United Kingdom Testing and Certification

Test Report

The fire resistance performance of a fully insulated, timber, single acting single door and a fully insulated, timber, single acting double door assembly when tested in accordance with BS EN 1634-1:2014+A1:2018

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Issue Date	26 June 2023
Date of Test	10 June 2023
Prepared For	Dorpro Limited Unit 203 Pointon Way, Stonebridge Cross Droitwich WR9 0LW

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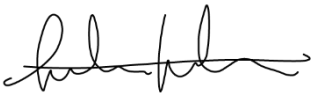
Cairnmuir House, Cairnmuir Road,
East Kilbride, Glasgow G74 4GY
+44 (0)1355 433 122
info@uktestcert.com
uktestcert.com

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Change History

Issue Date	Revision	Created by	Authorised by	Description of Change
26/06/2023	A	NS	D.F	Initial Issue

Signatories

		
Prepared by **Nathan Small*** Technical Officer	Checked by **Daniel Fitzsimmons*** Head of Testing	Authorised by **Andrew Hutchison*** Head of Technical Services

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

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1 Executive Summary

1.1 Specimen Summary

Specimen A had overall nominal dimensions of 1087 mm wide by 2078 mm high, incorporating an equal pair of door leaves each with overall dimensions of 500 mm wide by 2040 mm high by 54 mm thick. The door leaves were formed from graduated density chipboard with 6 mm thick hardwood lippings to the vertical edges. The leaf was hung in a hardwood frame on three steel hinges and the door assembly incorporated the following hardware:

Item No.	Description	Reference
11	Door Closer	AR1500-SSS/SSS
12	Door ID Tag	Data ID Tag

Specimen B had overall nominal dimensions of 998 mm wide by 2080 mm high, incorporating a door leaf each with overall dimensions of 928 mm wide by 2040 mm high by 44 mm thick. The door leaf was formed from a timber stile and rail construction with a jointed core material that was then faced with MDF to both faces. The leaf was hung in a hardwood frame on three steel hinges and the door assembly incorporated the following hardware:

Item No.	Description	Reference
25	Door Closer	AR1500-SSS/SSS
26	Lockset	Easi T
27	Lever Handle	Asker lever on rose*
28	Door ID Tag	Data ID Tag

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 16 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 test by United Kingdom Testing and Certification.

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1.5 Expression of Results

1.5.1 Specimen A

Specimen A satisfied the performance criterion specified in BS EN 1634-1:2014+A1:2018 § 11 for the following intervals:

Integrity (E)[1]	Sustained Flaming	61 minutes	No failure*
	Gap Gauge	61 minutes	No failure*
	Cotton Pad	61 minutes	No failure*
Insulation (I_1)[2]	Specimen	61 minutes	No failure*
Insulation (I_2)[3]	Specimen	61 minutes	No failure*

*The test was discontinued after a period of 61 minutes.

[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 BS 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 increase at the locations specified in BS EN 1634-1:2014+A1:2018 § 9.1.2.2, 9.1.2.3, 9.1.2.4 and the roving thermocouple above the initial average temperature by more than 180°C.

[3] 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.

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1.5.2 Specimen B

Specimen B satisfied the performance criterion specified in BS EN 1634-1:2014+A1:2018 § 11 for the following intervals:

Integrity (E)[4]	Sustained Flaming	33 minutes	No failure*
	Gap Gauge	33 minutes	No failure*
	Cotton Pad	33 minutes	No failure*
Insulation (I_1)[5]	Specimen	33 minutes	No failure*
Insulation (I_2)[6]	Specimen	33 minutes	No failure*

*The specimen was blanked off after a period of 33 minutes.

[4] 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 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.

[5] 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 increase at the locations specified in BS EN 1634-1:2014+A1:2018 § 9.1.2.2, 9.1.2.3, 9.1.2.4 and the roving thermocouple above the initial average temperature by more than 180°C.

[6] 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.

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2 Pre-test Examination

2.1 Closing Force Measurement

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

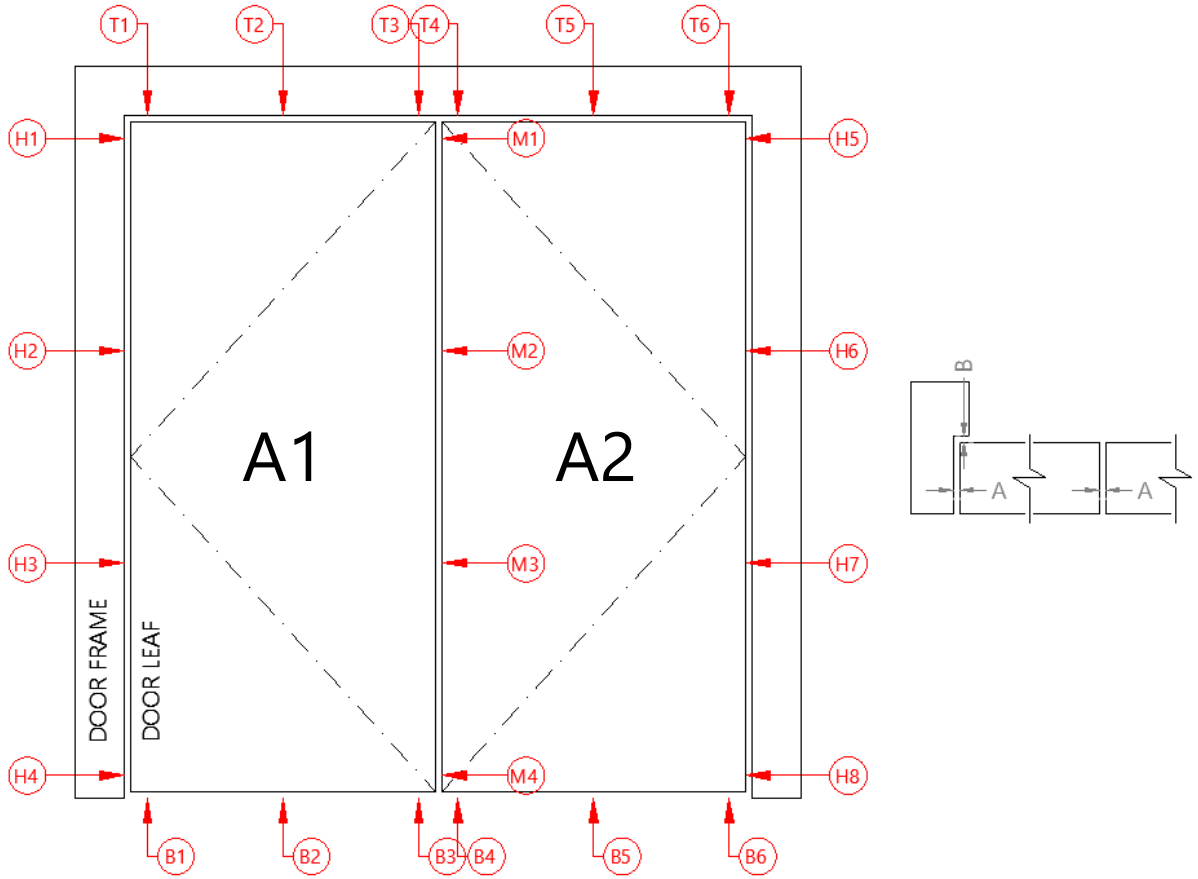
Measurement	Maximum Recorded Force (N)	Distance from Pivot to Measurement Location (m)	Moment (Nm)
Closing Force Specimen A1	56.1	0.400	22.44
Opening Force Specimen A1	96.6	0.400	38.64
Closing Force Specimen A2	70.2	0.400	38.64
Opening Force Specimen A2	115.6	0.400	46.24
Closing Force Specimen B	35.9	0.750	26.925
Opening Force Specimen B	62.2	0.750	46.65

2.2 Specimen Conditioning

The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of five days. Throughout this period, both the temperature and the humidity of the laboratory were measured and recorded as being within a range of from 16.7 °C to 17.5 °C and 52.0 % to 54.5 % respectively.

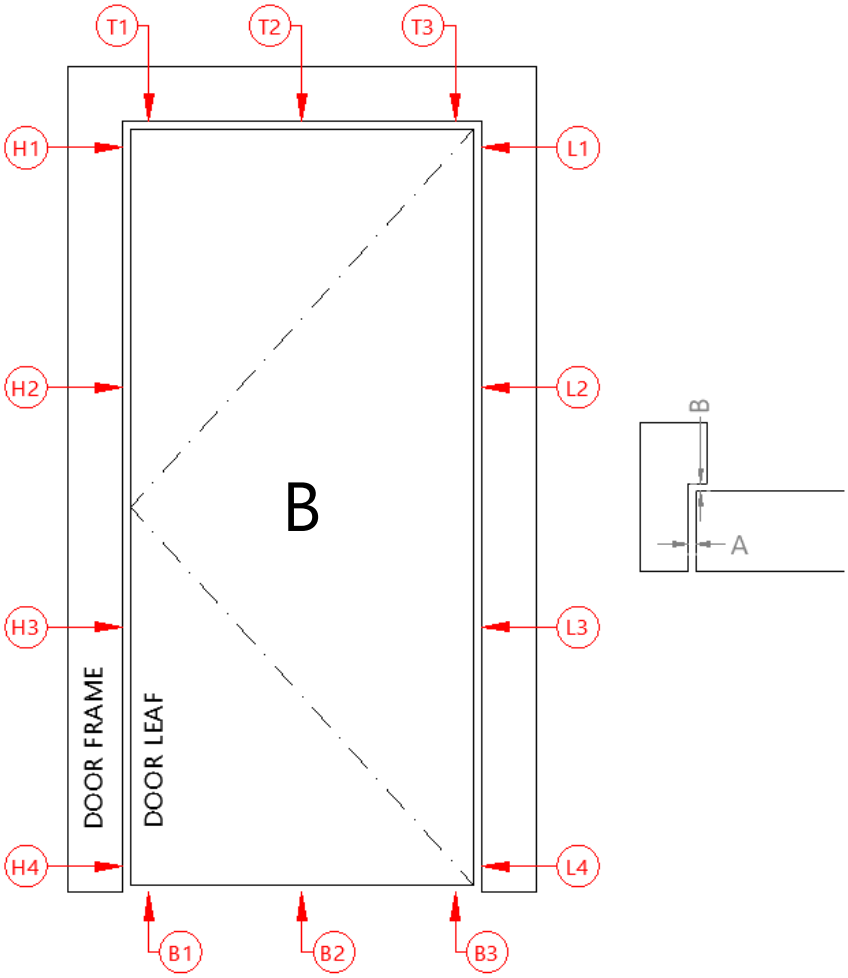
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2.3 Gap Measurements



	A	B			A			A	B
H1	2.9	0.0		M1	3.2		H5	3.2	1.1
H2	3.2	0.1		M2	2.9		H6	2.9	1.9
H3	3.5	0.1		M3	2.7		H7	2.7	2.4
H4	2.1	0.0		M4	3.6		H8	3.6	2.9
Mean	**2.9**			**Mean**	**3.1**		**Mean**	**3.1**	
Max	**3.5**			**Max**	**3.6**		**Max**	**3.6**	
Min	**2.1**			**Min**	**2.7**		**Min**	**2.7**	
Max Permitted	**5.2**			**Max Permitted**	**5.3**		**Max Permitted**	**5.3**	
	A	B		A	B		A		A
T1	3.8	0.1	T4	2.7	0.1	B1	3.5	B4	5.3
T2	3.1	0.3	T5	3.0	0.1	B2	4.1	B5	4.8
T3	2.6	0.6	T6	3.2	0.1	B3	5.9	B6	4.8
Mean	**3.2**		**Mean**	**3.0**		**Mean**	**4.5**	**Mean**	**5.0**
Max	**3.8**		**Max**	**3.2**		**Max**	**5.9**	**Max**	**5.3**
Min	**2.6**		**Min**	**2.7**		**Min**	**3.5**	**Min**	**4.8**
Max Permitted	**5.5**		**Max Permitted**	**5.1**		**Max Permitted**	**7.2**	**Max Permitted**	**7.2**

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Hanging Stile	A	B	Closing Stile	A	B
H1	2.8	0.4	L1	3.0	0.2
H2	2.7	0.8	L2	2.7	0.8
H3	3.0	0.8	L3	2.9	0.8
H4	1.7	0.8	L4	3.8	2.1
Mean	**2.6**		**Mean**	**3.1**	
Max	**3.0**		**Max**	**3.8**	
Min	**1.7**		**Min**	**2.7**	
Max Permitted	**4.8**		**Max Permitted**	**5.4**	
Top Edge	**A**	**B**	**Bottom Edge**	**A**	
T1	2.9	0.1	B1	3.3	
T2	2.7	0.1	B2	3.1	
T3	2.6	0.0	B3	4.8	
Mean	**2.7**		**Mean**	**3.7**	
Max	**2.9**		**Max**	**4.8**	
Min	**2.6**		**Min**	**3.1**	
Max Permitted	**4.8**		**Max Permitted**	**6.3**	

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3 Test Specimen Drawings

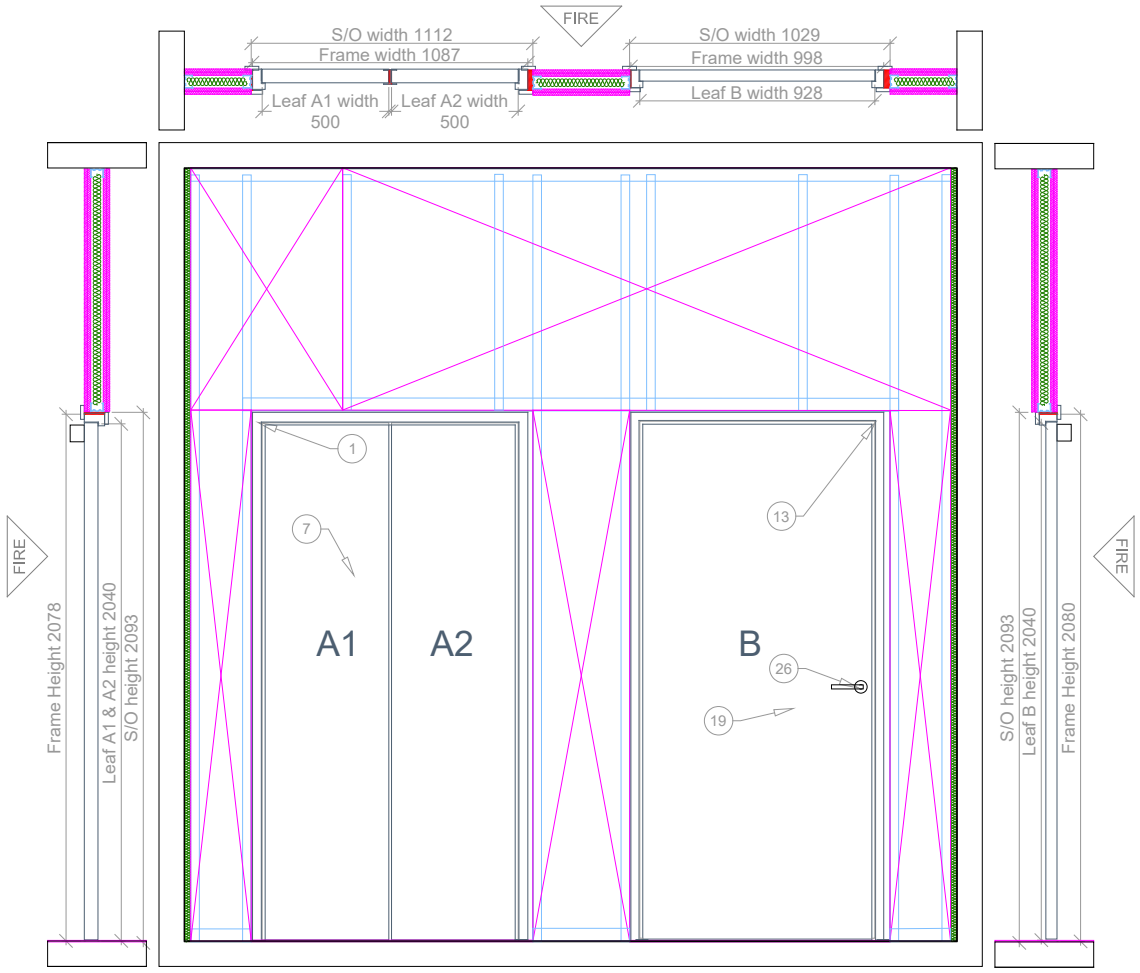


Figure 1 - General arrangement of test construction viewed from the unexposed surface

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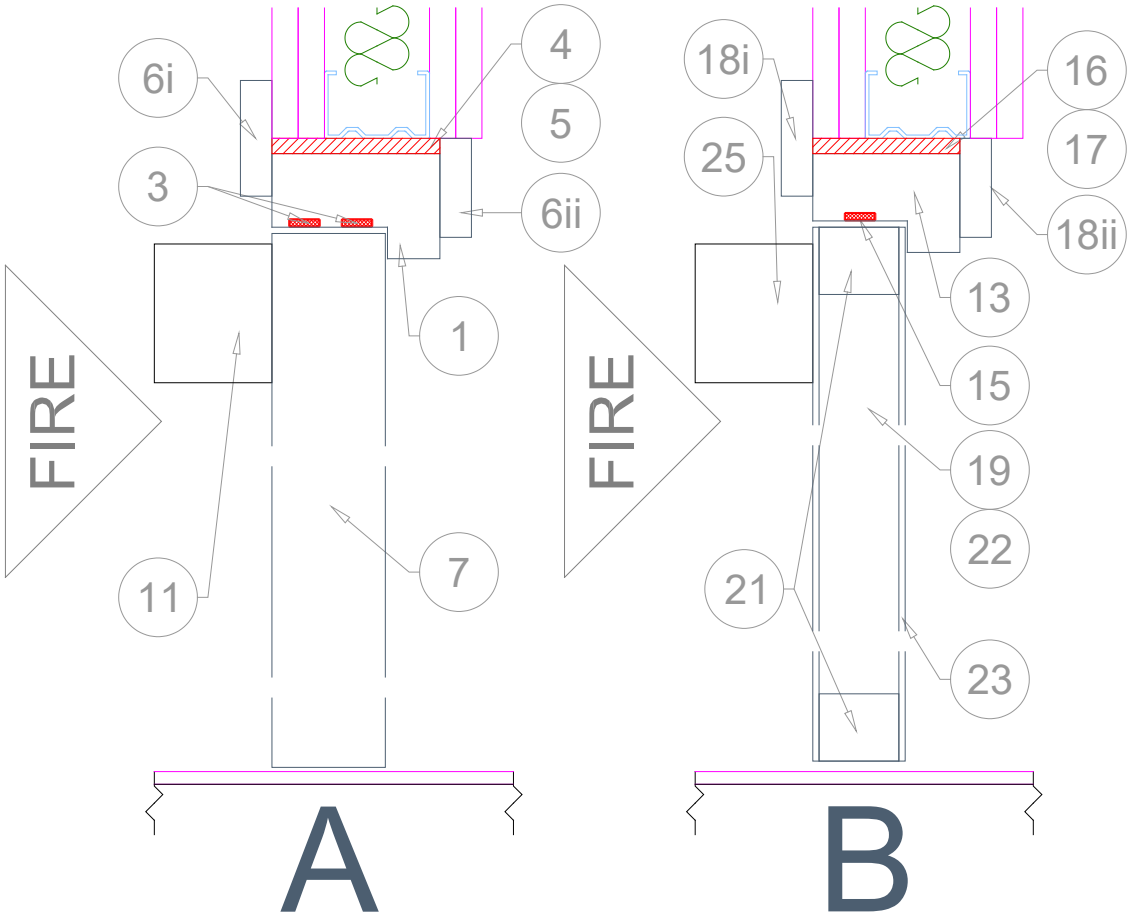


Figure 2 - Typical vertical section through the specimens

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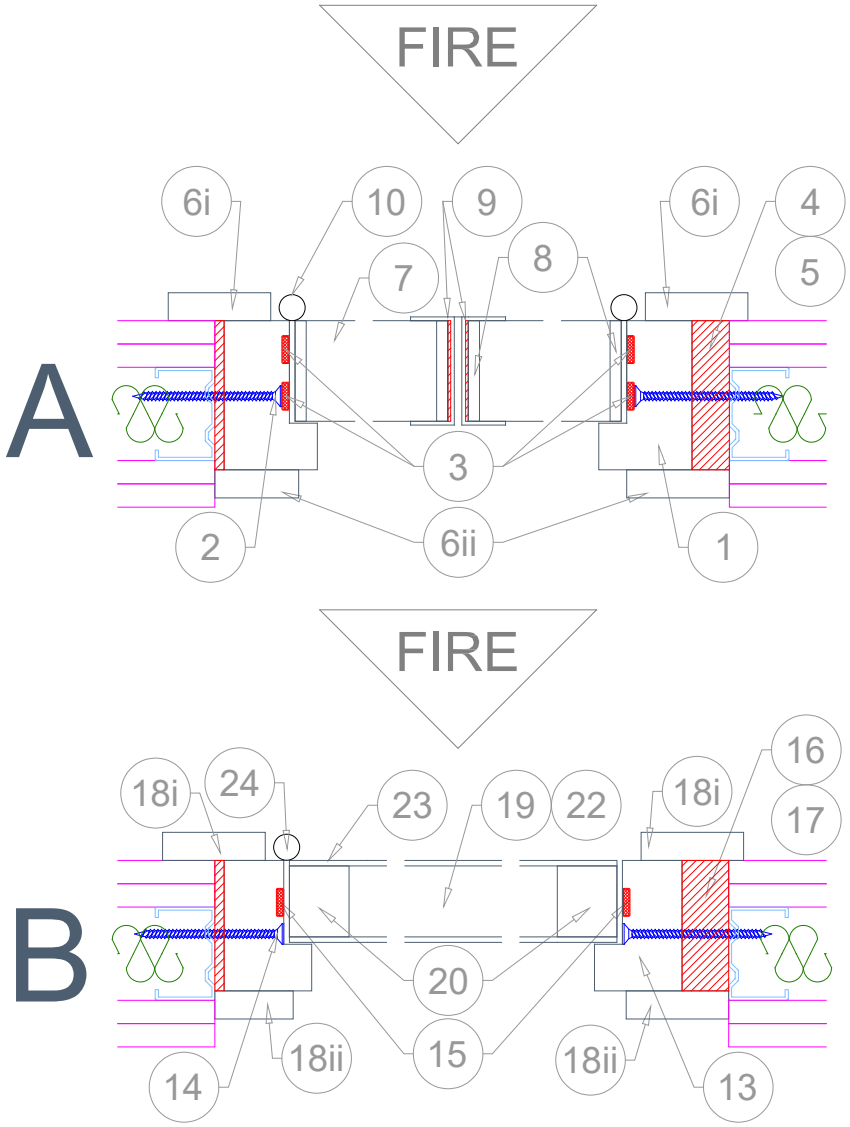


Figure 3 - Typical horizontal section through the specimens

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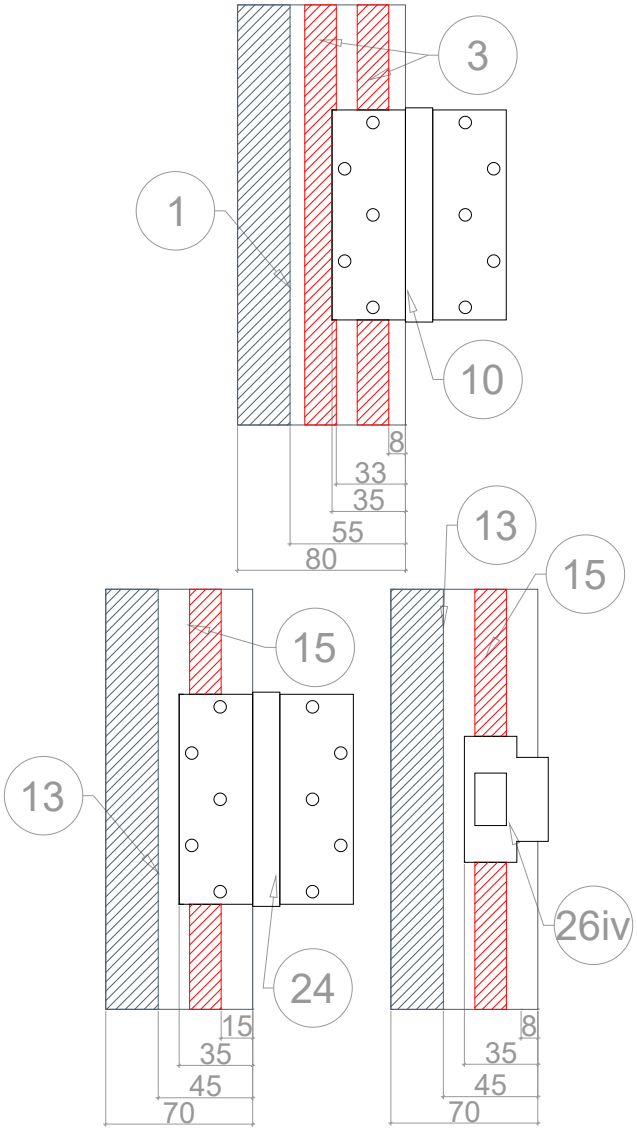


Figure 4 - Hardware intumescent interruptions

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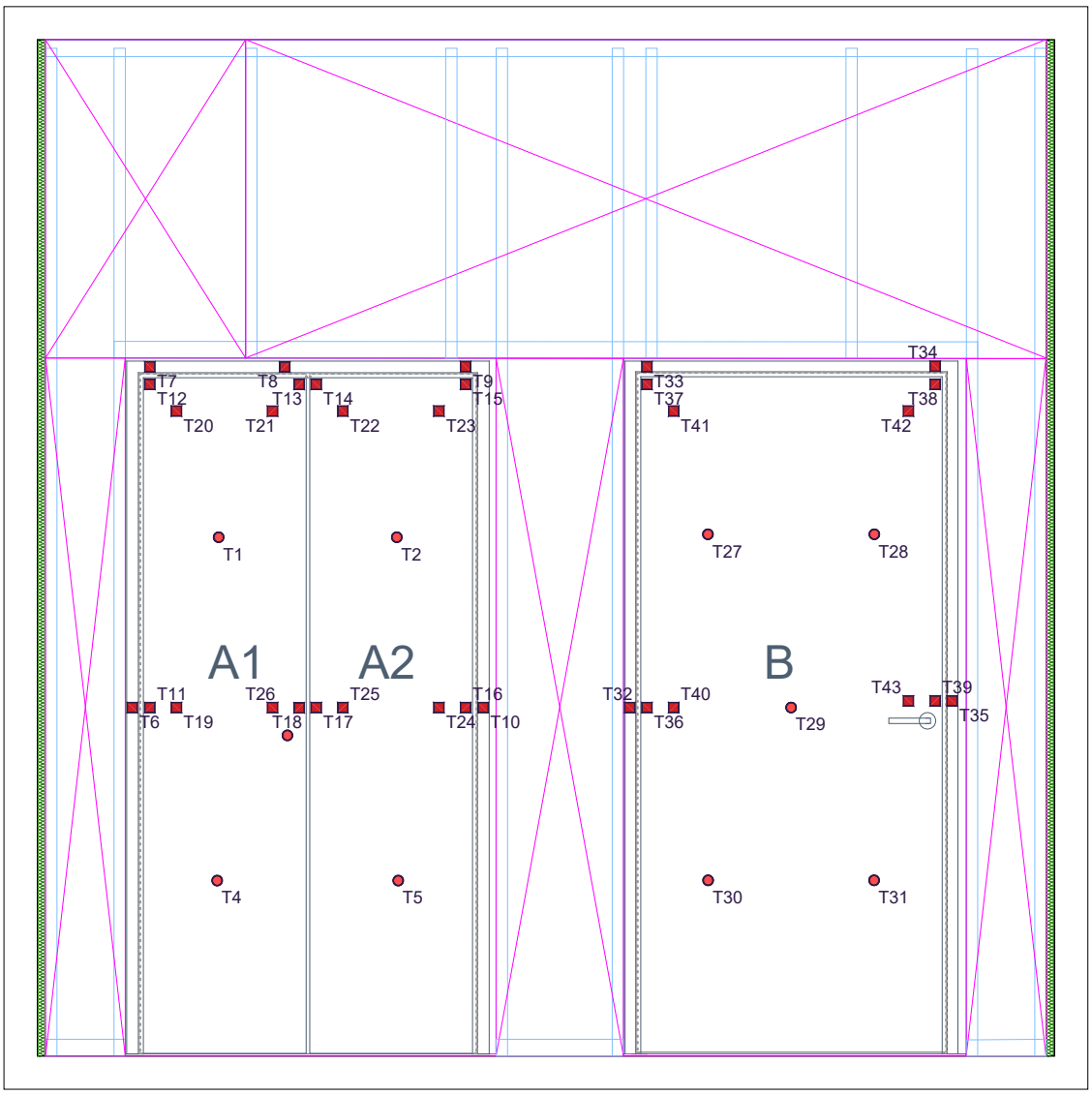


Figure 5 - Layout of instrumentation viewed from the unexposed surface of the test construction

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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 are retained on file by United Kingdom Testing and Certification.

4.1 Specimen A

1. Frame	
Manufacturer	Sa joinery
Reference	Fd60 sapele rebated frame
Material	sapele Head and sapele Jambs
Density	640 kg/m3
Moisture content	8.3-8.5 % (Lab measurement)
a. Overall size	1087 mm wide x 2080 mm high x 80 mm
i. Frame (Head)	80 mm wide x 50 mm thick with 55 mm wide x 15 mm deep rebate
ii. Frame (Jambs)	80 mm wide x 50 mm thick with 55 mm wide x 15 mm deep rebate
iii. Stop	25 mm x 15 mm
Jamb to Head jointing method, fixing detail and location	20 mm stub mortice*, 2 no 5 x 100 mm woodscrews 1 either side of tenon
Stop to Frame jointing method, fixing detail and location	n/a
b. Adhesive(s)	Yes
i. Manufacturer	Ureka*
ii. Type	Arobond 947*
iii. Reference	Batch 102044*
iv. Curing method	Moisture*
v. Application method	Glue spreader*
2. Frame Fixing Method to Supporting Construction	
Manufacturer	Spax

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Reference	Z2 A2L 1081020500805
Type & material	Carbon steel with yellow passivated coating
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 500 mm centres
Does the fixing penetrate intumescent seal within frame reveal	No
Packing Material	Blue 60 Packers
Packing Material Dimension	100 mm long x 15 mm wide x assorted thicknesses (1/3/5 mm)
Packing Material Location	At each fixing location
3. Intumescent to frame reveal (1)	
Quantity	2
Manufacturer	Pyroplex
Reference	Cf355
Material	Graphite
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)	8 mm and 33 mm from face of door
4. Frame to supporting construction fire stopping detail	
Manufacturer	DorPro
Reference	Blue 60 Foam
Material	PU expanding Foam
Overall dimension	5-30 mm wide x depth of frame
Application method	Foam Gun
5. Sealant to fire stopping detail	
Manufacturer	DorPro
Reference	Orange 240
Material	Acrylic sealant
Overall section size	5 - 15 mm wide x 10 mm deep
Application method	Cartridge Gunned

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Location	Gaps between the head and jambs to frame
6. Architrave	
a. Manufacturer	
i. Exposed	Sa joinery
ii. Unexposed	Sa joinery
b. Material	
i. Exposed	Sapele
ii. Unexposed	MDF
c. Overall section size	
i. Exposed	55 mm wide x 15 mm deep
ii. Unexposed	Scribed to fit width x 15 mm deep
d. Location	
i. Exposed	Exposed face
ii. Unexposed	Unexposed face
e. Application method, fixings and fixing frequency required	
i. Exposed	2 No. Ø 38 mm pins at 200 centres & 50 mm from edges
ii. Unexposed	2 No. Ø 38 mm pins at 200 centres & 50 mm from edges
7. Door Leaf	
Manufacturer (blank)	Halspan
Reference	Prima 60
Quantity of leaves on doorset	2
Overall leaf size supplied for testing	500 mm wide x 2040 mm high x 54 mm thick. Both doors equal size
8. Lippings / Edge banding	
Manufacturer	Sa joinery
Reference	6 mm sapele lippings
Material	sapele
Density	640 kg/m3
a. Moisture content	

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i. Leaf A1	8.6 – 9.1 % (Lab measurement)
ii. Leaf A2	8.8 – 8.9 % (Lab measurement)
Overall size	2040 mm deep x 54 mm wide x 6 mm thick
Fixing method	glued
Location	Vertical edges only
b. Adhesives	Yes
i. Manufacturer	Ureka*
ii. Type	Arobond 947*
iii. Reference	Batch 102044*
iv. Curing method	Moisture*
v. Application method	Glue spreader*
9. Meeting Edge Guard	
Manufacturer	Ram Extrusions
Reference	Door Edge Guard
Material	PVC with graphite intumescent
Overall section size	58 mm wide x 19 mm upstand x 2.5 mm thick
Location	1 no attached to each leaf.
Application Method	Pin fixed at 3 locations – 45 mm down from top, 35 mm up from bottom and one 1000 mm up from bottom.
a. Door Edge Gaps	Pre edge seal – 9 mm
i. Leading edge leaf A1	1 no. Pyrocist 1.5 mm thick x 50 mm wide
ii. Leading edge leaf A2	1 no. Pyrocist 1.5 mm thick x 50 mm wide
10. Hinges	
Supplier	Royde and tucker
Reference	Hi load 102
Quantity	3 nr per leaf (6 total)
Primary material	Stainless Steel
Type	Class 13 Butt Bearing Hinge
a. Size	
i. Knuckle	Ø 13 mm x 102 mm high

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ii. Blades	100 mm high x 35 mm wide x 3 mm thick
b. Fixings	
i. Type	Woodscrews
ii. Material	Steel
iii. Size	Ø 5 mm x 32 mm long
iv. Number off per blade	5
Position of each hinge relative to the head of the leaf	175 mm, 945 mm and 1715 mm
Details of intumescent protection	2mm vanquish interdens pads (mono ammonium phosphate)
Interruptions to Intumescent within the frame reveal	Fully interrupts one seal & partially interrupts the other
11. Door Closer	
Manufacturer	Arrone
Reference	AR1500-SSS/SSS
a. Material	
i. Body	Steel
ii. Closer arm	Steel
iii. Cover	Steel
Configuration	Scissor arm figure 1 mounted (hinge side)
Overall size	
Body	248 mm wide x 45 mm high x 56 mm deep
Cover	255 mm wide x 66 mm high x 60 mm deep
Fixing method	Fixed with fixings provided
12. Door Pin ID Tag	
Manufacturer	Door Data Systems
Reference	Data ID Tag
Material	Computer chip with dual plastic coating
Overall size	Ø 6 mm x 37.5 mm long
Location	Centered in the head of leaf A2.
Fixing method	Friction fitted into door edge.

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4.2 Specimen B

13. Frame	
Manufacturer	Sa joinery
Reference	Fd30 redwood rebated frame
Material	redwood Head and redwood Jambs
Density	540 kg/m3
Moisture content	10.4-10.5 % (Lab measurement)
a. Overall size	2080 mm high x 998 mm wide x 47 mm thick
i. Frame (Head)	70 mm wide x 47 mm thick with 45 mm wide x 15 mm deep rebate
ii. Frame (Jambs)	70 mm wide x 47 mm thick with 45 mm wide x 15 mm deep rebate
iii. Stop	Rebated in frame 25 mm x 15 mm
Jamb to Head jointing method, fixing detail and location	16 mm stub mortice* fixed with 2no Ø 5 mm x 100 mm woodscrews, one either side of tenon
Stop to Frame jointing method, fixing detail and location	n/a
b. Adhesive(s)	Yes
i. Manufacturer	Ureka *
ii. Type	Arobond 947 *
iii. Reference	Batch 102044 *
iv. Curing method	Moisture *
v. Application method	Glue spreader *
14. Frame Fixing Method to Supporting Construction	
Manufacturer	Spax
Reference	Z2 A2L 1081020500805
Type & material	Carbon steel with yellow passivated coating
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 500 mm centres
Does the fixing penetrate intumescent seal within frame reveal	No
Packing Material	Blue 60 Packers

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Packing Material Dimension	100 mm long x 15 mm wide x assorted thicknesses (1/3/5 mm)
Packing Material Location	At each fixing location
15. Intumescent to frame reveal (1)	
Quantity	1
Manufacturer	Pyroplex
Reference	Cf355
Material	Graphite based
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)	15 mm from face of door to start of seal
a. Adhesive(s)	N/A
16. Frame to supporting construction fire stopping detail	
Manufacturer	DorPro
Reference	Blue 60 Foam
Material	PU expanding Foam
Overall dimension	5-30 mm wide x depth of frame
Application method	Foam Gun
17. Sealant to fire stopping detail	
Manufacturer	DorPro
Reference	Orange 240
Material	Acrylic sealant
Overall section size	5 - 15 mm wide x 10 mm deep
Application method	Cartridge Gunned
Location	Gaps between the head and jambs to frame
18. Architrave	
a. Manufacturer	
i. Exposed face	Sa joinery
ii. Unexposed face	Sa joinery

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b. Material	
i. Exposed face	Softwood
ii. Unexposed face	MDF
c. Overall section size	
i. Exposed face	55 mm wide x 15 mm deep
ii. Unexposed face	Scribed to fit width x 15 mm deep
d. Location	
i. Exposed face	Exposed face
ii. Unexposed face	Unexposed face
e. Application method, fixings and fixing frequency required	
i. Exposed face	2 No. Ø 38 mm pins at 200 centres & 50 mm from edges
ii. Unexposed face	2 No. Ø 38 mm pins at 200 centres & 50 mm from edges
19. Door Leaf	
Manufacturer (blank)	Vicaima
Reference	CF218 A5337401
Quantity of leaves on doorset	1
Overall leaf size supplied for testing	926 mm wide x 2040 mm high x 44 mm thick
20. Stiles	
Manufacturer	Vicaima
Reference	CF218 A5337401
a. Material	
i. Outer	Timber (Not declared by sponsor) *
ii. Inner	Timber (Not declared by sponsor) *
b. Density	
i. Outer	(Not declared by sponsor) *
ii. Inner	(Not declared by sponsor) *
c. Moisture content	
i. Outer	(Not declared by sponsor) *

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ii. Inner	(Not declared by sponsor) *
d. Overall size	
i. Outer	38 mm wide x 32 mm thick
ii. Inner	(Not declared by sponsor) *
e. Adhesives	(Not declared by sponsor) *
f. Presence of Mechanical Fixings	(Not declared by sponsor) *
21. Rails	
Manufacturer	Vicaima
Reference	CF218 A5337401
a. Material	
i. Top	Timber (Not declared by sponsor) *
ii. Bottom	Timber (Not declared by sponsor) *
b. Density	
i. Top	(Not declared by sponsor) *
ii. Bottom	(Not declared by sponsor) *
c. Moisture content	
i. Top	(Not declared by sponsor) *
ii. Bottom	(Not declared by sponsor) *
d. Overall size	
i. Top outer	38 mm wide x 32 mm thick
ii. Bottom outer	38 mm wide x 32 mm thick
e. Adhesives	(Not declared by sponsor) *
f. Presence of Mechanical Fixings	(Not declared by sponsor) *
22. Core element 1	
Manufacturer	Vicaima
Reference	CF218 A5337401
Material	Timber (Not declared by sponsor) *
Density	(Not declared by sponsor) *
Overall thickness	38 mm thick

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Application method	(Not declared by sponsor) *
a. Adhesives	(Not declared by sponsor) *
b. Presence of Mechanical Fixings	(Not declared by sponsor) *
23. Facings	
Manufacturer	Vicaima
Reference	CF218 A5337401
Material	Timber (Not declared by sponsor) *
Density	(Not declared by sponsor) *
Moisture content	(Not declared by sponsor) *
Overall thickness and reduced thickness if door leaf incorporates fielded areas	3 mm thick, no fielded areas
Application method	(Not declared by sponsor) *
a. Adhesives	(Not declared by sponsor) *
b. Presence of Mechanical Fixings	(Not declared by sponsor) *
24. Hinges	
Supplier	Royd and tucker
Reference	Hi load 102
Quantity	3
Primary material	Stainless Steel
Type	Class 13 Butt Bearing Hinge
a. Size	
i. Knuckle	Ø 13 mm x 102 mm high
ii. Blades	100 mm high x 35 mm wide x 3 mm thick
b. Fixings	
i. Type	Woodscrews
ii. Material	Steel
iii. Size	Ø 5 mm x 32 mm long
iv. Number off per blade	5
Position of each hinge relative to the head of the leaf	175 mm, 945 mm, 1715 mm

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Details of intumescent protection	n/a
Interruptions to Intumescent within the frame reveal	Fully interrupts
25. Door Closer	
Manufacturer	Arrone
Reference	AR1500-SSS/SSS
a. Material	
i. Body	Steel
ii. Closer arm	Steel
iii. Cover	Steel
Configuration	Scissor arm figure 1 mounted (hinge side)
b. Overall size	
i. Body	248 mm wide x 45 mm high x 50 mm deep
ii. Cover	255 mm wide x 66 mm high x 56 mm deep
Fixing method	Fixed with fixings provided
26. Lockset / Latch	
Manufacturer	Altro
Reference	Easi t
a. Material	
i. Lockcase	Steel
ii. Forend plate	Steel
iii. Latch bolt	Brass
iv. keeper	Steel
b. Overall sizes	
i. Central Lockcase	16 mm wide x 22 mm high x 76 mm deep
ii. Forend plate	25 mm wide x 60 mm high x 1.5 mm thick
iii. Latch bolt	12 mm wide x 19 mm high x 12.75 mm projection
iv. Keeper	25 mm wide x 60 mm high x 1.5 mm thick with a 15 mm wide x 40 mm high tongue
Fixing method	2 No. Ø 4 mm x 30 mm wood screws in keeper

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	2 No. Ø 4 mm x 30 mm wood screws in forend plate
Operation of latch bolt	Engaged
c. Details of intumescent protection	
i. Central Lockcase	Vanquish* 1 mm interdens (mono ammonium phosphate)
ii. Forend plate	Vanquish* 1 mm interdens (mono ammonium phosphate)
iii. Keeper	Vanquish* 1 mm interdens (mono ammonium phosphate)
Interruptions to Intumescent within the frame reveal	Fully interrupts at keeper
Location of centre of the spindle relative to the bottom of the leaf	Centre of the spindle measures 1000 mm from the bottom of the leaf
27. Lever handles	
Manufacturer	Smith and Locke*
Reference	Asker lever on rose*
Material	Polished chrome*
Overall size	Ø 50 mm Rose, Ø 16 mm x 125 mm long handle
Fixing method, fixing material, sizes, quantity and location	3 No. Ø 3 mm x 19 mm wood screws to each face of door 2 No Ø 2.8 through bolts
Details of intumescent protection	None
28. Door Pin ID Tag	
Manufacturer	Door Data Systems
Reference	Data ID Tag
Material	Computer chip with dual plastic coating
Overall size	Ø 6 mm x 37.5 mm long
Location	Head edge – centred into the head of the door
Fixing method	Friction fitted into door edge.

4.3 Supporting Construction

29. Studs	
Supplier/ Manufacturer	United Kingdom Testing and Certification
a. Type & Material	Rolled steel C-Stud

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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
30. Head/ Floor Track	
Supplier/ Manufacturer	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 25 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
31. Lining(s)	
Supplier/ Manufacturer	United Kingdom Testing and Certification
Type & Material	Paper faced, gypsum plasterboard type F
Density	760 Kg/m^3
Layer Quantity	2
Dimensions	12.5 mm thick x 1200 mm wide x 2400 mm high
Fixings	Plasterboard Screw Fixings Ø 3.5 mm x 25 mm & 3.5 x 32
Joints Filled & Taped With	No nonsense
32. Wall Insulation	
Supplier	United Kingdom Testing and Certification
Type & Material	Mineral Wool
Density	33 Kg/m^3
Installation Method	Compression Fitted
Thickness	50 mm
Locations	Centrally Located in the wall
Additional Wall Construction Requests	N/a
33. Free Edge Gasket	
Manufacturer	Morgan Advanced Materials

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Reference	Superwool
Density	128 Kg/m^3
Dimensions	20 mm thick x 3025 mm long x 100 mm wide
Fixing(s)	Compression fitted between the supporting construction & restraint frame
34. Board for Simulated Floor Level	
Manufacturer	British Gypsum
Reference	Glasroc F MultiBoard 6mm
Density	833 Kg/m^3
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.

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5 Specimen Photographs



Figure 6 - Item 1, 7, 4, 5, 13, 16, 17, 19



Figure 7 - Item 2, 13



Figure 8 - Item 1, 3, 10



Figure 9 - Item 1, 6, 7, 11, 13, 18, 19, 25



Figure 10 - Item 1, 4, 5, 7, 8, 9, 12



Figure 11 - Item 11, 25



Figure 12- Item 13, 14, 15, 24



Figure 13 - Item 20, 21, 23, 28

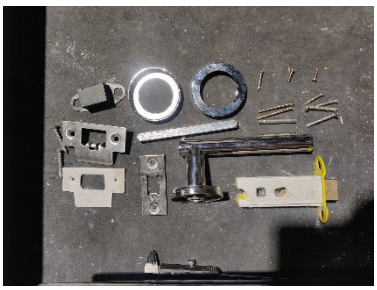


Figure 14 - Item 26, 27

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6 Test Procedure

6.1 Heating Conditions

The specimens were subject to heating conditions in accordance with BS EN 1363-1:2020 § 5.1. This was monitored and controlled for the duration of the test using type K thermocouples which were distributed across a vertical plane 100 ± 50 mm from the exposed surface of the test construction. The resulting Time-Temperature distribution is presented in Figure 27.

6.2 Pressure Conditions

The specimens were subject to a pressure regime in accordance with BS EN 1363-1:2020 § 5.2. 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 -1.1, 9.4 and 20.0 Pa respectively which equates to 0 Pa at a height of 500 mm from the furnace floor level. The furnace was maintained at these pressures within ± 5 Pa five minutes after the commencement of the test and ± 3 Pa ten minutes after the commencement of the test and for the remainder of the test duration. The Time-Pressure distribution is presented in Figure 28.

6.3 Unexposed Surface Temperature

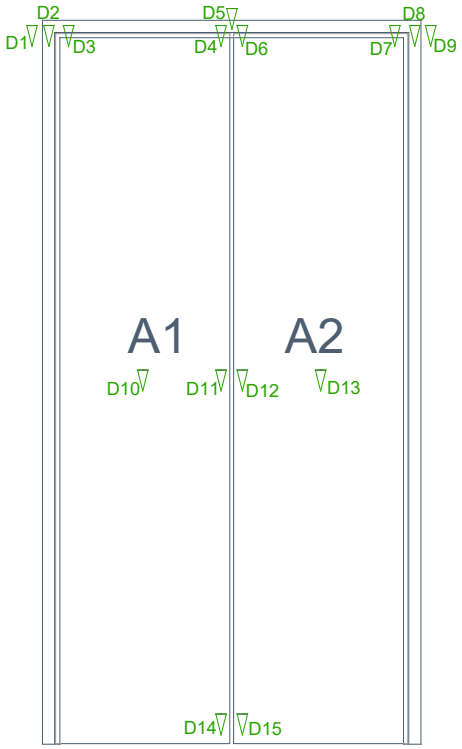
A roving thermocouple was available for the evaluation of the maximum temperature rise of the unexposed surface of the specimens for the duration of the test. Any measurements using the roving thermocouple are presented on page 34.

Disc thermocouples were affixed to the unexposed surface of the specimens in accordance with BS EN 1634-1:2014+A1:2018 § 9.1.2 to measure and monitor the maximum and the mean temperature rise of the unexposed surface of the specimens for the duration of the test. A summary of the measurements is presented in Figure 29 and Figure 30 and the locations of these thermocouples is illustrated in Figure 5.

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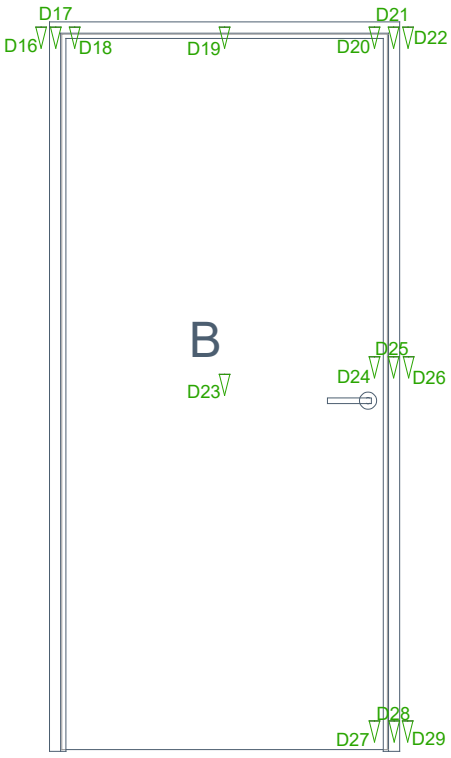
6.4 Deflection

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
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	2	2	2	5	5	5	5	6	3	0	3	5	5	-2
20	-1	0	2	3	2	3	4	3	3	1	1	0	2	4	0
25	0	2	2	2	4	5	5	0	5	0	-2	-2	1	2	-1
30	1	3	4	4	4	6	8	2	5	-2	-6	-6	-1	-2	-4
40	2	3	5	5	6	7	8	2	7	-4	-7	-8	-1	-1	-3
50	9	11	15	10	16	12	21	4	15	-5	-13	-14	-8	-2	-5
55	18	20	25	13	21	15	17	10	13	-11	-21	-24	-18	-3	-6
60	-1	24	25	10	18	612	12	4	7	-20	-33	-36	-32	-4	-7

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Time (mins)	D16	D17	D18	D19	D20	D21	D22	D23	D24	D25	D26	D27	D28	D29
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	8	8	6	9	13	6	6	5	3	3	4	3	0	1
20	7	1	-14	10	18	7	6	-2	3	3	5	5	0	1
25	5	6	-2	8	19	5	6	-10	2	2	7	5	-1	1
30	5	7	-25	11	24	9	8	-18	2	4	8	11	0	3

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6.5 Observations

Specimen	HH	MM	SS	E[7]	U[8]	Observation
	00	**00**	**00**			**The test commences.**
A+B	00	00	32		X	Steam/smoke releases from perimeters.
A	00	00	38		X	Steam/smoke releases from meeting stile.
B	00	00	54		X	Discolour up the vertical edges of the leaf.
A1+A2	00	03	45		X	Puffs of smoke at base of the leaves.
A+B	00	05	00		X	Leaves unrestrained.
B	00	06	42		X	Discolour along head.
A	00	07	25		X	Discolour at meeting stile and bottom of doors.
B	00	09	32		X	Moisture forming and running down faces of doors.
A1+A2	00	11	51		X	Meeting stile protectors expanding away from door face.
B	00	13	54	X		Door facing burnt away core looks to be joined mid-width vertically.
A1 +A2	00	14	52	X		Face of core cracked and into expands from hinges.
	00	19	32		X	Two loud thuds heard from inside the furnace chamber.
B	00	20	15	X		Closer has detached and rests on floor away from door.
A2	00	20	38	X		Closer has detached and rests on floor away from door.
	00	23	32		X	A further loud thud heard.
A1	00	23	50	X		Closer has detached and rests on floor away from door.
B	00	25	50		X	Hanging top corner black and at hinge positions on the edge.
A+B	00	30	00		X	No significant visible change.
A	00	31	49		X	Top hanging corners black.

[7] Viewed from exposed surface of the test construction.
[8] Viewed from unexposed surface of the test construction.

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Specimen	HH	MM	SS	E[9]	U[10]	Observation
A+B	00	33	00	X		No significant visible change.
B	**00**	**33**	**35**	**X**		**Specimen is blanked over at sponsor request to continue the test for specimen A. Failure criteria can no longer be performed and observations stopped.**
A	00	40	00		X	No significant visible change.
A	00	45	00		X	Meeting stile edge protector further expands.
A2	01	00	13		X	Glow observed from middle hinge position.
	01	**01**	**33**			**The test is discontinued at the request of the Test Sponsor.**

[9] Viewed from exposed surface of the test construction.
[10] Viewed from unexposed surface of the test construction.

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6.6 Test Images



Figure 15 – The exposed surface of the test construction prior to commencement of the test



Figure 16 - The unexposed surface of the test construction prior to the commencement of the test

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Figure 17 - The unexposed surface of the test construction after a test duration of 10 minutes



Figure 18 - The unexposed surface of the test construction after a test duration of 20 minutes

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Figure 19 - The unexposed surface of the test construction after a test duration of 25 minutes



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

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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

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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

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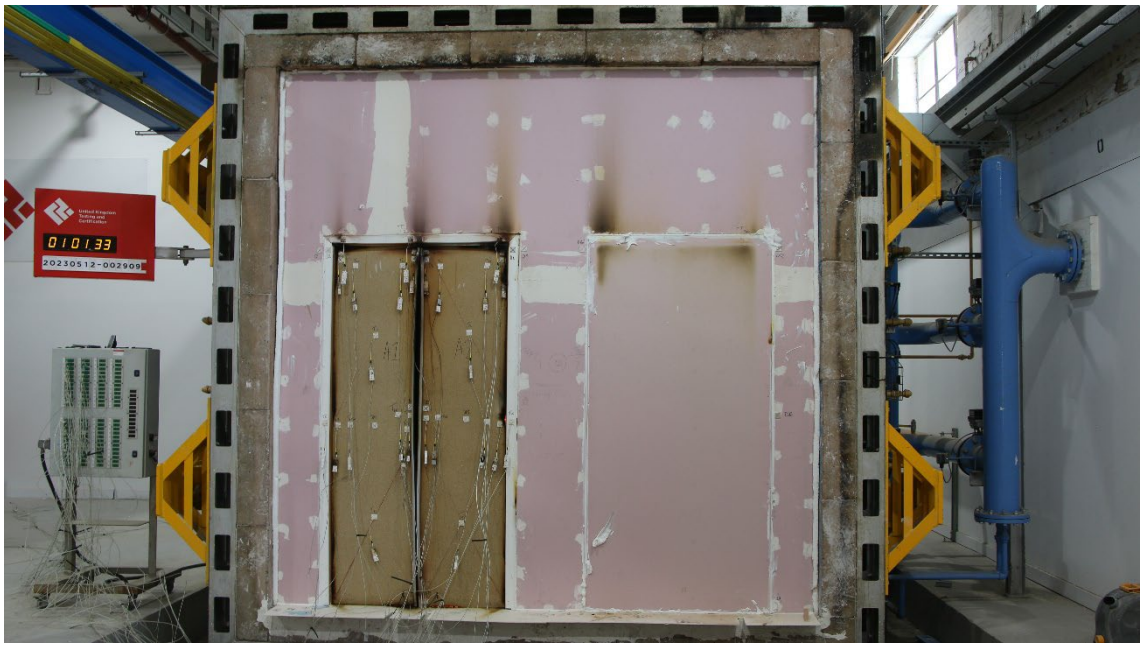


Figure 25 - The unexposed surface of the test construction after a test duration of 61 minutes

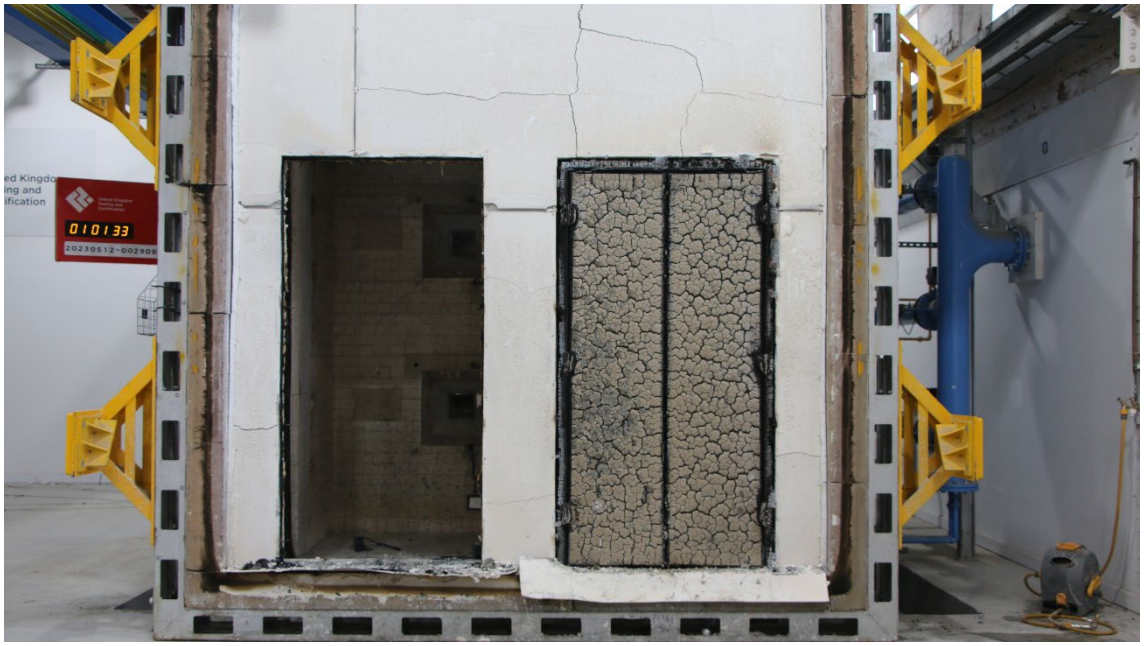


Figure 26 - The exposed surface of the test construction after the test was discontinued

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7 On-going Implications

7.1 Limitations

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 BS EN 1363-1, and where appropriate BS 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.

Guidance on the field of direct application can be found in BS EN 1634-1:2014+A1:2018 § 13 and can be applied following the identification of classification(s).

7.2 Accuracy of Results

Due to 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.

7.3 European Group of Organisations for Fire Testing (EGOLF)

Certain aspects of some fire test specifications are open to different interpretations. EGOLF have identified several such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Group. Where such Resolutions are applicable to this test then they have been followed.

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8 Figures

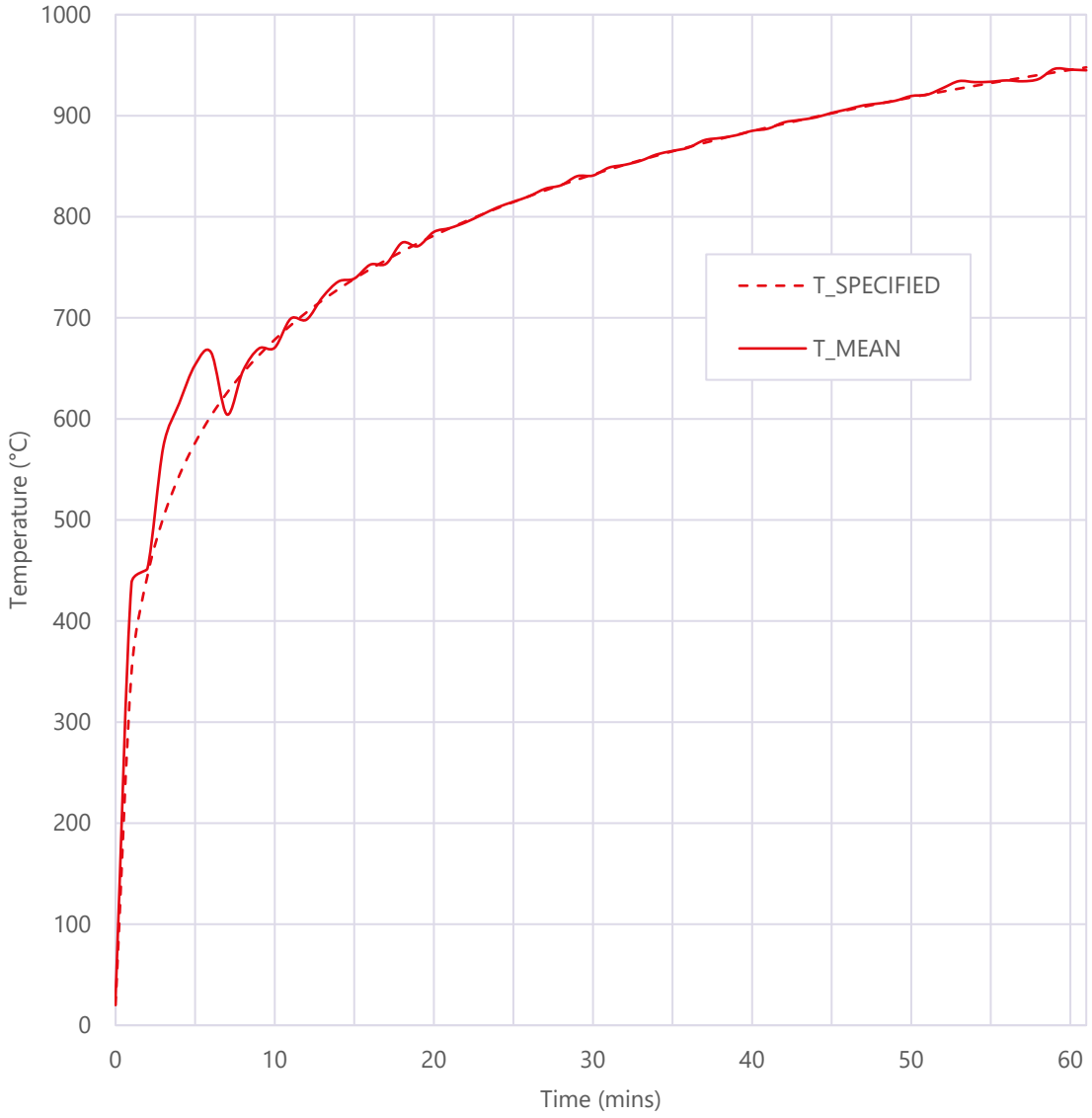


Figure 27 – Graph presenting the Time-Temperature distribution of the furnace

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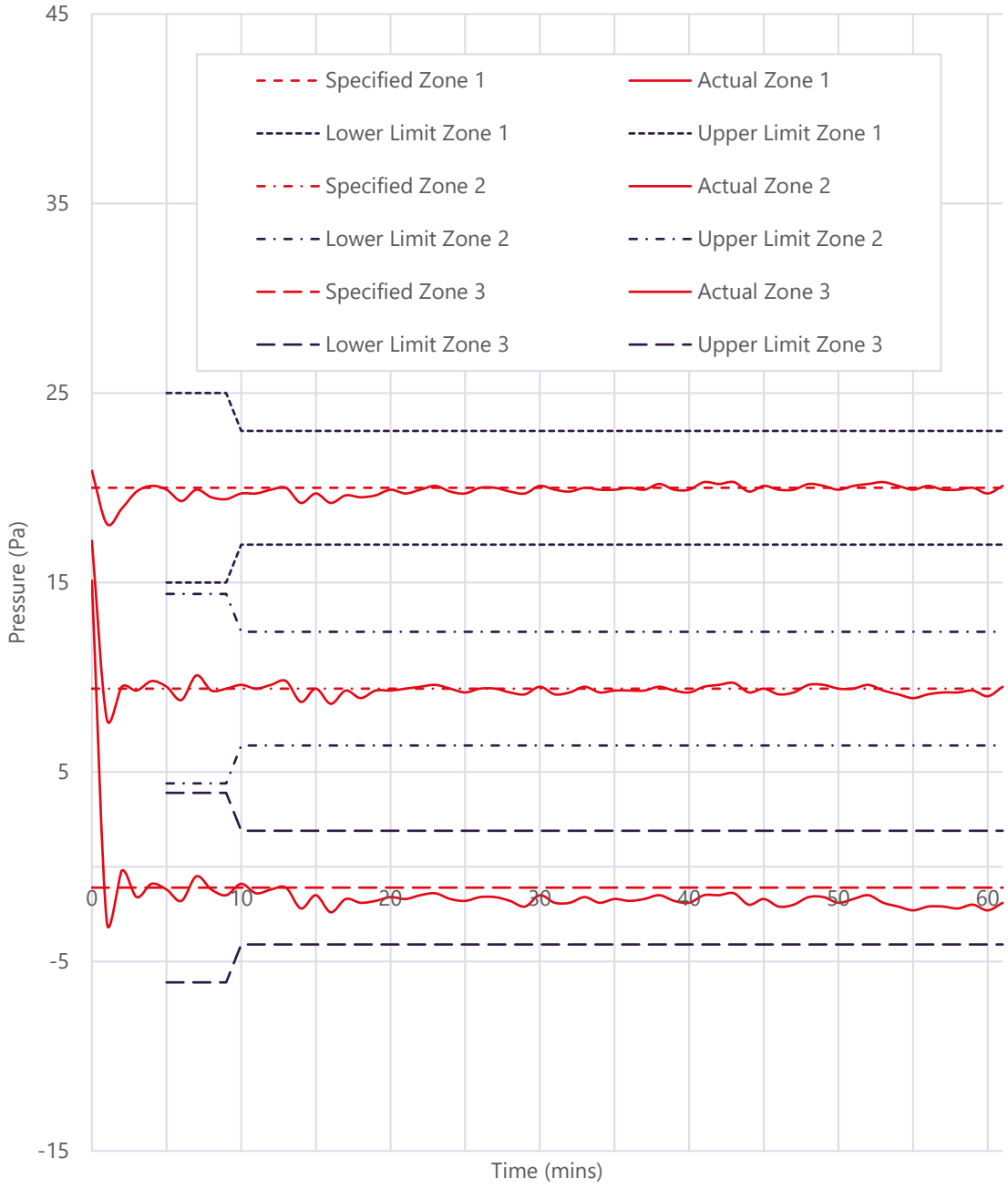


Figure 28 – Graph presenting the Time-Pressure distribution of the furnace

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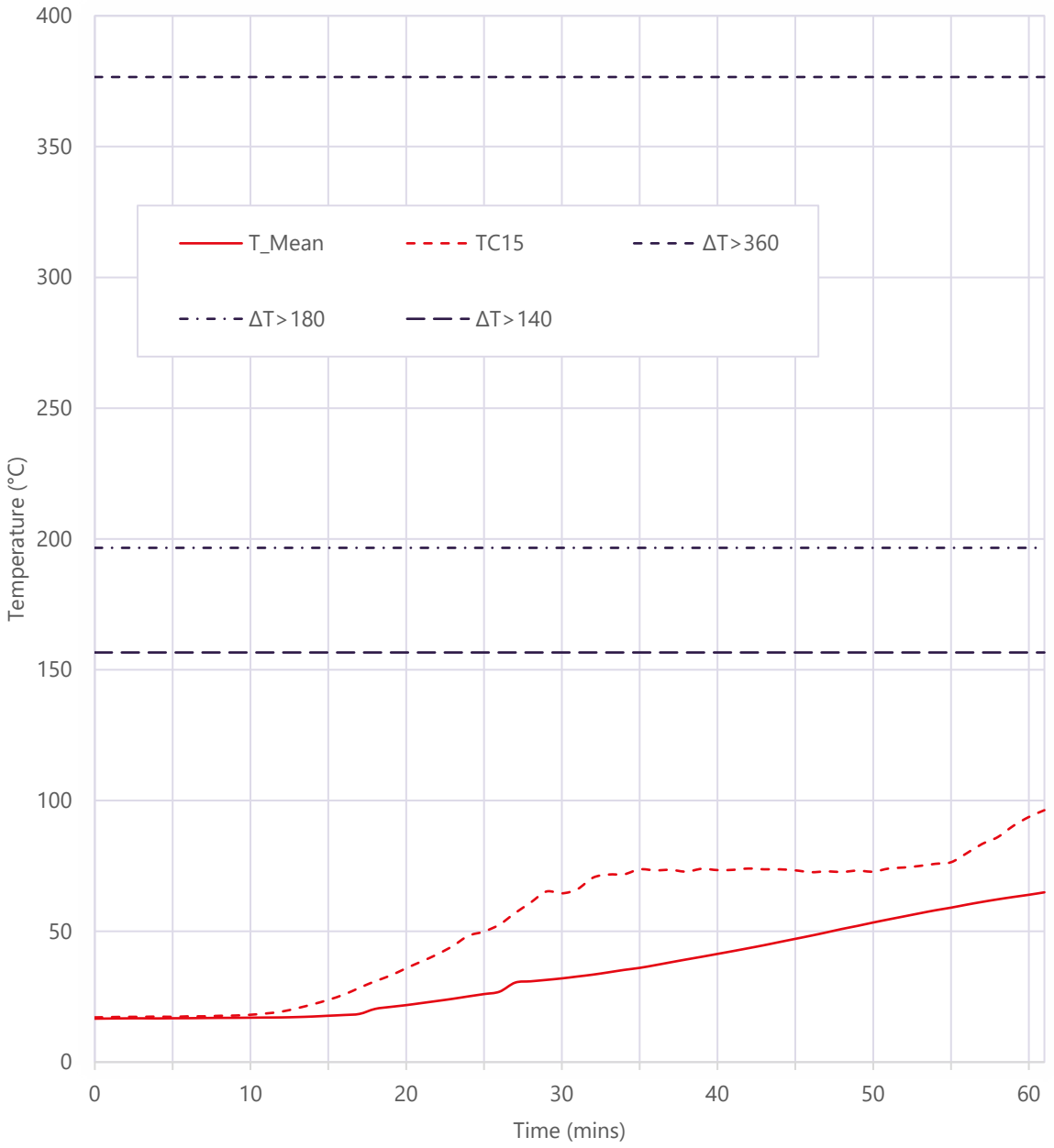


Figure 29 - Graph presenting the Time-Temperature distribution of the unexposed surface of Specimen A

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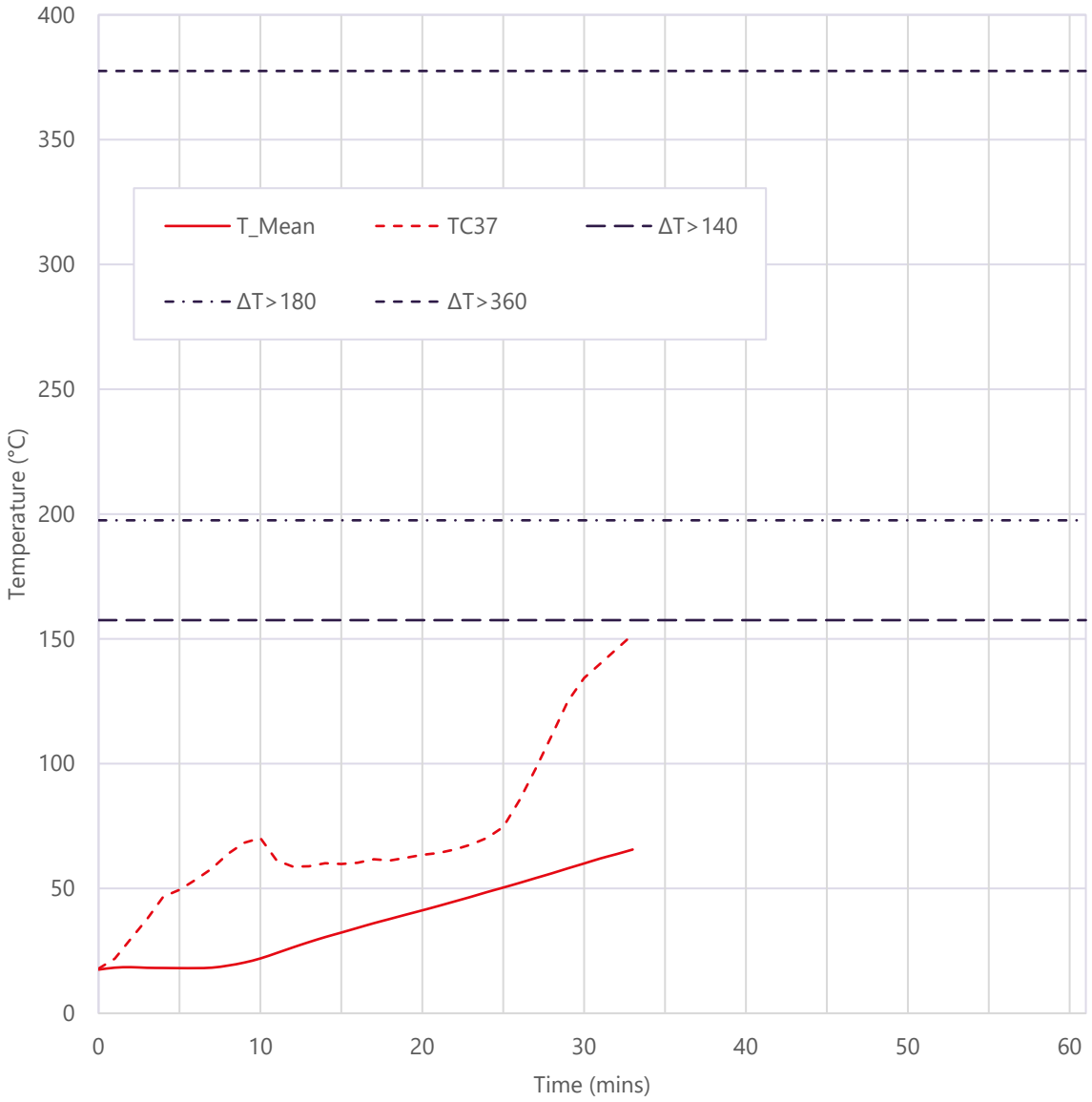


Figure 30 - Graph presenting the Time-Temperature distribution of the unexposed surface of Specimen B

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9 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 under the normal procedure (I_2). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC1	TC2	TC3	TC4	TC5
0	15.0	17.4	16.8	17.0	16.8
3	15.0	17.5	16.9	17.1	17.2
6	14.9	17.6	17.0	17.2	17.2
9	15.1	17.7	17.2	17.3	17.3
12	14.9	18.0	17.3	17.6	17.6
15	14.1	19.2	17.9	18.8	18.6
18	*	21.1	19.0	20.8	20.4
21	*	23.4	20.8	23.4	22.7
24	*	25.9	23.2	26.2	25.2
27	40.2	28.6	26.2	29.1	27.8
30	35.6	31.8	29.9	31.9	30.8
33	33.2	35.2	33.9	35.0	34.3
36	32.8	38.8	37.9	38.2	37.6
39	33.6	42.8	42.1	41.6	41.3
42	34.7	46.9	46.3	45.2	44.7
45	36.4	51.3	50.5	48.8	48.6
48	37.9	55.7	54.4	52.6	53.9
51	39.1	60.1	58.2	56.4	59.0
54	40.1	64.5	61.7	60.1	63.8
57	41.0	68.5	65.0	63.8	67.9
60	41.0	72.0	67.7	67.8	71.3
61	40.8	73.1	69.1	69.1	72.4

* Thermocouple malfunction.

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Table 2 – The temperatures recorded by the disc thermocouples used to evaluate the maximum temperature rise of the door leaf of Specimen A under the normal procedure (I_2). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC19	TC20	TC21	TC22	TC23	TC24	TC25	TC26
0	17.3	17.4	17.4	17.4	17.2	16.7	17.8	17.5
3	17.3	17.3	17.6	17.7	17.3	16.9	17.9	17.5
6	17.4	17.5	18.1	19.3	17.5	17.0	18.1	17.6
9	17.5	17.5	18.5	18.9	17.6	17.0	18.2	17.7
12	17.6	17.9	18.6	19.6	18.9	17.2	18.5	17.7
15	18.3	20.1	20.3	22.1	22.2	18.0	19.2	18.2
18	19.8	23.6	23.1	26.0	26.6	19.3	20.6	19.1
21	21.6	27.6	26.5	29.9	31.0	21.1	22.2	20.2
24	23.9	31.7	30.2	33.4	35.1	23.2	24.2	21.8
27	26.4	35.5	33.8	36.6	38.9	25.7	26.4	23.7
30	29.5	39.3	37.3	39.7	42.5	28.6	29.1	26.2
33	32.6	42.9	40.8	42.9	46.0	32.0	32.3	29.3
36	36.0	46.3	44.3	46.0	49.4	35.3	35.4	32.7
39	39.3	49.4	47.6	49.0	52.6	39.2	39.0	36.7
42	42.7	52.4	50.6	52.0	55.5	43.5	43.2	41.1
45	46.6	55.1	53.3	54.9	58.3	48.5	47.5	45.5
48	50.4	57.4	55.9	57.8	61.0	53.5	52.4	50.1
51	54.3	59.7	58.3	60.2	63.7	58.3	56.7	54.5
54	58.4	62.2	60.9	63.1	66.2	62.7	61.8	59.1
57	62.5	64.7	63.3	65.3	68.9	67.7	65.5	63.5
60	66.3	67.0	65.8	67.7	71.8	71.6	69.0	67.7
61	67.5	67.8	66.7	68.3	73.0	73.1	70.1	69.1

* Thermocouple malfunction.

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Table 3 – The temperatures recorded by the disc thermocouples used evaluate the maximum temperature rise of the door leaf of Specimen A under the supplementary procedure (I_1). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC11	TC12	TC13	TC14	TC15	TC16	TC17	TC18
0	15.2	17.3	17.0	17.1	17.1	16.6	17.9	14.7
3	15.3	17.4	30.3	25.5	17.3	17.6	18.2	14.4
6	15.3	17.9	34.2	28.8	17.5	17.7	18.6	14.3
9	15.3	18.7	35.1	34.2	17.8	18.0	18.5	14.2
12	15.1	20.8	39.2	55.1	19.3	18.9	18.7	14.0
15	14.0	25.0	43.0	86.0	23.8	20.9	19.5	13.2
18	*	30.8	53.1	85.3	30.9	24.2	21.1	*
21	*	38.7	58.1	77.6	38.5	27.8	23.5	*
24	*	60.5	66.1	76.1	48.3	31.6	26.3	*
27	*	78.3	64.9	76.5	57.0	35.1	29.8	*
30	43.2	83.4	64.1	68.1	64.5	39.1	34.0	37.4
33	41.0	76.4	69.6	69.6	71.7	43.0	*	43.1
36	40.2	75.8	72.3	70.4	73.3	46.1	*	47.9
39	38.8	77.8	70.9	65.6	73.9	48.2	*	52.7
42	38.1	77.8	72.3	66.3	74.0	49.7	*	57.0
45	38.8	76.9	74.0	67.7	73.3	51.1	*	61.1
48	38.6	76.5	75.8	71.5	72.7	51.3	*	64.9
51	38.4	76.2	76.7	74.5	74.0	50.8	*	68.4
54	37.2	76.2	78.2	77.1	75.8	50.9	*	71.6
57	35.3	78.1	80.4	80.3	83.4	54.1	71.0	74.1
60	34.9	80.7	82.6	84.2	93.7	65.2	73.8	76.3
61	34.6	82.2	82.9	85.7	96.3	65.9	74.6	77.1

* Thermocouple malfunction.

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

Time (mins)	TC6	TC7	TC8	TC9	TC10
0	16.3	15.8	16.0	16.7	16.5
3	16.3	16.0	19.3	16.8	16.7
6	16.4	16.0	23.8	17.0	16.8
9	16.5	16.2	26.4	17.0	16.8
12	16.5	16.2	29.5	17.1	16.9
15	16.6	16.6	29.7	17.6	17.0
18	16.8	17.2	30.9	19.1	17.4
21	17.2	18.8	39.3	23.5	17.9
24	17.7	28.0	36.0	32.2	18.8
27	18.2	35.0	33.8	36.5	19.8
30	18.9	39.5	33.7	52.4	21.0
33	19.9	42.4	33.4	56.5	22.3
36	20.9	40.5	34.0	61.2	25.2
39	22.1	42.3	36.6	58.2	30.5
42	23.3	43.8	39.0	56.8	36.9
45	24.5	40.6	41.1	56.0	42.1
48	26.2	40.2	43.0	54.9	47.0
51	28.0	39.2	45.1	55.1	49.7
54	29.4	39.5	47.9	57.8	52.2
57	31.9	40.7	50.3	60.1	52.7
60	35.5	41.7	52.5	67.1	53.7
61	37.4	42.8	53.3	69.5	53.9

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Table 5 – The temperatures recorded by the disc thermocouples used evaluate the mean and maximum temperature rise of the unexposed surface of Specimen B under the normal procedure (I_2). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC27	TC28	TC29	TC30	TC31
0	17.9	17.8	17.5	17.2	17.1
2	20.1	18.3	18.1	18.7	17.2
4	19.6	18.0	17.9	18.0	17.3
6	18.7	17.9	19.1	17.8	17.0
8	19.5	19.4	21.8	17.7	17.2
10	22.0	22.9	26.7	20.2	18.1
12	25.7	26.6	31.0	27.3	21.3
14	29.9	30.4	34.3	32.8	25.2
16	34.2	34.3	37.3	36.8	28.5
18	38.5	38.0	40.5	40.3	31.7
20	42.5	41.6	43.7	43.6	34.8
22	46.3	45.2	47.4	46.9	38.3
24	50.1	48.8	51.5	50.5	41.9
26	53.9	52.2	55.6	53.9	45.5
28	57.7	55.9	60.1	57.2	49.4
30	61.6	59.7	64.7	60.9	53.2
32	65.1	63.4	68.8	64.3	57.2
33	66.9	65.1	70.5	66.2	59.3

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Table 6 – The temperatures recorded by the disc thermocouples used to evaluate the maximum temperature rise of the door leaf of Specimen B under the normal procedure (I_2). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC40	TC41	TC42	TC43
0	16.8	17.9	17.8	17.4
2	20.7	22.4	18.9	18.6
4	20.0	21.7	18.3	17.7
6	18.5	20.4	18.6	17.6
8	19.6	20.6	19.0	17.6
10	23.0	27.4	21.3	20.5
12	26.9	33.7	28.9	28.7
14	31.0	38.3	34.4	35.4
16	34.8	41.9	39.5	39.9
18	38.8	45.2	44.0	43.5
20	42.4	48.4	48.1	46.8
22	46.0	51.9	51.8	50.1
24	49.8	55.5	55.3	53.3
26	53.1	58.8	59.0	56.0
28	56.3	61.7	62.9	58.9
30	59.8	65.0	66.6	61.7
32	63.3	68.4	70.0	64.7
33	65.0	70.0	71.5	66.1

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Table 7 – The temperatures recorded by the disc thermocouples used evaluate the maximum temperature rise of the door leaf of Specimen B under the supplementary procedure (I_1). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC36	TC37	TC38	TC39
0	18.1	17.9	17.7	17.0
2	33.4	29.9	21.0	31.3
4	36.4	46.7	39.5	23.2
6	31.3	53.5	75.4	21.4
8	29.4	63.9	81.5	21.3
10	33.2	70.2	63.0	23.0
12	35.4	58.8	52.4	42.3
14	34.8	60.1	50.8	46.7
16	34.7	60.3	51.8	48.8
18	35.7	61.2	55.6	51.4
20	38.0	63.5	59.1	51.8
22	40.5	65.6	62.3	53.4
24	44.1	70.3	66.2	54.2
26	47.8	85.3	69.7	57.1
28	50.5	111.3	74.3	61.0
30	53.7	134.3	80.2	65.3
32	56.5	145.9	85.8	69.2
33	59.3	151.7	88.5	71.2

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Table 8 – The temperatures recorded by the disc thermocouples used to evaluate the maximum temperature rise of the frame members adjacent to the door leaf of Specimen B. Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC32	TC33	TC34	TC35
0	16.2	16.9	16.9	15.4
2	16.4	24.6	19.2	15.6
4	16.4	31.1	19.2	15.3
6	16.8	32.2	25.3	15.5
8	16.7	35.9	43.1	15.7
10	16.4	38.9	45.0	15.5
12	16.3	40.2	35.4	15.5
14	17.1	38.6	30.4	15.5
16	18.1	38.7	28.7	15.7
18	19.0	40.9	28.5	15.8
20	19.9	42.7	29.0	15.6
22	21.1	45.2	31.0	15.6
24	22.3	49.7	33.6	15.6
26	23.9	56.4	36.8	15.6
28	25.8	65.6	41.3	15.6
30	28.0	75.2	46.9	15.8
32	30.4	84.2	48.7	28.6
33	31.8	88.1	50.2	27.3

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