



United Kingdom  
Testing and  
Certification

# Test Report

The fire resistance performance of two timber, single acting single door assembly when tested in accordance with BS 476-22: 1987 § 6

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Prepared For	Complete Fire Protection Ltd Unit 2 Ferry Steps Industrial Estate Albert Road Bristol BS2 0XW



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## Change History

Issue Date	Revision	Created by	Authorised by	Description of Change
05/06/2024	B	RG	NS	This report replaces document TR20231206-004709A Issued 24/04/2024. Reason for revision is an amendment to details within item 31 of the technical schedule.
24/04/2024	A	RG	NS	Initial Issue

## Signatories

	
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# 1 Executive Summary

## 1.1 Specimen Summary

Specimen A had overall nominal dimensions of 1011mm wide by 2093 mm high, incorporating a pair of door leaves each with dimensions of 463 mm wide by 2040 mm high by 54 mm thick each. The door leaves were formed from Particle board with 8 mm thick hardwood lippings to all edges. The leaves were hung in a hardwood frame on three steel hinges.

Specimen B had overall nominal dimensions of 996 mm wide by 2103 mm high, incorporating a single door leaf with overall dimensions of 926 mm wide by 2040 mm high by 44 mm thick. The door leaf was formed from Particle board with 5 mm thick hardwood lippings to the vertical edges. The leaf was hung in a hardwood frame on three steel hinges.

## 1.2 Specimen 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 specimens wherever possible. Refer to page 15 for full details of this survey.

## 1.3 Specimen Installation and Fixity

Specimen A was installed into the test construction by United Kingdom Testing and Certification. The specimen was installed such that the door leaf opened towards the heating conditions at the request of the Test Sponsor. The specimen was unlatched and unbolted prior to the commencement of the test at the request of the test sponsor.

Specimen B was installed into the test construction by United Kingdom Testing and Certification. The specimen was installed such that the door leaf opened towards the heating conditions at the request of the Test Sponsor. The specimen was unlatched and unbolted prior to the commencement of the test at the request of the test sponsor.

## 1.4 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.

## 1.5 Expression of Results

The performance criterion specified in BS 476-20: 1987 § 10 was satisfied for the following intervals:

<b>Integrity<sup>1</sup></b>	Specimen A	66 minutes	No failure*
	Specimen B	30 minutes	No failure**
<b>Insulation<sup>2</sup></b>	Specimen A	66 minutes	No failure*
	Specimen B	30 minutes	No failure**

\*The test was discontinued after a period of 66 minutes.

\*\* Specimen was extinguished and blanked over at 30 minutes at the sponsor's request

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<sup>1</sup> 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 BS 476-20:1987 § 10.3.2; b) permitting the penetration of a gap gauge as specified in BS 476-20: 1987 § 10.3.2; c) resulting in sustained flaming

<sup>2</sup> 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.

## 2 Pre-test Examination

### 2.1 Closing Force Measurement

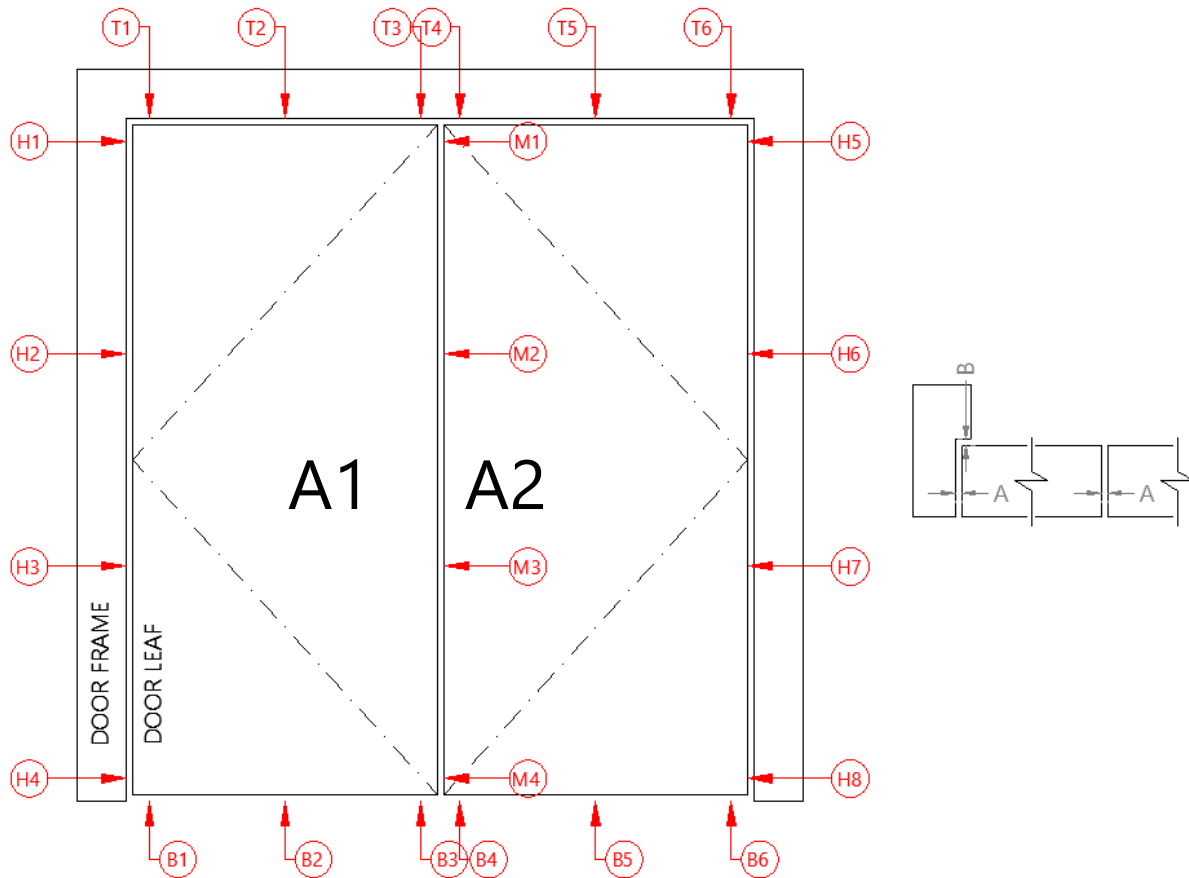
The door closing forces were measured and recorded three times. The results are presented below:

Measurement	Maximum Recorded Force (N)	Distance from Pivot to Measurement Location (m)	Moment (Nm)
Closing Force Specimen A	27.5	0.800	22
Opening Force Specimen A	64.4	0.800	51.52
Closing Force Specimen B1	25.4	0.300	7.62
Opening Force Specimen B1	115.6	0.300	34.5
Closing Force Specimen B2	38.0	0.300	11.4
Opening Force Specimen B2	144.2	0.300	43.26

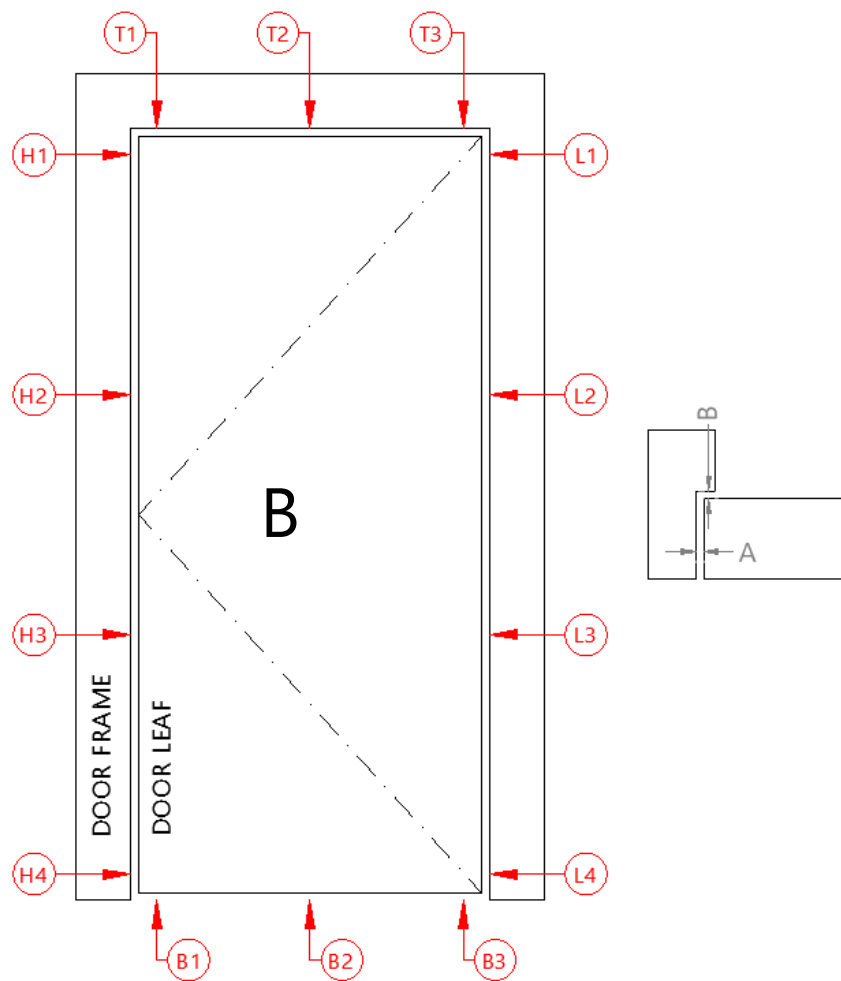
### 2.2 Specimen Conditioning

The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of three days. Throughout this period, both the temperature and the humidity of the laboratory were measured and recorded as being within a range of from 9.9 °C to 11.7 °C and 59 % to 71% respectively.

### 2.3 Gap Measurements



	A	B		A	B		A	B	
H1	3.7	3.0	X	M1	3.5	X	H5	2.3	3.0
H2	4.2	3.0		M2	3.5		H6	3.9	3.0
H3	3.8	3.0		M3	4.8		H7	3.4	3.0
H4	3.2	3.0		M4	5.7		H8	2.6	3.0
<b>Mean</b>	<b>3.7</b>	X	<b>Mean</b>	<b>4.4</b>	X	<b>Mean</b>	<b>3.1</b>	X	
<b>Max</b>	<b>4.2</b>		<b>Max</b>	<b>5.7</b>		<b>Max</b>	<b>3.9</b>		
<b>Min</b>	<b>3.2</b>		<b>Min</b>	<b>3.5</b>		<b>Min</b>	<b>2.3</b>		
	A	B		A	B		A	B	
T1	3.6	3.0	T4	3.3	3.0	B1	4.4	B4	2.8
T2	3.2	3.0	T5	3.3	3.0	B2	4.3	B5	2.7
T3	3.3	3.0	T6	2.3	3.0	B3	3.8	B6	2.6
<b>Mean</b>	<b>3.4</b>	X	<b>Mean</b>	<b>3.0</b>	X	<b>Mean</b>	<b>4.2</b>	<b>Mean</b>	<b>2.7</b>
<b>Max</b>	<b>3.6</b>		<b>Max</b>	<b>3.3</b>		<b>Max</b>	<b>4.4</b>	<b>Max</b>	<b>2.8</b>
<b>Min</b>	<b>3.2</b>		<b>Min</b>	<b>2.3</b>		<b>Min</b>	<b>3.8</b>	<b>Min</b>	<b>2.6</b>



Hanging Stile	A	B	Closing Stile	A	B
H1	2.7	0.1	L1	3.8	0.1
H2	2.6	0.1	L2	3.6	0.1
H3	2.5	0.1	L3	3.7	0.1
H4	2.4	0.1	L4	3.6	0.1
<b>Mean</b>	<b>2.5</b>	X	<b>Mean</b>	<b>3.7</b>	X
<b>Max</b>	<b>2.7</b>		<b>Max</b>	<b>3.8</b>	
<b>Min</b>	<b>2.4</b>		<b>Min</b>	<b>3.6</b>	
<b>Top Edge</b>	<b>A</b>	<b>B</b>	<b>Bottom Edge</b>	<b>A</b>	X
T1	3.1	0.1	B1	4.4	
T2	3.4	0.1	B2	4.3	
T3	3.3	0.1	B3	4.2	
<b>Mean</b>	<b>3.3</b>	X	<b>Mean</b>	<b>4.3</b>	
<b>Max</b>	<b>3.4</b>		<b>Max</b>	<b>4.4</b>	
<b>Min</b>	<b>3.1</b>		<b>Min</b>	<b>4.2</b>	

### 3 Test Specimen Drawings

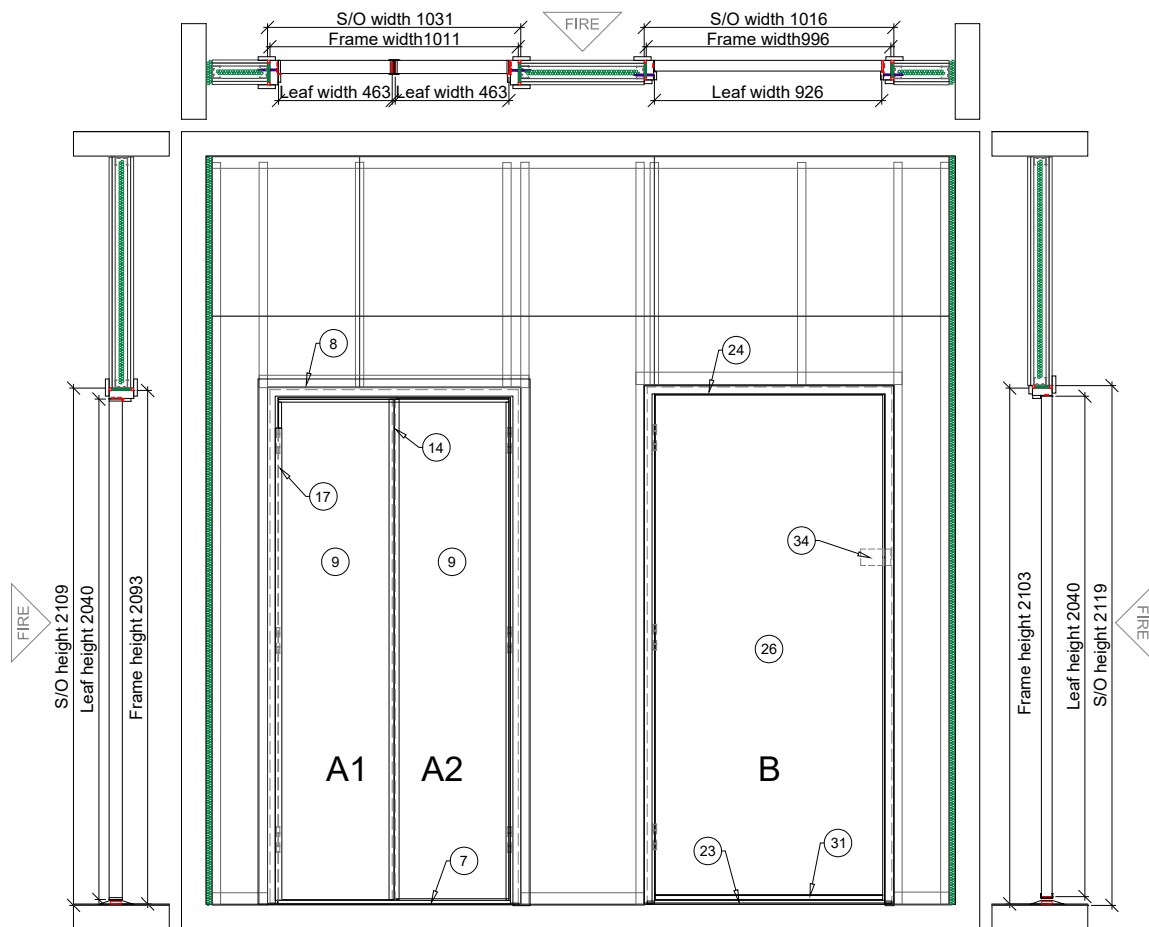


Figure 1 - General arrangement of test construction viewed from the unexposed surface

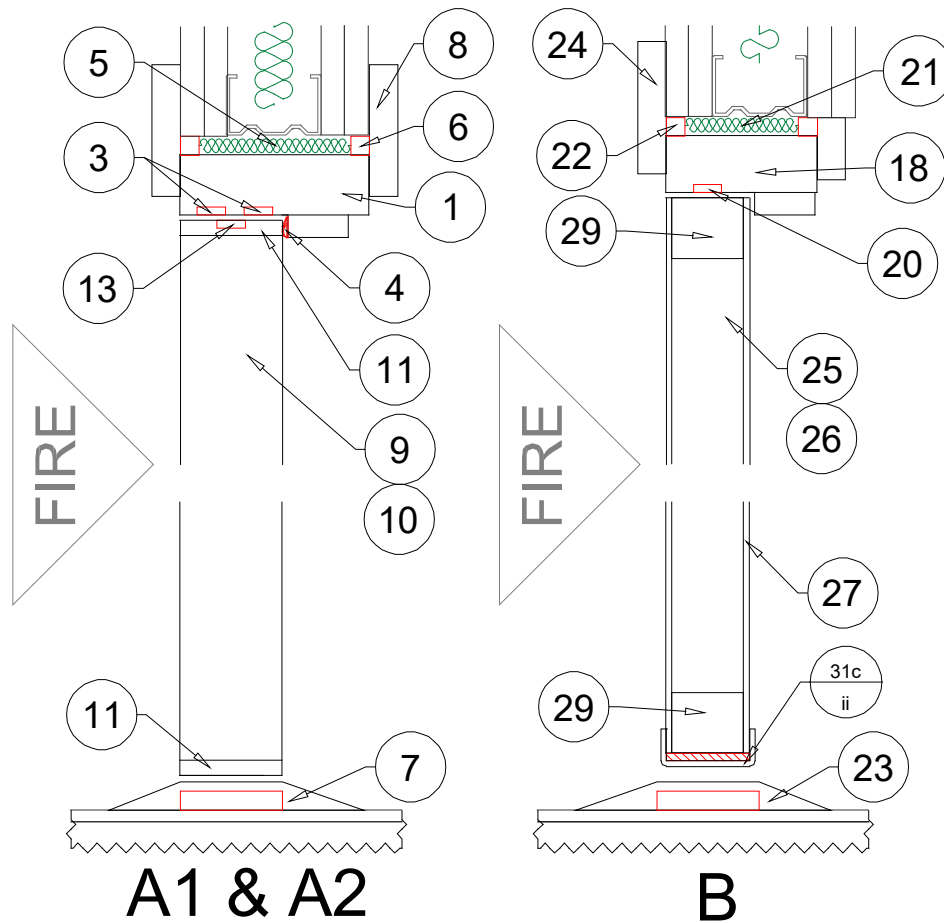


Figure 2 - Typical vertical section through the specimens

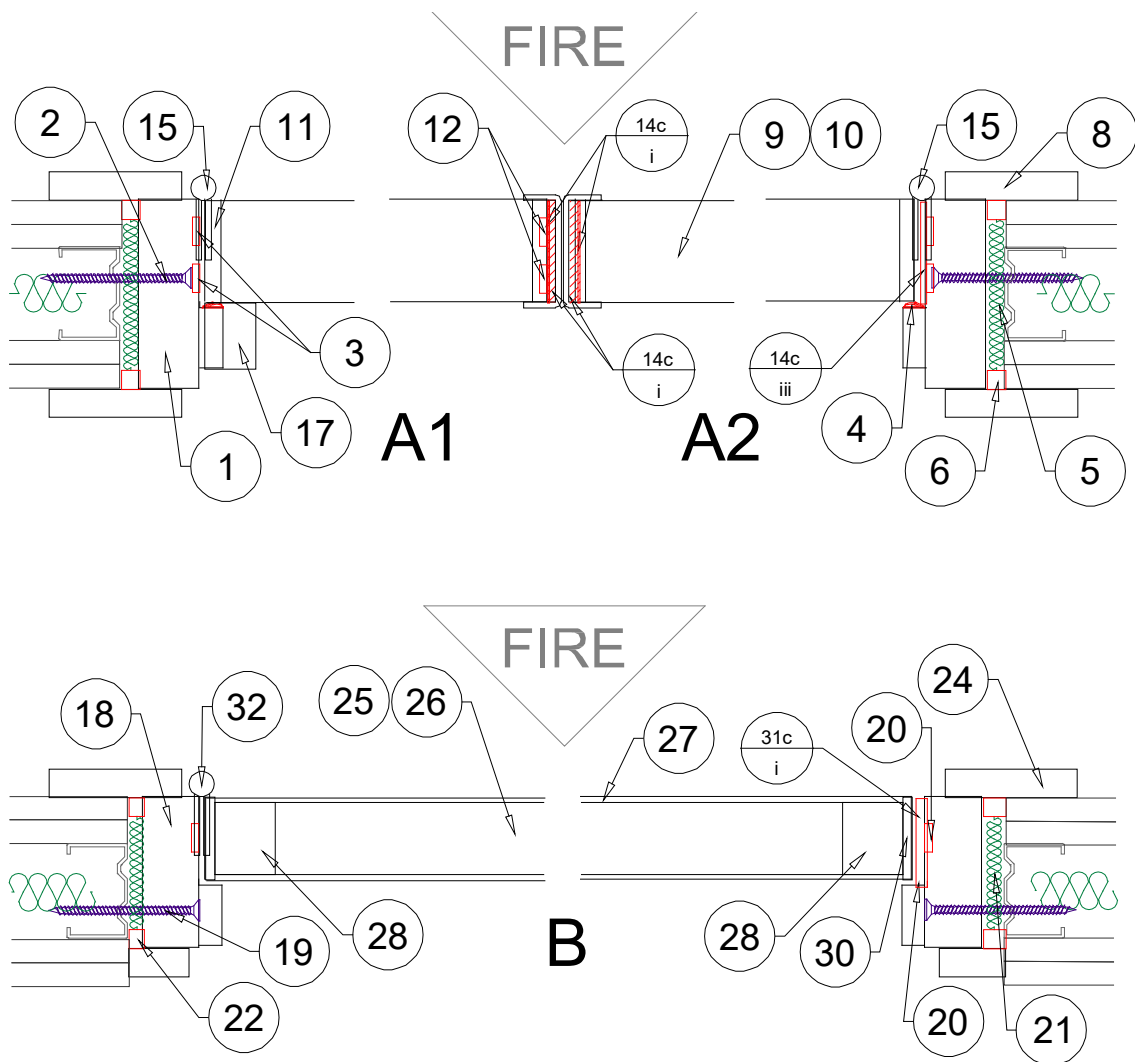


Figure 3 - Typical horizontal section through the specimens

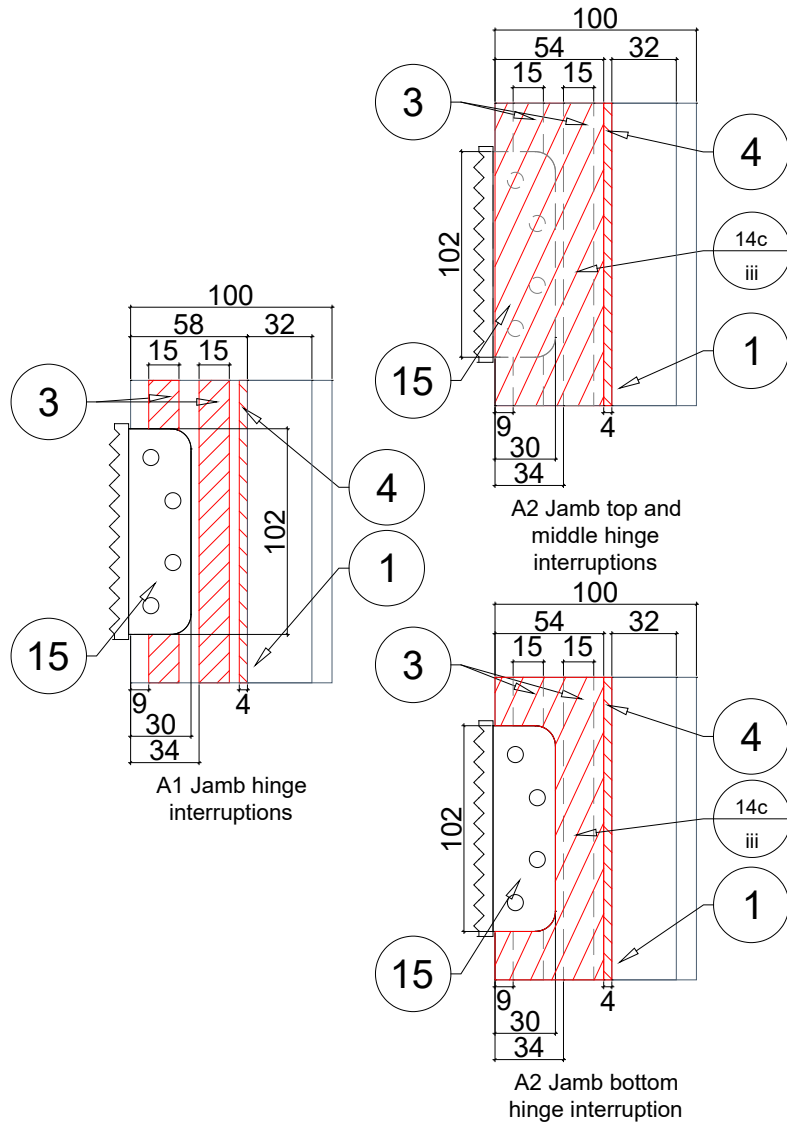
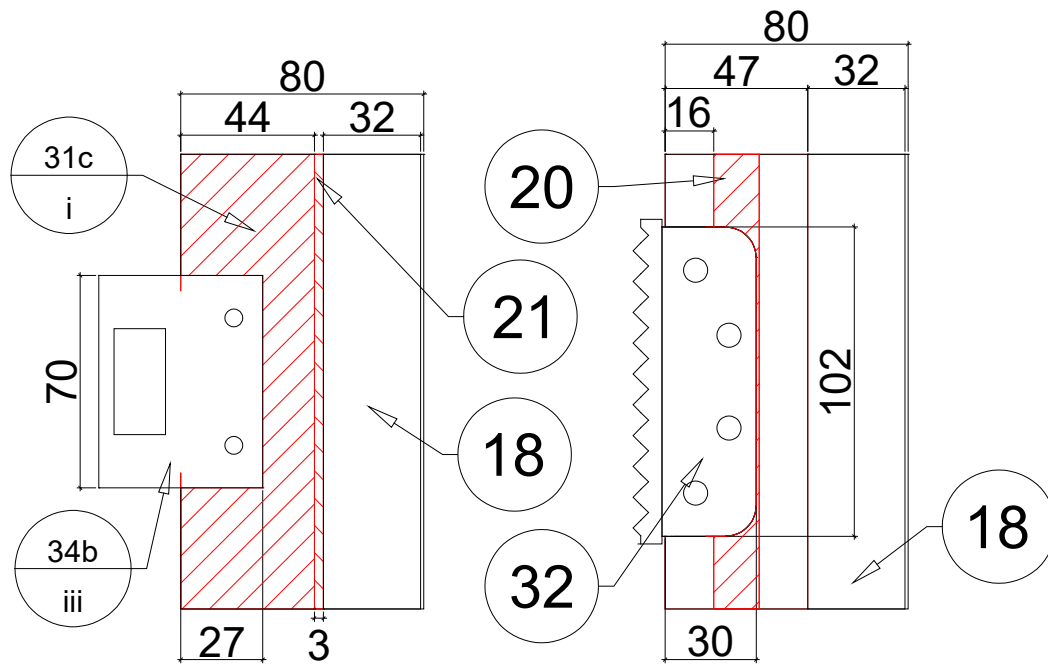


Figure 4 - Hardware intumescent interruptions specimen A



Specimen B Keep & Hinge Interruptions

Figure 5 - Hardware intumescent interruptions specimen B

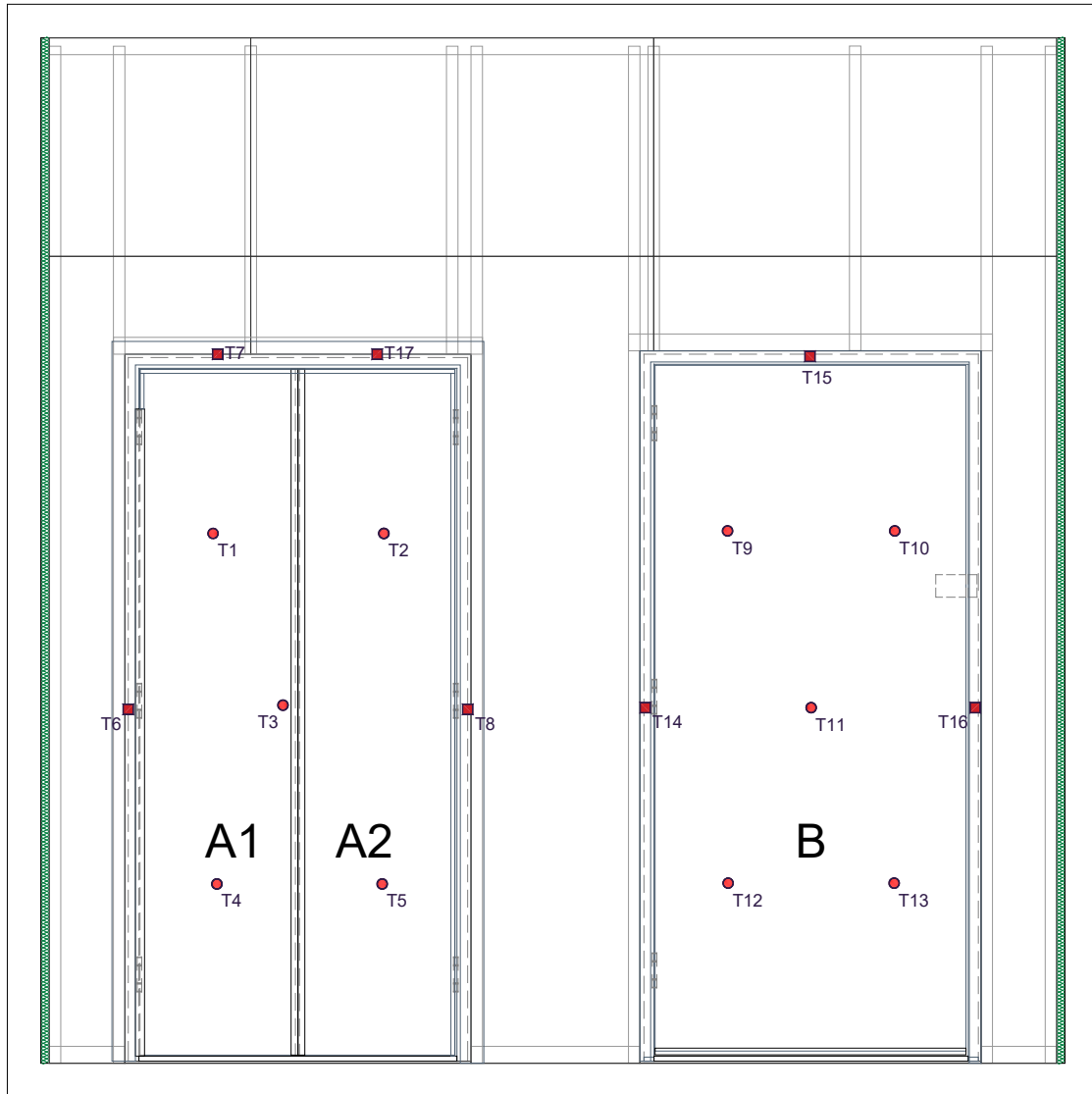


Figure 6 - Layout of instrumentation viewed from the unexposed surface of the test construction

## 4 Technical Schedule

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

\* 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.

### 4.1 Specimen A

1. Frame	
Manufacturer	DorSuite Ltd
Reference	Hardwood Frame *
Material	Sapele Head and Sapele Jambs *
Density	640 kg/m <sup>3</sup> *
Moisture	8.8 – 10.6 % (Lab Measurement)
Orientation to heating conditions	Opening towards
a. Overall size	1011 mm wide x 2093 mm high
i. Frame (Head)	100 mm wide x 32 mm thick
ii. Frame (Jambs)	100 mm wide x 32 mm thick
iii. Loose Stop	32 mm wide x 12 mm deep
iv. Cutout to stop	43 mm long x 3 mm deep Centred on frame Smoke seal interrupted
Jamb to Head jointing method, fixing detail and location	Housed butt joint with PVA & 2 No. Ø 0.5 mm x 60 mm long wood screws.
Stop to Frame jointing method, fixing detail and location	Pinned with 1.8 mm gauge x 50 mm long steel pins @ 300 mm centres.
b. Adhesive(s)	N/A
2. Frame Fixing Method to Supporting Construction	
Manufacturer	Spax *
Reference	4Cut *
Type & material	Passivated 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	Blue 60 packers
Packing Material Dimension	100 mm long x 30 mm Wide x Various thicknesses (1 mm, 2 mm, 3 mm, 5 mm)
Packing Material Location	At each fixing location up frame
<b>3. Intumescent to frame reveal</b>	
Quantity	2
Manufacturer	Lorient *
Reference	Lorient 617 *
Material	Hydrated sodium silicate *
Overall section size	15 mm wide x 4 mm thick
Application method	Adhesive strip to back
Location (relative to the opening face of the door leaf)	9 mm from opening face 34 mm from opening face
c. Adhesive(s)	N/A
<b>4. Smoke seal to frame reveal</b>	
Quantity	1
Manufacturer	Sealed Tight Solutions *
Reference	R1009 *
Material	PVC *
Overall section size	11 mm wide x 5.5 mm thick *
Application method	Self-adhesive *
Interruptions	Fully interrupted at head, centre width, for 43 mm
<b>5. Frame to supporting construction fire stopping detail</b>	
Manufacturer	Rockwool *
Reference	RWA45 *
Material	Mineral Wool *

Overall dimension	5 – 10 mm thick x depth of wall
Application method	Stuffed into gap *
<b>6. Sealant to fire stopping detail</b>	
Manufacturer	Certitek *
Reference	DM-01 Intumescent & Acoustic Acrylic Sealant *
Material	Acrylic Sealant *
Overall section size	10 mm deep x 2 mm to 10 mm wide
Application method	Using a cartridge gunned *
Location	Gaps between the head and jambs and supporting construction *
<b>7. Threshold detail</b>	
Supplier	Framefit Ltd / Complete Fire Protection Ltd *
Reference	Framefit Threshold Seal FFTS *
Material	PVC *
Dimensions	130 mm wide x 15 mm high x 947 mm long
Seal type within it and size	2 No. LM 5/54 & 1 No. LM3/54 *
Fixing Method	3 No. Ø 3.8 mm x 60 mm screws *
<b>8. Architrave</b>	
Manufacturer	DorSuite Ltd *
Reference	MDF Architraves *
Material	MDF *
Overall section size	70 mm wide x 15 mm thick
Location	Each side of frame
Application method, fixings and fixing frequency required	Pinned with 1.8 mm gauge x 50 mm long steel pins @ 300 mm centres.
<b>9. Door Leaf</b>	
Manufacturer (blank)	Halspan *
Reference	Prima *
Quantity of leaves on doorset	2

Glazing location relative to the head and closing edge	N/A
Overall leaf size supplied for testing	463 mm wide x 2040 mm high x 54 mm thick
Door Undercut (Top of bottom of frame)	18 mm
<b>10. Core element</b>	
Manufacturer	Halspan
Reference	Prima 54 *
Material	Particle board *
Density	640 kg/m <sup>3</sup> *
Overall thickness and reduced thickness if door leaf incorporates fielded areas	54 mm thick
Application method	N/A
<b>11. Lippings</b>	
Manufacturer	DorSuite Ltd *
Reference	LIP-0000 *
Material	Sapele *
Density	640 kg/m <sup>3</sup> *
a. Moisture	
i. A1	8.8 – 9.2 % (Lab Measurement)
ii. A2	10 – 11.2 % (Lab Measurement)
Overall size	8 mm deep x 54 mm wide
Fixing Method	Edge bander *
Location	All edges of the door leaf
b. Adhesives	
i. Manufacturer	Henkel *
ii. Type	PUR *
iii. Reference	Technomelt PUR 270/7G *
iv. Curing Method	Moisture Cured *
v. Application Method	Roller applied *

c. Presence of Mechanical Fixings	
i. Type, size, Material, location and Frequency	No *
<b>12. Intumescent Leaf A1 – Meeting Stile</b>	
Quantity	2
Manufacturer	Lorient *
Reference	617 *
Material	Sodium Silicate *
Overall section size	15 mm wide x 4 mm thick
Application method	Self-adhesive backing
Location (relative to the opening face of the door leaf)	7 mm & 32 mm
<b>13. Intumescent Leaf A1 &amp; A2 – Head</b>	
Quantity	1
Manufacturer	Lorient *
Reference	617 *
Material	Sodium Silicate *
Overall section size	15 mm wide x 4 mm thick
Application method	Self-adhesive backing
Location (relative to the opening face of the door leaf)	19.5 mm
<b>14. FrameFit System Details</b>	
Manufacturer	Complete Fire Protection Ltd *
Reference	FrameFit LM, HE & MES *
Material	Low modulus and high expansion fire retardant graphite intumescent and, PVC *
a. System Components	
i. LM	Low Modulus (LM) fire retardant intumescent Ref: LM1.5/54, LM3/54, LM5/54 *
ii. HE	High expansion intumescent Ref: HE54 *
iii. FFMES	Meeting Edge Seal – PVC Carrier Ref: FFMES

b. Overall Size	
i. LM	54 mm wide x 2100 mm long x 1.5/3/5 mm thick *
ii. HE	54 mm wide x 2100 mm long x 1.5 mm thick *
iii. FFMES	60 mm wide x 20 mm high x 3 mm thick *
Application Method	Measure existing gap and add FrameFit LM profiles (LM1.5, LM3, LM5) using the self-adhesive tape found on the back of the profile, to the existing HE profile inside each FFMES profile. Quantities will depend on the existing gap width to required to achieve a compliant gap. Locate each FFMES on the door edges opposite each other and mechanically fix (pin, screw) in pairs through the FFMES & LM profile into the door edge @300mm centres using a minimum 25mm long pins/screws. *
c. FrameFit Configuration	
i. Meeting Stile A1 & A2	FFMES containing – 1 No. 54 mm LM3 & 1 No. 54 mm HE54 *
ii. Jamb A2	Directly on jamb 1 No. 54 mm HE1.5 & 1 No. 54 mm LM1.5 – both layers were cut out around bottom hinge & layers were cut and patched over middle hinge leaving no interruption *
<b>15. Hinges</b>	
Supplier	DorSuite Ltd *
Reference	PP20070102 *
Quantity	3
Primary material	Stainless Steel
Type	Grade 13 Butt hinges *
a. Size	
i. Knuckle	Ø 14.5 mm x 107 mm high
ii. Blades	102 mm high x 31 mm wide x 3 mm thick
b. Fixings	
i. Type	Countersunk Screws
ii. Material	Stainless Steel
iii. Size	Ø 4.7 mm x 31 mm long
iv. Number off per blade	4

Position of each hinge relative to the head of the leaf	120 mm, 934 mm, 1748 mm
Details of intumescent protection	1 No. 1 mm interdens (Mono-ammonium Phosphate) to A1 Leaf & A1 Jamb. * 2 No. 1 mm graphite (FrameFit hinge pads) to A2 leaf & A2 Jamb. *
Interruptions to Intumescent within the frame reveal	Fully interrupted
<b>16. Door Closer</b>	
Supplier	DorSuite Ltd *
Reference	BR5004040307 *
a. Material	
i. Body	Mild Steel
ii. Closer arm	Mild Steel
iii. Cover	Stainless Steel
Configuration	
b. Overall size	
i. Body	55 mm high x 235 mm wide x 36 mm deep
ii. Cover	68 mm high x 265 mm wide x 40 mm deep
Fixing method	4 No. Ø 4.8 mm x 50 mm on body and 2 No. Ø 4.8 mm x 50 mm on bracket into frame
<b>17. Finger Guard</b>	
Manufacturer	Exitex *
Reference	Roller Finger Guard 1.01.0948.1925.31 *
Material	Aluminium/Cloth roller blind *
Overall size	1925 mm long x 27 mm wide x 45 mm deep *
Location	A1 leaf and jamb *
Fixing Method	7 No. Ø 3 mm x 16 mm screws to door & 7 No. Ø 3 mm x 16 mm screws to frame *

## 4.2 Specimen B

18. Frame	
Manufacturer	DorSuite Ltd
Reference	Softwood Frame *
Material	Redwood Head and Redwood Jambs *
Density	450 kg/m <sup>3</sup> *
Moisture content	11.5-14.5 % (Lab Measurement)
Orientation to heating conditions	Opening towards
a. Overall size	996 mm wide x 2103 mm high
i. Frame (Head)	80 mm wide x 30 mm thick
ii. Frame (Jambs)	80 mm wide x 30 mm thick
iii. Loose Stop	32 mm wide x 12 mm deep
Jamb to Head jointing method, fixing detail and location	Housed butt joint with PVA & 2 No. Ø 0.5 mm x 60 mm long wood screws. *
Stop to Frame jointing method, fixing detail and location	Pinned with 1.8 mm gauge x 50 mm long steel pins @ 300 mm centres.
Adhesive(s)	N/A *
Additional Note	12 mm extension to frame length applied to the foot of each jamb.
19. Frame Fixing Method to Supporting Construction	
Manufacturer	Spax
Reference	4Cut
Type & material	Passivated 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 60 mm in from edge
Does the fixing penetrate intumescent seal within frame reveal	No
Packing Material	Blue60 Packers
Packing Material Dimension	100 mm long x 15 mm wide
Packing Material Location	At each fixing location up frame

<b>20. Intumescent to frame reveal</b>	
Quantity	1
Manufacturer	Lorient *
Reference	Lorient 617 *
Material	Hydrated sodium silicate *
Overall section size	15 mm wide x 4 mm thick
Application method	Adhesive strip to back
Location (relative to the opening face of the door leaf)	16 mm from opening face
a. Adhesive(s)	N/A
Additional Note	At foot of each jamb, 12 mm patch applied to length extension piece.
<b>21. Frame to supporting construction fire stopping detail</b>	
Manufacturer	Rockwool *
Reference	RWA45 *
Material	Mineral Wool *
Overall dimension	5 – 10 mm thick x depth of wall
Application method	Stuffed into gap *
<b>22. Sealant to fire stopping detail</b>	
Manufacturer	Certitek *
Reference	DM-01 Intumescent & Acoustic Acrylic Sealant *
Material	Acrylic Sealant *
Overall section size	10 mm deep x 2 mm to 10 mm wide
Application method	Using a cartridge gunned
Location	Gaps between the head and jambs and supporting construction *
<b>23. Threshold detail</b>	
Supplier	Complete Fire Protection Ltd *
Reference	FrameFit Threshold Seal FFTS *
Material	PVC based *
Dimensions	130 mm wide x 15 mm high

Seal type within it and size	2 No. LM 5/44 & 1 No. LM3/44 *
Fixing Method	3 No. Ø 3.8 mm x 60 mm screws *
<b>24. Architrave</b>	
Manufacturer	DorSuite Ltd
Reference	MDF Architraves
Material	MDF
Overall section size	70 mm wide x 15 mm thick
Location	Each side of frame
Application method, fixings and fixing frequency required	Pinned with 1.8 mm gauge x 50 mm long steel pins @ 300 mm centres.
<b>25. Door Leaf</b>	
Manufacturer (blank)	Premdor *
Reference	Premdor FD30 44 *
Quantity of leaves on doorset	1
Overall leaf size supplied for testing	926 mm wide x 2040 mm high x 44 mm thick
Door Undercut (Top of cill / bottom of frame)	30 mm
<b>26. Core element</b>	
Manufacturer	Premdor *
Reference	Premdor FD30 44 *
Material	Particle board *
Density	(Sponsor did not declare)
Overall thickness and reduced thickness if door leaf incorporates fielded areas	38 mm thick *
<b>27. Facings</b>	
Manufacturer	Premdor *
Reference	Premdor FD30 44 *
Material	Veneered wood *
Density	(Sponsor did not declare)

Overall thickness and reduced thickness if door leaf incorporates fielded areas	3.2 mm thick
Application method	N/A *
<b>28. Stiles</b>	
Manufacturer	Premdor *
Reference	Premdor FD30 44 *
Material	Softwood *
Density	(Sponsor did not declare)
Moisture Content	9.3-10.6 % (Lab Measurement)
Overall Size	38 mm deep x 32 mm thick x 2040 mm long
Fixing Method	N/A *
Location	Vertical sides
<b>29. Rails</b>	
Manufacturer	Premdor *
Reference	Premdor FD30 44 *
Material	Softwood *
Density	(Sponsor did not declare)
Moisture Content	10.1 – 10.8 % (Lab Measurement)
Overall Size	38 mm deep x 32 mm thick x 850 mm long
Fixing Method	N/A *
Location	Top and Bottom *
<b>30. Lippings</b>	
Manufacturer	Premdor *
Reference	Premdor Lippings *
Material	Hardwood *
Density	(Sponsor did not declare)
Moisture Content	7.7 - 9.3 % (Lab Measurement)
Overall size	5 mm thick x 44 mm wide
Fixing Method	Prefixed by Premdor *

Location	Vertical edges only
<b>31. FrameFit System Details</b>	
Manufacturer	Complete Fire Protection Ltd *
Reference	FrameFit LM & HE profiles, FrameFit BDS & FrameFit TS
Material	Fire retardant graphite intumescent *
a. System Components	
i. LM	Low Modulus (LM) fire retardant intumescent Ref: LM1.5/44, LM3/44, LM5/44 *
ii. HE	High expansion intumescent Ref: HE44 *
iii. BDS	Bottom Door Seal - Bottom Door Seal for FD30 doors (Ref BDS30) *
iv. FFTS	FrameFit Threshold Seal
b. Overall Size	
i. LM	44 mm wide x 2100 mm long x 1/3/5 mm thick *
ii. HE	44 mm wide x 2100 mm long x 1.5 mm thick *
iii. BDS	50 mm wide x 31.5 mm high x 3 mm thick *
iv. FFTS	48 mm wide x 947 long x 15 mm high
Application Method	<p>Measure existing gap and add FrameFit LM profiles (LM1.5, LM3, LM5) using the self-adhesive tape found on the back of the profile, to the existing HE profile. Quantities will depend on the existing gap width to required to achieve a compliant gap.</p> <p>Threshold - Select appropriate LM profiles to raise the FrameFit TS to the desired height (15mm in this test using 2No LM5/44 + 1No LM3/44) Centre the FrameFit TS with the door frame. Cut away the door stop by 15mm, to allow a tight butt joint at each end of the door to frame. Screw fix the through the TS &amp; LM profiles into the floor using 3No 45mm x 6mm concrete screws.</p> <p>BDS - Measure the gap and select appropriate LM profiles to achieve desired finished gap (3mm in this test) Apply LM profiles into BDS PVC carrier, peel of double sided tape backing and adhere to the inside of the carrier. Slide on to bottom of door and screw/pin fix through carrier upstands both sides of the door.</p> <p>The BDS &amp; TS should align opposite each other leaving a compliant gap (3mm in this test)</p>
c. FrameFit Configuration	
i. Jamb Leading Edge	Directly on jamb 1 No. 54 mm HE1.5 & 2 No. 54 mm LM1.5 – all layers were cut out around the bottom hinge & layers were cut and patched over middle hinge leaving no interruption *

ii. BDS	2 No. 44 mm LM 1.5 & 1 No. 44 mm LM 1.5 *
iii. Threshold	2 No. LM5/44 & 1 No. LM1.5/44 *
<b>32. Hinges</b>	
Supplier	DorSuite Ltd *
Reference	PP20070102 *
Quantity	3
Primary material	Stainless Steel
Type	Grade 13 Butt hinges *
a. Size	
i. Knuckle	Ø 14.5 mm x 107 mm high
ii. Blades	102 mm high x 31 mm wide x 3 mm thick
b. Fixings	
i. Type	Countersunk Screws
ii. Material	Stainless Steel
iii. Size	Ø 4.7 mm x 31 mm long
iv. Number off per blade	4
Position of each hinge relative to the head of the leaf	Top: 120 mm Middle: 934 mm Bottom: 1748 mm
Details of intumescent protection	No intumescent to hinge blades
Interruptions to Intumescent within the frame reveal	Fully interrupted
<b>33. Door Closer</b>	
Supplier	DorSuite Ltd *
Reference	BR5004040307 *
a. Material	
i. Body	Mild Steel
ii. Closer arm	Mild Steel

iii. Cover	Stainless Steel
b. Overall size	
i. Body	55 mm high x 235 mm wide x 36 mm deep
ii. Cover	68 mm high x 265 mm wide x 40 mm deep
Fixing method	4 No. Ø 4.8 mm x 50 mm on body and 2 No. Ø 4.8 mm x 50 mm on bracket into frame
<b>34. Night Latch</b>	
Manufacturer	Yale *
Reference	630089001702 *
a. Material	
i. Lockcase	Steel and Alloys
ii. Latch bolt	Steel and Alloys
iii. keeper	Steel and Alloys
b. Overall sizes	
i. Central Lockcase	70 mm high x 90 mm wide x 27 mm deep
ii. Latch bolt	31.5 mm high x 17.5 mm wide x 16.5 projection
iii. Keeper	70 mm high x 54 mm wide 26 mm deep
c. Fixing method	2 screws on each
i. Fixings	
ii. Type	Countersunk Screws
iii. Material	Stainless Steel
iv. Size	Ø 3.5 x 25 mm long – lock to door Ø 3.7 x 31 mm long – keeper Ø 3.8 x 7 mm long – lockcase Ø 4.7 x 44 mm long – through bolt
v. Number off per blade	4
Operation of latch bolt	Disengaged
Intumescent	1 mm graphite pad (FrameFit Night Latch Kit for Ø 32 mm core) *
Location	1350 mm from bottom of door leaf to centre of lockcase

### 4.3 Supporting Construction

<b>35. Studs</b>	
Supplier	United Kingdom Testing and Certification
a. Type & Material	Rolled steel C-Stud
i. Dimensions	50 mm deep x 34 mm wide x 3000 mm long x 0.5 mm thick
ii. Stud centres	400-625 mm
iii. Fixing(s)	Friction fitted to the head/ floor track
Timber Inserts to Studs	No
<b>36. Head/ Floor Track</b>	
Supplier	United Kingdom Testing and Certification
Type & Material	Rolled steel U-Track
Dimensions	52 mm deep x 25 mm wide x 3000 mm long x 0.5 mm thick
Centres	600 mm Centres 20 mm Space between testing frame and wall frame for insulation.
Fixing(s)	Ø 7.5 x 50 mm long self-tapping screws staggered at max 600 mm centres
<b>37. Lining(s)</b>	
Supplier	United Kingdom Testing and Certification
Type & Material	Paper faced, gypsum plasterboard type F
Density	760 Kg/m <sup>3</sup>
Layer Quantity	2
Dimensions	12.5 mm thick x 1200 mm wide x 2400 mm high
Fixings	Plasterboard Screw Fixings Ø 5 mm x 25 mm
Joints Filled & Taped With	No nonsense
<b>38. Wall Insulation</b>	
Supplier	United Kingdom Testing and Certification
Type & Material	Mineral Wool

Density	33 Kg/m <sup>3</sup>
Installation Method	Compression Fitted
Thickness	50 mm
Locations	Centrally Located in the wall
Additional Wall Construction Requests	N/a
<b>39. Free Edge Gasket</b>	
Manufacturer	Morgan Advanced Materials
Reference	Superwool
Density	128 Kg/m <sup>3</sup>
Dimensions	25 mm thick x 3050 mm long x 150 mm wide
Fixing(s)	Compression fitted between the supporting construction & restraint frame
<b>40. Board for Simulated Floor Level</b>	
Manufacturer	British Gypsum
Reference	Glasroc F MultiBoard 6mm
Density	833 Kg/m <sup>3</sup>
Dimensions	6 mm thick x Opening width + 400 mm long x Wall Depth + 500 mm wide
Fixing(s)	Compression fitted between restraint frame and specimen.

## 5 Specimen Photographs



Figure 7 - Item 1, 8, 9, 14ci, 14cii, 16, 18, 25, 26, 34, 35



Figure 8 - Item 1, 3, 4, 11, 14ciii, 15

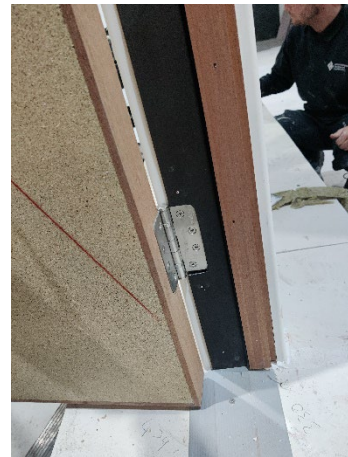


Figure 9 - Item 11, 14ciii, 15



Figure 10 - Item 7



Figure 11 - Item 11, 12, 13, 14ci



Figure 12 - Item 3, 4, 11, 17

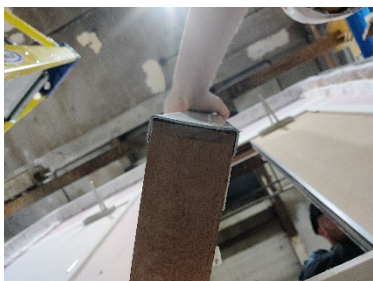


Figure 13- Item 11, 14cii



Figure 14 – Item 18, 20, 33



Figure 15 - Item 18, 21, 32ci, 35biii

## 6 Test Procedure

### 6.1 Heating Conditions

The specimens were subject to heating conditions in accordance with BS 476-20:1987 § 3.1. This was monitored and controlled for the duration of the test using type K thermocouples which were distributed across a vertical plane  $100 \pm 10$  mm from the exposed surface of the test construction. The resulting Time-Temperature distribution is presented in Figure 28.

### 6.2 Pressure Conditions

The specimens were subject to a pressure regime in accordance with BS 476-20: 1987 § 3.2. The calculated pressure differential relative to the laboratory atmospheric pressure at a height of 365, 1612 and 2850 mm from the furnace floor level was -5.4, 5.2 and 15.7 Pa respectively which equates to 0 Pa at a height of 1000 mm from the furnace floor level. The furnace was maintained at these pressures within  $\pm 2$  Pa five minutes after the commencement of the test and for the remainder of the test duration. The pressure deviated from the specified conditions on ten instances throughout the duration of the test. The Time-Pressure distribution is presented in Figure 29.

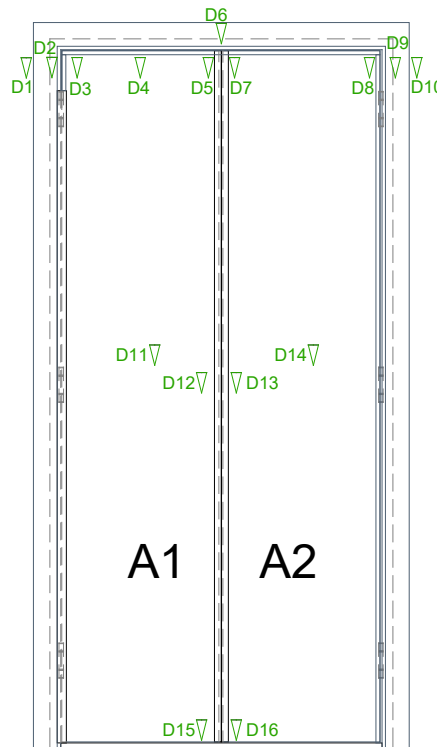
### 6.3 Unexposed Surface Temperature

A roving thermocouple was available for the evaluation of the maximum temperature rise criteria in accordance with BS 476-20: 1987 § 10.4. Any measurements using the roving thermocouple are presented on page 35.

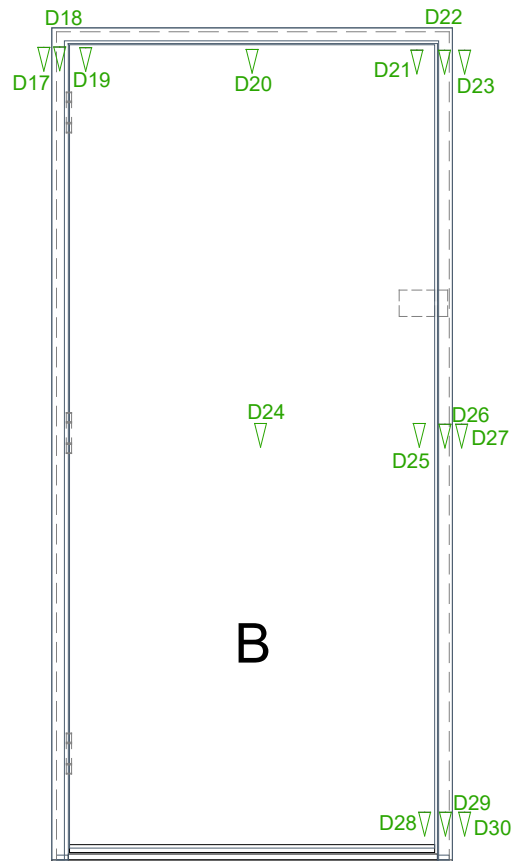
Disc thermocouples were affixed to the unexposed surface of the specimens in accordance with BS 476-22:1987 to measure and monitor the maximum and the mean temperature rise of the unexposed face of the specimen for the duration of the test. A summary of the measurements is presented in Figure 30 and Figure 31 and the locations of these thermocouples is illustrated in Figure 6.

### 6.4 Deflection

All measurements are in millimeters (mm) unless stated otherwise. Positive values indicate movement towards the heating conditions.



Time (mins)	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	4	1	5	1	7	10	5	8	6	7	6	1	4	3	1	2
20	4	3	5	2	6	12	2	5	5	7	3	0	6	3	2	4
30	2	1	5	2	4	11	1	3	5	3	-2	-5	5	1	2	10
40	4	1	4	0	1	15	-2	4	-1	0	-6	-12	1	-1	2	14
50	7	4	9	3	0	11	0	6	0	0	-11	-17	-6	-7	2	11
55	10	5	9	4	4	14	5	9	4	5	-11	-18	-7	-6	4	12
60	12	11	17	8	11	21	11	18	14	16	-8	-16	0	1	4	14
65	16	15	21	14	15	28	19	27	24	25	-6	-11	5	7	3	16



Time (mins)	D17	D18	D19	D20	D21	D22	D23	D24	D25	D26	D27	D28	D29	D30
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	9	9	10	13	16	6	3	6	6	5	5	8	1	0
20	6	6	10	13	27	6	4	1	5	5	3	15	1	1

## 7 Observations

Specimen	HH	MM	SS	E <sup>3</sup>	U <sup>4</sup>	Observation
	00	00	00			<b>The test commences.</b>
B	00	01	10		X	Smoke/Steam release at Hanging edge head and ¼ down.
A	00	01	47		X	Smoke/Steam release Meeting edge top and right Hanging edge top and mid-point.
A+B	00	06	37		X	Smoke/Steam release Meeting edge top and bottom of specimen A, Smoke/steam release bottom and top sides as well as leading edge mid-point on specimen B.
A+B	00	07	00		X	Discoloration meeting edge top on specimen A and on hanging edge of specimen B.
A	00	10	34		X	Discoloration and smoke/Steam release bottom meeting edge and hanging edge right side.
A+B	00	11	00	X		Visible charring all over and closers are still in place.
A	00	12	18		X	Intermittent flaming at bottom right.
B	00	13	20		X	Smoke release from cylinder.
A	00	15	12		X	Intermittent flaming at bottom right.
B	00	20	03		X	Discolouration and smoke/stream release ¼ down from hanging edge.
A+B	00	21	00	X		Door closers still intact.
B	00	26	00		X	Moisture release and discolouration around cylinder, heavy smoke/steam release at the top hanging edge and leading edge.
B	00	30	37		X	Glowing at the top right corner leading edge with intermittent flaming

<sup>3</sup> Viewed from exposed surface of the test construction.

<sup>4</sup> Viewed from unexposed surface of the test construction.

Specimen	HH	MM	SS	E <sup>5</sup>	U <sup>6</sup>	Observation
<b>B</b>	<b>00</b>	<b>30</b>	<b>48</b>		<b>X</b>	<b>Specimen B was sprayed down and blanked over performance criteria's are no longer being evaluated so that the test may continue for specimen A.</b>
A	00	34	00		X	A2 has moved into the heating conditions at the top of meeting edge.
A	00	35	00	X		Both closers have fallen from the specimen, architraves breaking up.
A	00	44	15		X	Moisture release along the top and bottom of the doors.
A	00	52	00		X	Top meeting edge continuing to move inwards.
A	01	00	00		X	No visible changes.
A	01	03	00		X	Discolouration along meeting edge and graphite within the meeting edge guard moving apart from it.
A	01	05	40		X	Smoke/steam release at the meeting edge top and mid-point
	<b>01</b>	<b>06</b>	<b>46</b>			<b>The test is discontinued at the request of the Test Sponsor.</b>

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<sup>5</sup> Viewed from exposed surface of the test construction.

<sup>6</sup> Viewed from unexposed surface of the test construction.

## 8 Test Images



Figure 16 – The exposed surface of the test construction prior to commencement of the test



Figure 17 - The unexposed surface of the test construction prior to the commencement of the test



Figure 18 - The unexposed surface of the test construction after a test duration of 10 minutes



Figure 19 - The unexposed surface of the test construction after a test duration of 20 minutes



Figure 20 - The unexposed surface of the test construction after a test duration of 30 minutes



Figure 21 - The unexposed surface of the test construction after a test duration of 40 minutes



Figure 22 - The unexposed surface of the test construction after a test duration of 50 minutes



Figure 23 - The unexposed surface of the test construction after a test duration of 55 minutes



Figure 24 - The unexposed surface of the test construction after a test duration of 60 minutes



Figure 25 - The unexposed surface of the test construction after a test duration of 65 minutes



Figure 26 - The unexposed surface of the test construction after a test duration of 66 minutes



Figure 27 - The exposed surface of the test construction after the test was discontinued

## 9 On-going Implications

### 9.1 Limitations

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.

BS 476-20: 1987 § Appendix A provides guidance information on the application of fire resistance tests and the interpretation of results. Application of the results to products of different specifications, including but not limited to differences in dimension; installation methodologies; supporting construction and components should be subject to design appraisal by a competent individual.

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

### 9.2 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 resistance to fire test standard.

### 9.3 Fire Test Study Group (FTSG)

Where areas of the test specification are ambiguous or open to interpretation the Fire Test Study Group (FTSG) Resolutions have been followed (where appropriate). These Resolutions provide the basis of common agreements between the fire test laboratories which are members of this Group.

## 10 Figures

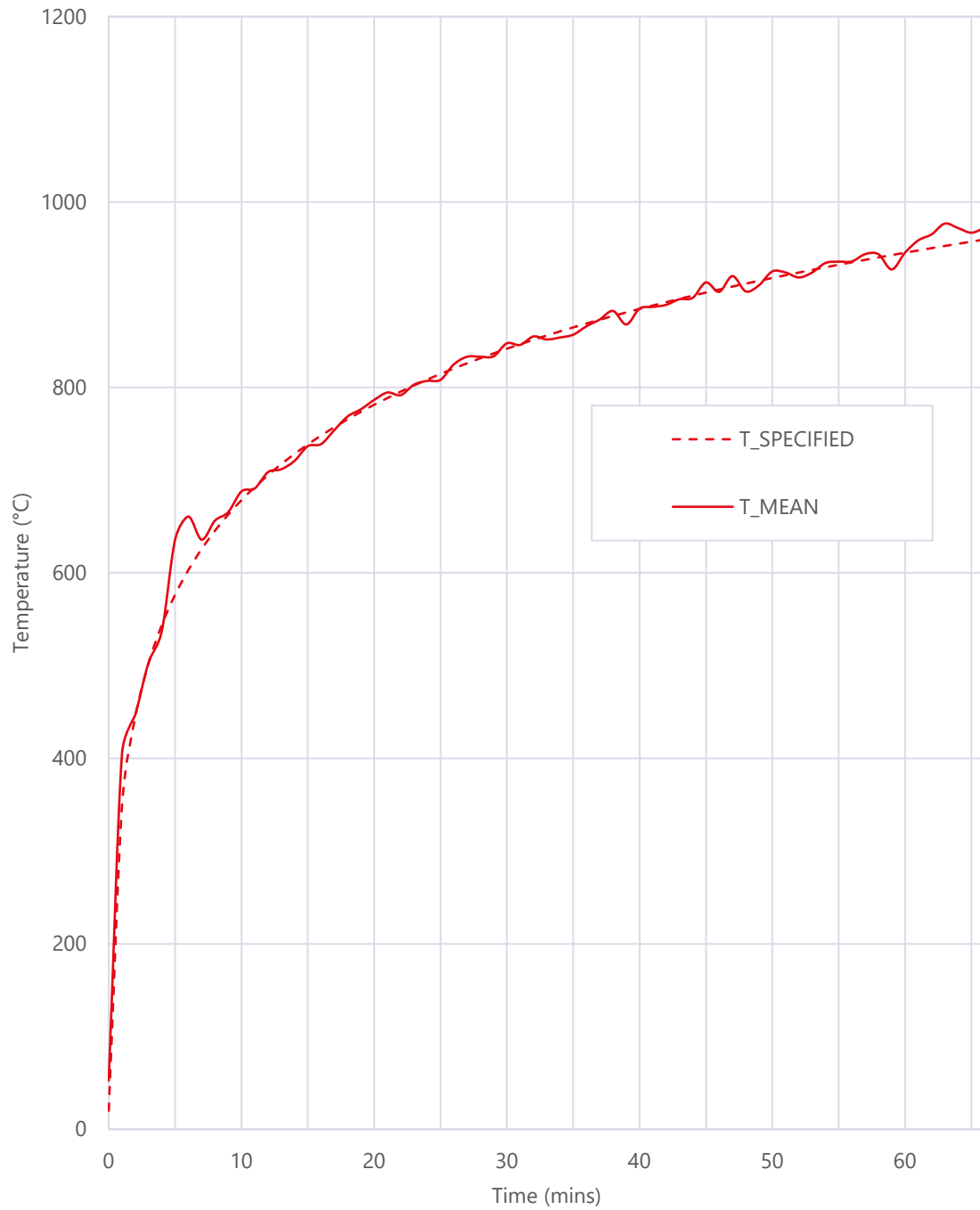


Figure 28 – Graph presenting the Time-Temperature distribution of the furnace

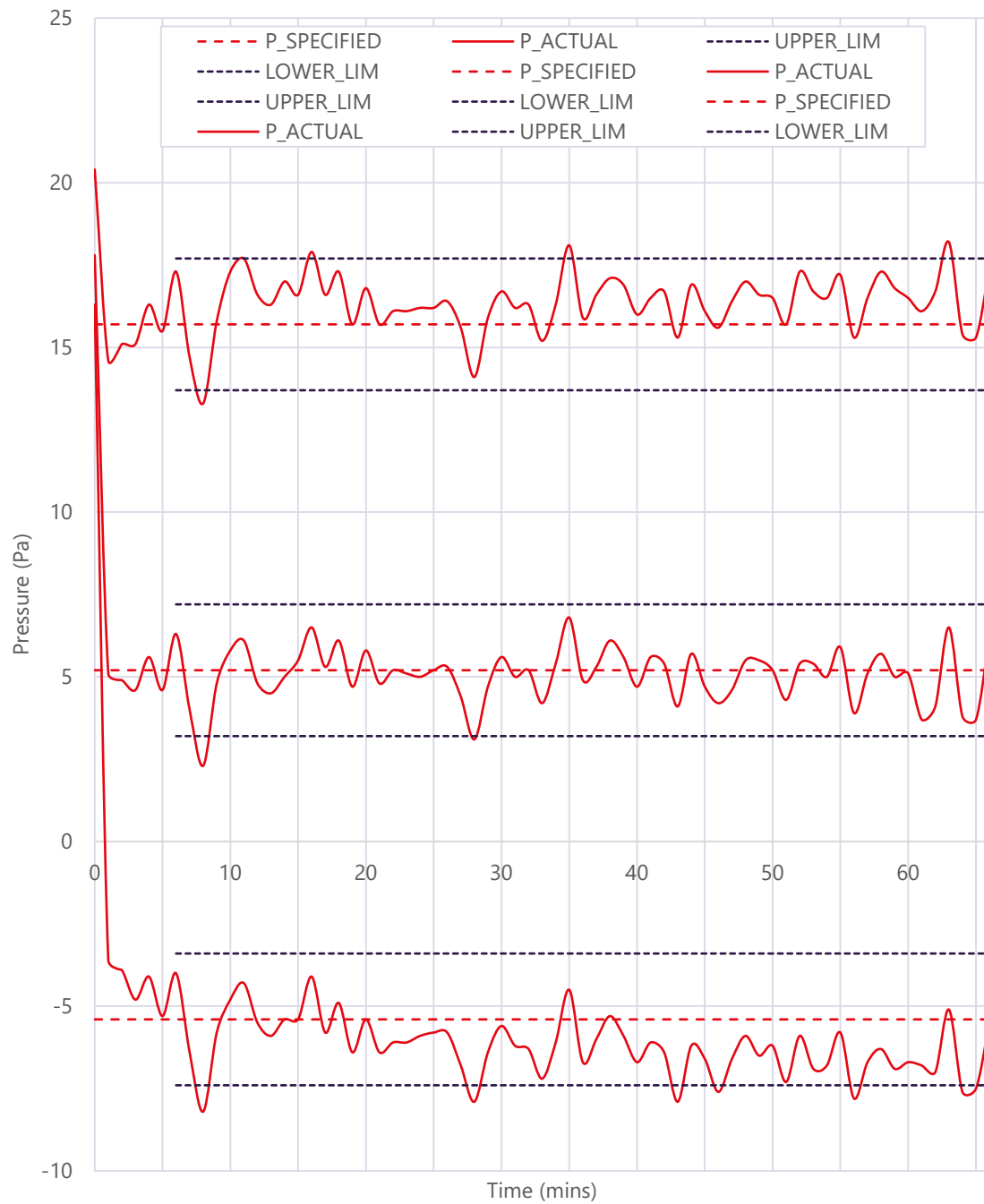


Figure 29 – Graph presenting the Time-Pressure distribution of the furnace

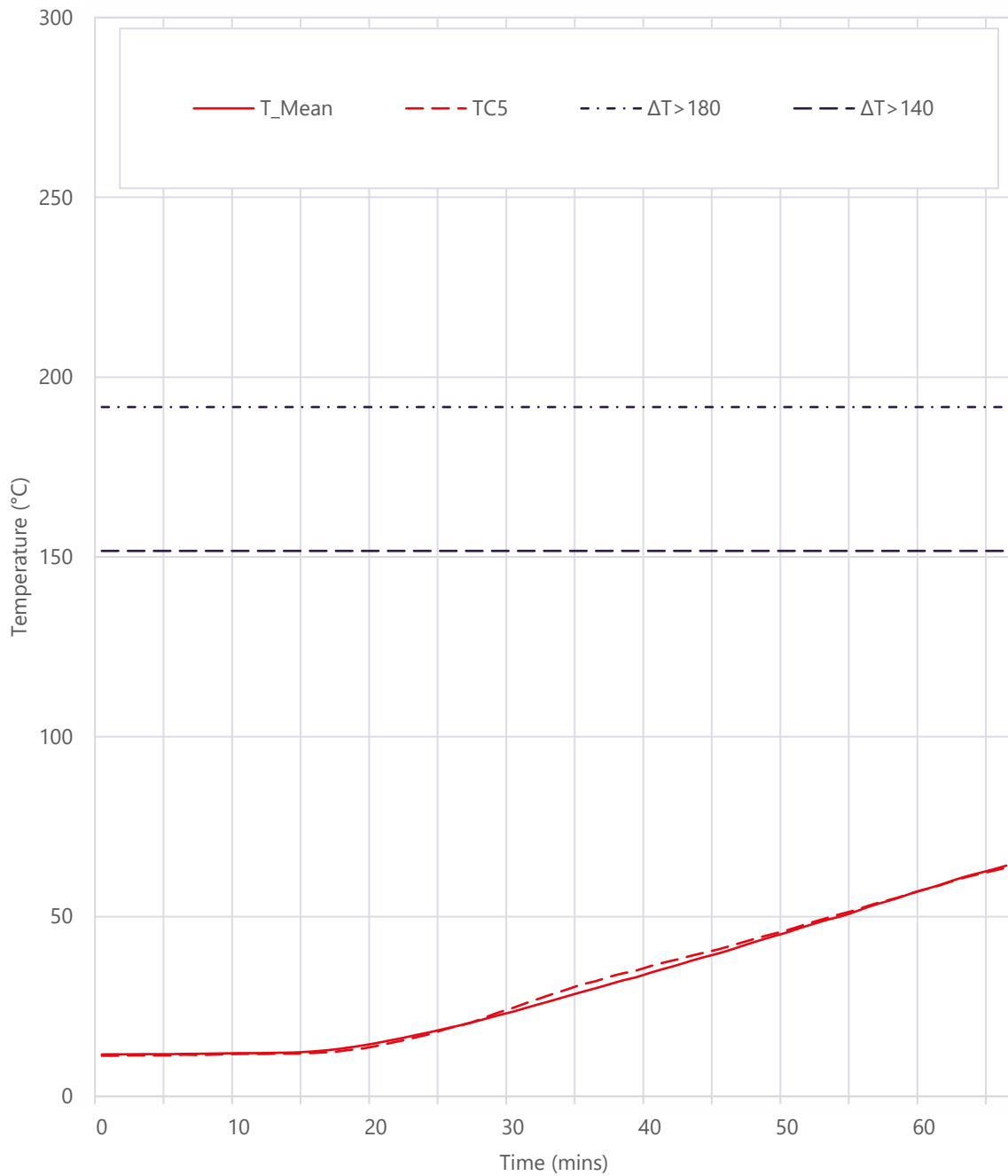


Figure 30 - Graph presenting the Time-Temperature distribution of the unexposed surface of Specimen A

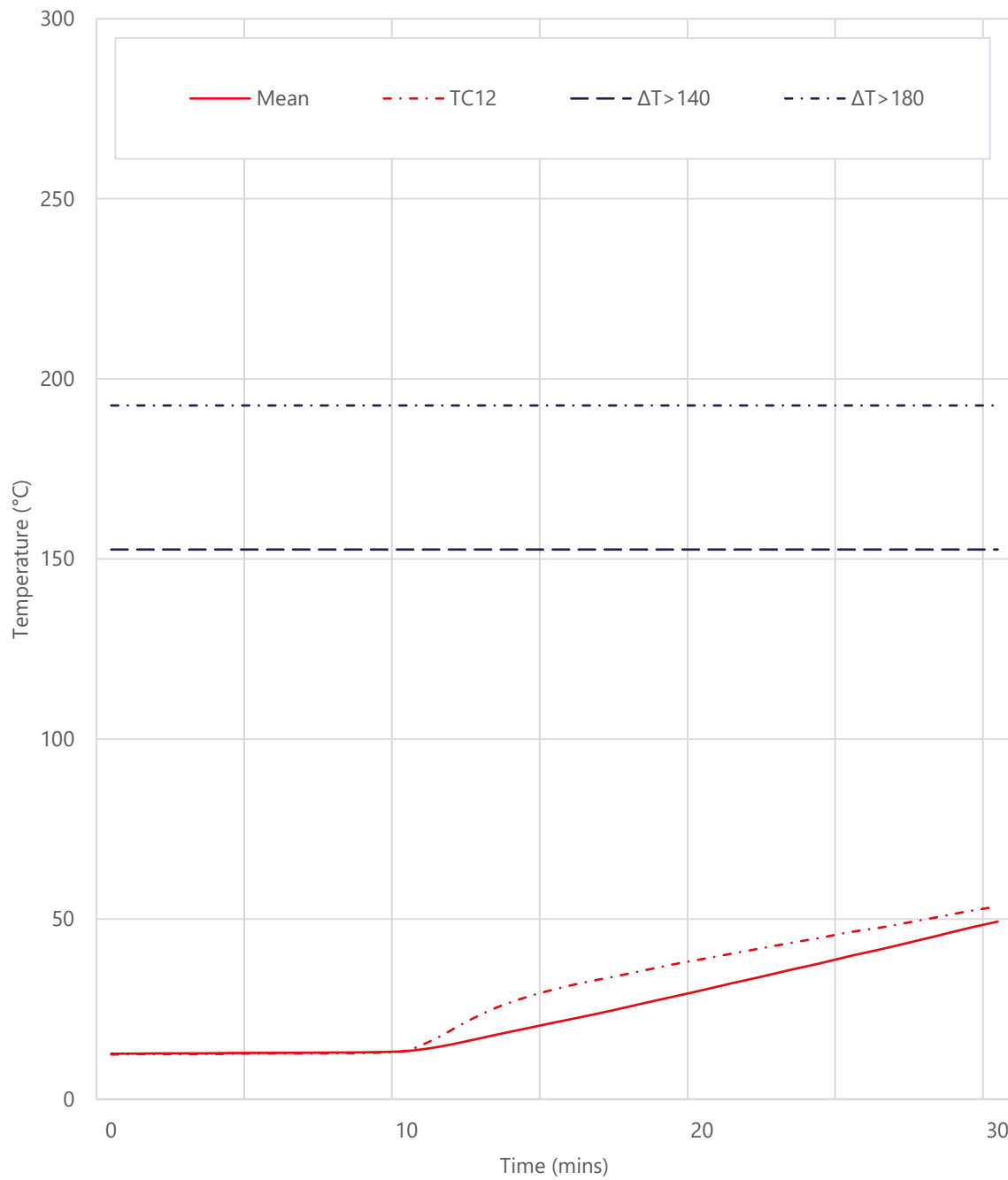


Figure 31 - Graph presenting the Time-Temperature distribution of the unexposed surface of Specimen B

## 11 Tables

Table 1 – The temperatures recorded by the disc thermocouples used evaluate the mean and maximum temperature rise of the unexposed surface of Specimen A. Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC1	TC2	TC3	TC4	TC5
0	11.7	11.7	11.8	11.9	11.3
3	11.8	11.9	11.8	11.8	11.4
6	11.8	12.0	11.9	11.8	11.6
9	12.0	12.1	12.0	12.0	11.7
12	12.1	12.2	12.1	12.1	11.8
15	12.6	12.6	12.5	12.3	12.0
18	14.0	13.7	13.5	13.8	12.9
21	16.0	15.4	15.1	16.4	14.8
24	18.4	17.4	16.8	19.5	17.4
27	21.1	19.7	18.8	22.6	20.6
30	24.1	22.3	21.1	25.7	24.6
33	27.5	25.2	23.9	28.8	28.6
36	31.0	28.4	27.1	31.7	32.0
39	34.3	31.6	30.6	34.2	35.0
42	38.0	34.9	34.2	37.4	38.1
45	41.3	38.3	38.1	40.2	40.9
48	45.0	41.9	42.0	43.8	44.2
51	48.4	45.7	45.8	47.1	47.4
54	51.4	49.2	49.4	49.9	50.8
57	55.2	53.4	53.6	53.3	54.2
60	58.6	57.5	57.4	56.6	57.5
63	62.0	61.4	61.4	59.8	60.9
66	65.1	65.1	64.7	62.4	63.6

Table 2 – The temperatures recorded by the disc thermocouples used to evaluate the maximum temperature rise of Specimen A. Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC6	TC7	TC8	TC17
0	11.0	10.9	11.0	11.8
3	11.0	11.0	11.1	11.9
6	11.0	11.1	11.2	12.0
9	11.1	11.2	11.2	12.0
12	11.1	11.2	11.6	12.0
15	11.1	11.2	11.0	12.0
18	11.1	11.4	11.1	12.1
21	11.2	12.0	11.5	12.4
24	11.3	13.1	12.3	12.8
27	12.0	14.5	13.8	13.5
30	13.4	16.2	15.0	14.6
33	15.6	18.0	16.3	15.8
36	17.9	20.0	18.0	17.7
39	19.8	21.8	19.0	19.3
42	21.4	23.8	20.1	21.0
45	22.9	25.9	21.5	22.1
48	24.5	27.7	22.4	23.6
51	25.9	29.5	23.5	25.4
54	27.5	30.6	24.2	26.9
57	28.9	31.5	25.1	27.9
60	30.2	32.5	26.0	29.5
63	31.4	33.4	26.6	30.6
66	32.7	34.3	27.1	32.2

Table 3 – The temperatures recorded by the disc thermocouples used evaluate the mean and maximum temperature rise of the unexposed surface of Specimen B. Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC9	TC10	TC11	TC12	TC13
0	13.0	12.8	12.7	12.4	12.2
3	13.1	12.9	12.8	12.5	12.3
6	13.3	13.0	12.9	12.7	12.4
9	13.5	13.2	13.1	12.9	12.6
12	16.0	14.1	15.2	21.4	13.5
15	21.4	17.5	20.0	30.5	17.0
18	27.1	22.7	25.5	35.7	22.0
21	33.0	28.5	31.4	40.4	27.6
24	38.8	34.3	37.4	44.8	33.4
27	44.7	40.2	43.9	49.1	39.5
30	50.4	46.1	50.6	53.5	45.9
31	*	*	*	*	*

\*Specimen was extinguished at blanked over after 30 minutes

Table 4 – The temperatures recorded by the disc thermocouples used to evaluate the maximum temperature rise of Specimen B. Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC14	TC15	TC16
0	10.4	11.1	10.8
3	10.6	16.4	10.8
6	10.7	17.6	10.8
9	10.8	16.0	10.9
12	10.8	15.1	11.0
15	11.1	15.0	11.0
18	12.5	16.3	11.2
21	15.3	19.0	11.7
24	18.4	22.0	12.6
27	20.7	24.8	13.8
30	23.7	27.4	15.5
31	*	*	*

\*Specimen was extinguished at blanked over after 30 minutes