): Bevel size (Ø x d):	UAP** Satin chrome SWALFSC-FR** Aluminium viewer with brass thread. Set 998 down from leaf head, central to leaf width. 26 x 70.5 26 x 7.5



Item	Component	Information
13	Letterbox Manufacturer: Part number: Description: Overall size (h x w x d): Aperture (h x w):	UAP** Silver anodised TS008 INTERNAL-SILVER-FD30/TS008-EXTERNAL-SILVER** Aluminium letterbox, with anti-vandal feature and restricted plate opening angle, located nominally central to leaf width, and letter plates at 1480 below head of leaf on exposed side, and 370 in from hanging stile. 115 x 300 x 34 58 x 261
14	Intumescent – Frame 1 Manufacturer: Part number: Description: Overall size (d x t):	Lorient Polyproducts LP1504DSF A sodium silicate based intumescent in a white PVC holder with a self-adhesive strip set 11 in from hinge knuckle face, fully interrupted at hinges and fully interrupted at closer and fully interrupted at strikes and uninterrupted at the automatic strike plate with a dual fin arrangement. 15 x 4
15	Intumescent – Frame 2 Manufacturer: Part number: Description: Overall size (d x t):	Lorient LP1004 Type 617** A sodium silicate based intumescent in a white PVC holder with a self-adhesive strip set 33 in from hinge knuckle face, fully interrupted at the closer. 10 x 4
16	Intumescent - Latch/lock 1 Manufacturer: Part number: Description: Overall size (t):	Intumescent Seals** FL1020N Therm-A-Flex** A graphite based intumescent with a self-adhesive strip to rear of latch/lock rebate, set into leaf central to leaf depth. also, to rear of strike faces (and their bodies) and automatic latch strike faces 10 x 2
17	Intumescent - Latch/lock 2 Manufacturer: Part number: Description: Overall size (t):	Exitex** Exi Fire Graphite** Graphite based intumescent to all rear faces of latch bodies 1



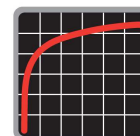
Item	Component	Information
18	Intumescent - Viewer Manufacturer: Part number: Description: Overall size (t):	Exitex** Exi Fire Graphite** A graphite based intumescent with a self-adhesive strip to viewer aperture. 1
19	Intumescent - Hinges Manufacturer: Part number: Description: Overall size (t):	Exitex** Exi Fire Graphite** A graphite base intumescent with a self-adhesive strip to full hinge blade profile on both leaf and frame side. 1
20	Intumescent - Glazing seal Manufacturer: Part number: Description: Overall size (h x w):	Exitex** Exi Glaze FD30 1.31.0950.0200** Compressible gasket 8 x 2
21	Smoke seal Manufacturer: Part number: Description: Overall size (h x w):	Exitex** A10** Foam seal to head and jambs set into rebate positioned 43 in from hinge knuckle face 15 x 9
22	Fire stopping detail Description:	The gaps were packed with Unifrax Insulfrax LTX blanket and capped with firewise intumescent and acoustic acrylic sealant.

Key:

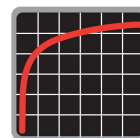
* Nominal value

** Sponsor declared value or detail, not verified by laboratory

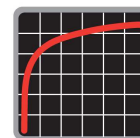
‡ Identified post-test from remains of specimen



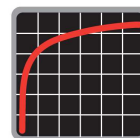
Item	Component	Information
3	<p>Leaf Supplier: Description: Overall size (h x w x t): Weight (kg): Sub-components: Core: Manufacturer: Type: Density (kg/m3): Overall size (h x w x d): Stiles: Type: Density (kg/m3): Overall size (h x w x d): Facings: Material: Adhesive: Overall size (t): Panel beading: Material: Type: Description: Adhesive: Overall size (h x d): Glazing aperture: Description: Aperture (h x w):</p>	<p>OH Industri A/S** With facings, stiles, panel beading and apertures for the glazing. 1981 x 914 x 44 57.9 (including frame and all doorset hardware). OH Industri A/S** 33 thick plywood** 530** 1981 x 635 x 33 Lamels, stiles mortise and tenon jointed to core. 550** 1981 x 139* x 33 1No. lightwood facing, 2No. red wood, 2No. aluminium, 1No. red wood (in order outside in). identical arrangement on both sides of core. MUF Melamine urethane** 1* timber sheets and 0.5* aluminium. Synthetic timber 4No. panels set in pairs 523, 1233 central to leaf depth with a gap of 108. To both faces of leaf, set into rebates suitable to house the rear of the beading. 47 x 15 Aperture set 230 down from leaf head and 154 in from head and 154 in from the closing stile. 265 x 568</p>
4	<p>Leaf glazing pane Supplier: Reference: Description: Pane Size (h x w x t): Sight size (h x w): Setting block material:</p>	<p>FireGlass UK 70416 7MM PYRO/10/6.8 CLEAR LAM IGU LAYER 1: PYROBELITE 7 251** X 556** 216 x 520 Bead of mastic to entire perimeter of aperture.</p>
5	<p>Leaf glazing bead Supplier: Material: Overall size (h x w): Section size (h x d): Fixings:</p>	<p>Performance Door Solutions** Sapele 309 x 614 46 x 19 Pneumatically fired 19swg x 50 steel pins at 200-240 centres.</p>



Item	Component	Information
6	Hinges Supplier: Type: Material: Number: Position (leaf head to top of blade): Blade size (h x w x t): Knuckle size (Ø): Fixings to leaf/frame:	UAP** Butt hinge with bearings Stainless-steel 3 100, 850, 1778 101 x 30 x 2.8 14 4No. Ø4.3 x 29 stainless-steel countersunk woodscrews, per blade
7	Closer Manufacturer: Type: Type: Position: Body size (l x h x d): Fixings:	Astra Integrated hinge closer Astra 4000 series** 1046 down from leaf head, 5 in from hinge knuckle face. 215** x 106** x 28** 6No. Ø3.9 x 39.5 steel countersunk woodscrews to frame. 6No. Ø4 x 38 steel countersunk woodscrews to leaf.
8	Latch/lock Manufacturer: Type: Description: Latch positions: Height of spindle from leaf base: Distance between forend and top of leaf: Distance of (...) from forend top: Top hook box: Automatic body: Latch body: Bottom hook box: Forend (h x d x w): Centre latch: Body (h x d x w): Strike (h x d x t): Upper/lower hook boxes: Body (h x w x d): Keep (h x d x t): Automatic body strike size (h x d x t): Fixings:	Fullex** CRIMEBEATER Fullex AUTO LOCK SL16 3-point automatic mortice latch. Steel assembly. 925 210 91 525 746 1492 1719 x 20 x 2.5 226 x 15 x 57 208 x 39 x 2 including tongue (46 x 18.5 set 36 down from top of strike). 135 x 14 x 42 143 x 20 x 2



Item	Component	Information
8 cont		50 x 30 x 2 2No. Ø3.9 x 29 stainless-steel countersunk woodscrews
9	Euro cylinder Supplier: Type:	ULTION TS007:2014 Stainless steel with steel sub components and thumb turn. 32/10/32
10	Handleset Manufacturer: Reference: Type: Overall size (h x w x d x t): Fixings: Handle size (Ø x w):	UAP** DH243-DUO-SSS-NANOCOAST Stainless steel** Aluminium lever handle with spindle fixing holes on hinge knuckle face part of handle to hold components together. 241 x 30 x 12 x 1.4 2No. Ø4.7 x 57 stainless-steel countersunk machine screws. 20 x 136
11	Viewer Manufacturer: Part number: Description: Overall size (Ø x d): Bevel size (Ø x d):	UAP** Satin Chrome SWALFSC-FR Aluminium viewer with brass thread positioned 658 down from leaf head, central to leaf width. 26 x 70.5 26 x 7.5
12	Letterbox Manufacturer: Part number: Description: Overall size (h x w x d): Aperture (h x w):	UAP** Silver anodised TS008 INTERNAL-SILVER-FD30/TS008-EXTERNAL-SILVER** Aluminium letterbox, with anti-vandal feature and restricted plate opening angle, located nominally central to leaf width, and letter plates at 1480 below head of leaf on exposed side, and 370 in from hanging stile. 115 x 300 x 34 58 x 261
13	Intumescent – Frame 1 Manufacturer: Part number: Description:	Lorient Polyproducts LP1504DSF A sodium silicate based intumescent in a white PVC holder with a self-adhesive strip set 11 in from hinge knuckle face, fully interrupted at hinges and fully interrupted at closer and fully interrupted at strikes and fully interrupted at the automatic strike plate with a dual fin arrangement.



Item	Component	Information
13	Overall size (d x t):	13 x 4
14	Intumescent – Frame 2 Manufacturer: Part number: Description: Overall size (d x t):	Lorient Polyproducts LP1004 Type 617** A sodium silicate based intumescent in a white PVC holder with a self-adhesive strip set 33 in from hinge knuckle face, fully interrupted at the closer. 10 x 4
15	Intumescent - Latch/lock 1 Manufacturer: Part number: Description: Overall size (t):	Intumescent Seals** Therm-A-Flex** A graphite based intumescent with a self-adhesive strip to rear of latch/lock rebate, set into leaf central to leaf depth. also, to rear of strike faces (and their bodies) and automatic latch strike faces. 10 x 2
16	Intumescent - Latch/lock 2 Manufacturer: Part number: Description: Overall size (t):	Exitex** Exi Fire** A graphite based intumescent to all rear faces of latch bodies 1
17	Intumescent - Viewer Manufacturer: Part number: Description: Overall size (t):	Exitex** Exi Fire** A graphite based intumescent with a self-adhesive strip to viewer aperture. 1
18	Intumescent - Hinges Manufacturer: Part number: Description: Overall size (t):	Exitex** Exi Fire** A graphite base intumescent with a self-adhesive strip to full hinge blade profile on both leaf and frame side. 1
19	Intumescent - Glazing seal Manufacturer: Part number: Description: Overall size (h x w):	Exitex** Exi Glaze 1.31.0950.0200** Compressible gasket** 8 x 2**

Item	Component	Information
20	Smoke seal - Frame Manufacturer: Part number: Description: Overall size (h x w):	Exitex** A10** Foam seal to head and jambs set into rebate positioned 43 in from hinge knuckle face. 15 x 9
21	Fire stopping detail Description:	The gaps were packed with Unifrax Insulfrax LTX blanket and capped with firewise intumescent and acoustic acrylic sealant.

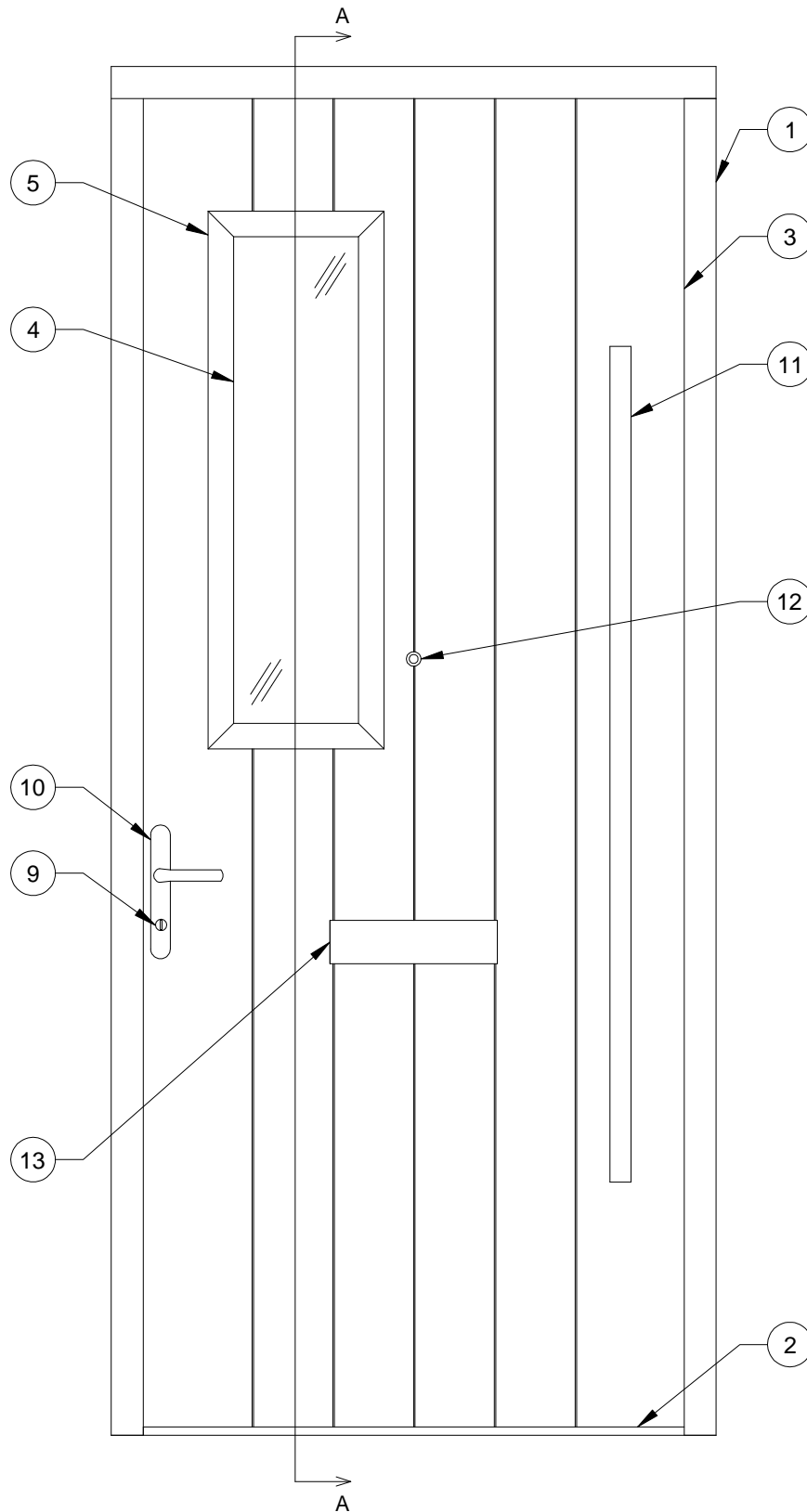
Key:

* Nominal value

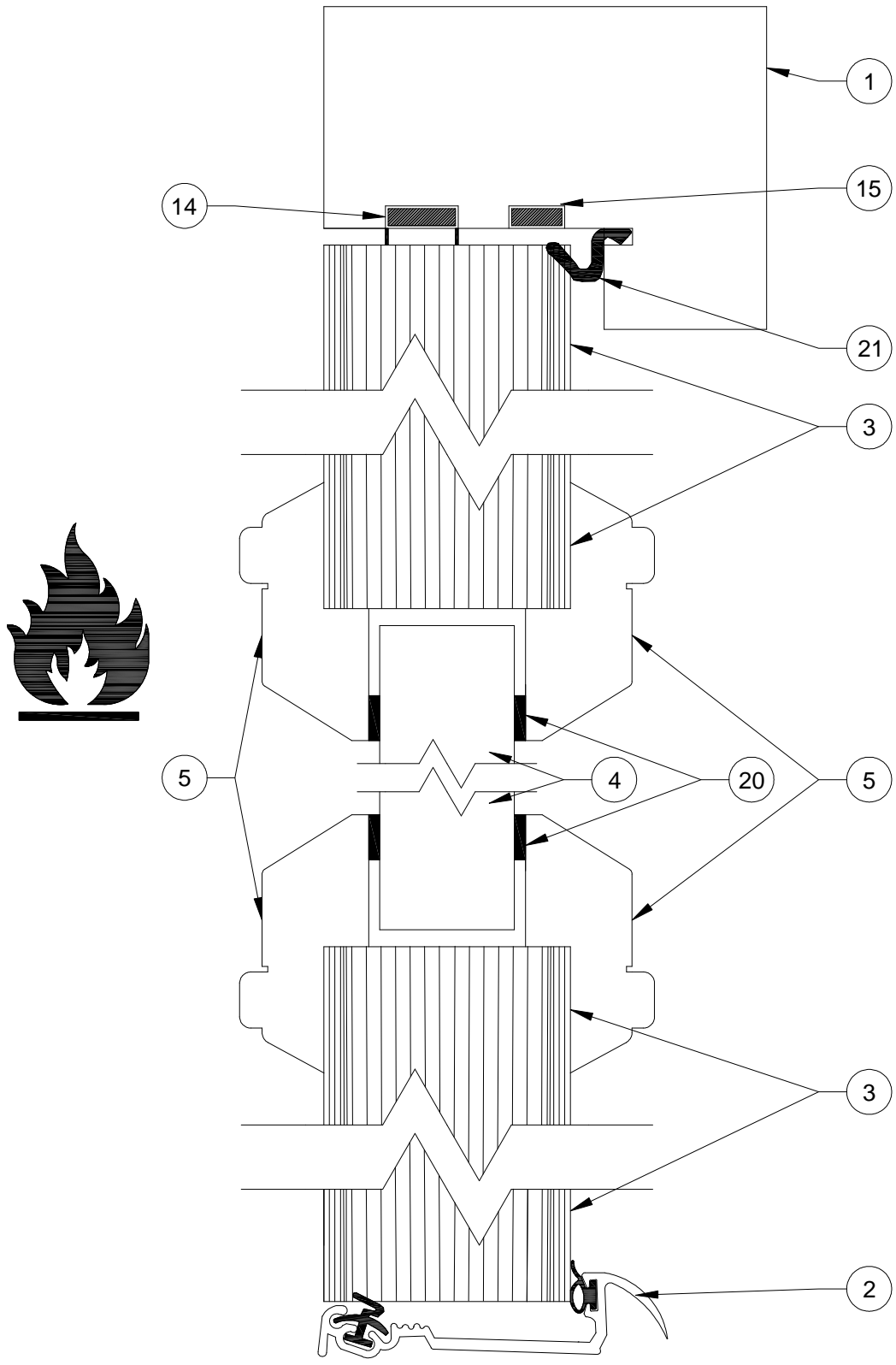
** Sponsor declared value or detail, not verified by laboratory

‡ Identified post-test from remains of specimen

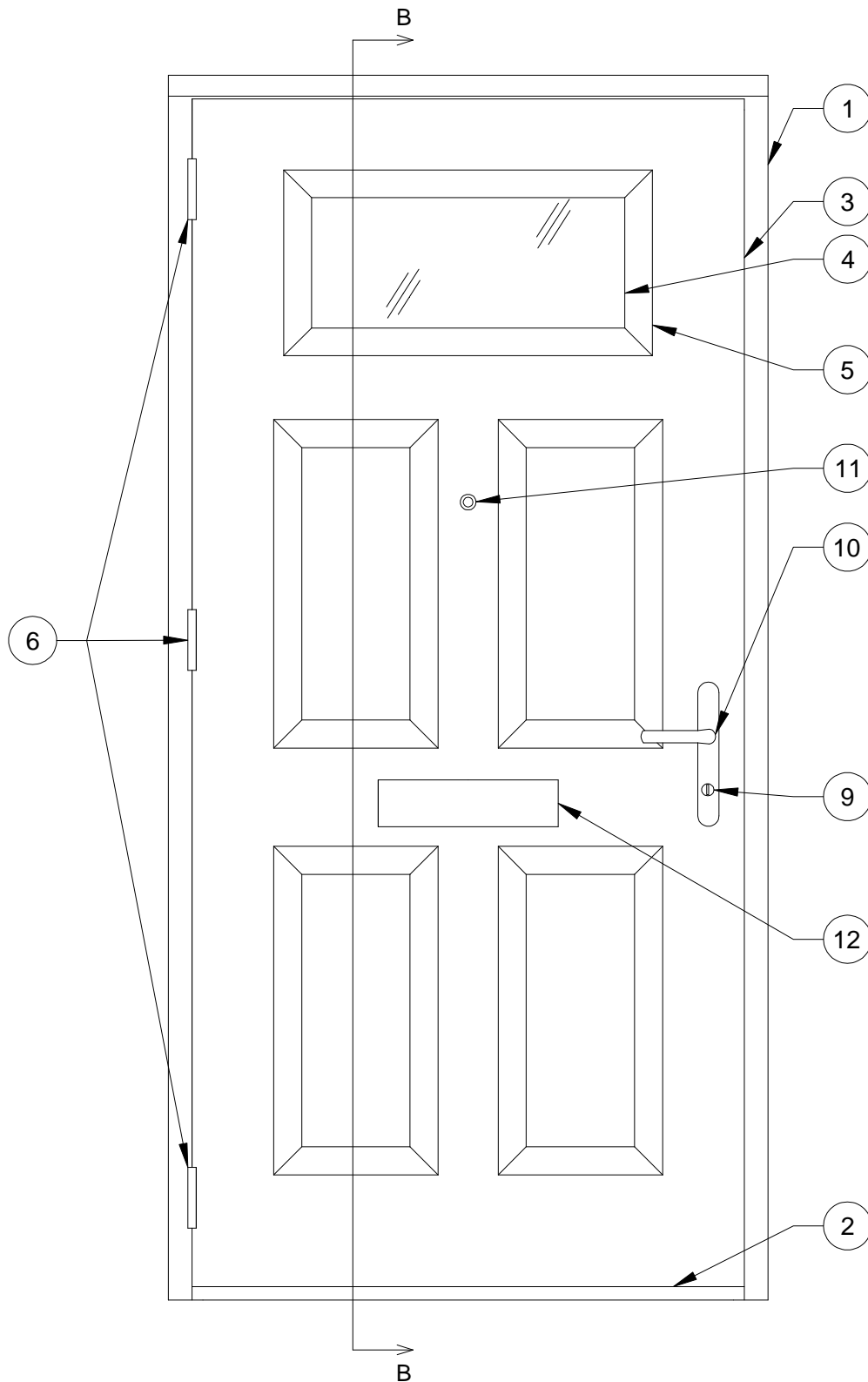
Appendix 1 Figure 1 – Left-hand doorset elevation (unexposed face view)



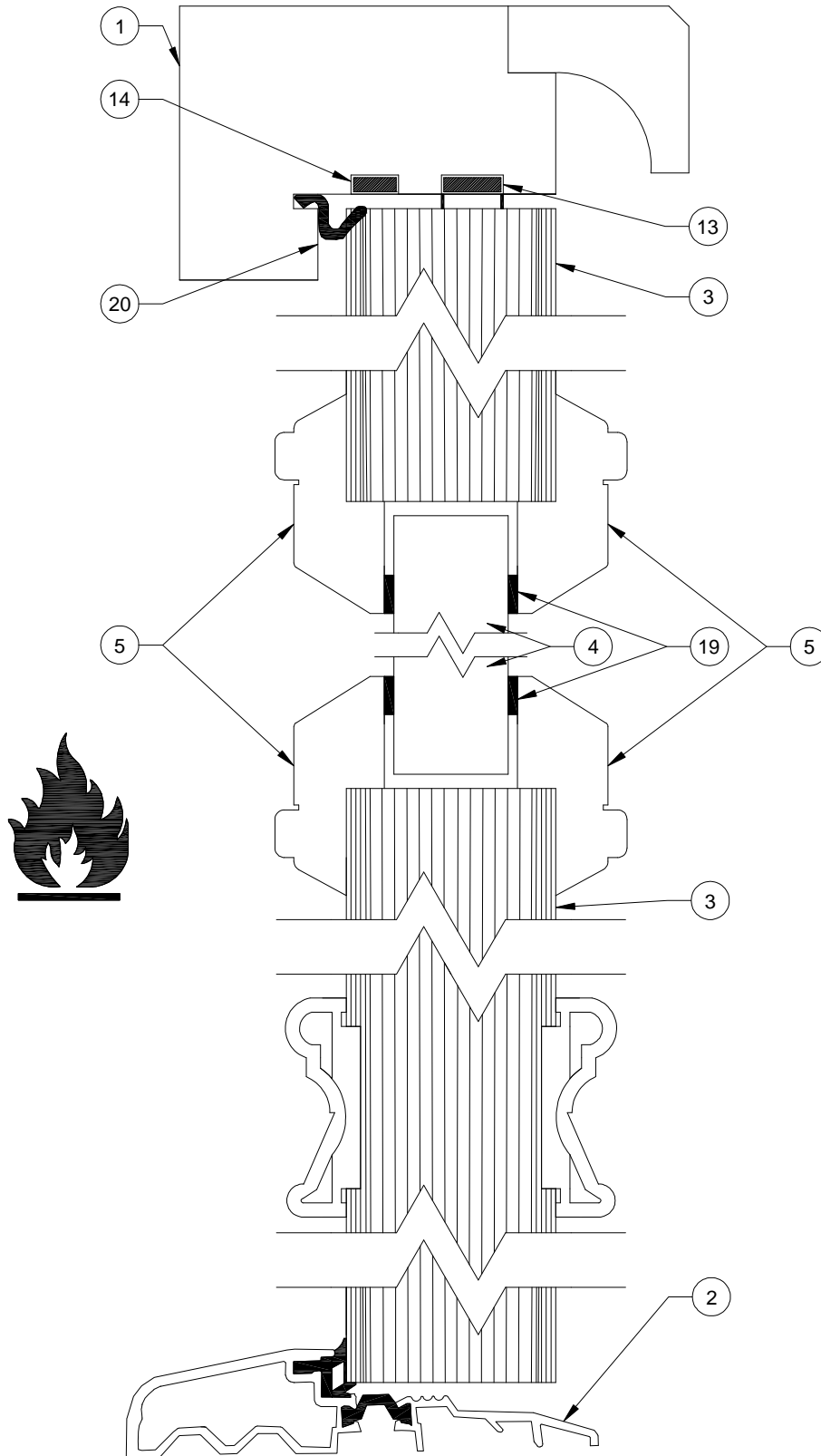
Appendix 1 Figure 2 – Section A – A



Appendix 1 Figure 3 – Right-hand doorset elevation (unexposed face view)



Appendix 1 Figure 4 – Section B – B



APPENDIX 2 PHOTOGRAPHS

Appendix 2.1 Pre-test photos

Photo 2.1.1 Left-hand specimen

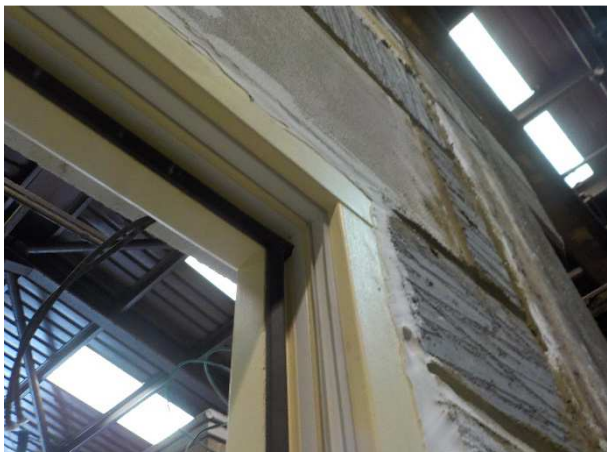


Photo 2.1.2 Left-hand specimen



Photo 2.1.3 Left-hand specimen

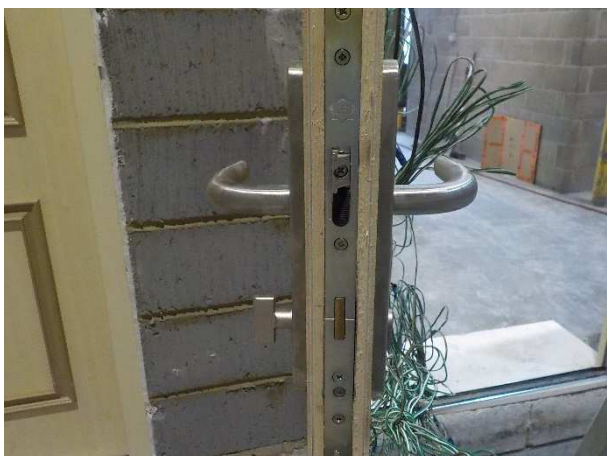


Photo 2.1.4 Left-hand specimen



Photo 2.1.5 Left-hand specimen

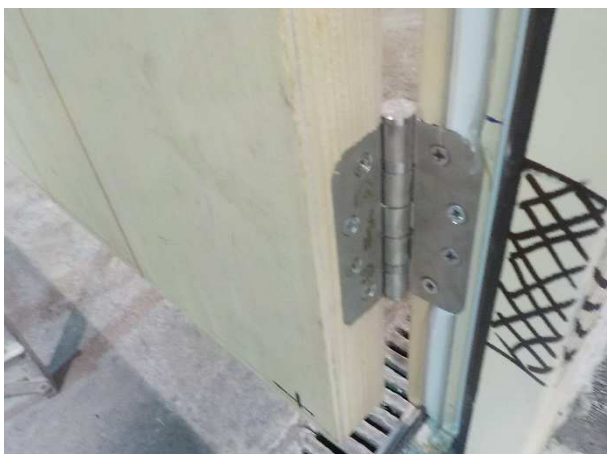


Photo 2.1.6 Left-hand specimen



Photo 2.1.7 Left-hand specimen

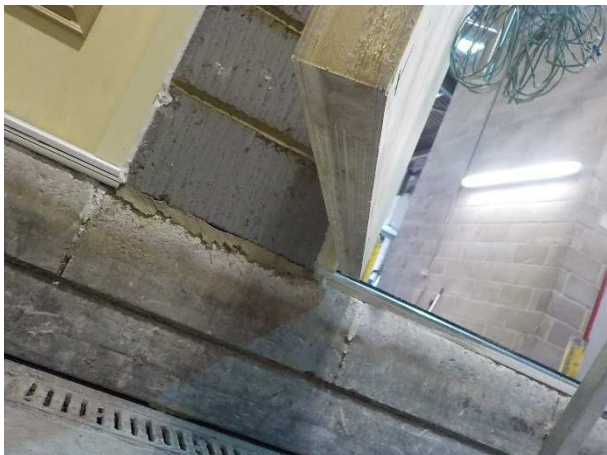


Photo 2.1.8 Left-hand specimen



Photo 2.1.9 Left-hand specimen



Photo 2.1.10 Left-hand specimen

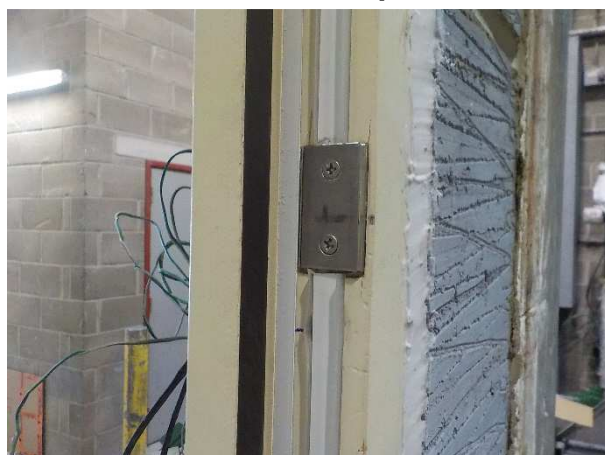


Photo 2.1.11 Left-hand specimen



Photo 2.1.12 Left-hand specimen



Photo 2.1.13 Right-hand specimen



Photo 2.1.14 Right-hand specimen



Photo 2.1.15 Right-hand specimen



Photo 2.1.16 Right-hand specimen



Photo 2.1.17 Right-hand specimen



Photo 2.1.18 Right-hand specimen

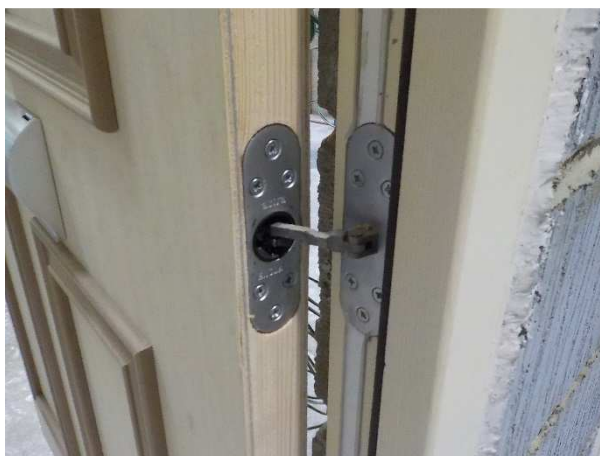


Photo 2.1.19 Right-hand specimen



Photo 2.1.20 Right-hand specimen



Photo 2.1.21 Right-hand specimen



Photo 2.1.22 Right-hand specimen

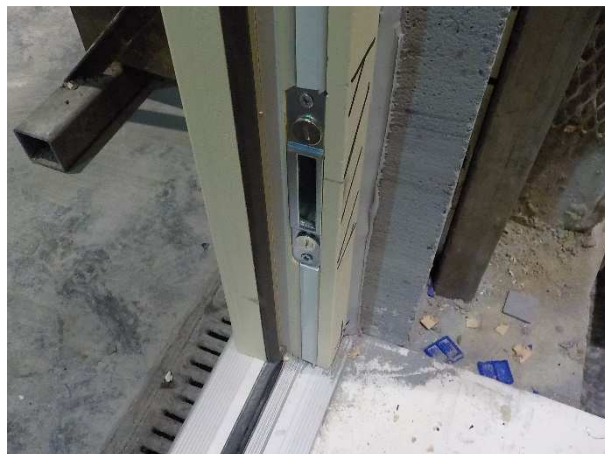


Photo 2.1.23 Right-hand specimen



Photo 2.1.24 Right-hand specimen



Photo 2.1.25



Appendix 2.2 During test photos

Photo 2.2.1

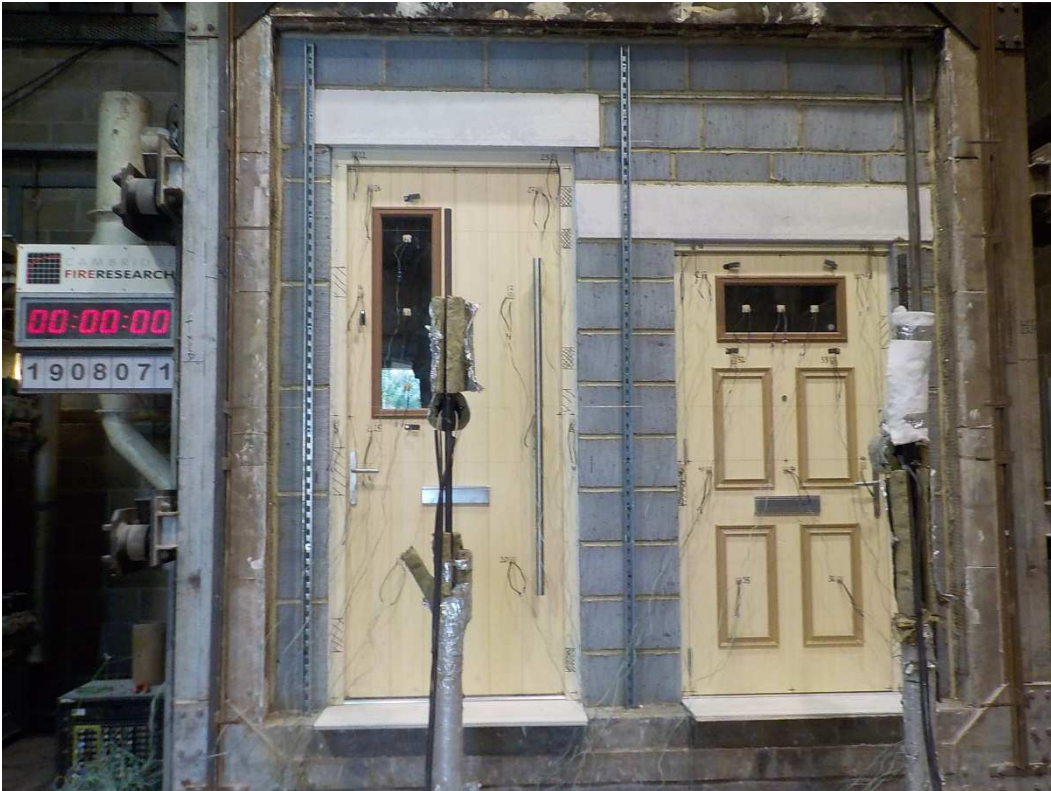


Photo 2.2.2

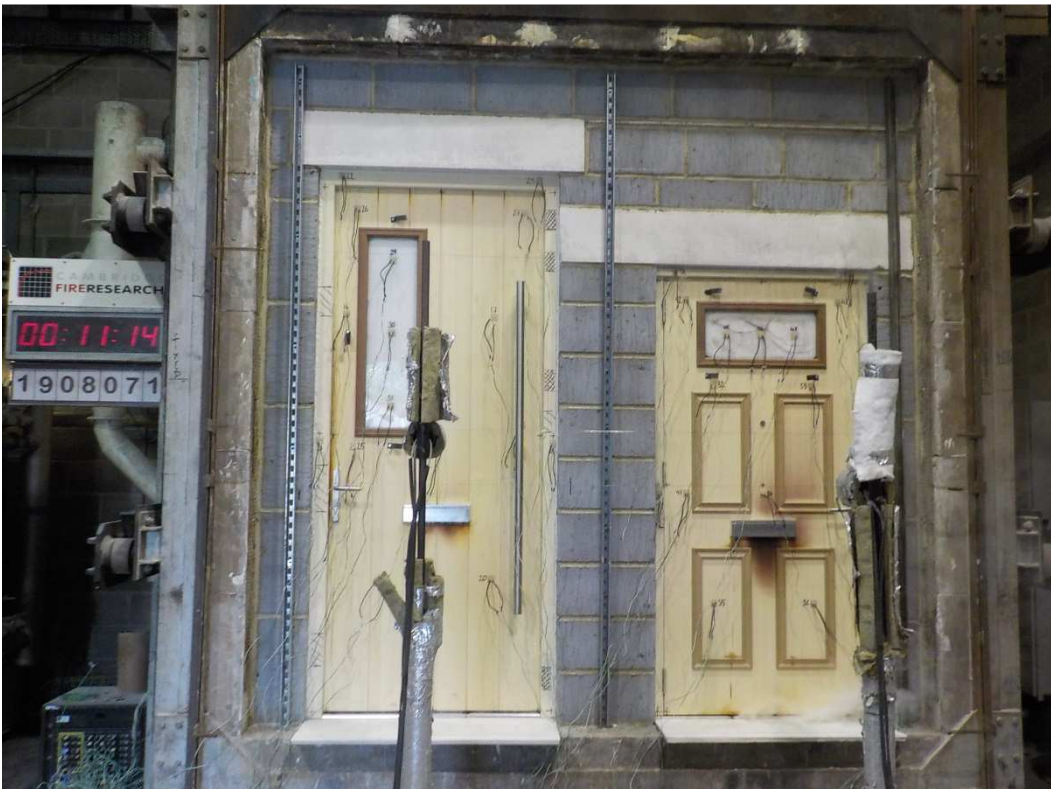


Photo 2.2.3



Photo 2.2.4 Right-hand leaf after 20 minutes



Photo 2.2.5

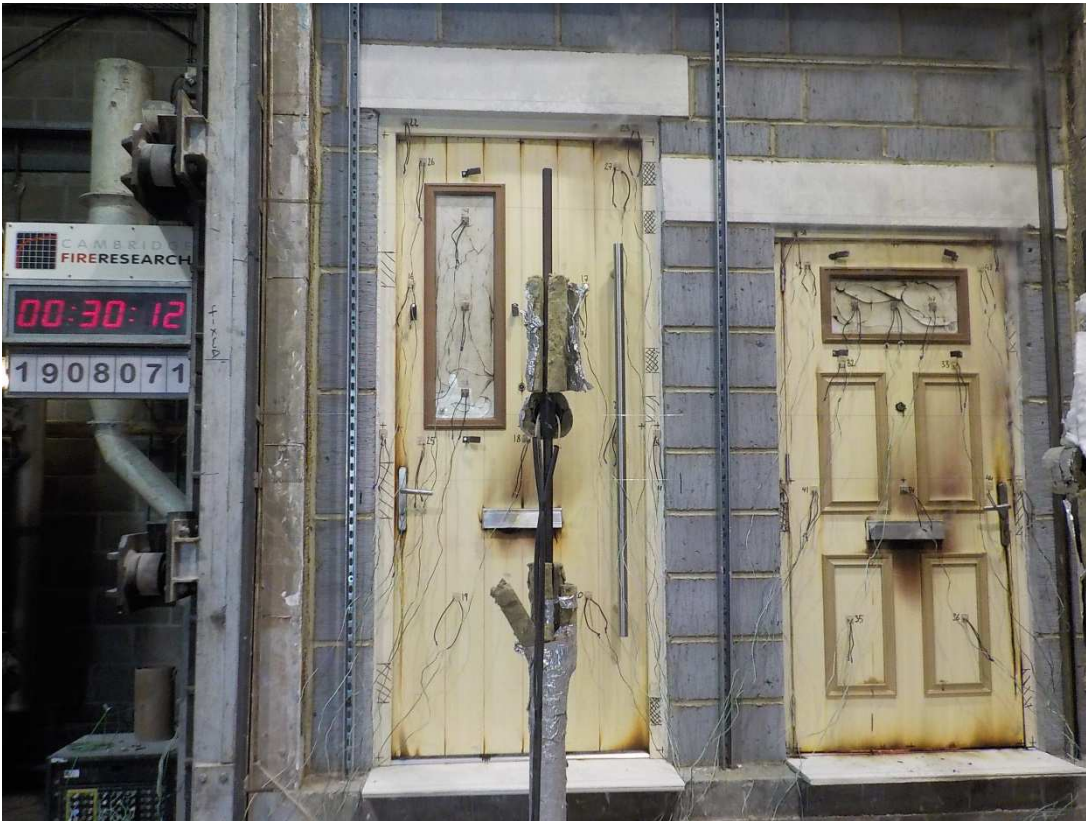


Photo 2.2.6 – right-hand doorset after 33 minutes

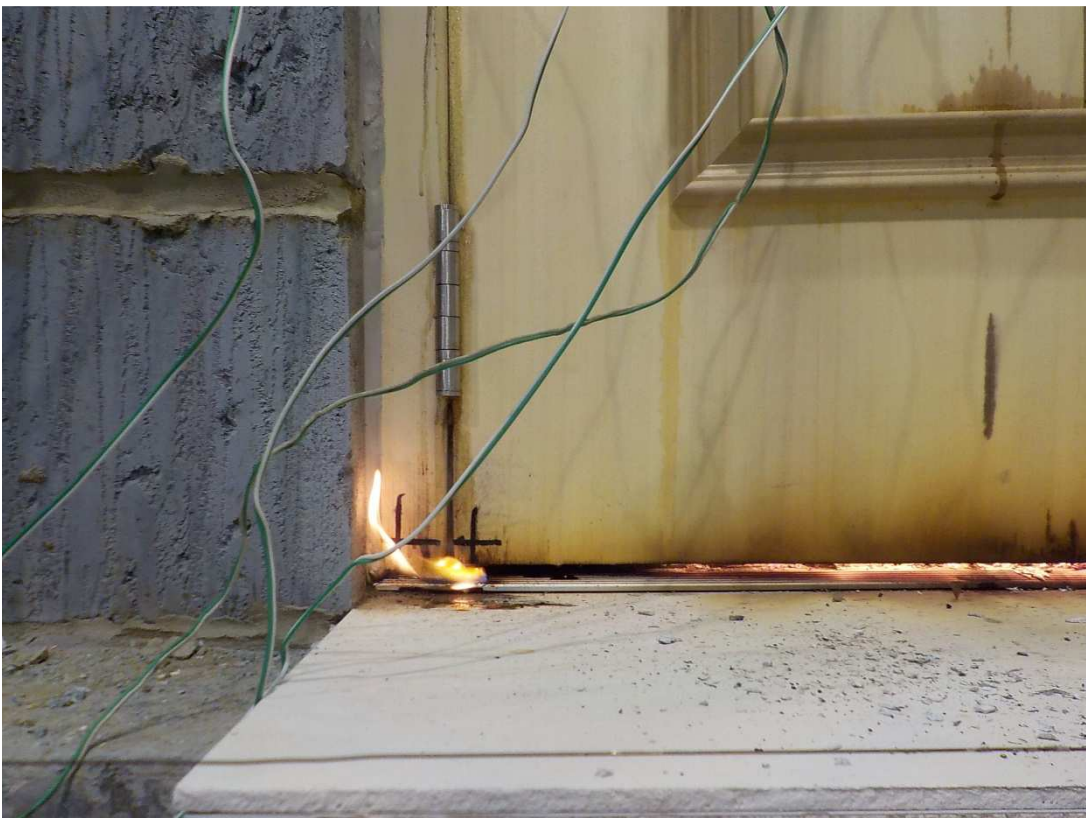


Photo 2.2.7



Photo 2.2.8 – left-hand doorset after 35 minutes



Photo 2.2.8

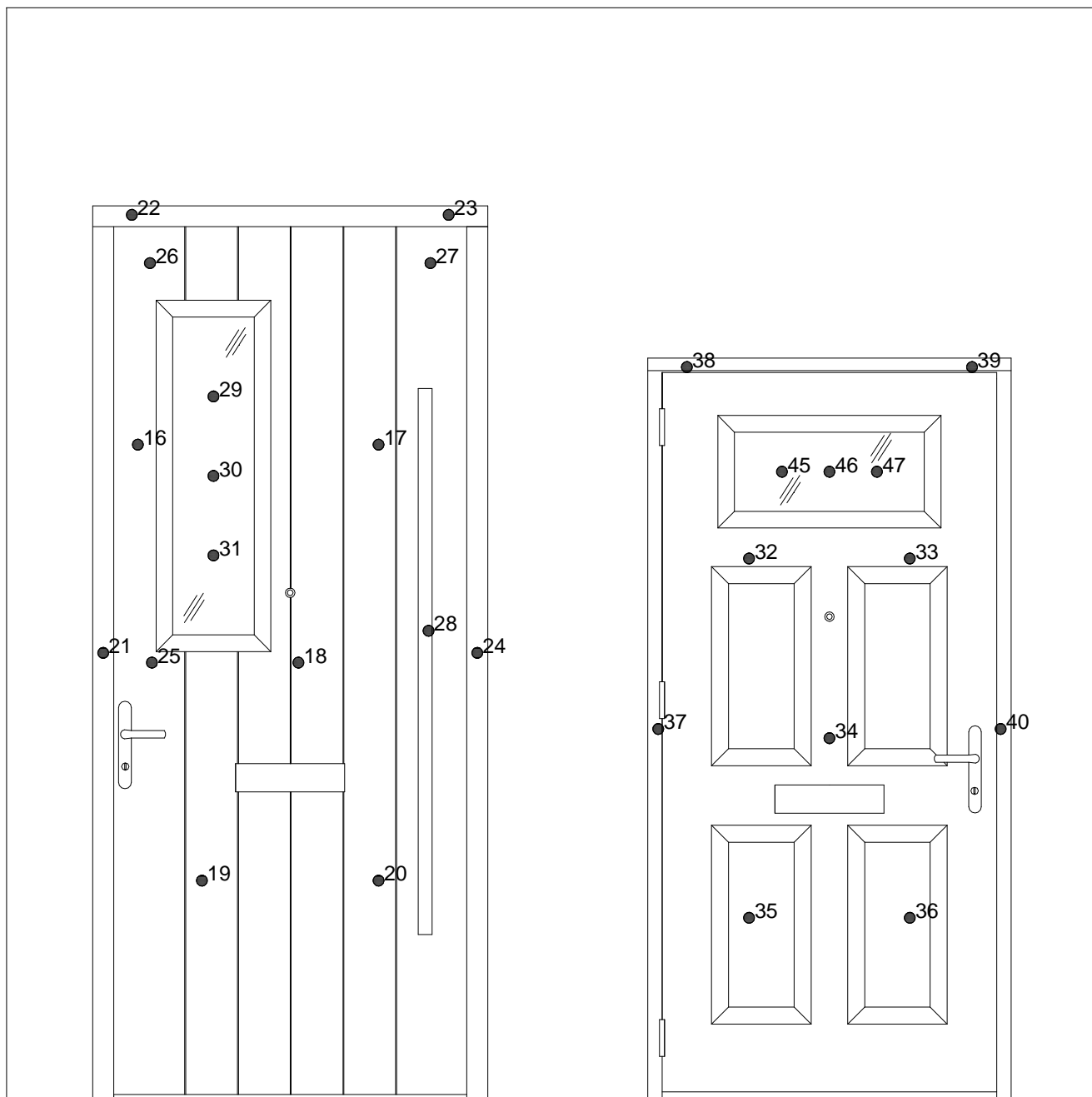


Appendix 2.3 Post-test photos

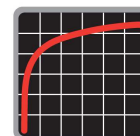
Photo 2.3.1



APPENDIX 3 POSITIONING OF INSTRUMENTATION

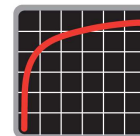


- Unexposed face specimen thermocouple
- ◀ Furnace pressure measurement position

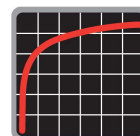


APPENDIX 4 RECORDED THERMOCOUPLE DATA

Time	T/C 16	T/C 17	T/C 18	T/C 19	T/C 20	T/C 21	T/C 22	T/C 23	T/C 24	T/C 25	T/C 26	T/C 27	T/C 28
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	26	26	26	26	26	25	25	25	25	26	26	26	25
1	26	26	26	26	25	25	25	25	25	26	26	26	25
2	26	26	26	26	26	25	25	25	25	26	26	26	25
3	26	26	26	26	26	25	25	25	25	26	26	26	26
4	26	26	26	26	26	25	25	25	25	26	26	26	25
5	28	26	26	26	26	25	26	25	25	26	27	27	28
6	31	26	26	26	26	25	27	26	25	27	28	27	32
7	30	26	26	26	26	25	26	26	25	27	27	27	36
8	31	26	26	26	26	25	26	26	25	27	28	27	41
9	32	27	26	26	26	25	26	26	25	28	28	28	45
10	33	27	27	26	26	25	26	26	25	29	29	29	47
11	35	28	26	26	27	25	26	26	25	30	29	29	48
12	36	29	33	27	27	25	26	26	25	31	30	30	49
13	38	30	30	28	28	25	26	26	26	32	31	32	50
14	40	31	34	29	29	25	27	27	27	34	33	33	51
15	42	32	36	29	30	25	27	27	27	35	34	34	52
16	44	33	39	30	31	25	27	28	28	37	35	36	53
17	45	34	41	32	33	26	28	29	30	40	37	38	55
18	47	36	43	33	35	26	28	30	31	42	39	41	56
19	48	38	44	35	37	26	28	31	32	44	41	43	57
20	50	39	45	36	39	26	29	33	33	46	43	46	58
21	51	41	47	38	41	27	31	35	34	48	45	48	60
22	52	43	48	39	43	27	33	36	36	50	47	51	61
23	54	45	53	42	46	28	35	37	37	52	50	53	63
24	55	48	55	44	49	28	37	38	39	54	52	56	64
25	57	50	56	46	51	29	41	39	40	56	54	58	65
26	58	53	59	50	54	29	42	40	41	58	56	60	67
27	60	56	61	53	56	30	46	41	42	60	58	63	68
28	61	59	63	56	59	31	47	41	43	62	61	66	70
29	63	63	65	59	63	31	48	43	44	64	62	69	71
30	65	66	67	62	67	32	49	44	45	67	65	72	73
31	67	69	70	65	70	33	49	45	46	70	67	76	74
32	70	71	73	67	74	35	48	47	47	73	69	78	75
33	72	74	77	71	77	35	48	48	47	75	71	81	76
34	75	76	82	73	80	36	48	51	48	78	73	82	78
35	77	80	88	77	84	37	50	52	49	81	75	84	80
36	80	83	94	80	86	38	54	54	50	83	77	86	83



Time	T/C 29	T/C 30	T/C 31	T/C 32	T/C 33	T/C 34	T/C 35	T/C 36	T/C 37	T/C 38	T/C 39	T/C 40	T/C 41
min	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
0	26	26	26	26	26	26	26	25	25	25	25	25	26
1	26	26	26	26	26	26	26	26	25	25	25	25	26
2	29	29	29	26	26	26	26	26	25	25	27	25	25
3	34	35	35	26	26	26	26	26	25	26	26	25	22
4	40	41	41	26	26	26	26	26	25	25	26	25	24
5	48	49	49	26	27	27	25	26	25	25	26	25	24
6	57	62	60	26	28	28	25	26	25	25	27	25	25
7	70	87	79	26	27	28	26	26	25	25	27	26	25
8	88	109	106	26	27	30	26	27	37	26	28	26	26
9	107	116	116	27	27	30	26	27	43	27	29	26	27
10	111	127	126	27	28	33	26	27	44	27	30	27	28
11	117	137	136	27	28	34	27	27	51	28	30	27	28
12	123	140	145	28	28	37	27	27	51	31	32	27	31
13	125	141	148	29	29	40	28	28	51	37	33	28	33
14	126	145	149	30	31	42	29	29	50	37	36	28	35
15	128	154	151	30	33	45	30	30	50	37	36	29	36
16	133	168	153	32	35	49	31	31	49	39	37	30	38
17	145	178	155	33	36	50	32	32	47	39	37	31	39
18	162	188	164	35	38	52	34	33	47	39	38	32	41
19	176	203	175	36	39	51	36	35	45	39	37	33	43
20	179	224	185	38	41	52	37	36	43	40	38	34	45
21	192	245	197	40	42	54	40	38	43	42	38	36	47
22	213	268	214	42	44	55	42	40	42	43	39	37	49
23	238	290	234	45	47	57	46	42	41	43	40	38	51
24	262	309	259	47	49	59	49	44	41	43	40	40	53
25	284	326	282	50	51	61	53	46	41	44	40	40	56
26	303	339	303	54	53	64	57	51	39	44	40	42	59
27	322	354	324	58	56	66	61	54	38	44	42	43	63
28	338	366	341	61	58	68	64	58	37	45	43	44	65
29	348	373	351	65	61	71	68	64	37	46	43	46	69
30	355	378	360	68	64	74	71	69	38	49	43	48	72
31	364	382	370	71	67	77	75	72	39	49	44	49	76
32	373	387	380	72	70	79	77	75	39	50	44	51	78
33	382	392	388	74	73	82	79	77	41	50	45	52	81
34	387	394	391	76	76	84	82	79	42	50	46	54	84
35	389	394	392	77	77	86	83	80	42	50	47	56	86
36	389	394	391	77	78	88	86	81	44	50	48	58	89



Time	T/C 42	T/C 43	T/C 44	T/C 45	T/C 46	T/C 47
min	°C	°C	°C	°C	°C	°C
0	26	26	26	26	26	26
1	26	26	26	26	26	26
2	26	26	26	29	29	29
3	26	26	23	36	36	36
4	26	26	25	45	48	52
5	26	26	25	56	62	77
6	26	28	24	76	86	104
7	26	27	27	107	110	125
8	27	27	28	110	110	127
9	27	27	30	115	114	128
10	27	28	32	126	124	132
11	28	28	32	142	140	138
12	28	29	35	156	157	146
13	29	31	37	163	165	154
14	31	32	40	167	170	159
15	32	34	42	175	180	166
16	34	36	44	189	198	176
17	35	37	47	209	218	189
18	37	39	49	229	239	205
19	39	40	52	250	263	222
20	41	42	53	273	284	239
21	43	43	56	296	305	258
22	45	45	58	319	326	276
23	47	46	59	339	346	293
24	49	48	62	358	364	307
25	51	50	63	375	381	319
26	53	51	66	389	394	328
27	55	53	69	403	403	338
28	57	55	72	411	407	347
29	59	57	75	411	406	352
30	62	59	78	405	401	353
31	64	61	80	403	399	355
32	66	63	82	405	400	359
33	68	66	84	409	403	364
34	70	68	86	411	405	368
35	72	70	88	411	406	371
36	74	73	90	411	406	373

APPENDIX 5 REVISION HISTORY

Revision	Identification of changed information and reasons	Prepared by	Checked by
0	Original issue	E Southern	T Smith
1	Leaf supplier changed to OH Industri A/S and core changed to 33 thick plywood. Drawing revised Appendix 1 Fig 4.	E Southern	T Smith