



United Kingdom
Testing and
Certification

Test Report

Project ID: 20210212-083912

United Kingdom Testing & Certification Ltd
Cairnmuir House, Cairnmuir Road
East Kilbride, G74 4GY

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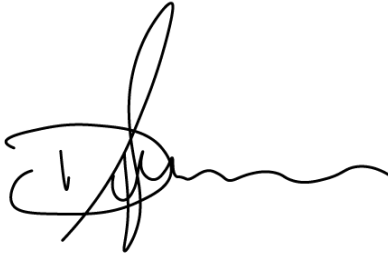
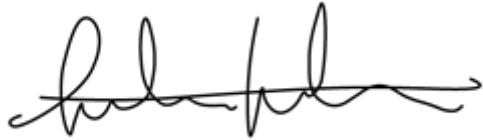


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Change History

Issue Date	Version	Created by	Description of change
13/03/2022	A	D.F	Initial issue

Signatories

	
Authorised Daniel Fitzsimmons* Testing Manager	Checked Andrew Hutchison MEng AMIMechE* Head of Technical Services

*For and on behalf of United Kingdom Testing and Certification.

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1 Test Summary

1.1 Test Details

Test Sponsor	ICS Security
Sponsor Address	Unit 1-23 JBJ Business Park Northampton Road Blisworth Northampton NN7 3DW
Date of Test	05 November 2021

1.2 Test Basis

The test was carried out in accordance with EN 1634-1: 2014 + A1: 2018 as instructed by the test sponsor and employed the following standard methods.

EN 1363-1: 2020	Fire resistance tests – Part 1: General requirements.
EN 1634-1: 2014 + A1: 2018	Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware- Part 1: Fire resistance test for door and shutter assemblies and openable windows.
EN 1363-2: 1999 § 8	Fire resistance tests – Part 2: Alternative and additional procedures.

1.3 Expression of Results

1.3.1 Specimen A

	Discrete Area	Performance Criteria	Result (mins)
Integrity¹		Sustained Flaming (> 10 s)	51 minutes**
		Gap Gauge (Ø6 mm)	51 minutes**
		Gap Gauge (Ø25 mm)	51 minutes**
		Cotton Pad	23 minutes
Insulation²	Door Leaf	Mean Temperature Rise ($\Delta T > 140\text{ }^{\circ}\text{C}$)	23 minutes*
		Max Temperature Rise ($\Delta T > 180\text{ }^{\circ}\text{C}$)	23 minutes*
	Door Frame/ Transom	Max Temperature Rise ($\Delta T > 360\text{ }^{\circ}\text{C}$)	23 minutes*

*By virtue of cotton pad failure.

**No longer able to evaluate due to area of the specimen being blanked off.

***The test is discontinued.

¹ The time(s) in completed minutes for which the test specimen(s) continues to maintain its separating function without: a) causing ignition to the cotton pad applied in accordance with EN 1363-1:2020 § 10.4.5.2 b) permitting the penetration of a gap gauge as specified in EN 1363-1:2020 § 10.4.5.3 c) resulting in sustained flaming.

² The time(s) in completed minutes for which the test specimen(s) continues to maintain its separating function without developing temperatures on its unexposed surface which: a) increase the average temperature above the initial average temperature by more than 140 °C; b) increase at any location (including the roving thermocouple) above the initial average temperature by more than 180°C with the exception that the limit for temperature rise for any frame member or transom member adjacent to the leaf/leaves of the doorset or openable window shall be 360°C.

1.3.2 Specimen B

	Discrete Area	Performance Criteria	Result (mins)
Integrity³		Sustained Flaming (> 10 s)	69 minutes***
		Gap Gauge (Ø6 mm)	69 minutes***
		Gap Gauge (Ø25 mm)	69 minutes***
		Cotton Pad	69 minutes***
Insulation⁴	Door Leaf	Mean Temperature Rise ($\Delta T > 140^\circ\text{C}$)	69 minutes***
		Max Temperature Rise ($\Delta T > 180^\circ\text{C}$)	69 minutes***
	Door Frame/ Transom	Max Temperature Rise ($\Delta T > 360^\circ\text{C}$)	69 minutes***

*By virtue of cotton pad failure.

**No longer able to evaluate due to area of the specimen being blanked off.

***The test is discontinued.

³ The time(s) in completed minutes for which the test specimen(s) continues to maintain its separating function without: a) causing ignition to the cotton pad applied in accordance with EN 1363-1:2020 § 10.4.5.2 b) permitting the penetration of a gap gauge as specified in EN 1363-1:2020 § 10.4.5.3 c) resulting in sustained flaming.

⁴ The time(s) in completed minutes for which the test specimen(s) continues to maintain its separating function without developing temperatures on its unexposed surface which: a) increase the average temperature above the initial average temperature by more than 140°C ; b) increase at any location (including the roving thermocouple) above the initial average temperature by more than 180°C with the exception that the limit for temperature rise for any frame member or transom member adjacent to the leaf/leaves of the doorset or openable window shall be 360°C .

2 Test Construction and Specimen(s)

2.1 Summary

Supporting Construction:	Group A flexible standard supporting construction pursuant to BS EN 1363-1 § 7.2 consisting of 50 mm steel stud lined both sides with two layers of 12.5 mm thick gypsum fireline board.
Specimen A:	Single acting single leaf timber door assembly
Specimen B:	Single acting single leaf timber door assembly

Items 1 to 10, 17 to 25 and 31 to 33 were provided by United Kingdom Testing and Certification.

Items 10 to 16 and 26 to 29 were provided by the Test Sponsor.

Please refer to page 29 for full details of these items.

2.2 Specimen(s) Verification

United Kingdom Testing and Certification carried out a comprehensive survey to verify the information provided by the Test Sponsor. This included verifying the materials, dimensions, and manufacturing methodologies of the test specimen(s) wherever possible. Refer to page 29 for full details of this survey.

2.3 Specimen(s) Installation and Fixity

The Specimen(s) were installed into the test construction by United Kingdom Testing and Certification. Specimen A was installed such that the door leaf toward the heating conditions at the request of the Test Sponsor. Specimen B was installed such that the door leaf toward the heating conditions at the request of the sponsor. Specimen A was centrally latched prior to the commencement of the test at the request of the test sponsor. Specimen B was centrally latched prior to the commencement of the test at the request of the test sponsor.

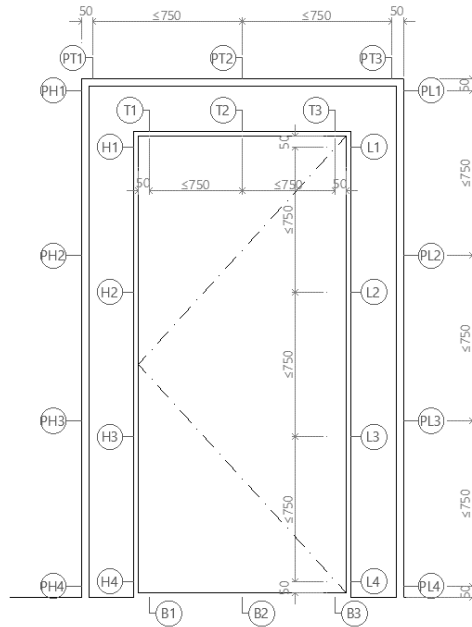
2.4 Sampling

United Kingdom Testing and Certification were not involved in the sampling or selection of the test specimen or any of the components. The results obtained during the test apply to the specimens as received and tested by United Kingdom Testing and Certification.

3 Pre-test Examination

3.1 Gap Measurements

The primary gaps were measured on the exposed face of the specimen(s) prior to the commencement of the test. The results were recorded on a Test History Record. A summary of these measurements is presented below. Please refer to page **Error! Bookmark not defined.** for details on measurement locations.



	Primary	Leaf to Stop
H1	2.2	0.0
H2	2.7	0.0
H3	2.6	0.0
H4	1.6	0.0
Mean	2.3	
Max	2.7	
Max Permitted	4.5	

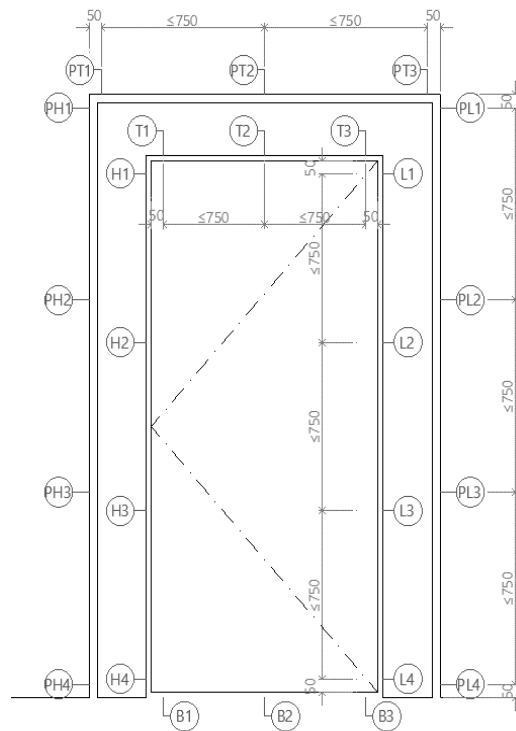
	Primary	Leaf to Stop
L1	2.7	0.0
L2	2.1	1.3
L3	3.3	2.5
L4	3.8	3.6
Mean	3.0	
Max	3.8	
Max Permitted	5.4	

	Primary	Leaf to Stop
T1	2.73	0
T2	2.36	0
T3	3.08	0
Mean	2.7	
Max	3.1	
Max Permitted	4.9	

	Primary	Leaf to Stop
B1	5.76	*
B2	3.38	*
B3	6.51	*
Mean	5.216666667	
Max	6.51	
Max Permitted	7.863333333	

PH1	17.5	PL1	13.7	PT1	6.5
PH2	15.0	PL2	12.4	PT2	7.4
PH3	12.6	PL3	12.3	PT3	8.8
PH4	12.5	PL4	11.4		

*Measurement not required.



	Primary	Leaf to Stop
H1	2.5	0.0
H2	2.6	0.0
H3	2.6	0.0
H4	2.1	0.0
Mean	2.5	
Max	2.6	
Max Permitted	4.5	

	Primary	Leaf to Stop
L1	4.0	3.2
L2	4.0	3.1
L3	3.5	1.4
L4	4.2	0.4
Mean	3.9	
Max	4.2	
Max Permitted	6.1	

	Primary	Leaf to Stop
T1	2.5	0.0
T2	2.6	2.2
T3	3.5	2.8
Mean	2.9	
Max	3.5	
Max Permitted	5.2	

	Primary	Leaf to Stop
B1	3.5	*
B2	3.4	*
B3	3.5	*
Mean	3.46	
Max	3.49	
Max Permitted	5.475	

PH1	15.4	PL1	16.1	PT1	7.2
PH2	15.2	PL2	15.6	PT2	7.3
PH3	15.0	PL3	15.9	PT3	6.1
PH4	14.8	PL4	16.8		

*Measurement not required.

3.2 Closing Force Measurements

Neither specimen was fitted with Closers, as such no closing force measurements were taken.

3.3 Operability

The specimen(s) were cycled in accordance with BS EN 16034:2014 § A.2.2.

3.4 Self-closing

A self-closing test was conducted on the specimen(s) in accordance with BS EN 16034:2014 § A.4.1

3.5 Final Setting

Final setting of the specimen(s) was carried out in accordance with BS EN 1634-1:2014 + A1:2018 § 10.1.4.

4 Test Procedure

4.1 Heating Conditions

The specimen(s) were subject to heating conditions in accordance with EN 1363-1:2020 § 5.1. This was monitored and controlled for the duration of the test using eight type K thermocouples which were distributed across a vertical plane 100 ± 50 mm from the exposed face of the test construction. The resulting Time-Temperature distribution is presented in Figure 4-1.

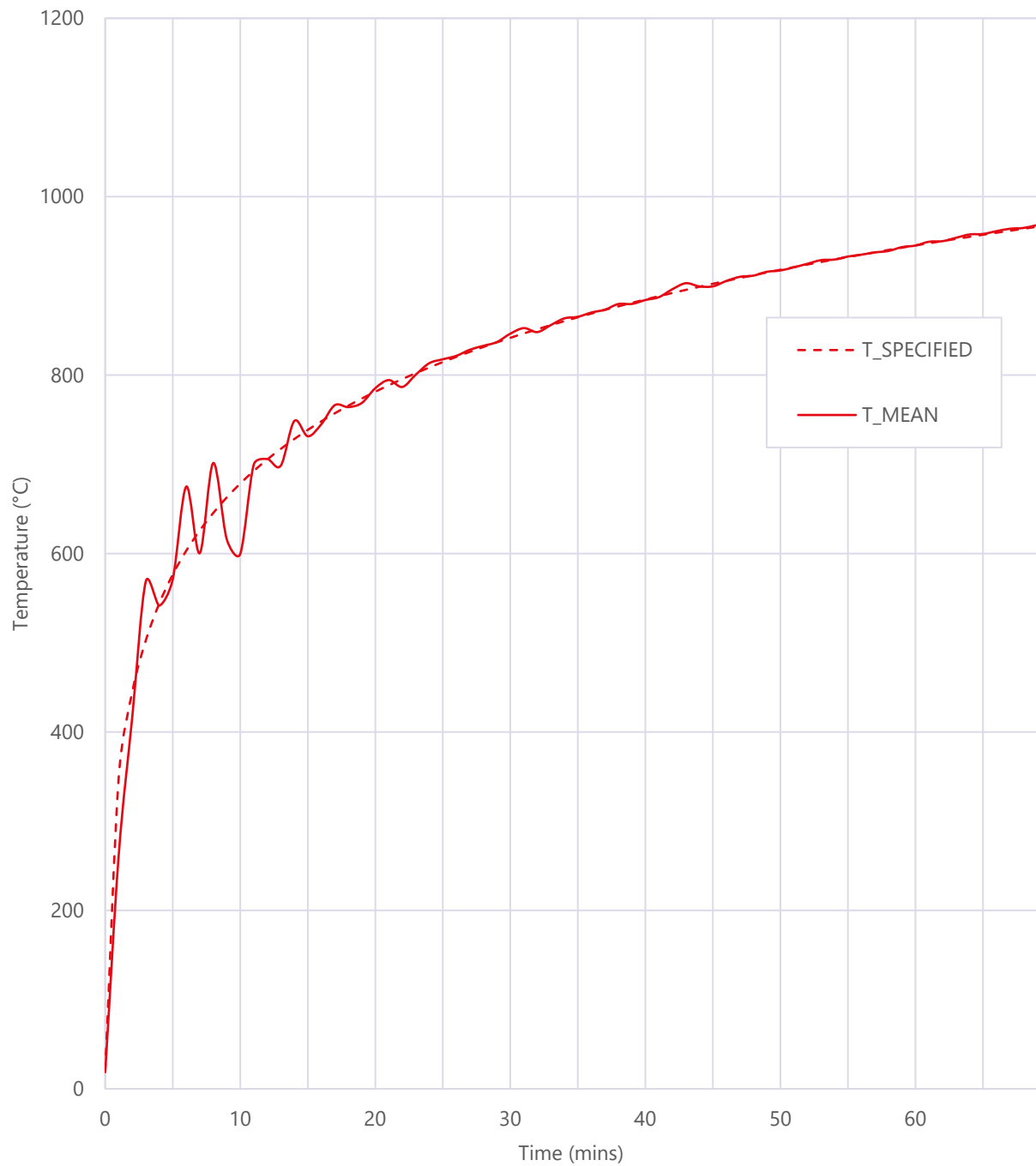


Figure 4-1

The percentage deviation of the resulting time-temperature curve has been evaluated against the standard time-temperature curve in accordance with EN 1363-1:2020 § 5.1.2. The Time-Percentage Deviation is presented in Figure 4-2.

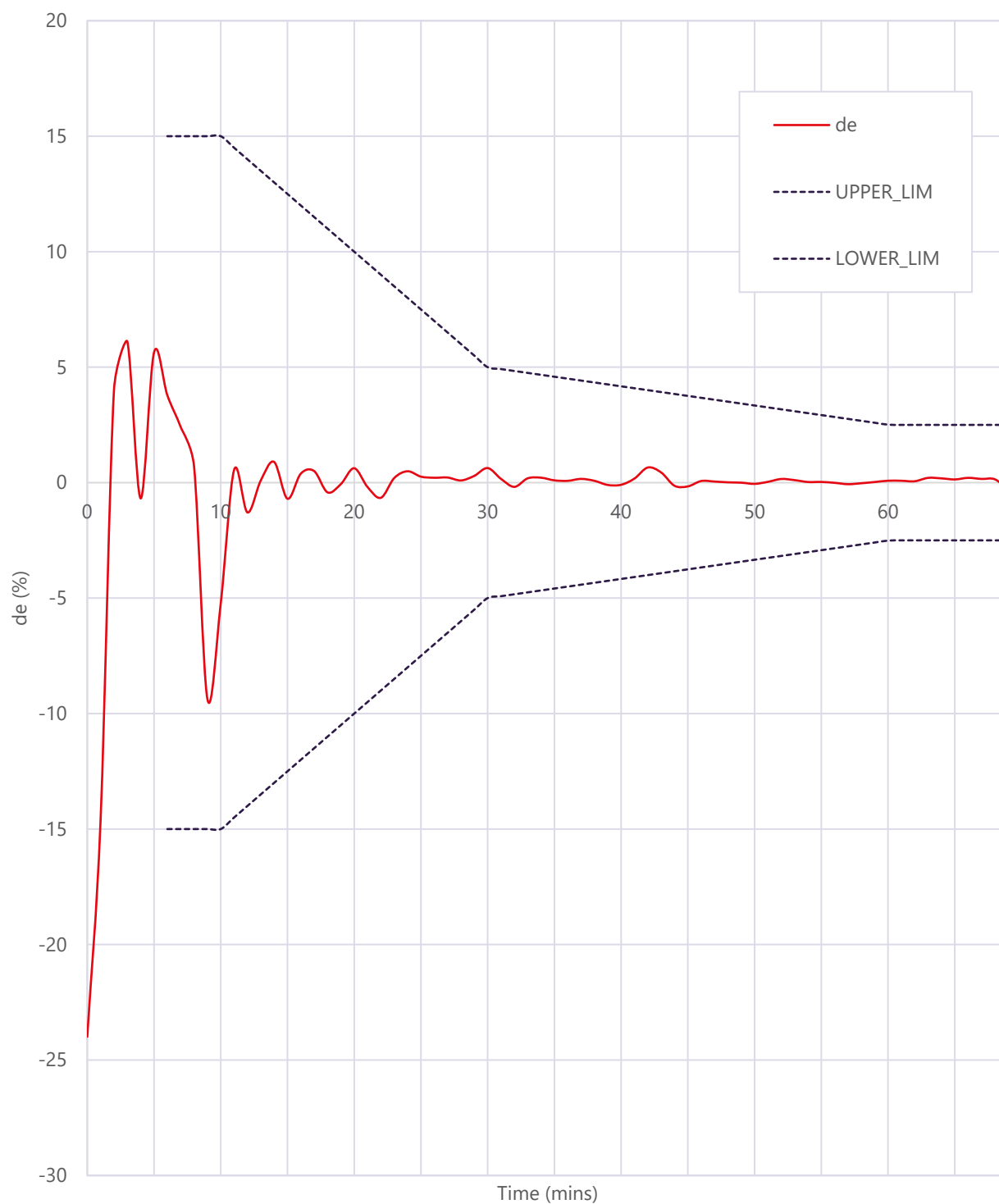


Figure 4-2

4.2 Pressure Conditions

The specimen(s) were subject to a pressure regime in accordance with EN 1363-1:2020 § 5.2. The calculated pressure differential relative to the laboratory atmospheric pressure at a height of 365 mm from the furnace floor level was -1.1 Pa which equates to 0 Pa at a height of 1000 mm from the furnace floor level. The furnace was maintained at these pressures within ± 2 Pa five minutes after the commencement of the test and for the remainder of the test duration. This was monitored and controlled for the duration of the test via a pressure tapping located at 2850 mm from the furnace floor. The Time-Pressure distribution is presented in Figure 4-3.

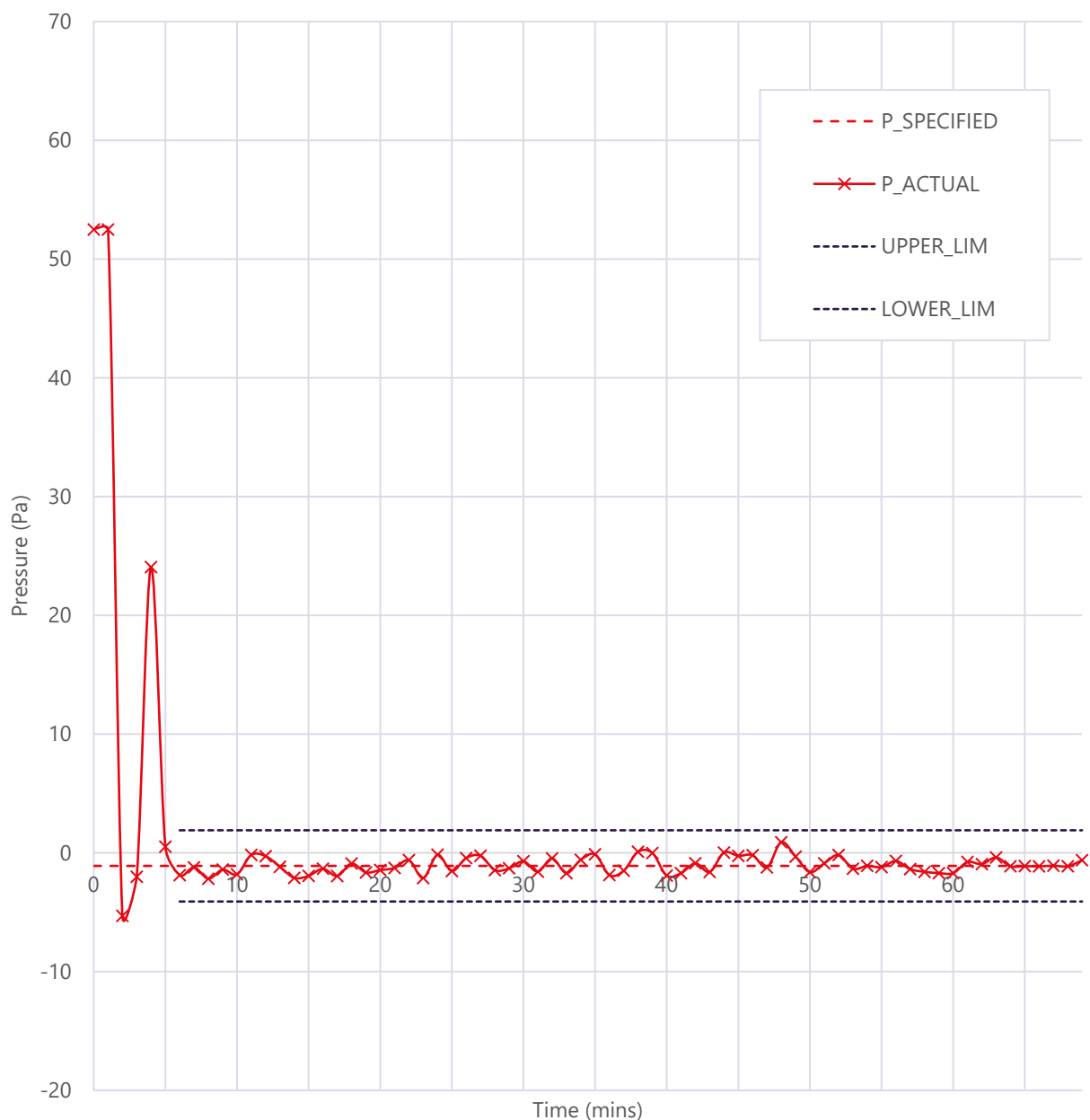


Figure 4-3

4.3 Environmental Conditions

The ambient temperature prior to the commencement of the test was 10.9°C. The Average Furnace Temperature prior to the commencement of the test was 10.2 °C. The ambient temperature immediately after the test was 12.5 °C.

4.4 Unexposed Surface Temperature

A roving thermocouple was available for the temperature measurement of any localised hot areas that were not monitored by surface thermocouples and any measurements using it were noted on a Test Observation Record. Please refer to page 21 for details of measurements recorded by the roving thermocouple.

Disc thermocouples were affixed to the unexposed surface of the specimen(s) in accordance with EN 1363-1:2020 § 9.1.2 to measure and monitor the maximum and the mean temperature rise of the unexposed face of the specimen(s) for the duration of the test. The time-temperature distribution and a summary of the key results is presented in Figure 4-4 and Figure 4-5. Refer to page 55 for full details of temperatures recorded.

4.4.1 Specimen A

	Allocated Thermocouple(s)
ΔT_{MAX} and ΔT_{AVE}	TC 1, 2, 3, 4, 5
ΔT_{MAX}	TC 16, 17, 19, 20

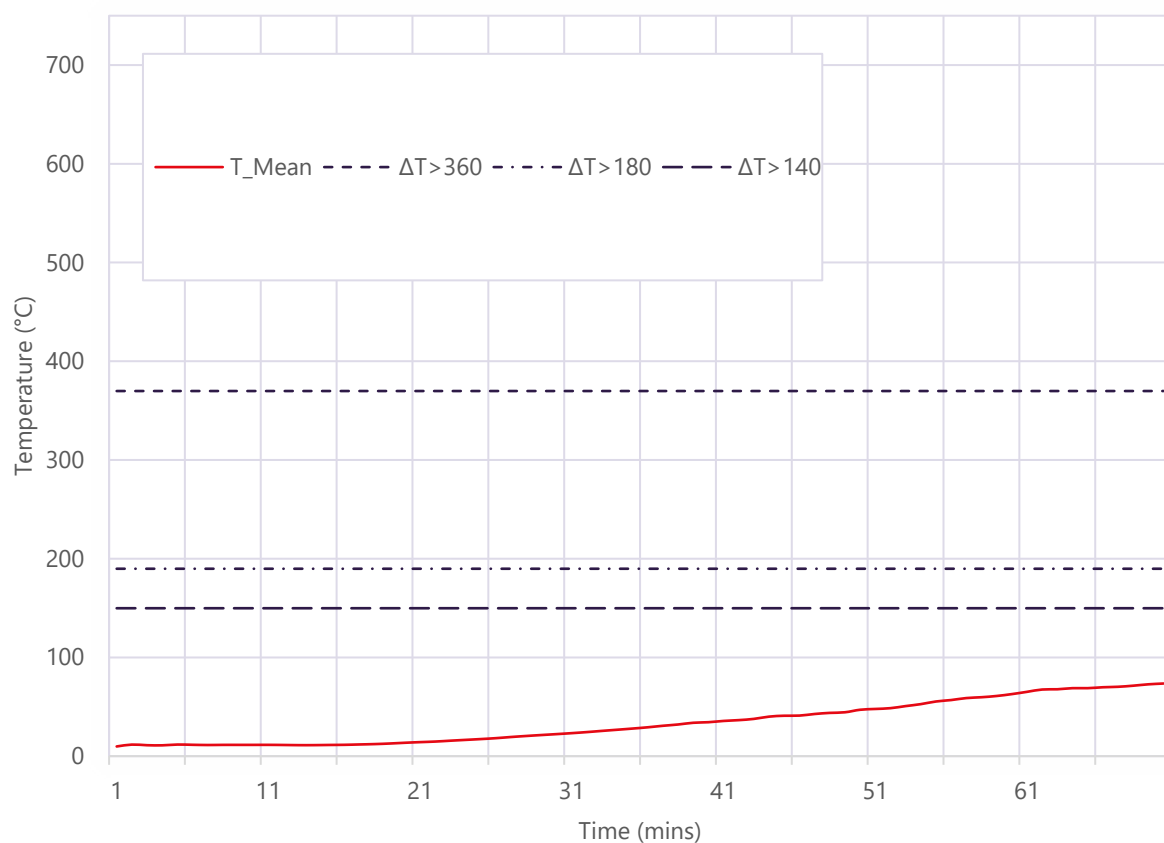


Figure 4-4

4.4.2 Specimen B

	Allocated Thermocouple(s)
ΔT_{MAX} and ΔT_{AVE}	TC 21, 22, 23, 24, 25
ΔT_{MAX}	TC 36, 37, 39, 40

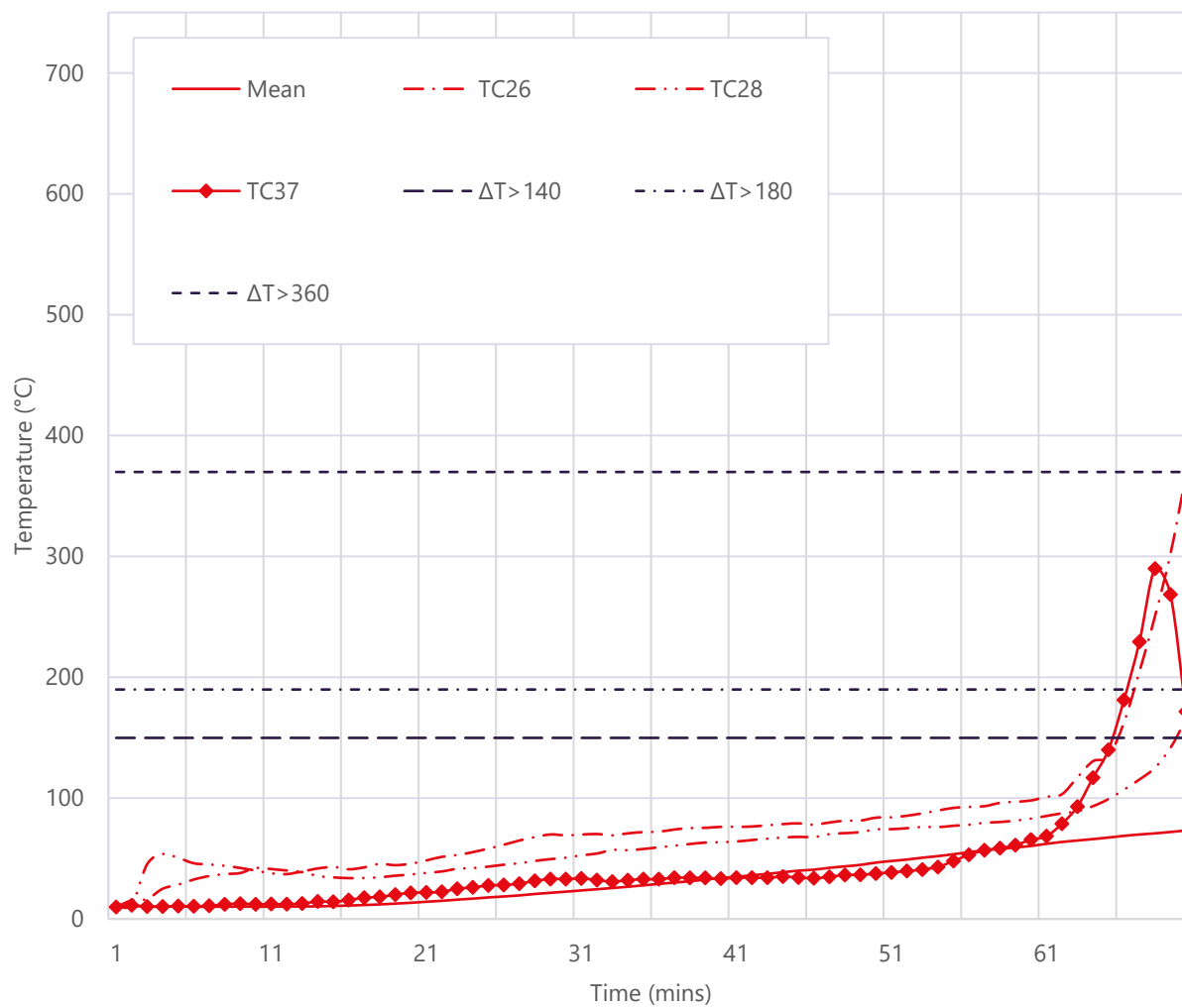


Figure 4-5

4.5 Deflection

A levelling line laser was installed parallel to the specimens to provide a fixed datum for the measurement of deflection in accordance EN 1363-1: 2020 § Annex G. Measurements were recorded throughout the test at regular intervals and recorded on a Deflection Measurement Record. The results are presented in Figure 4-7 and Figure 4-8. Refer to page **Error! Bookmark not defined.** for details on measurement locations and page 63 for the full details of the measurements recorded.

4.5.1 Specimen A

Positive values indicate movement toward the heating conditions.

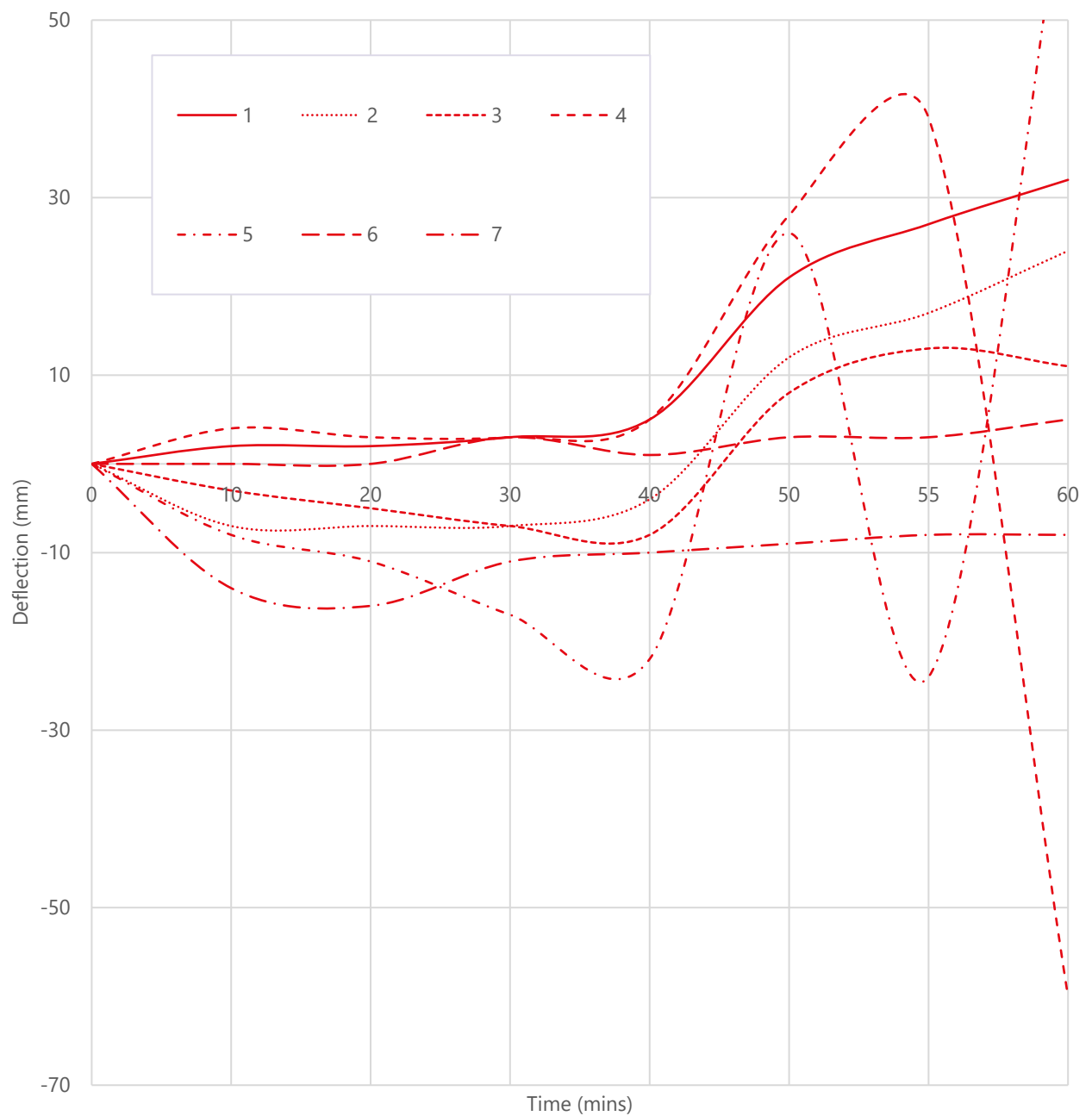


Figure 4-6

4.5.2 Specimen B

Positive values indicate movement toward the heating conditions.

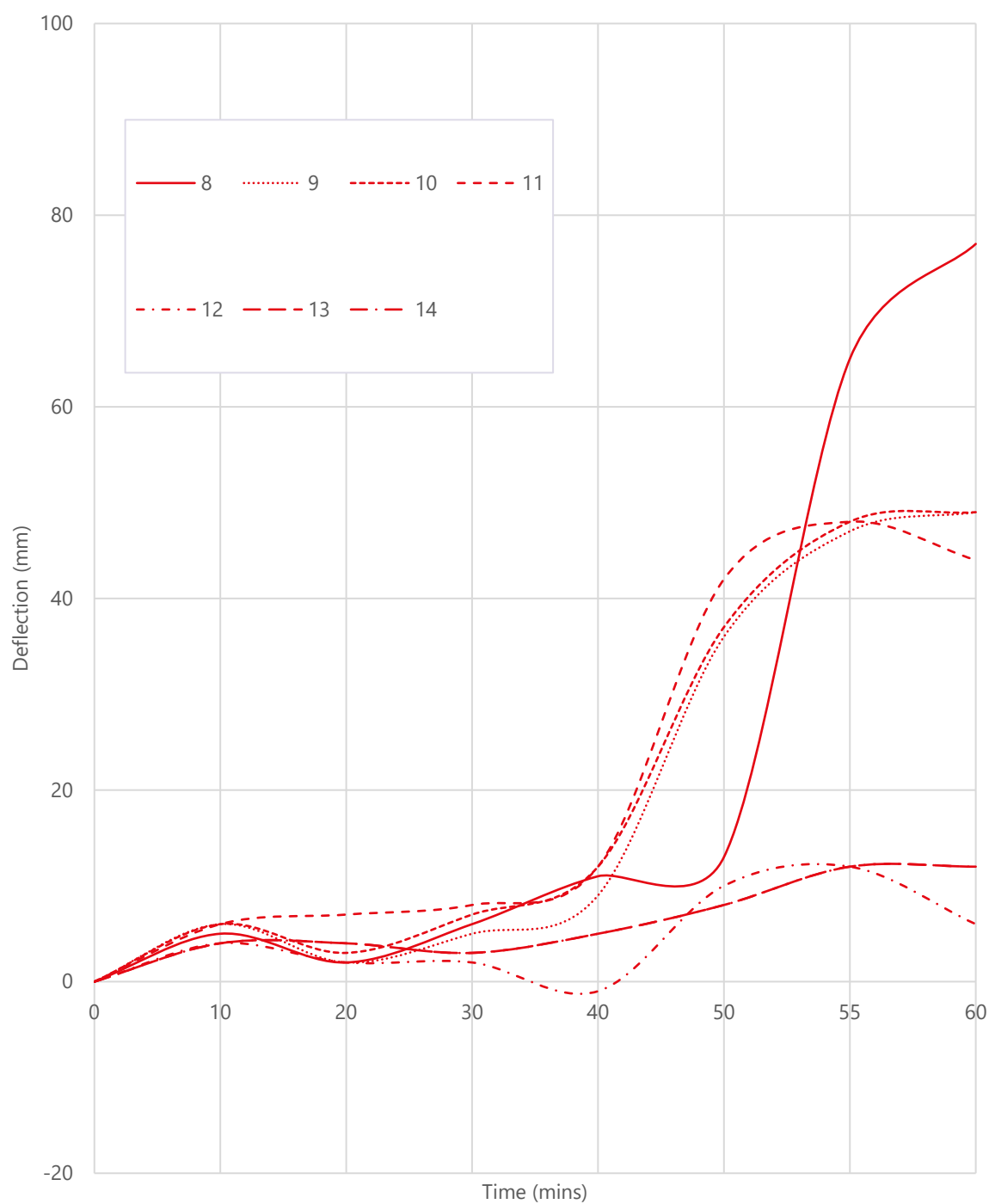


Figure 4-7

5 Specimen Behaviour

5.1 Observations

Observations relating to the general behavior of the specimen(s) were made for the duration of the test and recorded on a Test Observations Record. A summary of these observations is presented below.

Specimen	Time			E ⁵	U ⁶	Observation
	Hrs	Mins	Secs			
	00	00	00			The test commences.
A+B	00	01	00		x	Light steam/smoke release at the head and vertical edges.
A+B	00	05	35	x		Both leaves have ignited.
B	00	07	01		x	Discolouring of the leaf is observed at the leading edge.
A	00	07	41		x	Flickers of flame issue at the base of the leaf
A	00	08	59		x	The latch bolts along the leading edge have come away from the strike plates.
A	00	10	00	x		The push bar has fallen away from the doorset.
A	00	13	00		x	An orange glowing is observed at the bottom strike position
A	00	16	10		x	Cotton pad integrity test is performed over bottom strike. Pad discoloured but didn't ignite.
A	00	18	52	x		Handles have melted away and are pooling at the base of the leaf.
A	00	23	10		x	Flickers of flame continue at the bottom strike position. Cotton pad integrity test is performed. The pad ignites. Cotton pad integrity failure and by virtue insulation failure is deemed to have occurred.
A+B	00	25	00		x	Steam/smoke release continues at the head and vertical edges.
A	00	29	00	x		Push bar at the base of the leaf is observed pooling.
A	00	40	00		x	Charring of the base of the leaf as flames continue to flicker.
A	00	43	04		x	Flickers of flame issue through the intumescent at the bottom strike.
A	00	51	00		x	Flickers spreading from bottom strike up the leading edge. Area blanked with mastic. Sustained flame and gap gauge failure criteria are no longer able to be evaluated.

⁵ Viewed from exposed face of specimen

⁶ Viewed from unexposed face of specimen

Specimen	Time			E ⁷	U ⁸	Observation
	Hrs	Mins	Secs			
A	00	55	00		x	Sustained flames issues from bottom strike. The area is blanked off with ceramic wool to allow the test to continue.
A	00	59	26		x	An orange glowing is observed at top strike position.
A	00	59	00		x	Flickers from panic latch and spread up the leaf. Cotton pad integrity test is performed. Pad ignites. The area blanked with mastic to allow the test to continue.
B	01	01	00		x	Flicker of flame issues approximately 200 mm down from the head on the leading edge.
A	01	04	00		x	Flickers of flame issue at the top latch position.
A	01	06	00		x	Sustained flames issue along the head. The area is blanked off.
	01	09	00			The test is discontinued.

⁷ Viewed from exposed face of specimen

⁸ Viewed from unexposed face of specimen

5.2 Test Photographs











6 Limitations

6.1 Field of Application

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 and should be the subject to design appraisal by a competent individual.

EN 1634-1: 2014 + A1: 2018 § 13 provides guidance on the field of direct application of results. The permissible variations included in this guidance can be applied automatically without the need for the sponsor to seek additional evaluation, calculation, or approval.

6.2 Asymmetrical Test Specimens

The tested specimen(s) were asymmetrical and were tested such that the door leaves opened towards the heating conditions. The test results may not be appropriate to applications where the door leaves open away from the heating conditions.

6.3 Accuracy of Results

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.

No statement of conformity with the testing specifications is made or implied in this report. However, measurement results are reviewed, where applicable, to establish where measurement results exceed the control parameters established in the relevant fire resistance test standard.

Appendix A

A.1 Schedule of Components

All dimensions are in millimetres (mm) unless otherwise stated.

Legend	
*	Information provided by the Test Sponsor. Not verified by United Kingdom Testing and Certification
**	Nominal value
***	Information is commercial in confidence. Full details retained on file by United Kingdom Testing and Certification

A.1.1 Specimen A

1. Door frame	
Manufacturer	SA Joinery
Reference	Prima
Material	Sapele Head and Sapele Jambs
Density	620 - 660 kg/m ³ *
Moisture content	12- 14%*
Dimensions	
I. Overall size	2097 mm x 1045 mm
II. Frame (Head)	93 mm wide x 70 mm thick with 55 mm wide x 19 mm deep rebate
III. Frame (Jambs)	93 mm wide x 70 mm thick with 55 mm wide x 19 mm deep rebate
IV. Stop	N/a
V. Jamb to Head jointing method, fixing detail and location	Stub mortice & screwed, using 75 mm long x Ø 4.6 mm countersunk head wood screws through screwed and plugged
VI. Presence of Adhesives	N/a

2. Frame Fixing Method to Supporting Construction	
Manufacturer	SPAX International GmbH & CO. KG
Type & material	Single Thread Screws & Hardened Steel
Overall size	Ø 5 mm x 80 mm long

Spacing	150 mm from top corner of jamb, 150 mm from bottom corner of jamb and at no more than 600 mm centres
Does the fixing penetrate intumescent seal within frame reveal	No
Packing Material	Certitek PVC U Shims
Packing Material Dimension	101 mm x 43 mm assorted thicknesses
Packing Material Location	At each fixing location

3. Intumescent to frame reveal

Quantity	2
Manufacturer	Pyroplex Ltd
Reference	CF 355
Material	Graphite intumescent strip within a polyvinyl chloride, PVC, carrier
Overall section size	No. 2 at 15 mm wide x 4 mm thick
Application method	Self-adhered into grooves within rebate of frame and the strips were interrupted at furniture positions
Location (relative to the opening face of the door leaf)	6 mm from opening face & 4 mm from rebate
Presence of Adhesives	None other than self-adhesive strips

4. Frame to supporting construction fire stopping detail

Manufacturer	Saint-Gobain
Reference	Isover Insulation
Material	Mineral Wool
Overall dimension	50 mm
Application method	Compression fitted

5. Sealant to fire stopping detail

Manufacturer	Certitek
Reference	DM1 Intumescent & Acoustic Acrylic Sealant

Material	Acrylic Sealant
Overall section size	10 mm deep
Application method	Using a cartridge gunned
Location	Gaps between the head and jambs and supporting construction

6. Door Leaf	
Manufacturer	SA Joinery
Reference	Prima
Quantity of leaves on door set	1
Overall leaf size supplied for testing	932 mm wide x 2040 mm high x 54 mm thick

7. Core element	
Manufacturer	SA Joinery
Reference	Prima
Material	Chipboard
Density	620-740kg/m ³ *
Overall thickness	54 mm thick

8. Lipping's / Edge banding	
Manufacturer	S A Joinery
Reference	Door Lipping
Material	Hardened Sapele
Density	640 kg/m ³ ⁹
Moisture content	13%*
Overall size	44 mm wide x 8 mm thick x 2200 mm long
Fixing method	Adhesive
Location	Vertical edges only

⁹ [Wood Species Database: Sapele | TRADA](#)

Adhesives	Yes
Manufacturer	ARO-BOND
Type	MCPU
Reference	947
Curing method	Flush Trim
Application method	Damp cloth over area apply PU with Spatula
Presence of Mechanical Fixings	No

9. Hinges	
Supplier	Royde & Tucker
Reference	Hi load 102
Quantity	No. 3 per leaf
Primary material	Zinc plated steel
Type	Butt Hinge
Size	
I. Knuckle	Ø 14 mm x 104 mm high
II. Blades	100 mm high x 35 mm wide x 3 mm thick
Fixings	
I. Type	Countersunk head wood screws
II. Material	Steel
III. Sizes	Ø 5 mm x 30 mm long
IV. Number off per blade	5
Position of each hinge relative to the head of the leaf	175 mm, 945 mm & 1720 mm
Details of intumescent protection	1 mm Interdens
Interruptions to Intumescent within the frame reveal	Fully interrupted

10. Lockset / Latch	
Manufacturer	Gianni
Reference	ML450M (electric strike with union latch)
Quantity	1 No. at the top the door leaf
Material	
I. Lock case	Stainless Steel
II. Forend plate	Stainless Steel
III. Latch bolt	Stainless Steel
IV. Lock bolt	Stainless Steel
V. Top and bottom lock case	Stainless Steel
VI. Top and bottom lock bolts	Stainless Steel
VII. Strike Plate	Stainless Steel
Overall sizes	
I. Lock case	260 mm high x 24 mm wide x 40.5 mm deep
II. Forend plate	210 mm high x 25 mm wide x 3 mm thick
III. Main Latch	26 mm long x 17 mm Wide x 13 mm Protrusion
IV. Mini Latch	5 mm long x 17 mm Wide x 13 mm Protrusion
V. Strike Plate	150 mm Long 32 mm Wide x 12 mm Protrusion
Fixing method	
I. Forend Plate	Wood screws No. 2 at Ø 5.0 mm x 5 mm
II. Strike Plate	Wood screws 2 No. at Ø 10 mm x 30 mm
III. Operation of latch bolt	Disengaged
IV. Operation of lock bolt	Disengaged
Details of intumescent protection	
I. Central lock case	1 mm Interdens
II. Top and bottom lock case	1 mm Interdens
III. Forend plate	1 mm Interdens
IV. Interruptions to Intumescent within the frame reveal	Fully Interrupted

Location of centre of the spindle relative to the bottom of the leaf	Centre of the bottom spindle's measures 1000mm from the bottom of the leaf
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11. Lockset / Latch	
Manufacturer	Union
Reference	JL2C25
Quantity	No. 3 one for each spindle location on Doorset
Material	
I. Lock case	Stainless Steel
II. Forend plate	Stainless Steel
III. Latch bolt	Stainless Steel
IV. Lock bolt	Stainless Steel
V. Strike Plate	See item 12 ,13 & 14
Overall sizes	
I. Lock case	165 mm long x 16 mm wide x 83 mm Deep
II. Forend plate	235 mm long x 24 mm wide x 3 mm Thick
III. Main Latch	30 mm long x 17 mm wide x 13 mm Projection
IV. Mini Latch	5 mm long x 17 mm wide x 13 mm Projection
V. Strike Plate	See item 12 & 13
Fixing method	
I. Forend Plate	Wood screws 2 No. at Ø 9 mm x 25 mm
II. Strike Plate	Wood screws No. 2 at Ø 6 mm x 20 mm
III. Operation of latch bolt	Disengaged
IV. Operation of lock bolt	Disengaged
Details of intumescent protection	
I. Central lock case	1 mm Interdens
II. Forend plate	1 mm Interdens
III. Interruptions to Intumescent within the frame reveal	Fully Interrupted

12. Electric Release Strike Plate 1	
Manufacturer	Gianni
Reference	GK231M (electric strike with union latch)
Location	Top left Spindle 650 mm from top of frame 115 mm from door edge
Primary Material	Stainless Steel
Overall sizes	
I. Forend	200 mm long x 25 mm wide x 3 mm Thick
II. Main Body	140 mm long x 39.5 mm wide x 25 mm Thick
III. Plate Opening	47.5 mm long x 20 mm wide
Operation of Latch bolt (upper lockset)	Disengaged
Operation of dead bolt (lower lockset)	Disengaged
Intumescent Details	1 mm Interdens
Fixings	Ø 10 mm x 30 mm x 2

13. Electric Release Strike Plate 2	
Manufacturer	Gianni
Reference	GK311M
Location	660 mm up from bottom of door to centre of spindle (electric strike with union latch)
Primary Material	Stainless Steel
Overall sizes	
I. Forend	201.6 mm long x 36.5 wide x 2.5 mm thick
II. Main Body	85.5 mm long x 43.5 mm wide x 17 mm thick 29.5 mm depth
III. Plate Opening	36.5 mm long
Operation of Latch bolt (upper lockset)	Disengaged
Operation of dead bolt (lower lockset)	Disengaged
Intumescent Details	1 mm Interdens

Fixings	No 2 at Ø 5 mm x 30 mm Wood Screws
---------	------------------------------------

14. Electric Release Strike Plate 3	
Manufacturer	Gianni
Reference	GK450ST (electric strike with union latch)
Location	Top left Spindle 650 mm from top of frame 115 mm from door edge fitted on its own
Primary Material	Stainless Steel
Overall sizes	
I. Forend	201.6 mm long x 36.5 wide x 2.5 mm thick
II. Main Body	85.5 mm long x 43.5 mm wide x 17 mm thick 29.5 mm Depth
III. Plate Opening	36.5 mm long
Operation of Latch bolt (upper lockset)	Disengaged
Operation of dead bolt (lower lockset)	Disengaged as
Intumescent Details	1 mm Interdens
Fixings	No. 2 at Ø 5 mm x 30 mm Wood Screws

15. Rim Cylinder Doorset	
Manufacturer	Kae Mang
Primary Material	Brass with a Satin Chrome Finish
Overall sizes	
I. Body	33 mm x 77 mm wide
II. Operation	Disengaged
III. Number of Pins	5- Pins
IV. Fixings	Ø 8 mm x 75 mm x 2 through bolts

16. Lever handles	
Manufacturer	ASEC URBAN
Reference	Portland Lever on Rose SKU: AS10966

Material	Stain Stainless Steel
Overall size	52 mm high x 144 mm wide x 20 mm thick x 60 mm projection
Fixing method, fixing material, sizes, quantity, and location	Wood Screw at No.3 Ø 5 mm x 20 mm
Details of intumescent protection	None

17. Push Bar	
Manufacturer	Gianni
Manufacturers Product Reference	PBH-100MLD
Material	Aluminium alloy silver coated finish
Overall size	890 mm long x 65 mm Wide
Fixing method	Wood Screw No. 6 at Ø 5 mm x 20 mm
Intumescent protection	N/a

A.1.2 Specimen B

18. Door frame	
Manufacturer	SA Joinery
Reference	Prima
Material	Sapele Head and Sapele Jambs
Density	620 - 660 kg/m ^{3*}
Moisture content	12- 14% ¹⁰
Dimensions	
I. Overall size	2097 mm x 1045 mm
II. Frame (Head)	93 mm wide x 70 mm thick with 55 mm wide x 19 mm deep rebate
III. Frame (Jambs)	93 mm wide x 70 mm thick with 55 mm wide x 19 mm deep rebate
IV. Stop	N/a

¹⁰ [Benefits & Availability of Sapele Lumber \(sapeleoutlet.com\)](https://sapeleoutlet.com)

V. Jamb to Head jointing method, fixing detail and location	Stub mortice & screwed, using 75 mm long x Ø 4.6 mm countersunk head wood screws through screwed and plugged
VI. Presence of Adhesives	N/a

19. Frame Fixing Method to Supporting Construction

Manufacturer	SPAX International GmbH & CO. KG
Type & material	Single Thread Screws & Hardened Steel
Overall size	Ø 5 mm x 80 mm long
Spacing	150 mm from top corner of jamb, 150 mm from bottom corner of jamb and at no more than 600 mm centres
Does the fixing penetrate intumescent seal within frame reveal	No
Packing Material	Certitek PVC U Shims
Packing Material Dimension	101 mm x 43 mm assorted thicknesses
Packing Material Location	At each fixing location

20. Intumescent to frame reveal

Quantity	2
Manufacturer	Pyroplex Ltd
Reference	CF 355
Material	Graphite intumescent strip within a polyvinyl chloride, PVC, carrier
Overall section size	No. 2 at 15 mm wide x 4 mm thick
Application method	Self-adhered into grooves within rebate of frame and the strips were interrupted at furniture positions
Location (relative to the opening face of the door leaf)	6 mm from opening face & 4 mm from rebate
Presence of Adhesives	None other than self-adhesive strips

21. Frame to supporting construction fire stopping detail	
Manufacturer	Saint-Gobain
Reference	Isover Insulation
Material	Mineral Wool
Overall dimension	50 mm
Application method	Compression fitted

22. Sealant to fire stopping detail	
Manufacturer	Certitek
Reference	DM1 Intumescent & Acoustic Acrylic Sealant
Material	Acrylic Sealant
Overall section size	10 mm deep
Application method	Using a cartridge gunned
Location	Gaps between the head and jambs and supporting construction

23. Door Leaf	
Manufacturer	SA Joinery
Reference	Prima
Quantity of leaves on door set	1
Overall leaf size supplied for testing	932 mm wide x 2040 mm high x 54 mm thick

24. Core element	
Manufacturer	SA Joinery
Reference	Prima
Material	Chipboard
Density	620-740kg/m ³ *
Overall thickness	54 mm thick

25. Lipping's / Edge banding	
Manufacturer	S A Joinery
Reference	Door Lipping
Material	Hardened Sapele
Density	640 kg/m ³ ¹¹
Moisture content	13% ¹²
Overall size	44 mm wide x 8 mm thick x 2200 mm long
Fixing method	Adhesive
Location	Vertical edges only
Adhesives	Yes
Manufacturer	ARO-BOND
Type	MCPU
Reference	947
Curing method	Flush Trim
Application method	Damp cloth over area apply PU with Spatula
Presence of Mechanical Fixings	No

26. Hinges	
Supplier	Royde & Tucker
Reference	Hi load 102
Quantity	No. 3
Primary material	Zinc plated steel
Type	Butt Hinge
Size	
I. Knuckle	Ø14 mm x 104mm high

¹¹ [Wood Species Database: Sapele | TRADA](#)

¹² [Sapele | The Wood Database - Lumber Identification \(Hardwood\) \(wood-database.com\)](#)

II. Blades	100 mm high x 35 mm wide x 3 mm thick
Fixings	
I. Type	Countersunk head wood screws
II. Material	Steel
III. Sizes	Ø 5mm x 30 mm long
IV. Number off per blade	5
Position of each hinge relative to the head of the leaf	175 mm, 945 mm & 1720 mm
Details of intumescent protection	1 mm Interdens
Interruptions to Intumescent within the frame reveal	Fully interrupted

27. Lockset / Latch	
Manufacturer	Gianni
Reference	ML450M
Quantity	1 No. at the top the door leaf's
Material	
I. Lock case	Stainless Steel
II. Forend plate	Stainless Steel
III. Latch bolt	Stainless Steel
IV. Lock bolt	Stainless Steel
V. Strike Plate	Stainless Steel
Overall sizes	
I. Lock case	260 mm high x 24 mm wide x 40.5 mm deep
II. Forend plate	21 0mm high x 25 mm wide x 3 mm thick
III. Main Latch	26mm Long x 17 mm Wide x 13mm Projection
IV. Mini Latch	5 mm long x 17 mm wide x 13 mm Projection

V. Strike Plate	150mm Long 32mm wide x 12 mm Projection
Fixing method	
I. Forend Plate	Wood screws No. 2 at Ø 5.0 mm x 5 mm & 2 No. at Ø 10 mm x 30 mm
II. Strike Plate	Wood screws 2 No. at Ø 10 mm x 30 mm
III. Operation of latch bolt	Disengaged
IV. Operation of lock bolt	Disengaged
Details of intumescent protection	
I. Central lock case	1 mm Interdens
II. Forend plate	1 mm Interdens
III. Interruptions to Intumescent within the frame reveal	Fully Interrupted
Location of centre of the spindle relative to the bottom of the leaf	Centre of the bottom spindle's measures 1000 mm from the bottom of the leaf

28. Lockset / Latch	
Manufacturer	Union
Reference	JL2C25
Quantity	No. 3 one for each spindle location on door leaf
Material	
I. Lock case	Stainless Steel
II. Forend plate	Stainless Steel
III. Latch bolt	Stainless Steel
IV. Lock bolt	Stainless Steel
V. Strike Plate	See item 29, 30 & 31
Overall sizes	
I. Lock case	165 mm long x 16 mm wide x 83 mm deep
II. Forend plate	235 mm long x 24 mm wide x 3 mm thick

III. Main Latch	30 mm long x 17 mm wide x 13 mm projection
IV. Mini Latch	5 mm long x 17 mm wide x 13mm Projection
V. Strike Plate	See item 29,30 & 31
Fixing method	
I. Forend Plate	Wood screws 2 No. at 9 Ømm x 25mm
II. Strike Plate	Wood screws No. 2 at 6 Ømm x 20mm
III. Operation of latch bolt	Disengaged
IV. Operation of lock bolt	Disengaged
Details of intumescent protection	
I. Central lock case	1 mm Interdens
II. Forend plate	1 mm Interdens
III. Interruptions to Intumescent within the frame reveal	Fully Interrupted

29. Electric Release Strike Plate 1	
Manufacturer	Gianni
Reference	GK231M (electric strike with union latch)
Location	Top right Spindle 650 mm from top of frame 115 mm from door edge
Primary Material	Stainless Steel
Overall sizes	
I. Forend	200 mm long x 25 mm Wide x 3 mm Thick
II. Main Body	140 mm long x 39.5 mm Wide x 25 mm Thick
III. Plate Opening	47.5 mm long x 20 mm Wide
Operation of Latch bolt (upper lockset)	Disengaged
Operation of dead bolt (lower lockset)	Disengaged
Intumescent Details	1 mm Interdens
Fixings	10 Ø mm x 30 mm x 2

30. Electric Release Strike Plate 2	
Manufacturer	Gianni
Reference	GK311MST
Location	660mm up from bottom of door to centre of spindle (electric strike with union latch)
Primary Material	Stainless Steel
Overall sizes	
I. Forend	201.6 mm long x 36.5 Wide x 2.5 mm Thick
II. Main Body	85.5 mm long x 43.5 mm Wide x 17 mm Thick 29.5 mm Depth
III. Plate Opening	36.5 mm long
Operation of Latch bolt (upper lockset)	Disengaged
Operation of dead bolt (lower lockset)	Disengaged as
Intumescent Details	1 mm Interdens
Fixings	No. 2 at Ø 5 mm x 30 mm Wood Screws

31. Electric Release Strike Plate 3	
Manufacturer	Gianni
Reference	GK450ST- 1224 (electric strike with union latch)
Location	Top left Spindle 650 mm from top of frame 115 mm from door edge fitted on its own
Primary Material	Stainless Steel
Overall sizes	
I. Forend	201.6 mm long x 36.5 Wide x 2.5 mm thick
II. Main Body	85.5 mm long x 43.5 mm wide x 17 mm thick 29.5 mm depth
III. Plate Opening	36.5 mm long
Operation of Latch bolt (upper lockset)	Disengaged
Operation of dead bolt (lower lockset)	Disengaged as
Intumescent Details	1 mm Interdens
Fixings	No. 2 at Ø 5 mm x 30 mm Wood Screws

32. Lever handles	
Manufacturer	ASEC URBAN
Reference	Portland Lever on Rose SKU: AS10966
Material	Stain Stainless Steel
Overall size	52 mm high x 144 mm wide x 20 mm thick x 60mm projection
Fixing method, fixing material, sizes, quantity, and location	No. 3 at Ø 5 mm x 20 mm
Details of intumescent protection	None

A.1.3 Supporting Construction

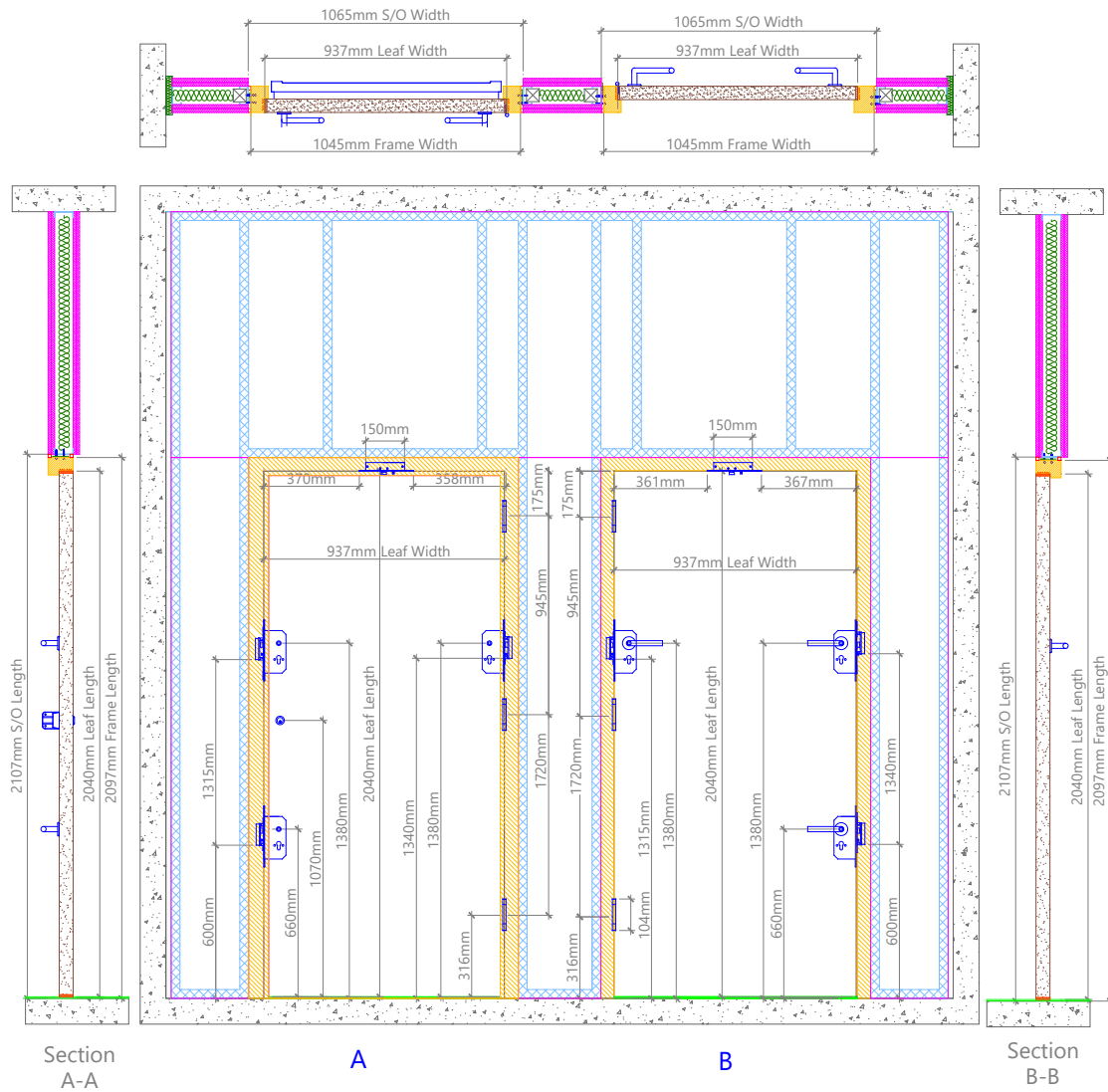
33. Supporting Wall Frame Details	
Supplier	UKTC Provided
Wall Supporting Structure (Frame)	
I. Manufacturer	Gypsum
II. Type & Material	Steel C Stud
III. Thickness & Size	50 mm wide x 34 mm thick x 3000 mm Long
IV. Centres	600 mm centres 20 mm space between testing frame and wall frame for Insulation
Additional Wall Construction Requests	N/a

34. Plasterboard	
Manufacturer	Gypsum Saint-Gobain
Type & material	Gypsum Gyproc FireLine Plasterboard Tapered Edge
Layer Quantity	2
Thickness & Sheet Size	12.5 mm Per Layer 25 mm Total & 2400 mm x 1200 mm per sheet
Fixings	Plasterboard screw fixings Ø 5 mm x 25 mm

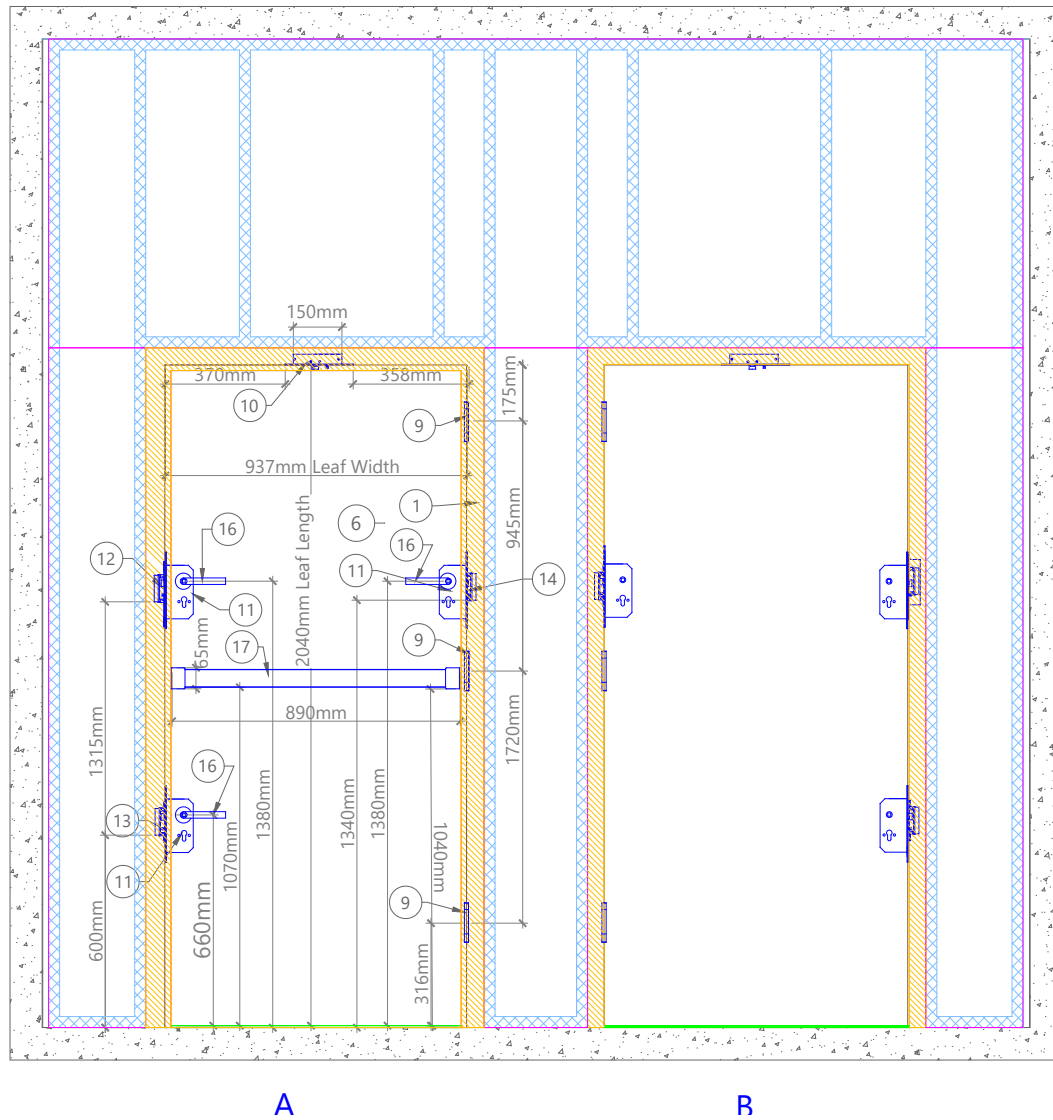
Joints Filled & Taped With	Filled with Gyproc ProMix Lite & Gyproc Fire Strip
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35. Wall Insulation	
Manufacture	Saint-Gobain
Type & material	Mineral Wool
Installation Method	Compression fitted
Reference	Isover Insulation
Thickness	50 mm
Locations	Centrally located in the wall & at the free edges of the testing frame to the wall frame
Additional Wall Construction Requests	N/a

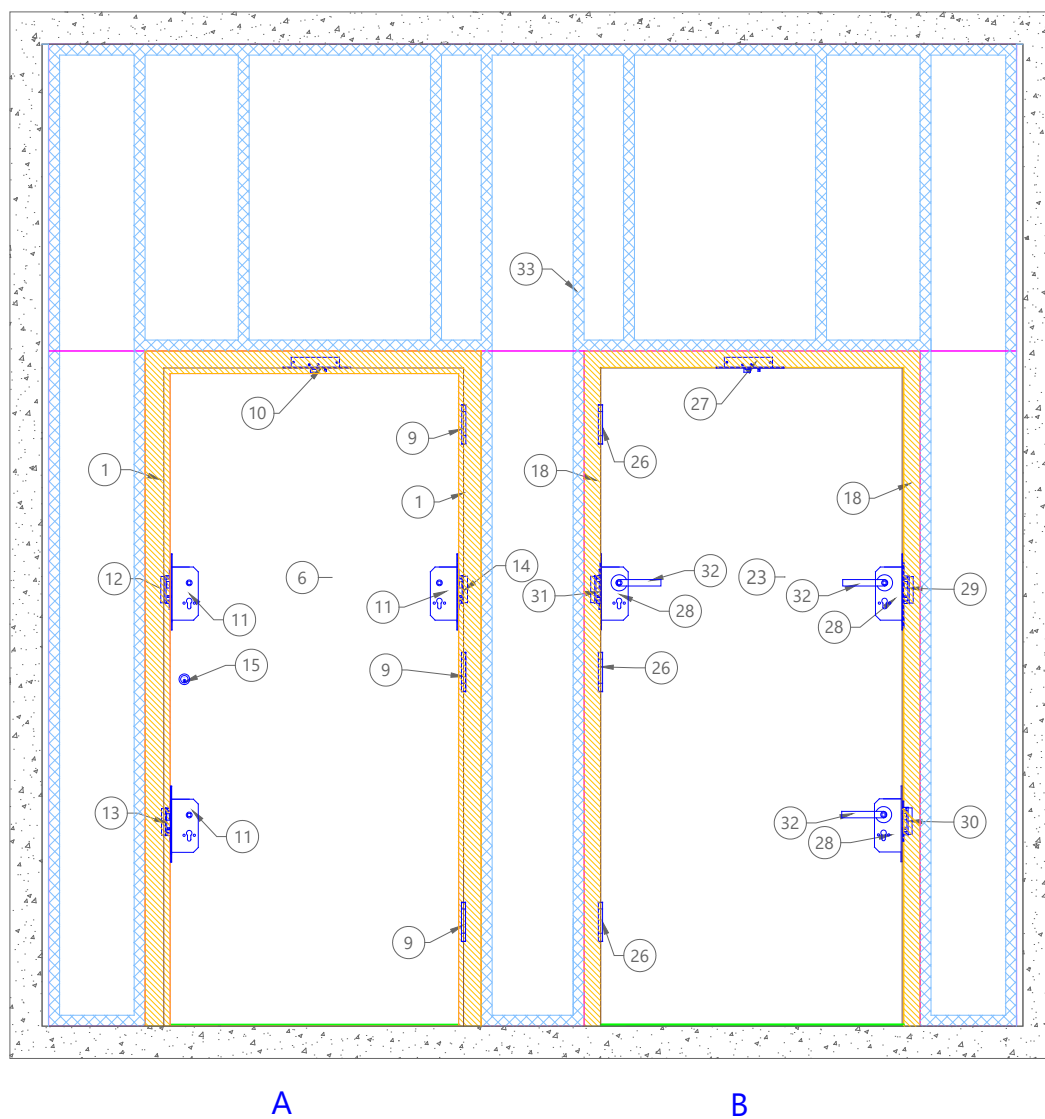
A.2 General Arrangement



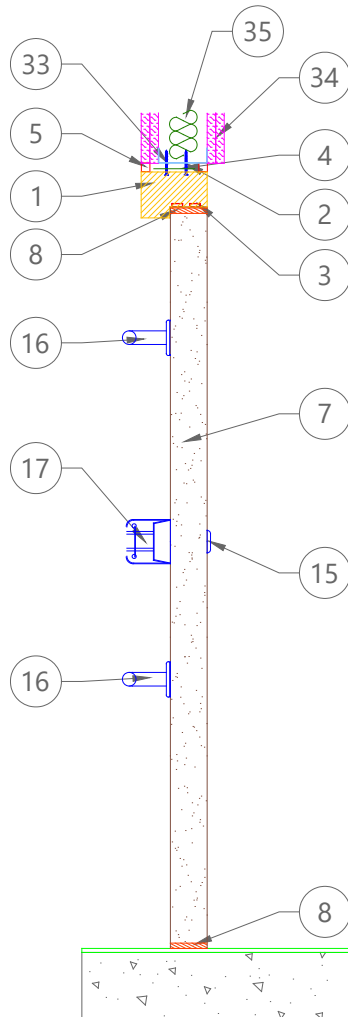
A.3 Exposed Face Elevation



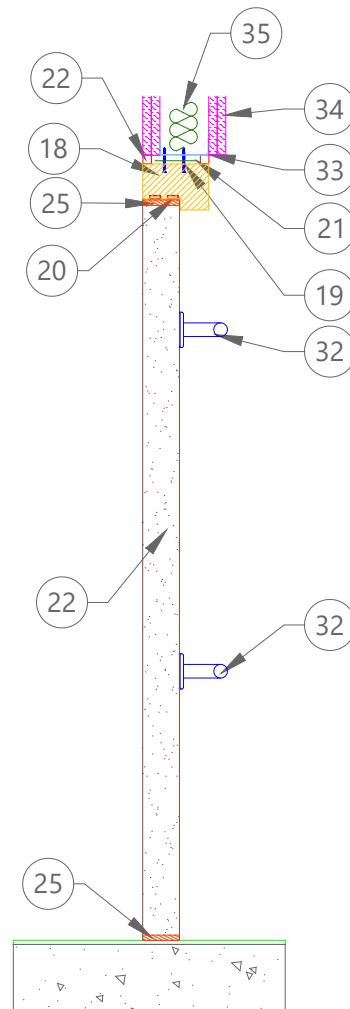
A.4 Component Positions



A.5 Vertical Sections

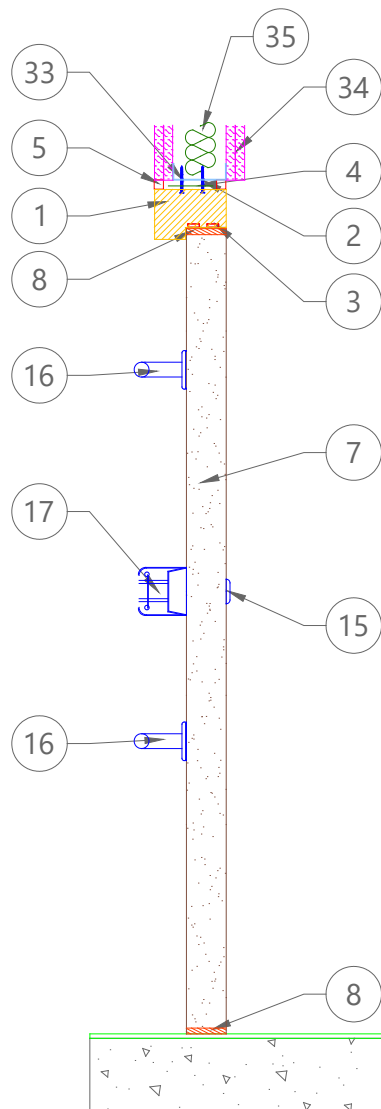


Vertical
Specimen A

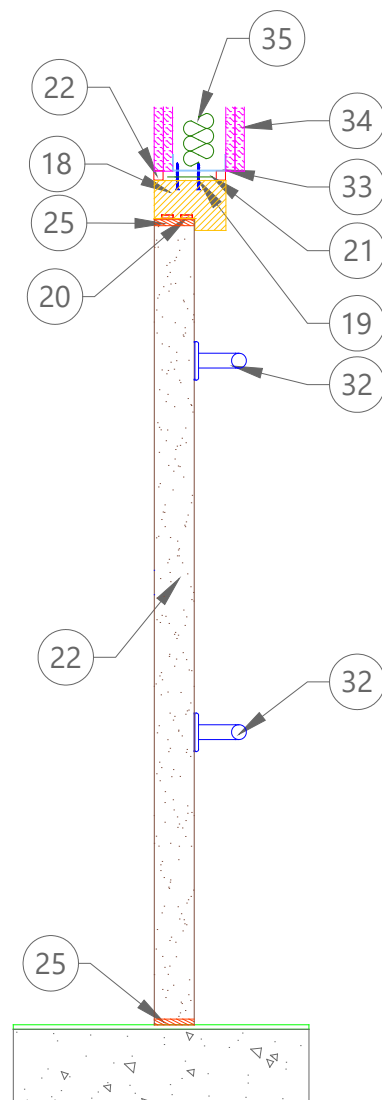


Vertical
Specimen B

A.6 Horizontal Sections

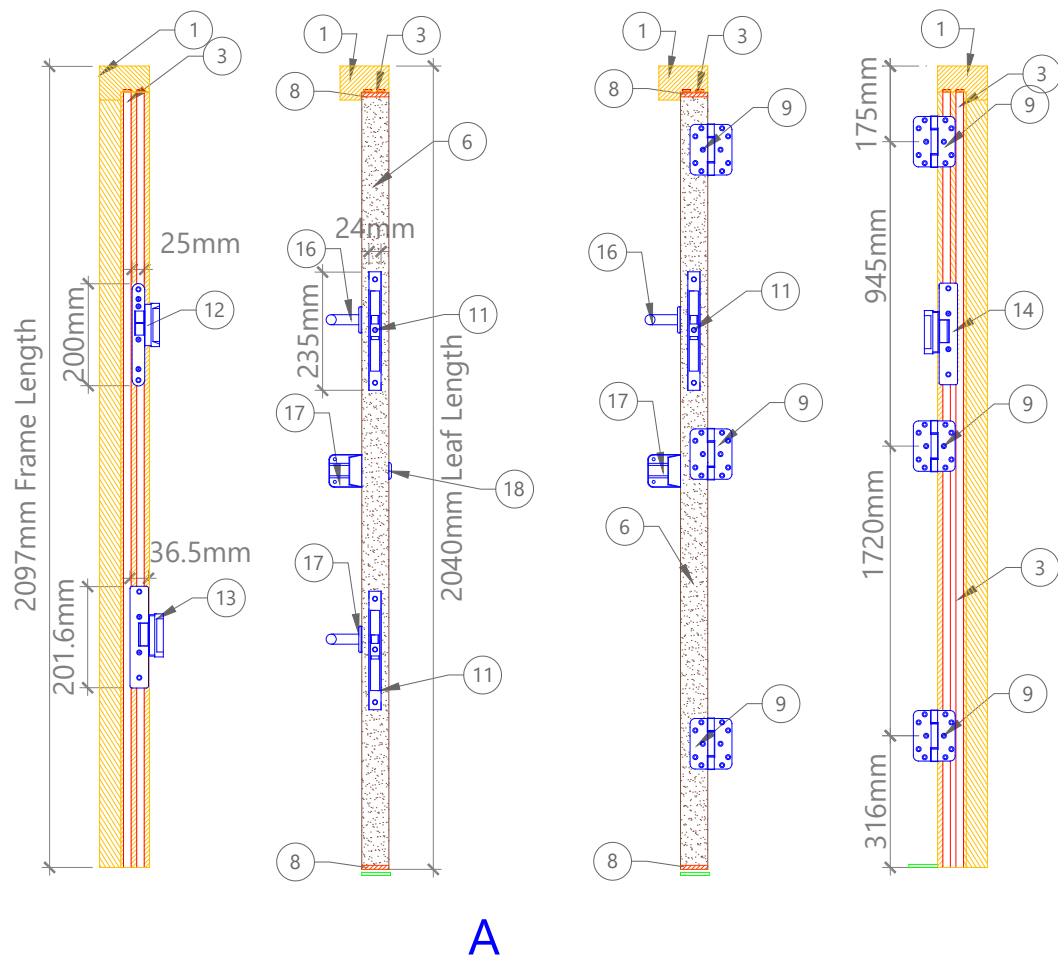


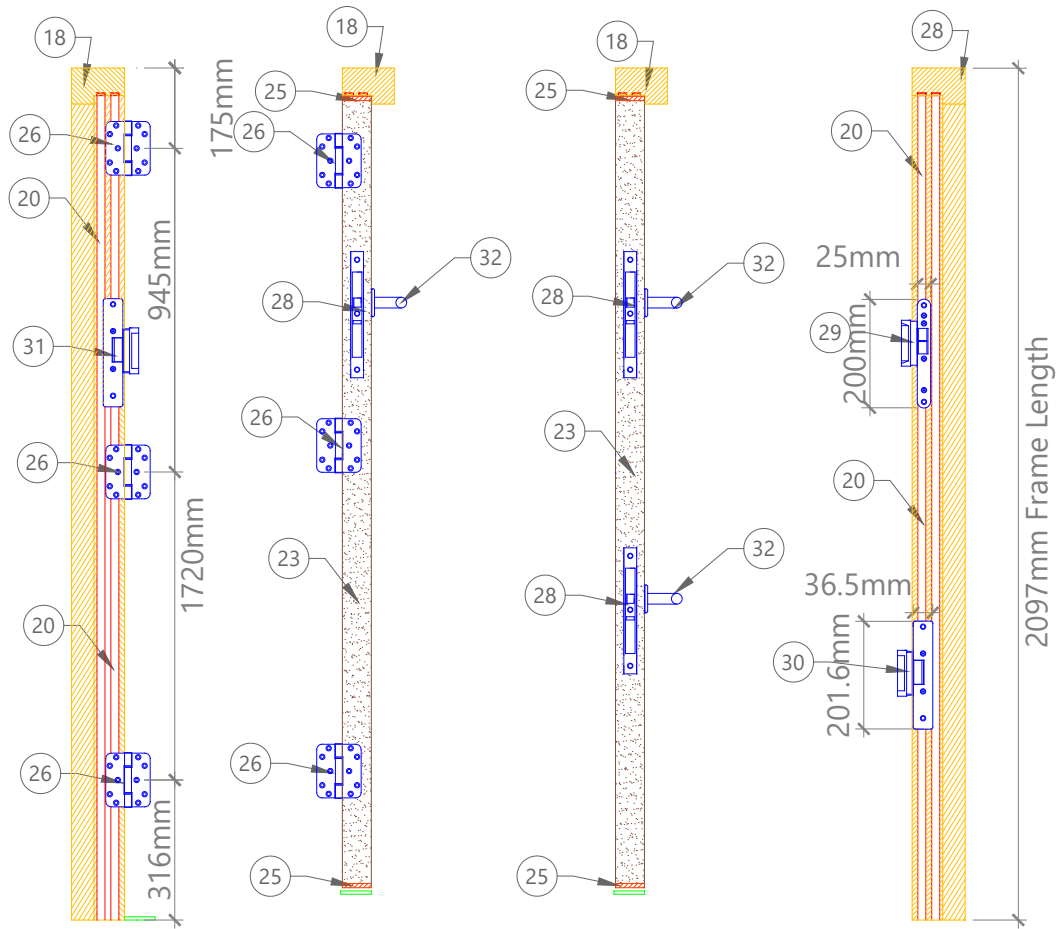
Vertical
Specimen A



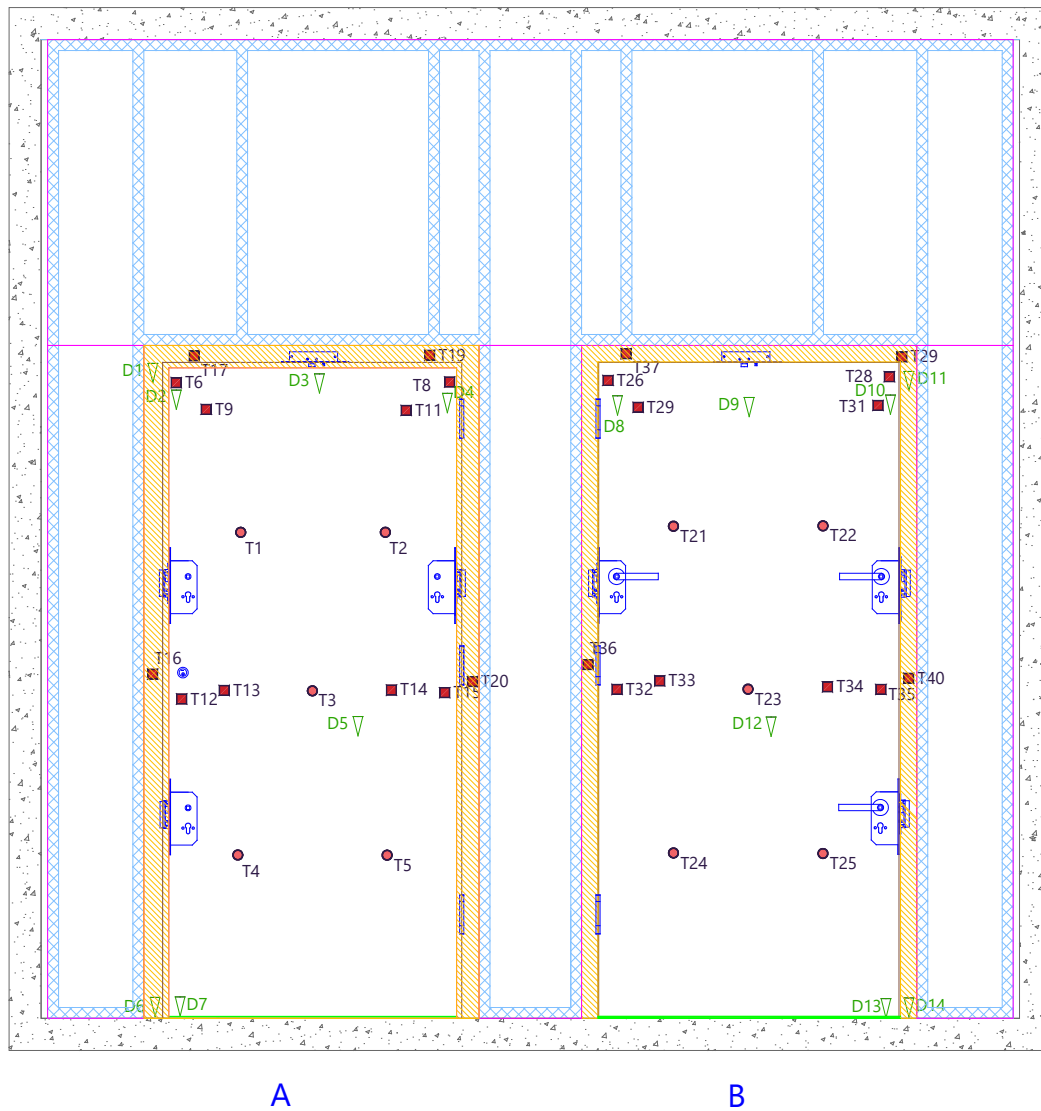
Vertical
Specimen B

A.7 Interruptions to frame intumescent



**B**

A.8 Instrumentation



Appendix B

B.1 Unexposed Surface Temperature Measurements

Legend	
*	Instrument not in use
**	Instrument Malfunction

Time (mins)	Mean	TC1	TC2	TC3	TC4	TC5
0	10	10	10	10	10	10
1	12	12	11	12	13	11
2	11	11	11	11	12	11
3	11	12	11	11	11	10
4	12	13	11	12	13	11
5	12	13	11	11	12	11
6	11	12	11	11	12	11
7	11	13	11	11	12	11
8	11	13	11	11	12	11
9	11	13	11	11	12	11
10	11	13	11	11	12	11
11	11	12	11	11	12	11
12	11	12	11	11	12	11
13	11	12	11	11	12	11
14	11	12	11	11	12	11
15	12	13	11	11	12	11
16	12	13	12	11	12	11
17	12	14	12	11	12	12
18	13	15	13	12	13	12
19	14	16	14	13	14	12
20	14	16	14	13	14	13
21	15	17	15	14	15	13
22	16	18	16	15	16	14
23	17	19	17	15	17	15
24	17	20	18	16	17	15
25	18	21	19	17	18	16
26	19	22	20	18	20	17
27	20	23	21	19	20	18
28	21	25	23	20	21	19
29	22	26	24	21	22	20
30	23	26	25	22	23	21
31	24	28	26	23	24	22
32	26	29	27	24	25	23
33	27	30	29	25	27	24
34	28	31	30	26	28	25

Time (mins)	Mean	TC1	TC2	TC3	TC4	TC5
35	29	32	31	28	29	27
36	31	34	32	29	31	28
37	32	35	34	30	32	30
38	34	36	35	32	34	32
39	34	37	36	33	34	32
40	36	38	37	34	35	34
41	36	39	38	35	36	35
42	38	40	39	37	37	37
43	40	42	41	38	39	40
44	41	42	42	39	40	41
45	41	43	42	40	40	41
46	43	44	44	42	41	43
47	44	45	45	43	42	44
48	44	45	46	44	42	45
49	47	47	48	46	45	49
50	48	48	49	47	46	50
51	49	49	50	48	46	50
52	51	51	52	50	48	53
53	53	53	53	52	51	56
54	55	55	55	54	54	59
55	57	56	56	55	55	61
56	59	57	58	58	57	65
57	60	58	59	58	59	65
58	61	58	60	60	59	68
59	63	60	61	62	62	69
60	65	62	63	64	65	71
61	68	64	65	67	68	74
62	68	64	65	67	68	75
63	69	65	66	69	69	76
64	69	66	67	69	68	74
65	70	67	68	70	69	74
66	70	68	69	71	69	75
67	71	68	70	72	70	76
68	73	70	72	74	72	77
69	74	70	72	75	73	78

Time (mins)	TC6	TC8	TC9	TC11	TC12	TC13	TC14	TC15	TC16	TC17	TC19	TC20
0	10	10	11	10	10	10	10	10	9	10	10	10
1	14	12	13	11	13	14	11	11	9	12	14	11
2	16	12	13	11	14	13	10	10	9	14	12	10
3	17	14	14	11	18	14	10	10	9	15	11	10
4	23	15	15	11	23	16	11	10	10	19	12	10
5	23	16	16	11	24	16	10	10	11	20	12	10
6	24	16	15	11	24	15	10	10	11	20	13	10
7	30	17	17	11	26	15	11	10	12	23	12	10
8	34	17	18	11	27	15	10	10	11	26	12	10
9	33	18	16	11	26	16	10	10	12	26	18	10
10	29	19	15	11	25	15	10	10	12	27	22	10
11	26	20	14	11	24	15	10	10	13	25	25	10
12	25	21	14	11	22	14	10	10	13	26	25	11
13	25	23	14	11	22	14	10	10	14	26	25	11
14	24	26	14	12	21	14	10	10	15	24	25	11
15	24	26	14	12	21	14	10	10	15	26	26	12
16	25	27	15	12	21	14	11	11	16	28	28	12
17	25	29	15	13	21	15	11	11	16	29	28	13
18	25	29	16	14	21	16	11	11	17	30	30	14
19	26	30	17	15	22	17	12	11	18	30	30	15
20	26	32	18	16	23	18	13	12	19	31	30	16
21	27	33	19	17	23	18	13	12	19	32	30	18
22	28	34	21	19	24	20	14	14	20	33	31	24
23	29	35	22	20	25	20	15	14	21	33	32	24
24	29	36	23	22	26	21	16	15	22	35	32	24
25	31	37	24	23	27	23	17	16	23	34	33	25
26	32	39	26	25	29	25	18	17	24	36	34	25
27	33	40	27	26	30	26	19	18	25	38	36	25
28	34	41	29	28	31	27	20	19	25	39	37	25
29	35	42	30	29	32	27	21	20	26	38	36	25
30	36	44	31	31	33	28	22	21	26	41	37	25
31	38	45	33	33	34	29	23	22	27	41	38	26
32	39	47	34	34	35	30	24	24	28	42	40	27
33	42	48	36	36	36	32	25	26	29	47	43	27
34	43	49	37	37	38	33	27	27	30	48	46	27
35	44	51	39	39	39	34	28	29	31	46	46	28
36	46	52	41	40	41	35	30	31	32	47	49	28
37	48	54	42	42	42	37	31	33	33	45	48	28
38	50	56	44	43	44	38	33	35	34	44	48	29
39	50	57	44	44	44	39	34	37	35	43	46	30
40	50	58	45	45	45	40	35	39	35	43	46	30
41	50	60	46	46	46	40	36	41	36	42	45	31
42	51	61	47	47	46	41	37	43	37	42	45	32
43	52	62	49	49	48	43	40	46	39	45	48	33

Time (mins)	TC6	TC8	TC9	TC11	TC12	TC13	TC14	TC15	TC16	TC17	TC19	TC20
44	53	63	49	50	49	44	42	48	39	43	45	35
45	52	64	49	50	49	44	41	49	39	41	42	36
46	53	65	50	51	50	45	43	51	41	41	42	37
47	54	65	51	52	51	46	44	53	42	43	42	38
48	53	66	51	53	51	46	45	54	42	42	42	36
49	55	67	53	55	52	48	48	57	45	42	43	38
50	55	67	53	55	53	49	49	58	46	44	43	37
51	55	68	54	56	56	50	50	59	49	44	42	37
52	57	68	55	57	67	55	52	61	63	45	43	38
53	58	69	56	58	72	56	53	62	71	48	44	39
54	60	71	58	59	68	57	56	64	64	50	46	40
55	61	71	58	60	66	56	57	66	60	52	46	41
56	61	72	59	62	66	57	60	68	59	53	47	43
57	62	73	60	62	66	58	60	68	59	55	48	43
58	63	73	60	63	66	58	62	69	60	55	48	45
59	65	74	62	64	66	60	64	70	62	58	49	46
60	68	75	64	65	68	62	65	71	69	59	50	47
61	72	76	67	66	71	65	68	73	75	60	53	49
62	71	76	67	67	70	64	68	74	71	60	53	50
63	70	77	66	67	70	65	70	75	70	60	54	52
64	71	78	67	68	72	65	70	75	70	60	56	53
65	73	79	69	69	74	67	71	76	71	62	57	55
66	73	80	69	70	76	67	72	76	73	62	58	57
67	73	81	70	71	74	67	73	77	76	62	58	58
68	79	88	71	73	74	69	74	78	85	57	47	60
69	85	95	71	73	74	70	75	79	92	58	53	62

Time (mins)	Mean	TC21	TC22	TC23	TC24	TC25
0	10	10	10	10	9	10
1	11	11	10	11	10	11
2	10	11	10	10	10	11
3	10	10	10	10	10	11
4	10	11	10	10	10	11
5	10	10	10	10	10	10
6	10	10	10	10	10	10
7	10	10	10	10	10	10
8	10	10	10	10	10	10
9	10	10	10	10	10	11
10	10	10	10	10	10	11
11	10	11	10	10	10	11
12	10	11	10	10	10	11
13	10	11	11	10	10	11
14	11	11	11	10	11	11
15	11	12	11	11	11	11
16	12	12	12	11	11	12
17	12	13	13	11	12	12
18	13	14	13	12	12	13
19	13	15	14	12	13	14
20	14	15	15	13	13	15
21	15	16	16	13	14	15
22	16	18	17	14	15	16
23	17	19	18	15	15	17
24	18	20	19	16	16	18
25	19	20	20	17	17	19
26	19	21	21	17	18	20
27	21	22	23	18	19	21
28	22	23	24	19	20	22
29	23	24	25	20	21	23
30	24	25	26	21	22	24
31	25	26	27	22	23	25
32	26	27	28	23	24	26
33	27	28	29	25	24	27
34	28	30	31	26	25	28
35	29	31	32	27	26	29
36	30	32	33	28	27	30
37	31	33	34	29	28	31
38	33	34	36	31	30	33
39	34	35	37	32	31	34
40	35	37	38	33	32	35
41	36	38	39	35	33	36
42	37	39	41	36	34	37
43	39	41	42	38	35	38

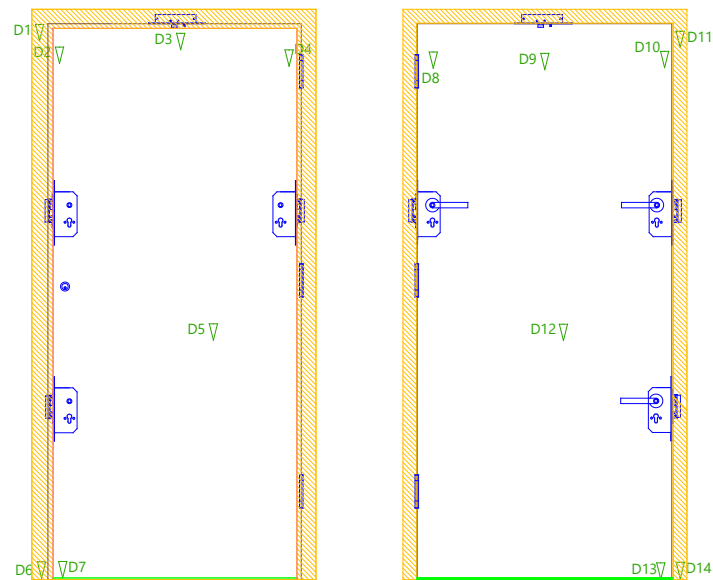
Time (mins)	Mean	TC21	TC22	TC23	TC24	TC25
44	40	42	44	39	36	39
45	41	42	44	40	37	40
46	42	44	46	42	39	41
47	44	45	47	43	40	42
48	45	47	48	45	41	43
49	47	49	50	47	43	45
50	48	50	51	48	44	46
51	49	51	53	50	45	47
52	51	53	54	51	47	49
53	52	54	55	53	48	50
54	54	56	57	55	50	52
55	55	57	58	56	52	53
56	57	59	60	58	53	55
57	58	60	61	59	54	56
58	59	61	62	60	56	57
59	60	62	63	62	57	58
60	62	64	64	63	59	60
61	64	66	66	65	61	62
62	65	67	67	66	62	63
63	66	68	68	67	64	64
64	67	69	69	68	65	66
65	69	71	70	69	67	67
66	70	72	71	70	68	68
67	71	73	72	71	69	70
68	72	74	73	72	71	71
69	73	75	74	73	72	72

Time (mins)	TC26	TC28	TC29	TC31	TC32	TC33	TC34	TC35	TC36	TC37	TC39	TC40
0	10	10	10	10	12	11	10	10	10	10	10	9
1	15	12	12	11	30	16	11	12	11	11	10	10
2	17	45	11	21	21	13	12	21	10	10	15	11
3	25	54	11	21	19	12	13	39	10	10	26	13
4	28	51	12	18	21	12	12	36	10	11	27	15
5	33	46	12	16	19	12	12	33	10	11	26	14
6	36	45	12	15	19	12	12	30	10	11	26	13
7	37	44	11	14	18	12	12	32	10	12	27	13
8	38	42	11	14	17	12	11	30	10	13	26	12
9	42	40	12	14	17	11	11	27	10	12	26	11
10	41	38	12	13	17	11	11	26	10	12	27	11
11	40	37	12	13	16	11	11	25	10	12	28	12
12	40	39	12	13	17	11	11	25	10	13	28	11
13	42	36	12	13	17	11	11	24	11	14	28	11
14	43	34	13	13	16	12	11	24	11	14	27	11
15	41	34	13	14	16	12	12	24	11	16	29	12
16	43	34	14	14	17	12	12	23	12	18	30	12
17	46	35	15	15	18	12	13	22	12	18	30	12
18	45	36	16	16	19	13	13	23	13	20	33	12
19	46	37	17	17	20	13	14	23	14	22	34	12
20	48	38	18	18	21	14	15	23	14	22	32	12
21	51	39	20	19	22	15	15	24	15	22	31	13
22	53	42	21	21	24	16	16	24	17	25	31	13
23	55	42	22	22	25	16	17	24	18	26	31	14
24	58	43	23	23	27	17	18	25	19	28	30	14
25	61	45	24	24	29	18	19	27	20	28	30	14
26	65	46	26	26	31	19	20	27	20	29	31	14
27	68	48	27	27	33	19	21	29	21	32	31	15
28	70	50	28	29	34	20	22	30	22	33	32	16
29	69	51	30	30	36	21	23	30	23	33	32	16
30	70	53	31	31	38	22	24	32	23	34	32	17
31	70	54	32	32	40	23	25	33	24	32	32	17
32	69	57	33	34	41	24	26	35	25	31	32	18
33	71	57	34	35	43	25	27	36	25	32	33	19
34	72	58	36	36	45	26	29	37	26	33	33	19
35	72	59	37	37	46	27	30	39	26	33	33	19
36	74	61	38	39	48	29	31	41	27	34	34	20
37	75	62	39	40	49	30	32	42	28	34	34	20
38	75	63	41	41	51	31	33	44	28	34	34	21
39	76	64	42	42	53	32	35	46	28	33	34	21
40	76	64	43	43	55	34	36	47	29	34	34	22
41	77	65	44	44	57	35	37	48	29	34	34	23
42	78	66	45	45	58	36	38	50	29	34	34	23
43	79	67	46	47	60	38	39	52	30	35	35	24

Time (mins)	TC26	TC28	TC29	TC31	TC32	TC33	TC34	TC35	TC36	TC37	TC39	TC40
44	79	68	47	48	62	39	41	54	31	34	35	24
45	78	68	48	48	63	40	42	54	30	34	35	25
46	80	70	50	50	65	42	43	56	31	35	36	25
47	81	71	51	51	66	43	45	57	32	36	37	26
48	81	72	52	52	67	45	46	59	32	37	37	26
49	84	74	54	54	68	46	47	61	32	38	38	27
50	84	74	55	55	70	48	49	63	32	39	38	28
51	85	75	56	56	71	49	50	63	33	40	39	28
52	87	76	57	57	73	51	52	65	34	41	41	29
53	90	76	58	58	74	53	53	67	34	43	41	29
54	92	77	59	60	75	55	55	69	34	48	43	30
55	93	78	61	61	77	57	56	71	35	53	45	30
56	93	80	62	62	78	58	58	72	35	57	49	31
57	96	80	64	63	79	60	59	73	36	59	57	32
58	97	81	65	64	79	61	60	74	36	61	60	32
59	98	83	67	65	79	63	62	74	36	66	62	32
60	101	85	68	66	79	65	63	75	37	69	66	33
61	103	87	70	67	80	66	65	76	37	79	66	33
62	117	89	88	68	81	67	66	77	38	93	68	34
63	131	93	102	69	81	69	67	78	38	117	71	35
64	134	99	87	70	82	70	68	79	39	140	69	35
65	163	107	81	71	83	71	69	79	39	181	66	35
66	205	115	78	72	83	72	71	80	39	229	65	36
67	250	125	77	73	84	73	72	81	40	290	66	36
68	302	142	77	74	85	75	73	83	40	268	66	37
69	367	165	78	75	86	76	73	83	41	172	69	38

B.2 Deflection Measurements

Legend	
*	Instrument not in use
**	Instrument Malfunction
-	Indicates movement towards the heating conditions



Time (mins)	D1	D2	D3	D4	D5	D6	D7
0	0	0	0	0	0	0	0
10	2	-7	-3	4	-8	0	-14
20	2	-7	-5	3	-11	0	-16
30	3	-7	-7	3	-17	3	-11
40	5	-4	-8	5	-22	1	-10
50	21	12	8	28	26	3	-9
55	27	17	13	39	-24	3	-8
60	32	24	11	-60	68	5	-8

Time (mins)	D9	D10	D11	D12	D13	D14	D15
0	0	0	0	0	0	0	0
10	5	6	6	6	4	6	4
20	2	2	3	7	2	7	4
30	6	5	7	8	2	8	3
40	11	9	12	12	-1	7	5
50	13	36	37	42	10	9	8
55	65	47	48	48	12	11	12
60	77	49	49	44	6	11	12