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 and two cable passthroughs tested with additional of guidance where practicable of BS EN 1366-3: 2021

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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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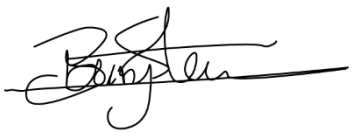
Change History

Issue Date	Revision	Created by	Authorised by	Description of Change
28/03/2023	A	B.S	D.F	Initial Issue

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

Table of Contents

1 Executive Summary

1.1 Specimen Summary

Specimen A had overall nominal dimensions of 1003 mm wide by 2097 mm high, incorporating a single door leaf with overall dimensions of 930 mm wide by 2040 mm high by 54 mm thick. The door leaf was formed from graduated density chipboard with 6 mm thick hardwood lippings to all four edges. The leaf was hung in a hardwood frame on three steel hinges, such that it opened towards the heating conditions of the test. The doorset was unlatched for the duration of the test. The doors assembly incorporated the following hardware:

Item No.	Description	Reference
12	Door Closer	Dorma TS92
13	Lockset	Zoo ZCS23055 (Latch)
14	Lever Handles	Zoo ZCS03055
15	Door Pin ID Tag	Data ID Tag

Specimen B had overall nominal dimensions of 1084 mm wide by 2095 mm high, incorporating double door leaves with overall dimensions of 502 mm wide by 2042 mm high by 54 mm thick. The door leaves were formed from graduated density chipboard with 6 mm thick hardwood lippings to all edges. The leaf was hung in a hardwood frame on three steel hinges, such that it opened towards the heating conditions of the test. The doorset was unlatched for the duration of the test. The doors assembly incorporated the following hardware:

Item No.	Description	Reference
27	Door Closer	Test sponsor unable to verify
28	Door Pin ID Tag	Data ID Tag

Specimen C was a circular steel service hatch and had had nominal dimensions of 355 mm wide with a 50 mm flange, incorporating a single with dimensions of 350 mm wide by 2 mm thick. The hatch was hung onto the wall with four screw, such that it opened away from the heating conditions of the test. The through hole was formed from UPVC pipe and include cables in a smoke sock.

Specimen D was a circular steel service hatch and had had nominal dimensions of 355 mm wide with a 50 mm flange, incorporating a single with dimensions of 350 mm wide by 2 mm thick. The hatch was hung onto the wall with four screw, such that it opened away from the heating conditions of the test. The through hole was formed from UPVC pipe and include cables in a smoke sock.

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 24 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.

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	66 minutes	No failure*
	Gap Gauge	66 minutes	No failure*
	Cotton Pad	66 minutes	No failure*
Insulation (I_1)[2]		66 minutes	No failure*
Insulation (I_2)[3]	Specimen	66 minutes	No failure*

*Specimen was hosed down and blanked off after a period of 66 minutes to allow test to continue for specimens C & D.

[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.

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	48 minutes	
	Gap Gauge	66 minutes	Area blanked off
	Cotton Pad	48 minutes	
Insulation (I_1)[5]		48 minutes	Due to integrity failure
Insulation (I_2)[6]	Specimen	48 minutes	Due to integrity failure

*Specimen was hosed down and blanked off after a period of 66 minutes to allow test to continue for specimens C & D.

[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.

1.5.3 Specimen C

Specimen C satisfied the performance criterion specified in BS EN 1366-3 § 11 for the following intervals:

Integrity (E)[7]	Sustained Flaming	121 minutes	No failure*	
	Gap Gauge	121 minutes	No failure*	
	Cotton Pad	121 minutes	No failure*	
Insulation ($I_)$[8]		107	Exceeded maximum temperature criteria	TC37

*The test was discontinued after a period of 121 minutes.

[7] 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.

[8] 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 at any location (including the roving thermocouple) above the initial individual temperature by more than 180°C. as specified in EN 1366-3:2021 § 11.2

1.5.4 Specimen D

Specimen D satisfied the performance criterion specified in BS EN 1366-3 § 11 for the following intervals:

Integrity (E)[9]	Sustained Flaming	35 minutes	No failure*	
	Gap Gauge	35 minutes	No failure*	
	Cotton Pad	35 minutes	No failure*	
Insulation (I)[10]	Specimen	10 minutes	Exceeded maximum temperature criteria	@ TC43

*The test was discontinued after a period of 35 minutes.

[9] 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.

[10] 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 at any location (including the roving thermocouple) above the initial individual temperature by more than 180°C. as specified in EN 1366-3:2021 § 11.2

2 Pre-test Examination

2.1 Closing Force Measurement

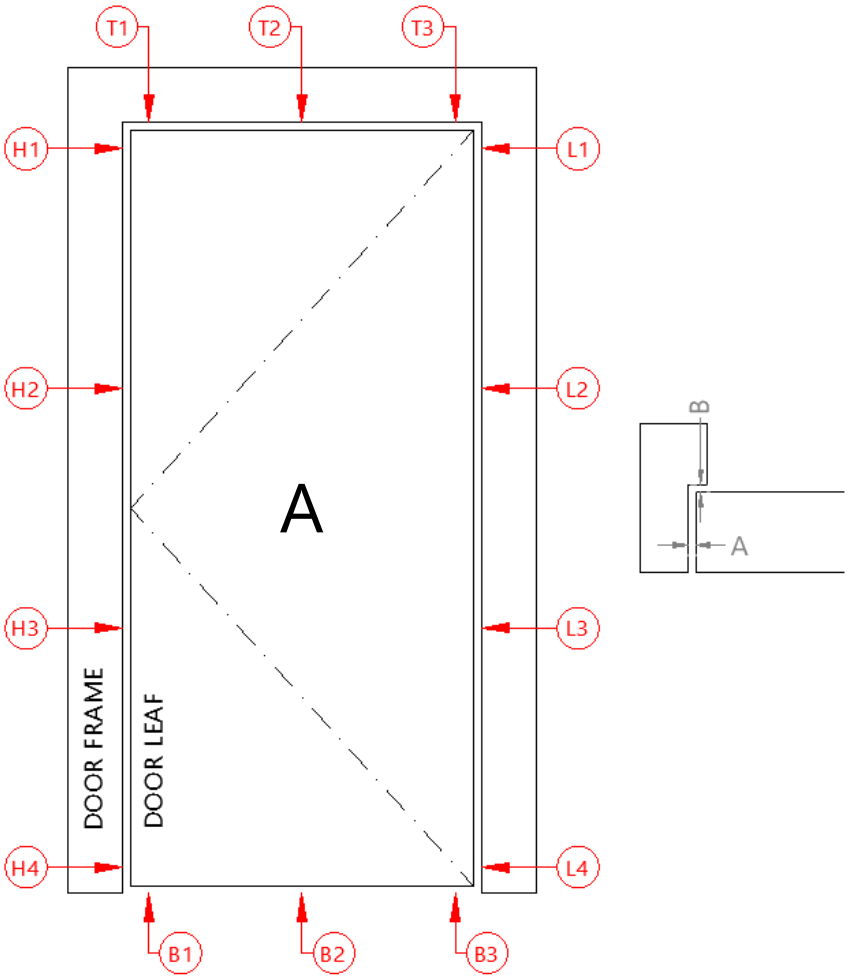
The door closing forces were measured and recorded three times. The results are presented below:

Measurement	Maximum Recorded Force (N)	Distance from Pivot to Measurement Location (m)	Moment (Nm)
Closing Force Specimen A	33.6	0.750	25.2
Opening Force Specimen A	52.8	0.750	39.6
Closing Force Specimen B1	42.2	0.750	31.6
Opening Force Specimen B1	103.6	0.750	77.7
Closing Force Specimen B2	54.4	0.750	40.8
Opening Force Specimen B2	104.6	0.750	78.4

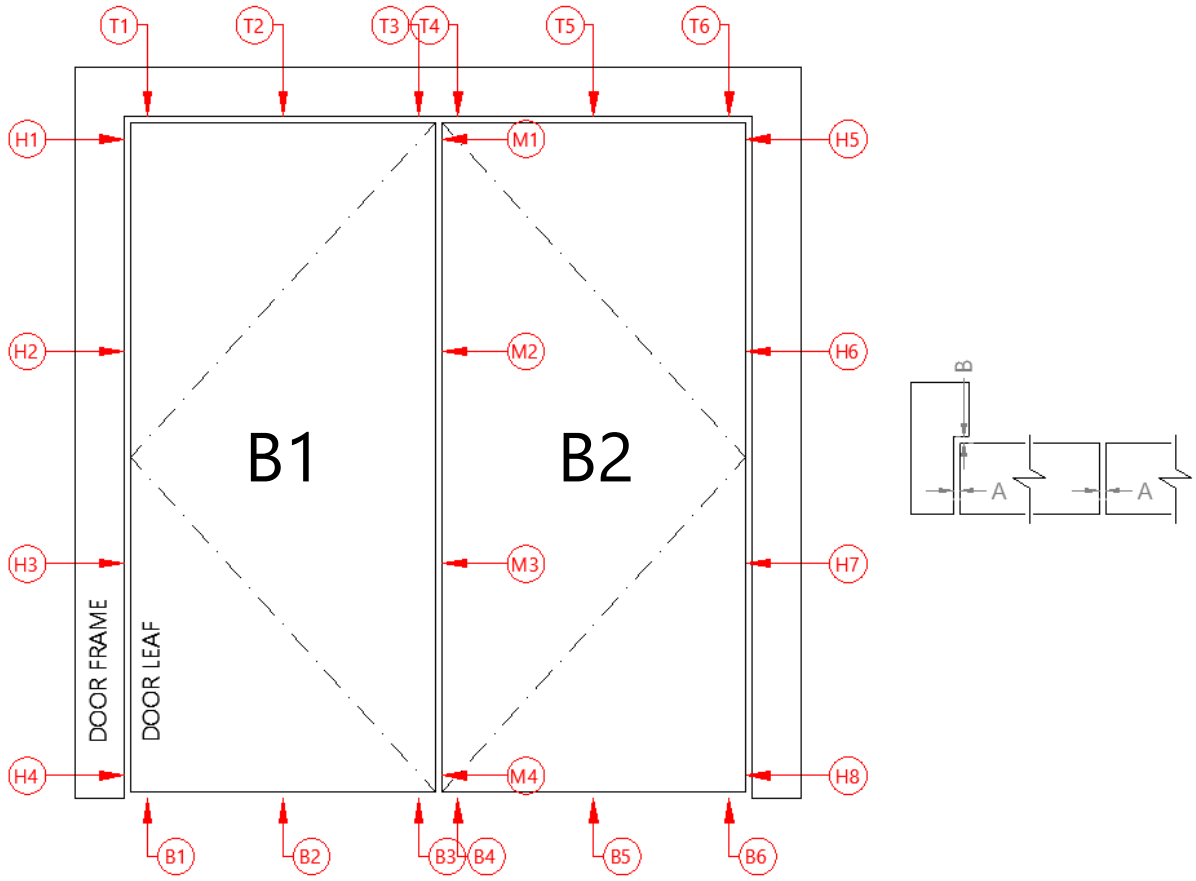
2.2 Specimen Conditioning

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 12.6 °C to 12.6 °C and 54.0 % to 60.4 % respectively.

2.3 Gap Measurements



Hanging Stile	A	B	Closing Stile	A	B
H1	3.0	0.3	L1	3.1	0.1
H2	3.1	0.3	L2	3.4	0.2
H3	3.5	0.4	L3	3.4	0.3
H4	2.6	0.4	L4	2.5	0.3
Mean	**3.0**		**Mean**	**3.1**	
Max	**3.5**		**Max**	**3.4**	
Min	**2.6**		**Min**	**2.5**	
Max Permitted	**5.2**		**Max Permitted**	**5.2**	
Top Edge	**A**	**B**	**Bottom Edge**	**A**	
T1	3.5	0.2	B1	2.9	
T2	3.1	0.3	B2	3.5	
T3	3.3	0.1	B3	4.1	
Mean	**3.3**		**Mean**	**3.5**	
Max	**3.5**		**Max**	**4.1**	
Min	**3.1**		**Min**	**2.9**	
Max Permitted	**5.4**		**Max Permitted**	**5.8**	



	A	B			A			A	B
H1	1.3	0.1		M1	2.8		H5	1.8	0.1
H2	1.2	0.1		M2	2.4		H6	1.8	0.1
H3	1.4	0.1		M3	2.0		H7	1.4	0.1
H4	1.3	0.1		M4	2.2		H8	2.2	0.1
Mean	**1.3**			**Mean**	**2.3**		**Mean**	**1.8**	
Max	**1.4**			**Max**	**2.8**		**Max**	**2.2**	
Min	**1.2**			**Min**	**2.0**		**Min**	**1.4**	
Max Permitted	**3.3**			**Max Permitted**	**4.6**		**Max Permitted**	**4.0**	
	A	B		A	B		A		A
T1	3.6	0.1	T4	3.2	0.5	B1	4.9	B4	4.7
T2	3.3	0.3	T5	3.2	0.3	B2	3.3	B5	5.4
T3	3.2	0.5	T6	3.0	0.1	B3	4.8	B6	7.0
Mean	**3.3**		**Mean**	**3.1**		**Mean**	**4.3**	**Mean**	**5.7**
Max	**3.6**		**Max**	**3.2**		**Max**	**4.9**	**Max**	**7.0**
Min	**3.2**		**Min**	**3.0**		**Min**	**3.3**	**Min**	**4.7**
Max Permitted	**5.4**		**Max Permitted**	**5.2**		**Max Permitted**	**6.6**	**Max Permitted**	**8.4**

3 Test Specimen Drawings

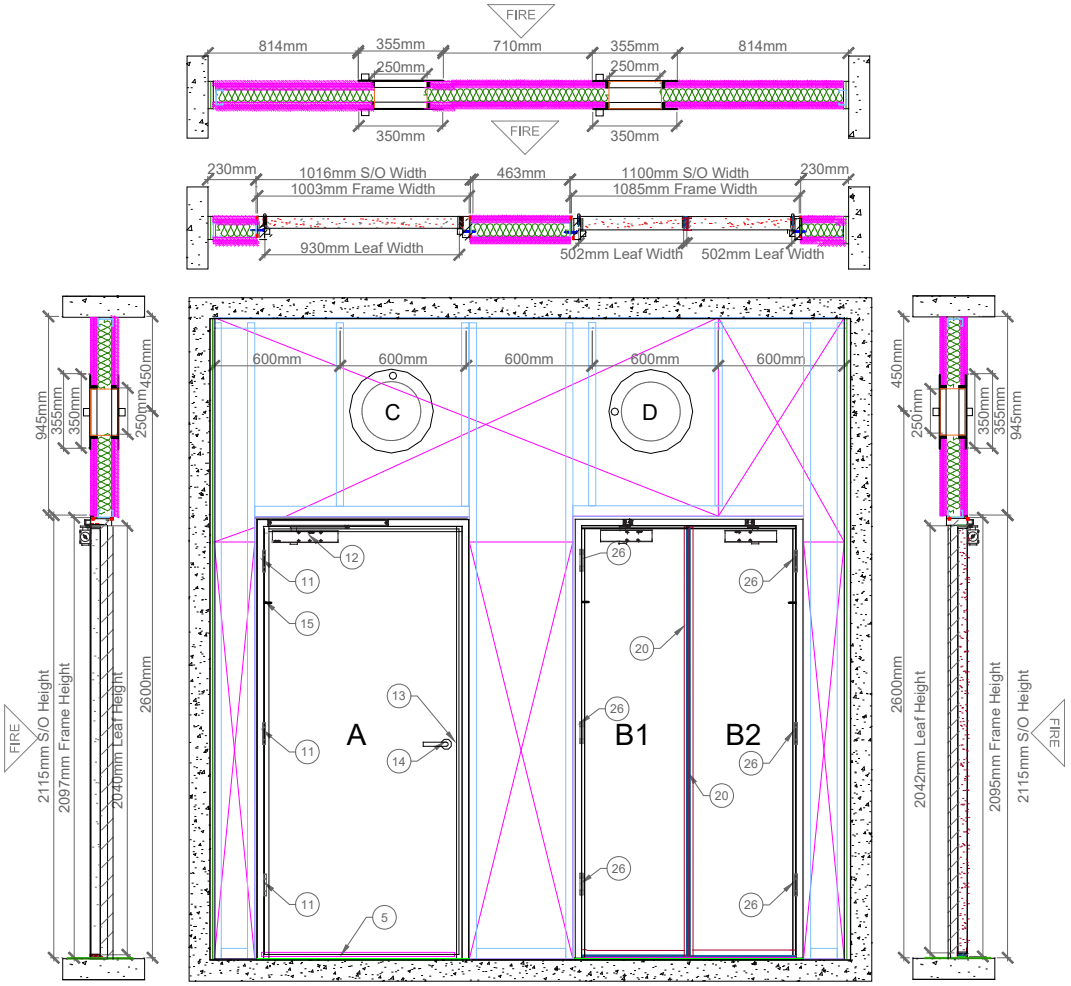


Figure 1 - General arrangement of test construction viewed from the unexposed surface

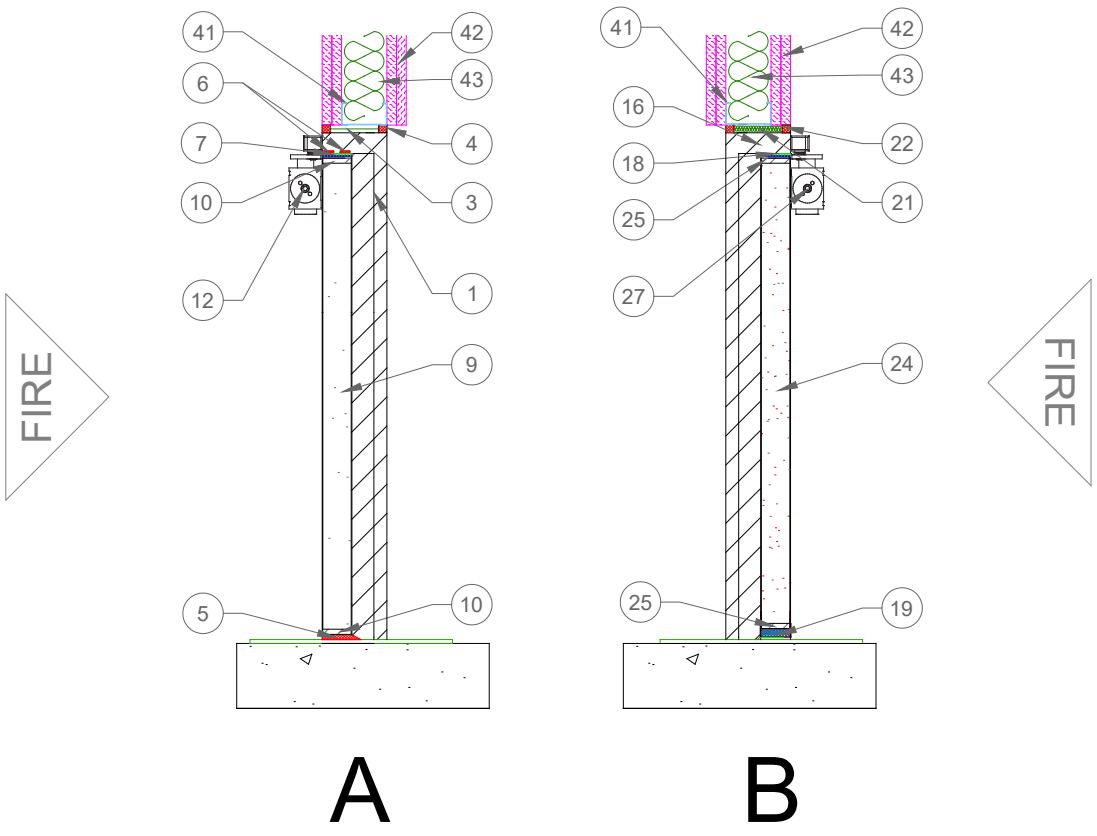


Figure 2 - Typical vertical section through the specimens A & B

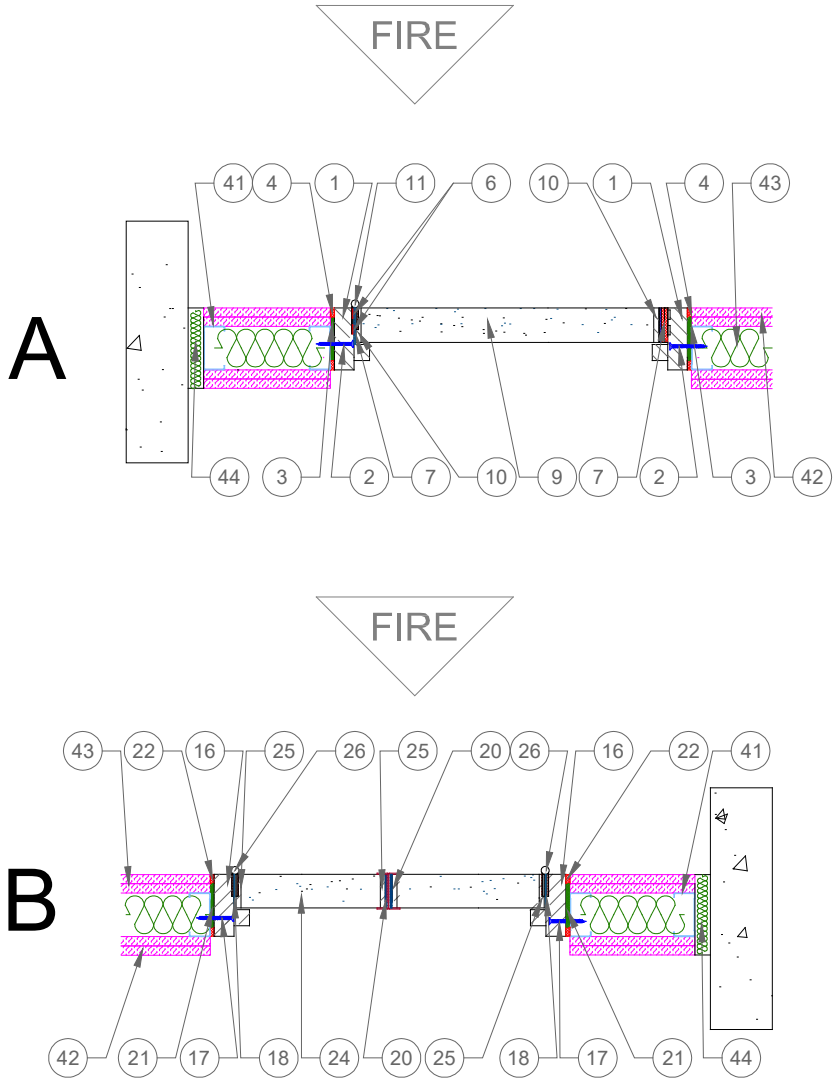


Figure 3 - Typical horizontal section through the specimens A & B

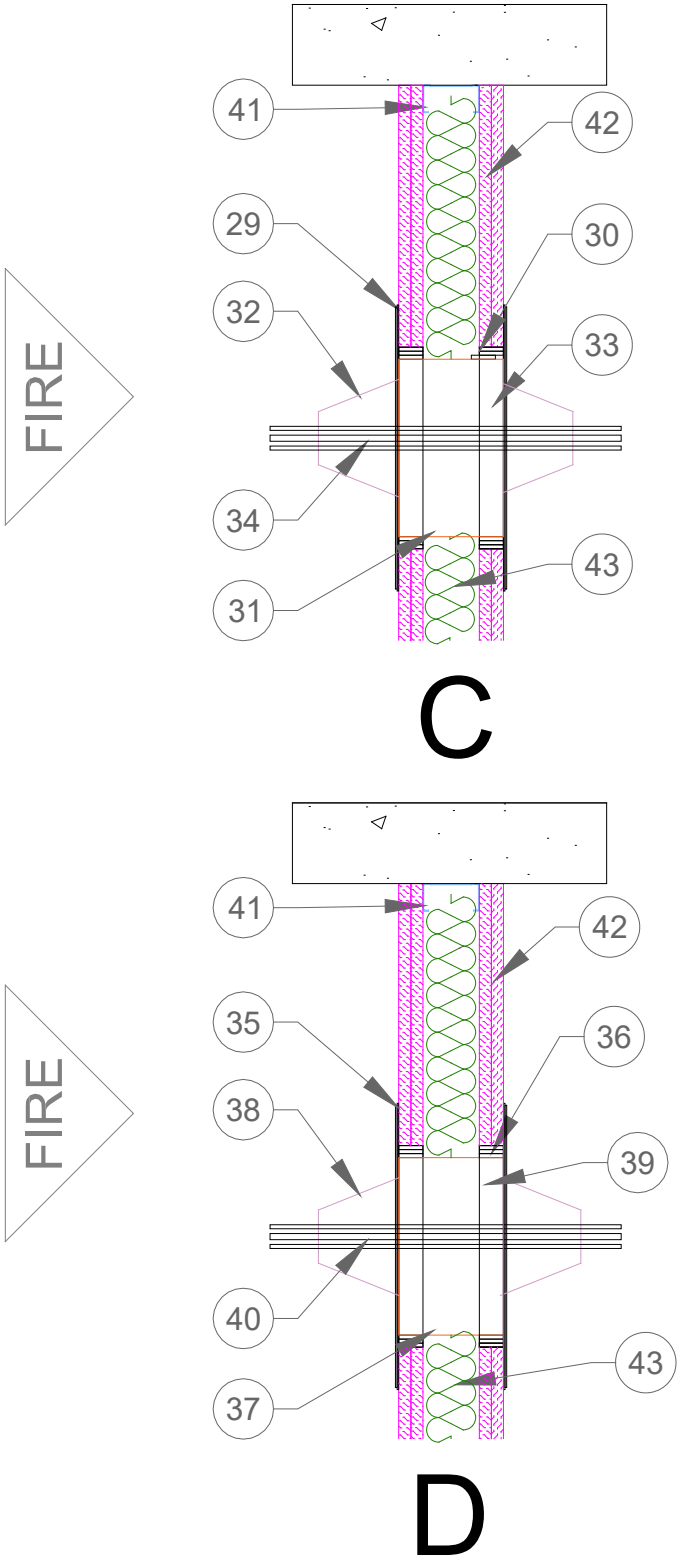


Figure 4 - Typical vertical section through the specimens C & D

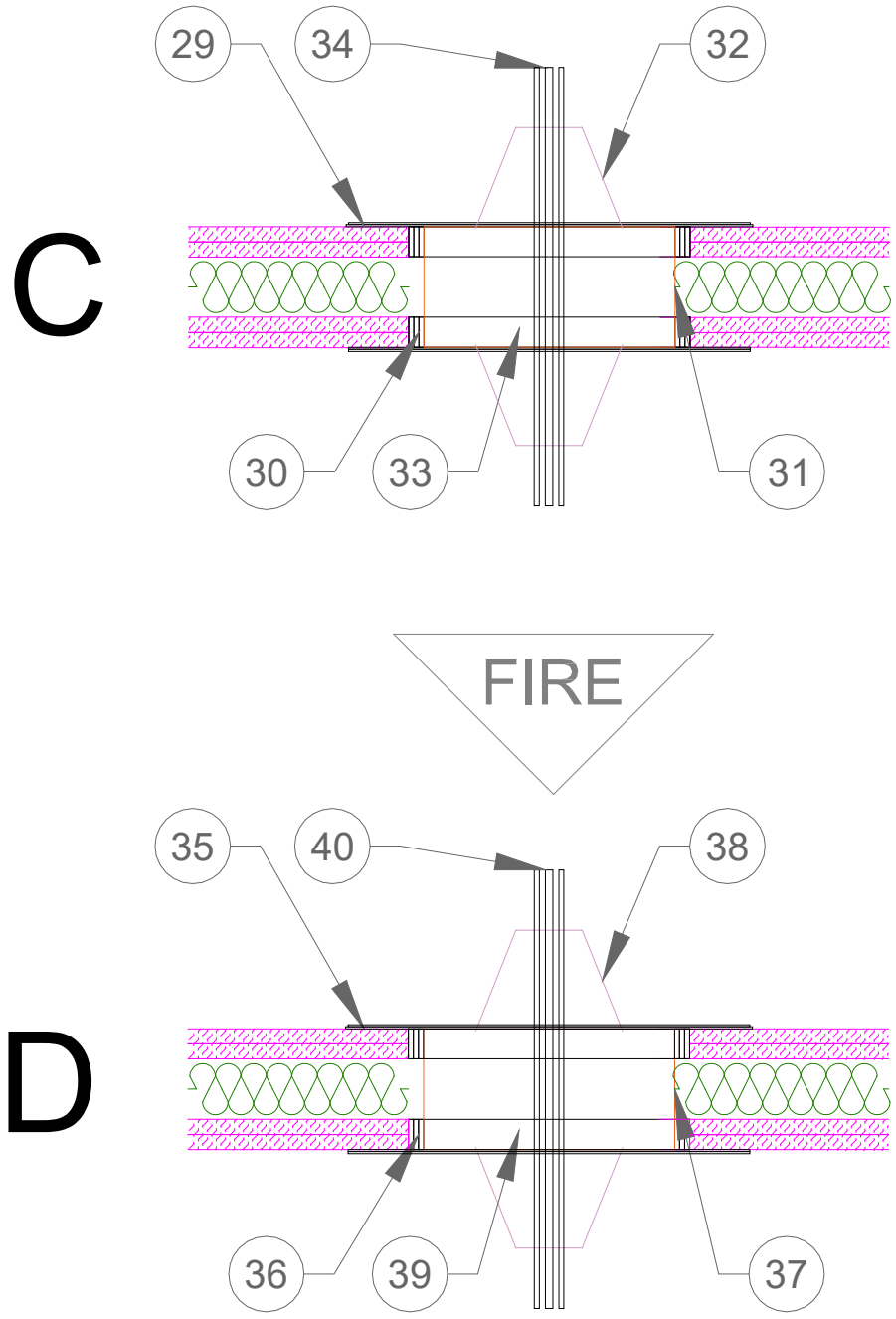


Figure 5 - Typical vertical section through the specimens C & D

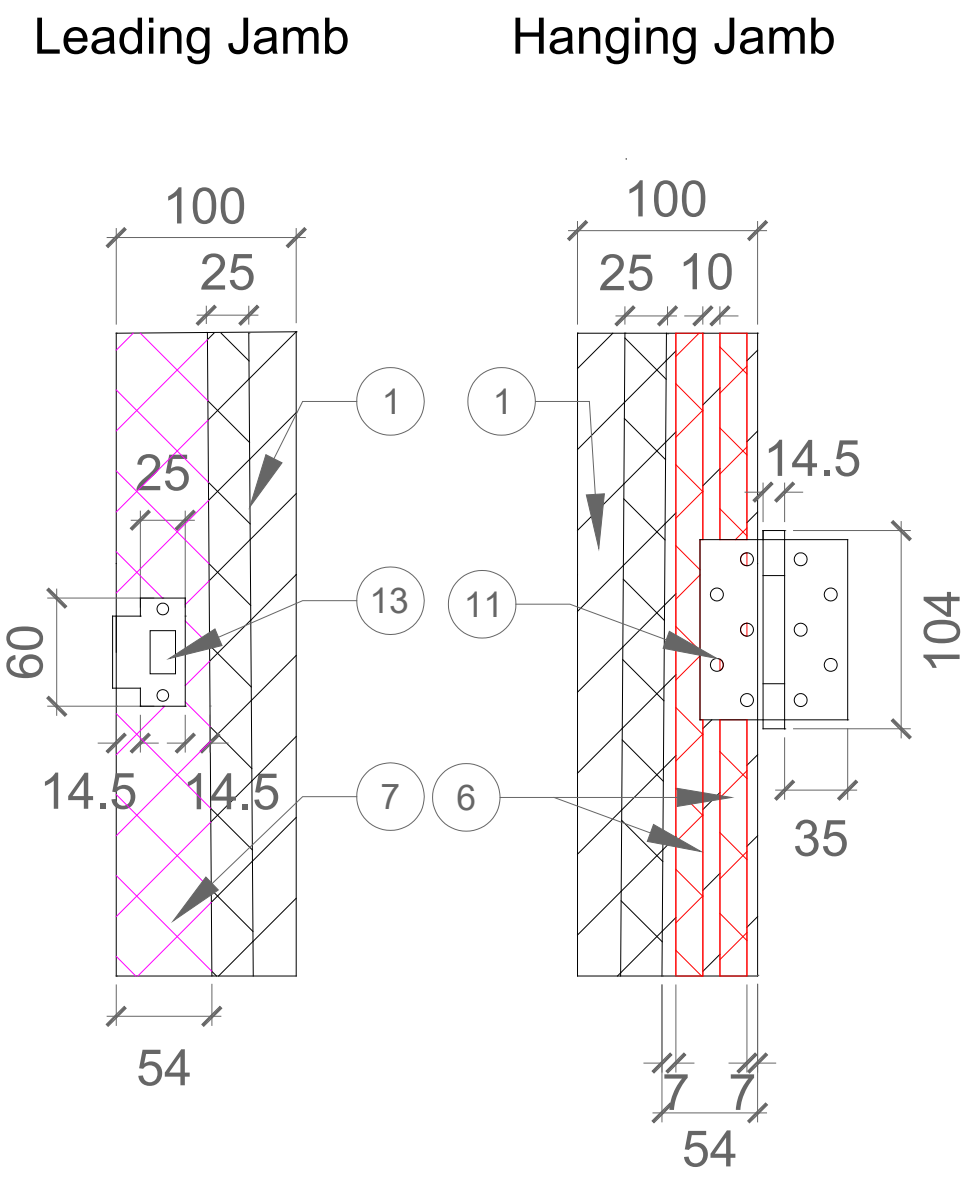


Figure 6 - Hardware intumescent interruptions on specimen A only

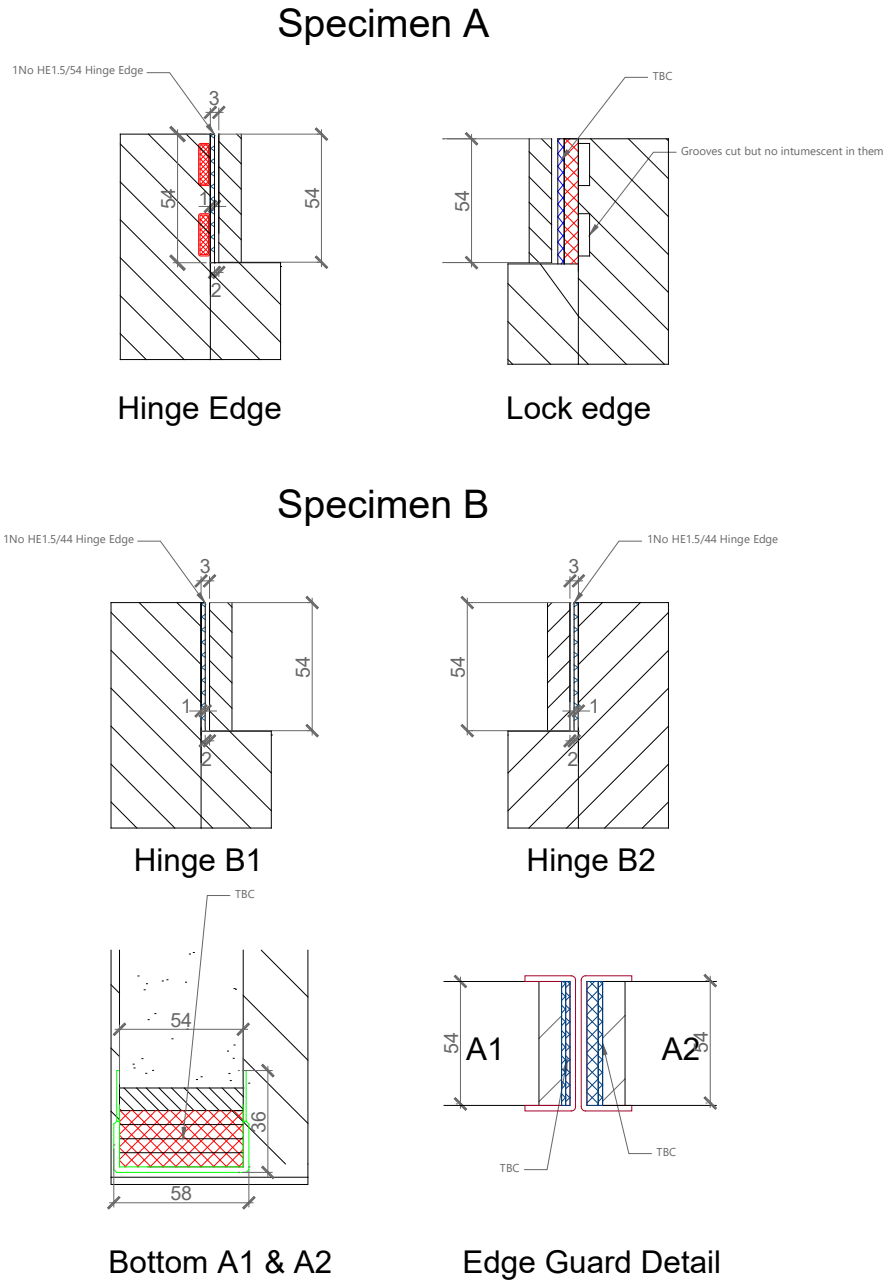


Figure 7 – Framefit details on specimen A & B

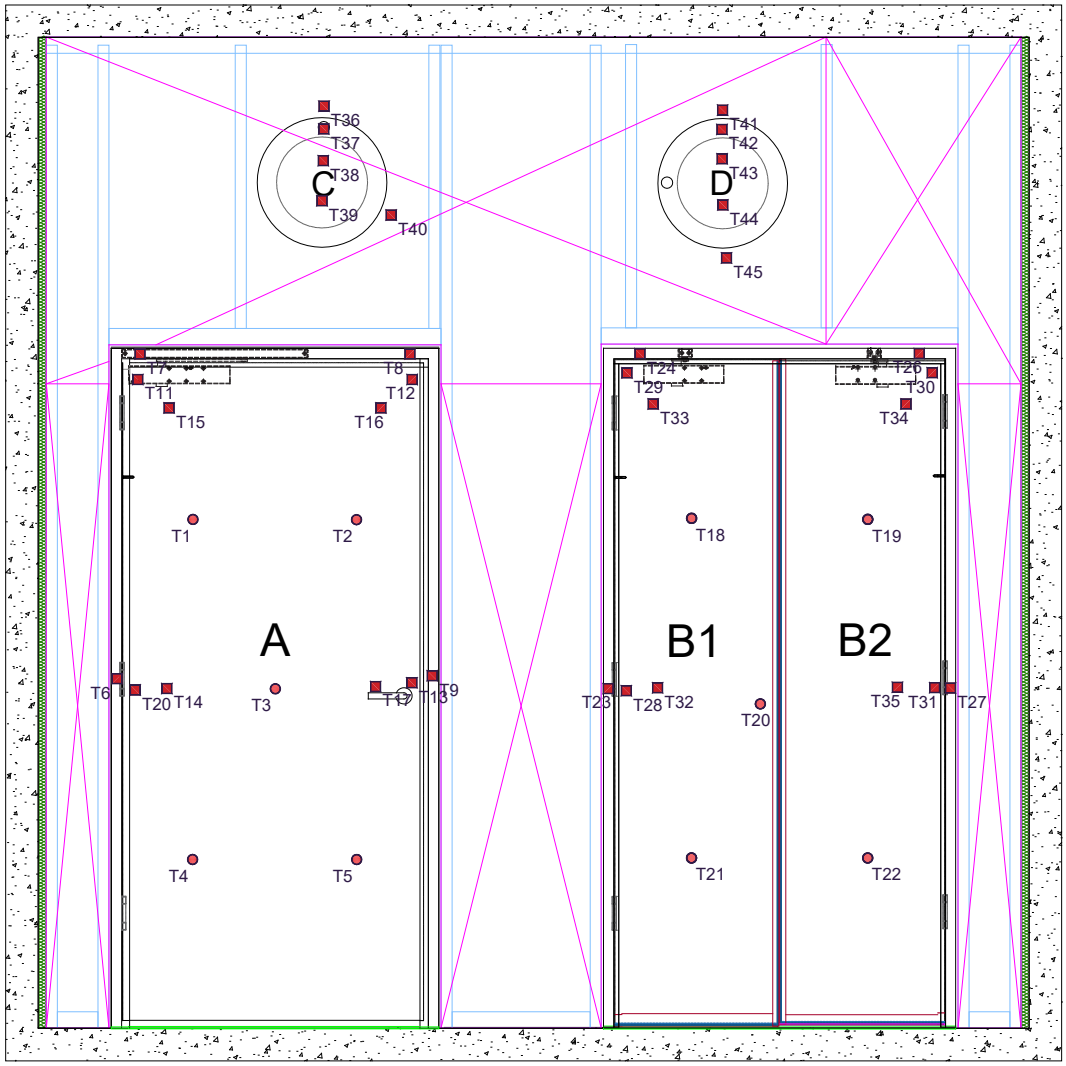


Figure 8 - Layout of instrumentation viewed from the unexposed surface of the test construction

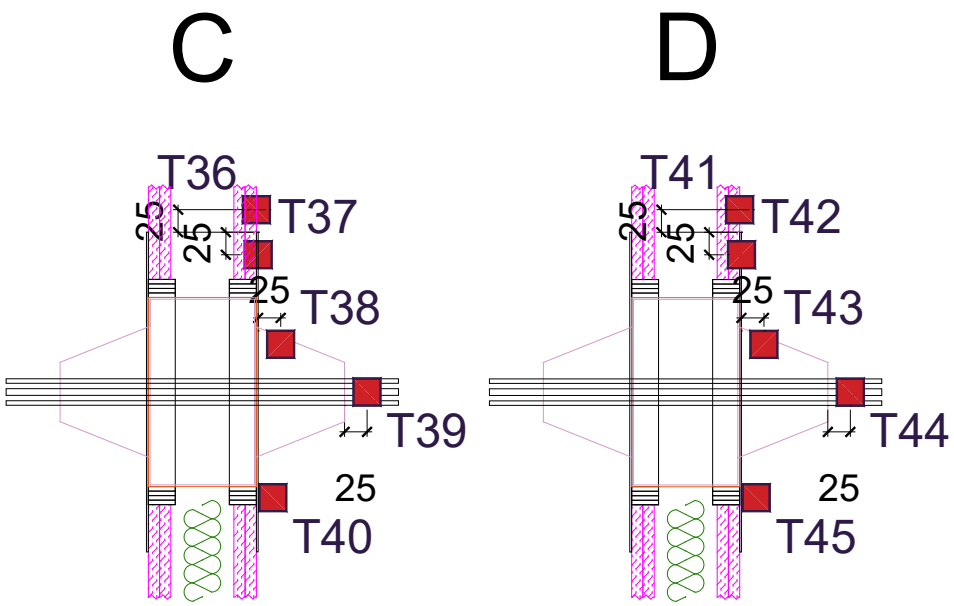


Figure 9 – Vertical layout of instrumentation on specimens C & D

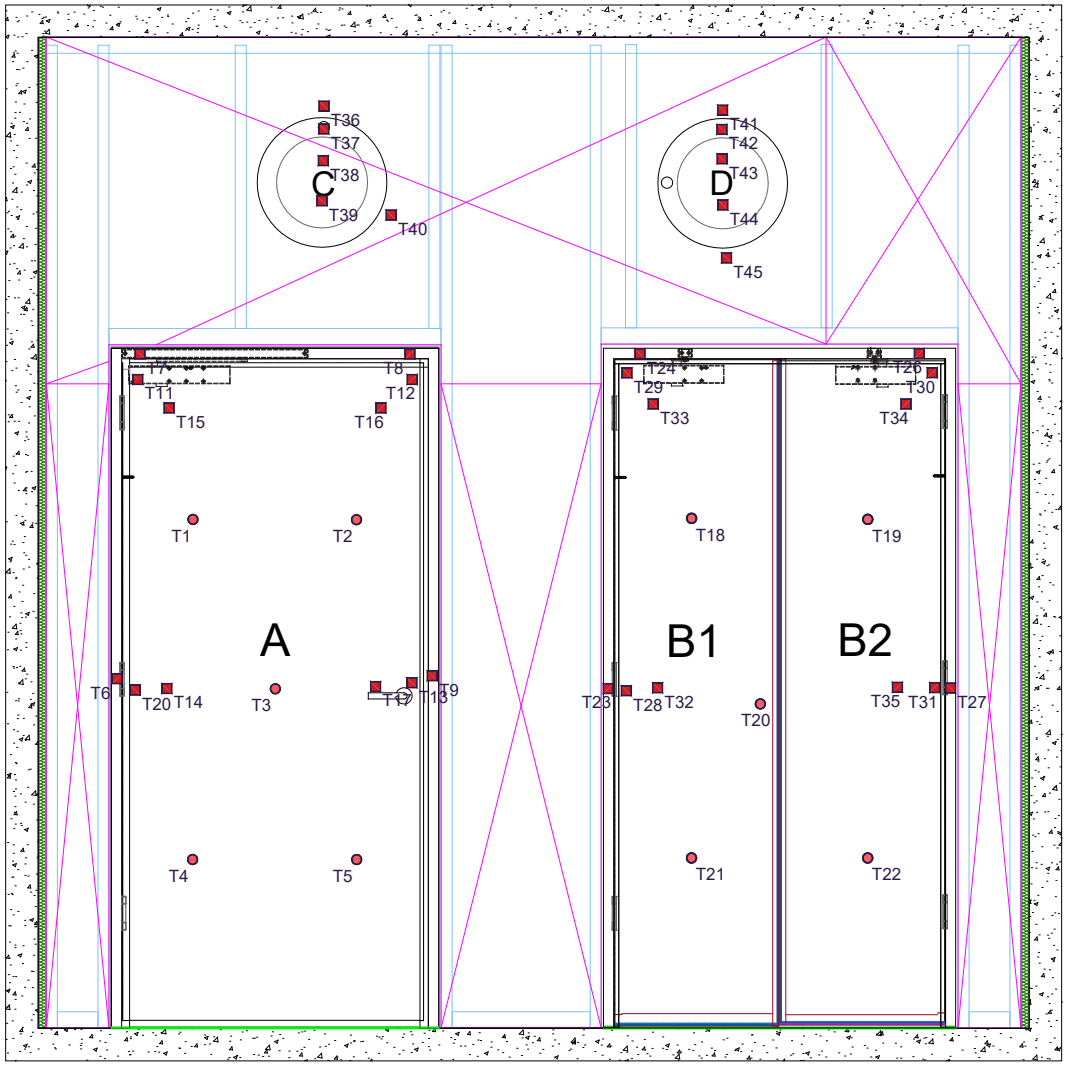


Figure 10 - Layout of instrumentation viewed from the unexposed surface of the test construction

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 are retained on file by United Kingdom Testing and Certification.

4.1 Specimen A

1. **Frame**	
Manufacturer	SA Joinery
Reference	FD60
Material	Sapele Head and Sapele Jambs
Density	640 kg/m3 *
Moisture content	10.5 – 11.9% (laboratory measurement)
a. Overall size	2097 mm high x 1003 mm wide x 100 mm deep
i. Frame (Head)	42 mm wide x 100 mm deep
ii. Frame (Jambs)	42 mm wide x 100 mm deep
iii. Stop	25 mm wide x 15 mm deep
Jamb to Head jointing method, fixing detail and location	2No. at Ø 5 mm x 100 mm long wood screw
Stop to Frame jointing method, fixing detail and location	Pinned with Ø 1.6 x 38 mm brad nails at 450 mm centres
b. Adhesive(s)	
i. Manufacturer	Everbuild
ii. Type	D4 PVA
iii. Reference	EN 204
iv. Curing method	Air
v. Application method	Squeezed & brushed
2. **Frame Fixing Method to Supporting Construction**	
Manufacturer	Timco
Reference	427KG
Type & material	Carbon Steel PZ double countersunk screws

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	N/a
Packing Material	Certitek PVC U Shims
Packing Material Dimension	101 mm x 43 mm assorted thicknesses
Packing Material Location	At each fixing location
3. **Frame to supporting construction fire stopping detail**	
Manufacturer	Saint-Goban Isover
Reference	Acoustic Partition Roll
Material	Glass Mineral Wool
Overall dimension	3–10 mm x 80 mm deep
Application method	Friction fitted into gaps between the supporting construction and frame
4. **Sealant to fire stopping detail**	
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
5. **Threshold detail**	
Supplier	Framefit Ltd / Complete Fire Protection Ltd
Reference	Framefit Threshold
Material	PVC based
Seal type within it and size	2 no. LM 5/54
Fixing Method	Secured 3 No. Ø 5 mm x 100 mm concrete masonry screws
6. **Intumescent to frame reveal**	
Quantity	2
Manufacturer	Pyroplex

Reference	8487
Material	PVC Encapsuled Graphite
Overall dimension	15 mm wide x 4 mm thick
Application method	Self-adhesive
Location	On the hanging edge and head, the leading edge had grooves cut out but no intumescent in them.
7. **Fireplug Framefit System Details**	
Manufacturer	Complete Fire Protection Ltd
Reference	Fireplug FrameFit System for 60-minute fire doors - Ref FF60
Material	Low modulus fire retardant graphite intumescent
a. System Components	
i. Gap spacers (LM Range for 30-minute doors)	Low Modulus (LM) fire retardant intumescent Ref: LM1.5/54, LM3/54, LM5/54
ii. Hinge Side (HE44 for 30-minute doors)	High expansion intumescent Ref: HE54
b. Overall Size	
i. LM/44 Range	54 mm wide x 2100 mm long x 1.5/3/5 mm thick
ii. HE44	54 mm wide x 2100 mm long x 1.5 mm thick
iii. Application Method	Fix required LM profiles to the door frame opposite the door edges by using the double-sided adhesive tape found on the reverse side of each profile. Once the correct number of LM profiles are in place, pin fix through all layers into the door frame using a minimum of 20 mm long panel pins at seal ends. The HE54 is generally used on the hinged side only. It is fitted using the double-sided adhesive tape found on the reverse side of each profile.
c. Door Edge Gap sizes	**FrameFit Configurement**
i. Hinge (3 mm)	None
ii. Top Edge (3 mm)	None
iii. Leading Edge (6 mm)	1 no. HE 1.5/54 + 1 no. LM 1.5/54
8. **Door Leaf**	
Supplier	SA Joinery
Reference	FD60 Strebord
Quantity of leaves on doorset	1
Glazing location relative to the head and closing edge	N/a

Overall leaf size supplied for testing	2040 mm high x 930 mm wide x 54 mm thick
9. **Core element**	
Manufacturer	Falcon Panel Products
Reference	54 mm Strebord 60
Material	Multi Layered Particleboard
Density	630 kg/m^3
Overall thickness	54 mm
10. **Lippings**	
Manufacturer	SA Joinery
Material	Sapele
Density	640 kg/m^3
Moisture content	8.6 – 9.4 % (laboratory measurement)
Overall size	6 mm
Fixing method	Adhered
Location	All Edges
a. Adhesives	
i. Manufacturer	Ureka
ii. Type	PU
iii. Reference	Aerobond 947
iv. Curing method	Moisture
v. Application method	Roller
b. Presence of Mechanical Fixings	N/a
11. **Hinges**	
Supplier	Royde and Tucker Manufacturing
Reference	H102
Quantity	3 no.
Primary material	Steel
Type	Ball Butt Bearing
a. Size	

i. Knuckle	Ø 14 mm x 104 mm high
ii. Blades	100 mm high x 35 mm wide x 3 mm thick
b. Fixings	
i. Type	Countersunk wood screws
ii. Material	Stainless 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	250 mm, 1000 mm and 1770 mm
Details of intumescent protection	1 mm Interdens
Interruptions to Intumescent within the frame reveal	Framefit fireplug sits over the hinges.
12. **Door Closer**	
Manufacturer	Dorma
Reference	TS 92
a. Material	
i. Body	Mild Steel
ii. Slide arm	Stainless Steel
iii. Cover	Stainless Steel
Configuration	Cam. Action Slide Arm
b. Overall size	
i. Slide arm	
ii. Body	225 mm long x 45 mm high x 40 mm deep
iii. Cover	232 mm long x 65 mm high x 50 mm deep
Fixing method	Screwed with 4 no Ø 4.8 mm x 50 mm stainless steel screws
13. **Lockset**	
Manufacturer	Zoo Hardware Ltd
Reference	ZCS23055 (Latch)
a. Material	
i. Forend plate	Stainless steel
ii. Latch bolt	Stainless steel

iii. Strike	Stainless steel
b. Overall sizes	
i. Central Lockcase	60 mm high x 20 mm wide x 76 mm deep
ii. Forend plate	60 mm high x 25 mm wide x 3 mm
iii. Latch bolt	40 mm high x 15 mm wide x 20 mm projection
iv. Strike	60 mm high x 25 mm wide x 3 mm thick
v. Fixing method	2 No Ø 4.5 mm x 25 mm long screws on both lockset and strike plate
Operation of latch bolt	Disengaged
c. Details of intumescent protection	
i. Central Lockcase	1 mm Graphite
ii. Forend plate	1 mm Graphite
iii. Strike	1 mm Graphite
Interruptions to Intumescent within the frame reveal	Fully interrupts
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
14. **Lever handles**	
Manufacturer	Zoo Hardware Ltd
Reference	ZCS03055
Material	Satin Stainless steel
a. Overall size	
i. Rose	Ø 52 mm x 8 mm thick
ii. Handle	Ø 19 mm x 140 mm long x 55 mm projection
iii. Escutcheon	Ø 52 mm x 8 mm thick
Fixing method, fixing material, sizes, quantity and location	4No. Ø 3.5 mm x 25 mm long wood screws for the handle and the escutcheon is a threaded connection to the handle.

15. **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	Hinge edge – 865 from top of door and 19 in from hinge face of Each door.
Fixing method	Friction fitted into door edge.

4.2 Specimen B

16. **Frame**	
Manufacturer	Test sponsor unable to verify
Reference	Test sponsor unable to verify
Material	Sapele
Density	650 kg/m^3
Moisture content	15.2% - 15.8% (laboratory measurement)
a. Overall size	2095 mm high x 1084 mm wide x 100 mm deep
i. Frame (Head)	42 mm wide x 100 mm deep
ii. Frame (Jambs)	42 mm wide x 100 mm deep
iii. Stop	25 mm wide x 15 mm deep
Jamb to Head jointing method, fixing detail and location	Stub Tenon 16 mm 2 no. off Ø 5 mm x 100 mm long wood screw
Stop to Frame jointing method, fixing detail and location	Ø 1.5 mm x 50 mm Gas fired pins @ 200 mm centres
b. Adhesive(s)	
i. Manufacturer	Test sponsor unable to verify
ii. Type	Test sponsor unable to verify
iii. Reference	Test sponsor unable to verify
iv. Curing method	Test sponsor unable to verify
v. Application method	Test sponsor unable to verify

17. **Frame Fixing Method to Supporting Construction**	
Manufacturer	Timco
Reference	427KG
Type & material	Yellow PZ Countersunk Woodscrews
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	N/a
Packing Material	Certitek DP01 - PVC U Shims
Packing Material Dimension	100 mm x 43 mm assorted thicknesses
Packing Material Location	At each fixing location
18. **Fireplug Framefit System Details**	
Manufacturer	Complete Fire Protection Ltd
Reference	Fireplug FrameFit System for 60-minute fire doors - Ref FF60
Material	Low modulus fire retardant graphite intumescent
a. System Components	
i. Gap spacers (LM Range for 30-minute doors)	Low Modulus (LM) fire retardant intumescent Ref: LM2/54, LM3/54, LM5/54
ii. Hinge Side (HE44 for 30-minute doors)	High expansion intumescent Ref: HE54
b. Overall Size	
i. LM/44 Range	54 mm wide x 2100 mm long x 1.5/3/5 mm thick
ii. HE44	54 mm wide x 2100 mm long x 1.5 mm thick
iii. Application Method	Fix required LM profiles to the door frame opposite the door edges by using the double-sided adhesive tape found on the reverse side of each profile. Once the correct number of LM profiles are in place, pin fix through all layers into the door frame using a minimum of 20 mm long panel pins at the ends. The HE54 is generally used on the hinged side only. It is fitted using the double-sided adhesive tape found on the reverse side of each profile.
c. Door Edge Gap sizes	**FrameFit Configurement**
i. Hinge (3 mm)	1No. HE/54
ii. Top Edge (6-7 mm)	1No LM5/54

19. **Fireplug Framefit Bottom**	
Manufacturer	Complete Fire Protection Ltd
Reference	Fireplug Framefit - for 60-minute doors
Material	Low modulus fire retardant graphite intumescent
Overall section size	As LM Range
Location (relative to the opening face of the door leaf)	Located on the bottom door edge
Application Method	Fix required LM profiles to the bottom door edge by using the double-sided adhesive tape found on the reverse side of each profile. Once the correct number of LM profiles are in place, encase the profiles with the appropriate BDS cover strip. Then screw/pin fix through all layers into the bottom of the door edge using a minimum of 40 mm long screws/panel pins @ 350 mm centres ensuring screws/pins penetrate door edge by minimum of 10 mm.
Door Edge Gaps	**FrameFit configurement**
Bottom of leaf (24 mm)	Various LM Range between (Sponsor unable to verify) mm due to the difference in gap at the bottom of the specimen in relation to the restraint frame
20. **Door Edge Guard**	
Manufacturer	Test sponsor unable to verify
Reference	Test sponsor unable to verify
Material	Rigid PVC with flexible bumper and High Expansion Graphite Intumescent to back.
Intumescent ref	Test sponsor unable to verify
Overall section size	Test sponsor unable to verify
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.
21. **Frame to supporting construction fire stopping detail**	
Manufacturer	Saint-Gobain
Reference	Isover Insulation
Material	Mineral Wool
Overall dimension	80 mm deep x 2 mm to 10 mm wide
Application method	Compression fitted

22. **Sealant to fire stopping detail**	
Manufacturer	Certitek
Reference	DM-01 Intumescent & Acoustic Acrylic Sealant
Material	Acrylic Sealant
Overall section size	10 mm deep x 2 mm to 15 mm wide
Application method	Using a cartridge gunned
Location	Gaps between the head and jambs and supporting construction
23. **Door Leaf**	
Supplier	Test sponsor unable to verify
Reference	Test sponsor unable to verify
Quantity of leaves on doorset	2
Glazing location relative to the head and closing edge	N/a
Overall leaf size supplied for testing	2No. at 2042 mm high x 502 mm wide x 54 mm thick
24. **Core element**	
Manufacturer	Test sponsor unable to verify
Reference	Test sponsor unable to verify
Material	Multi Layered Particleboard
Density	630 kg/m^3
Overall thickness	54 mm thick
25. **Lipping**	
Manufacturer	Test sponsor unable to verify
Reference	Test sponsor unable to verify
Material	Sapele
Density	640 kg/m^3
Moisture content	8.9– 9.4 % (laboratory measurement)
Overall size	6 mm x 54 mm x length of door
Fixing method	Adhered
Location	L4E
a. Adhesives	

i. Manufacturer	Test sponsor unable to verify
ii. Type	Test sponsor unable to verify
iii. Reference	Test sponsor unable to verify
iv. Curing method	Test sponsor unable to verify
v. Application method	Test sponsor unable to verify
b. Presence of Mechanical Fixings	No
26. **Hinges**	
Supplier	Royde and Tucker Manufacturing
Reference	H102
Quantity	3 no.
Primary material	Steel
Type	Ball Butt Bearing
a. Size	
i. Knuckle	Ø 14 mm x 104 mm high
ii. Blades	100 mm high x 35 mm wide x 3 mm thick
b. Fixings	
i. Type	Countersunk wood screws
ii. Material	Stainless Steel
iii. Size	Ø 5 mm x 32 mm long
iv. Number off per blade	5 no.
Position of each hinge relative to the head of the leaf	180 mm, 950 mm and 1730 mm
Details of intumescent protection	Test sponsor unable to verify
Interruptions to Intumescent within the frame reveal	N/a
27. **Door Closer**	
Manufacturer	Dorma Kaba
Reference	Test sponsor unable to verify
a. Material	
i. Body	Mild Steel
ii. Closer arm	Stainless Steel

iii. Cover	Stainless Steel
Configuration	Overhead closer
b. Overall size	
i. Body	45 mm high x 240 mm wide x 50 mm deep
ii. Cover	48 mm high x 245 mm wide x 59 mm deep
Fixing method	Screwed with 4 no Ø 5 mm x 50 mm stainless steel screws
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	Hinge edge – 865 from top of door and 19 in from hinge face of Each door.
Fixing method	Friction fitted into door edge.

4.3 Specimen C

29. **Steel Hatch**	
Manufacturer	Complete Fire Protection
Reference	Fire Plug Cable Pass Through System
Model	CPTFRAW190
Material	Mild Steel
a. Overall size	
i. Wall Trim	Ø 355 mm x 50 mm wide x 2 mm thick
ii. Hatch Lid	Ø 350 mm x 2 mm thick
iii. Handle	Ø 35 mm x 30 mm projection
iv. Steel collar	Ø 253 mm x 30 mm wide x 30 mm deep x 2 mm thick
Location	2600 mm up to centre of hatch Ø 305 mm hole
Fixing method	4 No. Ø 4 x 50 mm Screws with

30. **Intumescent**	
Manufacturer	Tenmat
Reference	FF160
Material	Graphite based intumescent
Overall size / location	3No. layers wrapped around collar – 30 mm wide x 5 mm thick per layer
Fixing method	Friction fitted between steel collar and UPVC Pipe.
31. **UPVC Pipe**	
Manufacturer	JDP
Reference	Plain Ended Underground Drainage Pipe
Material	PVC-U
Overall size	Ø 250 mm x 132 mm long
Location	Fitted into steel collars of Steel hatches.
32. **Smoke Sock**	
Manufacturer	Culimeta-Saveguard Ltd
Reference	FireHalt SF Fire Barrier
Material	Treated Woven Glass Cloth
Overall size	Ø 225 mm x 1000 mm long
Location	Fitted around UPVC Pipe.
Rope in Sock Ends	Ø 8 mm Ceramic Fiber Rope (Braided) - Murugappa
33. **Acoustic Bung**	
Manufacturer	The Morgan Crucible Company plc
Reference	Superwool® Plus Blanket
Material	Ceramic fiber wool
Overall size	Ø 200 mm x 100 mm thick
Location	Fitted into sock and pipe.

34. **Wires**	
a. Manufacturer	
i. Wire 1	Datasure Ltd
ii. Wire 2	Time Ltd
iii. Wire 3	Prysm Lang Group
b. Reference	
i. Wire 1	RG6 Coaxial
ii. Wire 2	Single core 543JY-00011
iii. Wire 3	2.5 mm – 3 core armored
c. Qty & Size	
i. Wire 1	3 No. Ø 6 mm plastic cassed copper wires (yellow)
ii. Wire 2	1 No. Ø 6 mm plastic cased wires (grey)
iii. Wire 3	1 No. Ø 2.5 mm plastic cased wires (white)

4.4 Specimen D

35. **Steel Hatch**	
Manufacturer	Complete Fire Protection
Reference	Fire Plug Cable Pass Through System
Model	CPTFRAW190
Material	Mild Steel
a. Overall size	
i. Wall Trim	Ø 355 mm x 50 mm wide x 2 mm thick
ii. Hatch Lid	Ø 350 mm x 2 mm thick
iii. Handle	Ø 35 mm x 30 mm projection
iv. Steel collar	Ø 253 mm x 30 mm wide x 30 mm deep x 2 mm thick
Location	2600 mm up to centre of hatch Ø 305 mm hole
Fixing method	4 No. Ø 4 x 50 mm Screws with
36. **Intumescent**	
Manufacturer	Tenmat

Reference	FF160
Material	Graphite based intumescent
Overall size / location	3No. layers wrapped around collar – 30 mm wide x 5 mm thick per layer
Fixing method	Friction fitted between steel collar and UPVC Pipe.
37. **UPVC Pipe**	
Manufacturer	JDP
Reference	Plain Ended Underground Drainage Pipe
Material	PVC-U
Overall size	Ø 250 mm x 132 mm long
Location	Fitted into steel collars of Steel hatches.
38. **Smoke Sock**	
Manufacturer	Culimeta-Saveguard Ltd
Reference	FireHalt SF Fire Barrier
Material	Treated Woven Glass Cloth
Overall size	Ø 225 mm x 1000 mm long
Location	Fitted around UPVC Pipe.
Rope in Sock Ends	Ø 8 mm Ceramic Fiber Rope (Braided) - Murugappa
39. **Acoustic Bung**	
Manufacturer	The Morgan Crucible Company plc
Reference	Superwool® Plus Blanket
Material	Ceramic fiber wool
Overall size	Ø 200 mm x 100 mm thick
Location	Fitted into sock and pipe.

40. **Wires**	
a. Manufacturer	
i. Wire 1	Datasure Ltd
ii. Wire 2	Time Ltd
iii. Wire 3	Prysm Lang Group
b. Reference	
i. Wire 1	RG6 Coaxial
ii. Wire 2	Single core 543JY-00011
iii. Wire 3	2.5 mm – 3 core armored
c. Qty & Size	
i. Wire 1	3 No. Ø 6 mm plastic cassed copper wires (yellow)
ii. Wire 2	1 No. Ø 6 mm plastic cased wires (grey)
iii. Wire 3	1 No. Ø 2.5 mm plastic cased wires (white)

4.5 Supporting Construction

41. **Metal Frame**	
Supplier	UKTC Provided
a. Supporting Structure	
i. Type & Material	Steel C Stud
ii. Thickness & Size	72 mm wide x 34 mm thick x 3000 mm long
iii. Centres	600 mm centres
Additional Wall Construction Requests	N/a
42. **Plasterboard**	
Supplier	UKTC Provided
Type & Material	Gypsum Plasterboard Tapered Edge
Layer Quantity	2
Thickness & Size	12.5 mm per layer 25 mm total x 2400 mm x 1200 mm Per Sheet
Fixings	Plasterboard Screw Fixings Ø 5 mm x 25 mm Long Screw
Joints Filled & Taped With	Limestone filler & Butyl rubber

43. **Wall Insulation**	
Supplier	UKTC Provided
Type & Material	Mineral Wool
Installation Method	Compression Fitted
Thickness	50 mm
Locations	Centrally Located in the wall
Additional Wall Construction Requests	N/a

44. **Details of Free Edge Packing Material**	
Manufacturer	Morgan Advance Materials
Reference	Superwool HT
Overall size	200 mm wide x 3050 mm high x 25 mm deep
Fixing Method	Compression fitted into the free edges of the wall

5 Specimen Photographs

Figure 11 - Item 11

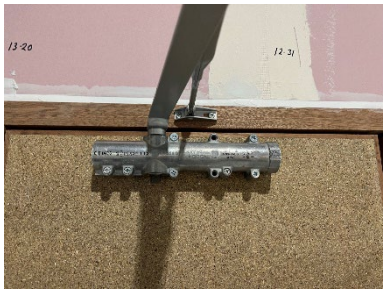


Figure 12 - Item 12

Figure 13 - Item 27

Figure 14 - Item 26

Figure 15 - Item 28,30,35 & 36

Figure 16 - Item 13

Figure 17- Item 29

Figure 18 - Item 35

Figure 19 - Item 28

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 35.

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 36.

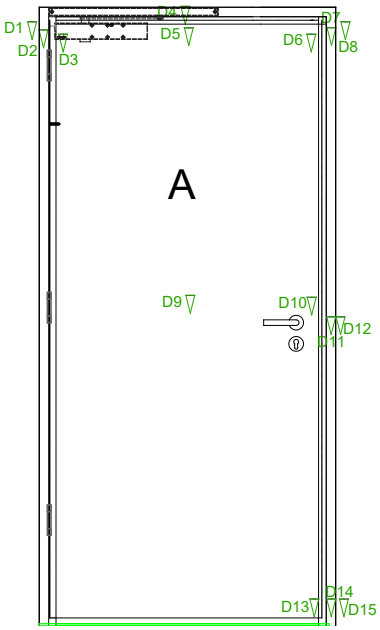
6.3 Unexposed Surface Temperature

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 45.

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 37 and Figure 38 and the locations of these thermocouples is illustrated in Figure 8.

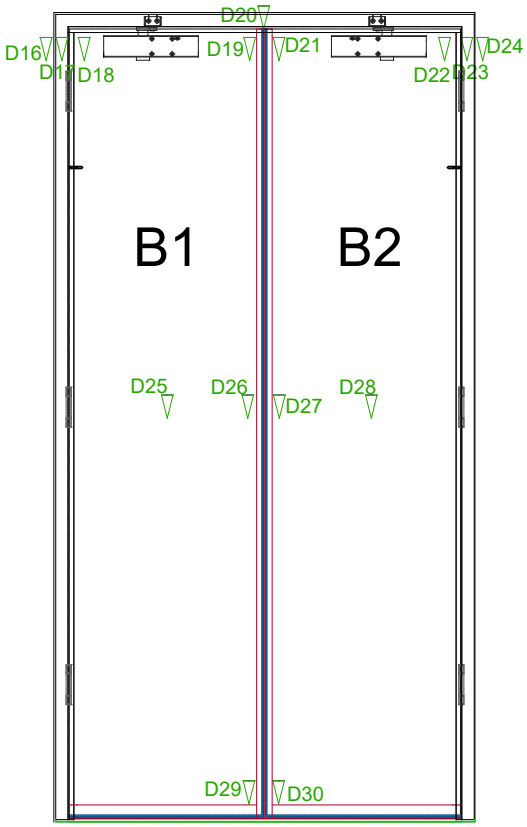
6.4 Deflection

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	1	0	0	2	4	6	6	5	-1	2	6	5	2	0	1
20	3	3	5	3	4	7	6	6	0	2	4	5	5	0	2
30	1	-4	2	-3	1	3	2	2	-5	-1	1	2	5	0	1
40	1	2	3	-2	0	3	3	3	-7	-2	1	2	4	-1	0
50	0	-1	0	1	-3	3	2	2	-14	-3	1	1	5	-1	0
55	-1	-1	0	-1	-4	3	3	2	-17	-2	2	3	7	2	-1
60	3	0	-5	9	-4	10	9	7	-17	5	10	11	8	0	1
65	5	5	6	*	6	18	18	17	-17	12	18	19	9	1	1

* Unable to gather a reading/faulty reading due to smoke/steam



Time (mins)	D16	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	0
10	3	7	7	9	5	6	6	1	5	6	7	6	1	4	7
20	2	7	7	11	7	8	6	8	5	4	6	1	1	7	6
30	-1	3	6	7	3	3	4	4	3	0	0	-3	-3	7	5
40	0	4	6	10	3	4	5	3	5	-1	-2	-5	-6	6	4
50	1	5	2	8	3	1	5	4	6	-8	-8	-11	-13	6	5
55	1	7	5	6	3	1	4	4	6	-6	-8	-11	-14	9	8
60	8	12	11	14	7	9	10	7	8	-4	-4	-8	-10	9	8
65	20	23	26	30	1	26	16	13	13	2	2	-2	-5	9	9

6.5 Observations

Specimen	HH	MM	SS	E[11]	U[12]	Observation
	00	00	00			**The test commences.**
A&B	00	00	40		X	Smoke/steam release all round specimens.
B	00	02	33		X	Discolour at meeting stile mid height.
A	00	03	38		X	Increased smoke/steam release from hinge side and top edge.
C&D	00	04	22		X	Smoke steam release from both specimens.
C&D	00	06	02		X	Both socks are becoming very discoloured.
B	00	06	29		X	Meeting stile seal just above mid height is becoming discoloured.
A	00	08	17		X	Moisture release down hinge side.
A	00	09	08		X	Bottom corner on latch side is deflecting in towards heat.
D	**00**	**10**	**29**		**X**	**Unexposed temperature has reached 180 degrees. Insulation failure is deemed to have occurred.**
D	00	10	38	X		Hatch has fallen from wall into furnace.
C	00	14	08		X	Moisture release around bottom of specimen.
D	00	16	25		X	Hatch is becoming very discoloured.
C	00	18	54	X		Hatch is falling from wall into furnace.
A	00	21	25		X	Discolouration down hinge side.
A	00	23	10		X	
A	00	30	05		X	Very discoloured top corner on hinge side.
D	**00**	**32**	**00**		**X**	**Blanked off at clients request to allow test to continue for other specimens.**

[11] Viewed from exposed surface of the test construction.
[12] Viewed from unexposed surface of the test construction.

Specimen	HH	MM	SS	E[13]	U[14]	Observation
B	00	43	44		X	Glowing at top corner left hinge door side.
B	00	46	35		X	Cotton pad applied at top left no ignition or embers.
B	**00**	**48**	**03**		**X**	**Cotton pad applied at top left; pad ignited. Integrity failure is deemed to have occurred.**
B	**00**	**48**	**09**		**X**	**Sustained flaming top left corner.**
B	00	48	45		X	Mastic applied at top corner to stop fire, to allow the test to continue.
A	00	51	40		X	Top hinge has eroded through.
A	00	53	46		X	Glowing at top right of specimen.
B	00	57	16		X	Increased smoke issuing from top left of door and discolouring.
B	00	58	05		X	Mastic applied at top right of door to continue fire stop.
A	00	58	41		X	Increased smoke at mid height on hinge side.
A	01	01	46		X	Smoke/steam release at door handle.
B	01	04	00		X	Mastic applied along top of door.
A&B	01	06	00		X	Blanked off both doors to allow test to continue for other specimen.
C	01	16	00		X	Discolouration showing around hatch.
C	01	46	49		X	Smoke/steam release is now increasing.
	02	**01**	**42**			**The test is discontinued at the request of the Test Sponsor.**

[13] Viewed from exposed surface of the test construction.
[14] Viewed from unexposed surface of the test construction.

6.6 Test Images

Figure 20 – The exposed surface of the test construction prior to commencement of the test

Figure 21 - The unexposed surface of the test construction prior to the commencement of the test

Figure 22 - The unexposed surface of the test construction after a test duration of 10 minutes

Figure 23 - The unexposed surface of the test construction after a test duration of 20 minutes

Figure 24 - The unexposed surface of the test construction after a test duration of 34 minutes

Figure 25 - The unexposed surface of the test construction after a test duration of 39 minutes

Figure 26 - The unexposed surface of the test construction after a test duration of 50 minutes

Figure 27 - The unexposed surface of the test construction after a test duration of 55 minutes

Figure 28 - The unexposed surface of the test construction after a test duration of 60 minutes

Figure 29 - The unexposed surface of the test construction after a test duration of 65 minutes

Figure 30 - The unexposed surface of the test construction after a test duration of 100 minutes

Figure 31 - The unexposed surface of the test construction after a test duration of 110 minutes

Figure 32 - The unexposed surface of the test construction after a test duration of 120 minutes

Figure 33 - The unexposed surface of the test construction after a test duration of 121 minutes

Figure 34 - The exposed surface of the test construction after the test was discontinued

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 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.

8 Figures

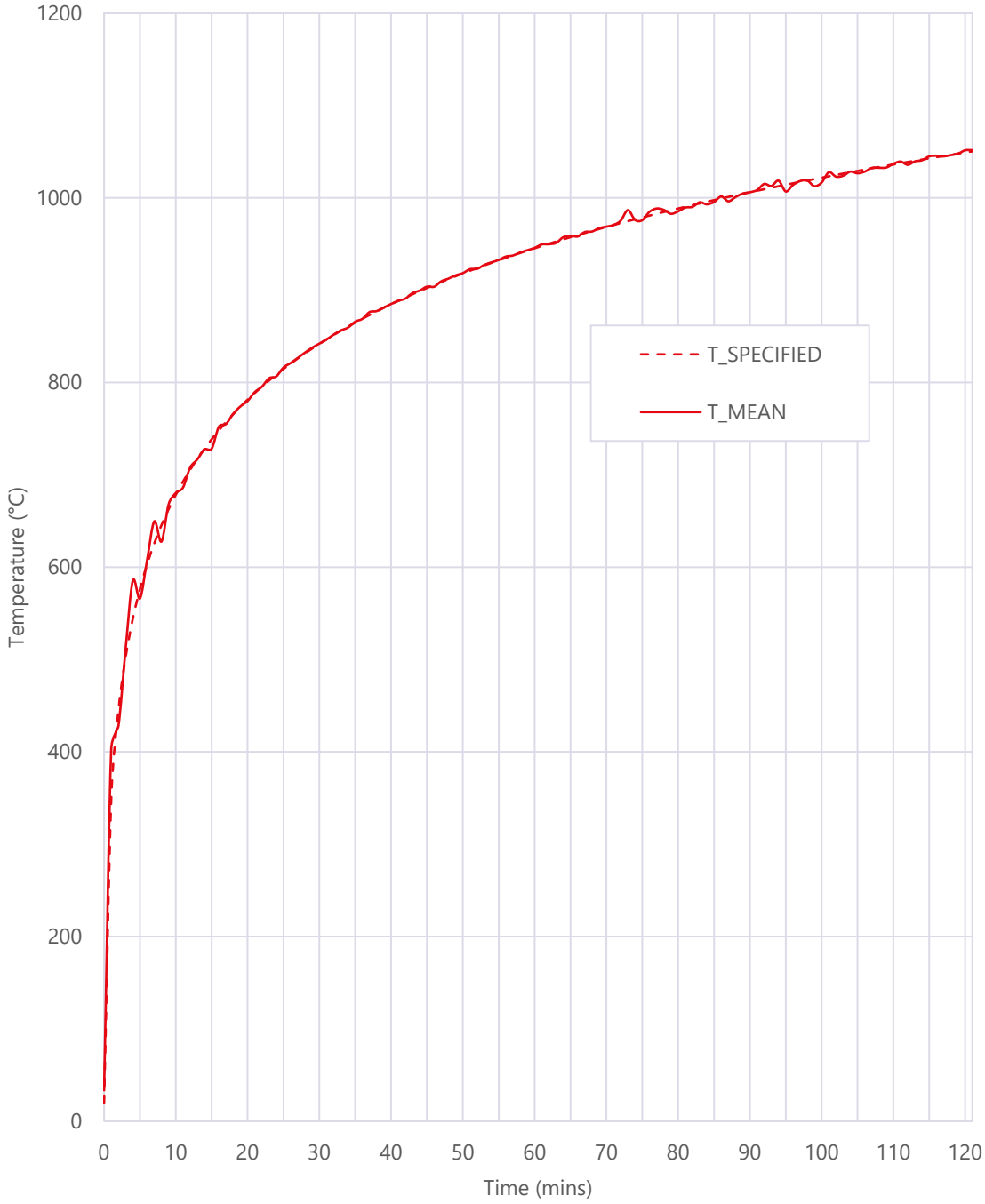


Figure 35 – Graph presenting the Time-Temperature distribution of the furnace

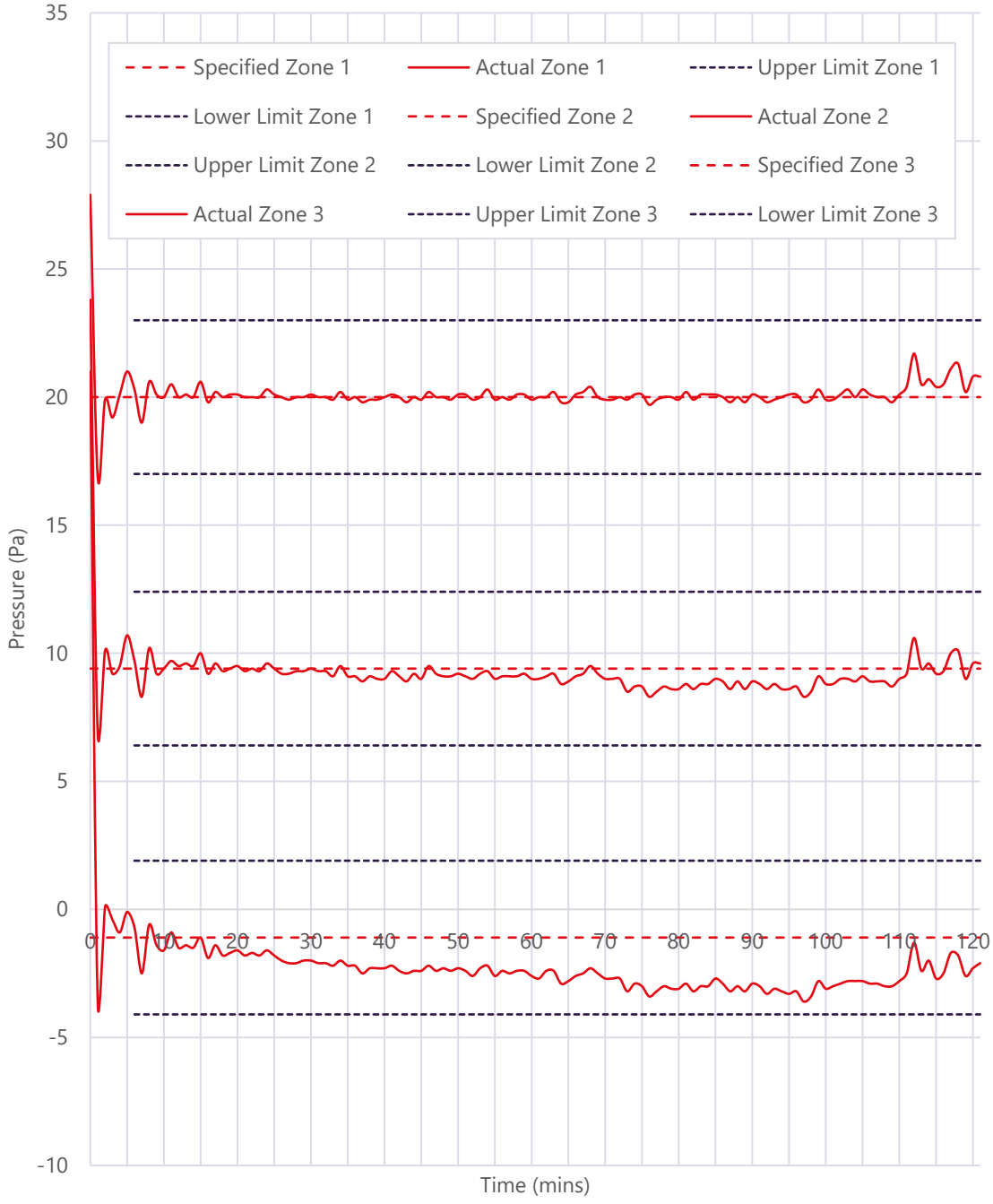


Figure 36 – Graph presenting the Time-Pressure distribution of the furnace

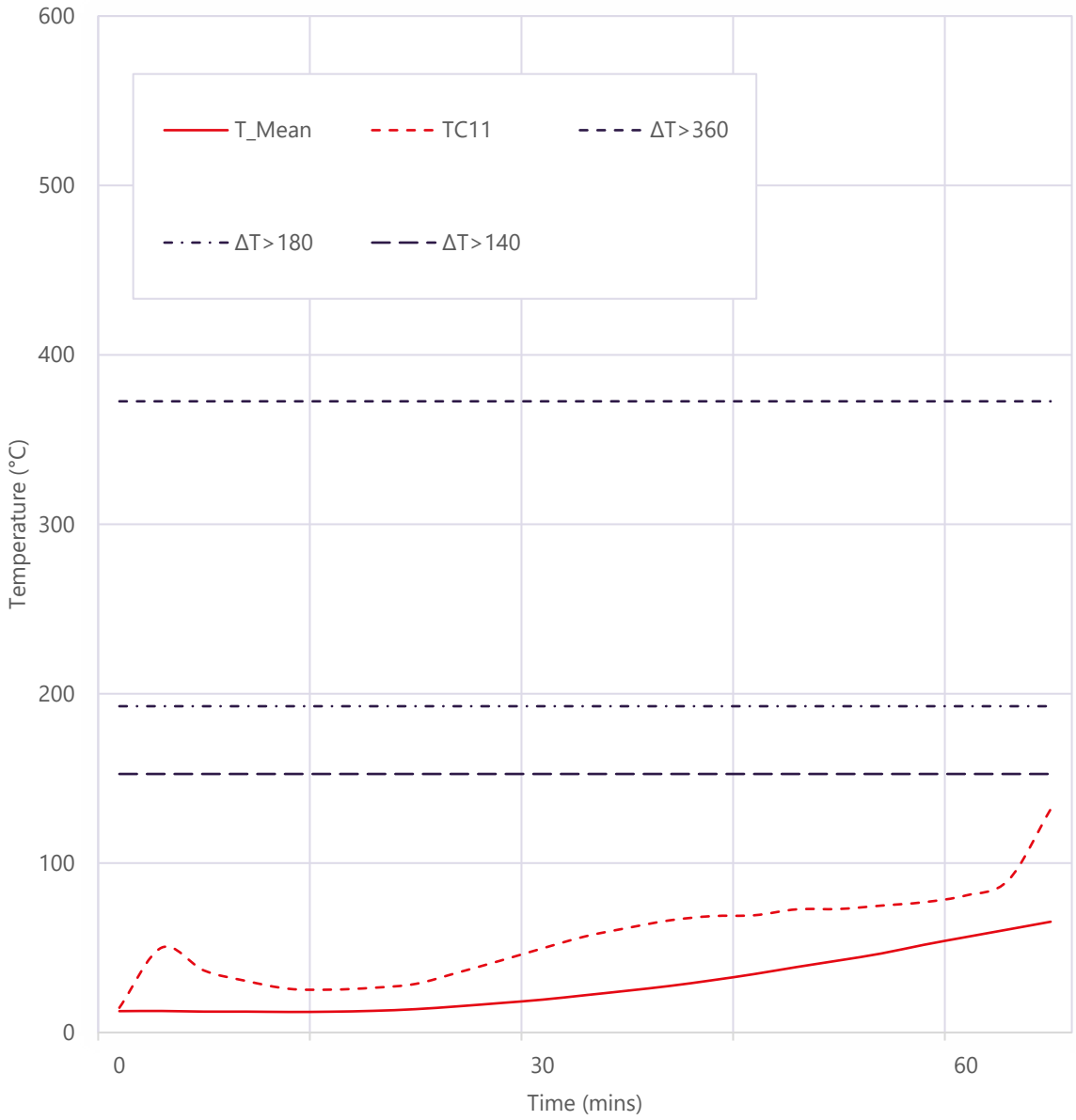


Figure 37 - Graph presenting the Time-Temperature distribution of the unexposed surface of Specimen A

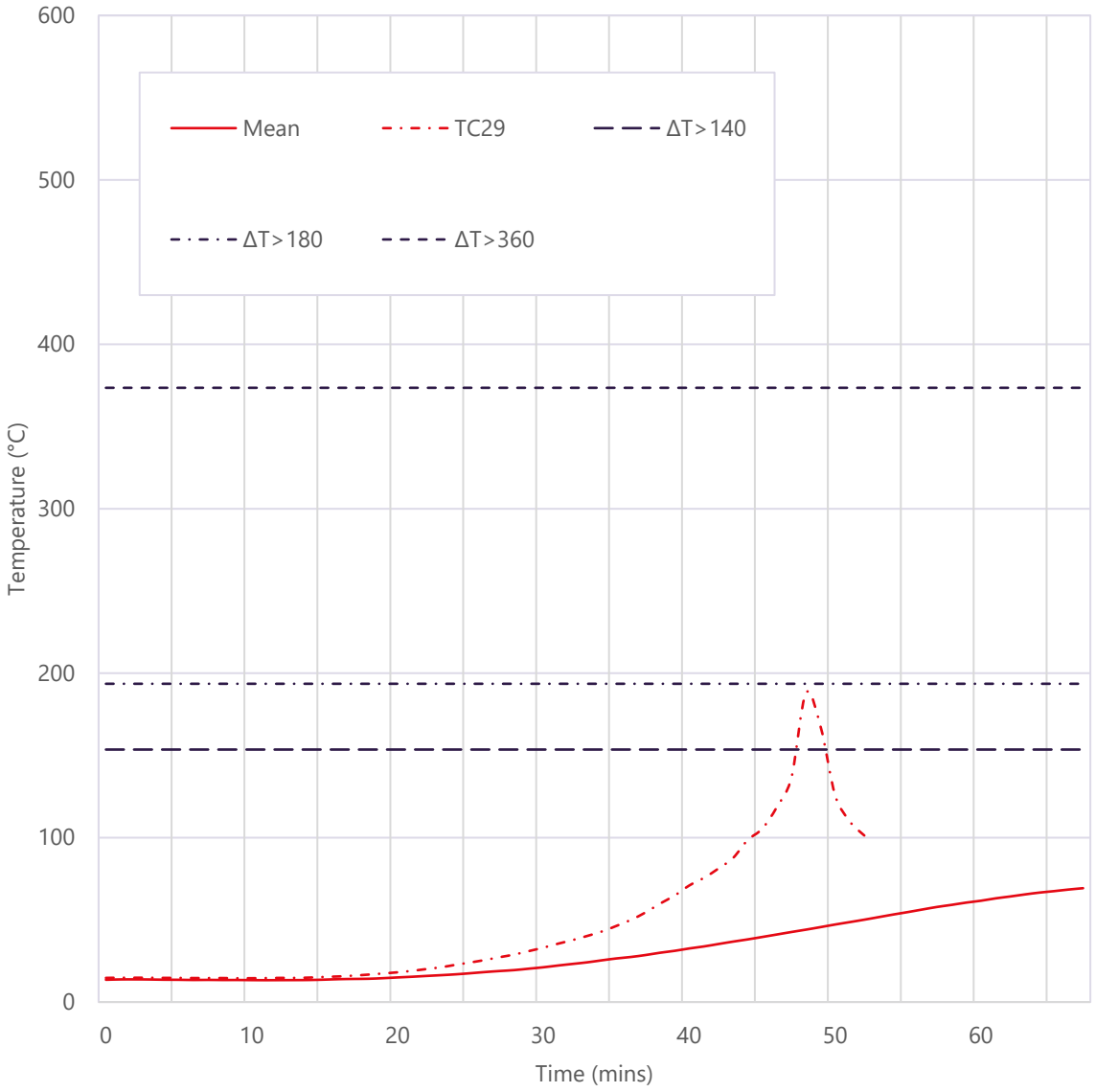


Figure 38 - Graph presenting the Time-Temperature distribution of the unexposed surface of Specimen B

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	13.2	13.3	12.6	12.2	11.7
3	13.5	13.3	12.6	12.3	11.8
6	12.7	12.8	12.3	12.2	11.6
9	12.5	12.9	12.3	12.1	11.8
12	12.1	12.7	12.1	12.0	11.7
15	12.4	13.0	12.3	11.9	11.8
18	13.0	13.6	12.9	12.3	12.1
21	14.4	14.8	14.1	12.8	12.8
24	16.4	16.8	16.1	14.0	14.0
27	18.3	19.1	18.2	15.3	16.0
30	20.4	21.8	20.4	16.8	17.6
33	23.4	23.9	23.5	18.9	20.3
36	26.0	26.4	26.3	21.4	23.2
39	28.8	29.2	29.3	23.7	26.4
42	32.0	32.6	32.6	27.1	29.8
45	35.6	36.1	36.3	30.5	34.0
48	40.0	40.6	40.3	34.3	38.0
51	43.3	44.5	44.4	38.3	42.2
54	47.1	49.2	48.3	42.1	46.5
57	51.5	55.0	53.3	47.3	51.6
60	55.8	60.3	57.6	52.0	56.0
63	59.9	65.3	61.6	56.8	60.6
66	64.7	70.7	65.5	61.4	64.6

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)	TC14	TC15	TC16	TC17
0	12.6	13.9	13.9	14.0
3	13.6	18.5	13.9	13.6
6	12.9	14.8	13.4	13.3
9	12.5	13.4	13.2	13.6
12	12.1	12.5	13.1	13.5
15	12.2	13.2	13.7	14.4
18	12.9	14.3	15.1	19.3
21	14.2	16.2	17.2	*
24	16.0	19.0	20.3	21.9
27	18.3	21.8	24.2	25.8
30	20.3	24.7	28.5	29.1
33	22.7	27.7	32.5	33.6
36	25.0	30.5	36.6	37.3
39	27.7	33.8	40.9	40.8
42	30.5	37.5	45.2	44.6
45	33.7	40.8	49.5	48.3
48	37.4	45.2	54.1	51.7
51	40.9	48.6	58.1	54.8
54	44.7	51.8	61.7	57.7
57	49.4	55.7	65.3	61.3
60	53.8	59.5	68.6	63.9
63	57.9	61.9	71.3	67.4
66	62.7	65.7	73.6	70.3

*Thermocouple malfunction

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)	TC10	TC11	TC12	TC13
0	14.1	14.6	14.6	*
3	24.5	50.1	17.9	*
6	23.8	36.6	17.5	*
9	20.0	30.4	17.1	*
12	18.3	25.8	17.5	*
15	18.5	25.3	19.0	*
18	20.6	26.4	21.5	*
21	24.9	28.7	*	*
24	29.8	35.4	30.4	31.0
27	35.5	42.4	37.0	35.6
30	40.6	49.7	44.5	41.7
33	46.3	56.7	50.8	48.1
36	50.4	61.7	56.8	53.1
39	54.2	66.2	62.2	57.3
42	56.9	68.7	66.0	60.4
45	59.5	69.2	68.5	63.1
48	62.6	72.7	71.7	65.2
51	64.7	72.9	73.7	67.1
54	67.2	74.9	76.4	69.0
57	70.0	76.9	79.4	70.9
60	72.6	80.9	83.7	72.5
63	75.5	89.9	82.4	74.6
66	78.5	131.8	84.1	76.2

*Thermocouple malfunction

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

Time (mins)	TC6	TC7	TC8	TC9
0	12.2	12.5	13.0	12.6
3	12.1	22.0	17.3	12.7
6	12.0	21.6	16.8	12.3
9	11.8	21.8	16.4	12.9
12	11.8	18.3	19.5	14.4
15	11.7	19.9	27.1	17.6
18	11.8	20.1	28.1	20.8
21	11.7	20.6	30.9	23.4
24	11.7	28.7	36.1	26.6
27	11.4	35.5	36.0	29.2
30	11.2	38.5	36.7	31.4
33	11.3	40.0	39.2	33.4
36	11.4	40.9	39.5	34.8
39	11.2	39.8	39.4	36.9
42	11.3	39.4	40.4	38.4
45	11.3	38.3	40.6	40.0
48	11.4	40.6	41.6	41.4
51	11.2	41.4	43.2	42.4
54	11.3	44.6	46.1	43.6
57	11.4	45.9	48.4	45.1
60	11.2	48.2	49.4	45.7
63	11.4	58.5	50.3	46.7
66	11.3	83.6	52.3	47.5

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)	TC18	TC19	TC20	TC21	TC22
0	13.7	14.3	13.7	13.4	12.7
3	14.2	14.3	13.9	13.5	12.7
6	13.5	14.2	13.7	13.2	12.5
9	13.5	14.1	13.7	13.3	12.5
12	13.3	14.0	13.7	13.2	12.5
15	13.5	14.5	13.9	13.6	12.7
18	14.2	13.6	15.0	14.5	13.5
21	15.2	15.2	16.5	15.5	14.6
24	16.6	16.2	18.7	16.9	16.0
27	18.4	17.8	21.7	18.6	17.9
30	20.4	20.4	25.0	20.3	19.7
33	23.0	23.5	29.5	22.5	22.3
36	26.1	26.1	34.0	25.5	25.4
39	29.5	30.2	38.9	28.5	28.7
42	33.6	35.0	43.6	31.9	32.4
45	37.6	39.9	48.4	35.6	36.4
48	41.9	45.3	53.3	39.3	40.4
51	46.3	50.4	58.2	43.5	44.7
54	50.8	56.2	62.6	47.7	49.0
57	55.3	62.1	65.8	52.5	53.6
60	58.7	66.8	68.3	56.6	57.7
63	62.6	70.9	70.7	61.2	61.8
66	65.8	73.9	72.8	64.4	65.2
67	66.8	75.0	73.1	65.4	65.9

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)	TC32	TC33	TC34	TC35
0	13.3	15.1	14.9	13.9
3	13.3	15.1	14.9	13.8
6	13.0	14.9	14.8	13.7
9	13.0	14.8	14.6	13.5
12	12.9	14.7	14.6	13.5
15	13.2	14.9	14.8	10.5
18	14.0	15.6	15.0	9.4
21	15.1	16.7	16.1	10.5
24	16.5	18.1	17.5	12.8
27	18.3	19.8	18.7	15.5
30	20.5	21.8	20.0	16.9
33	23.1	24.3	22.4	17.6
36	26.4	27.4	21.1	21.2
39	30.2	31.0	26.6	24.4
42	34.5	35.5	30.5	28.2
45	39.1	40.2	34.3	32.6
48	43.8	46.9	39.0	37.6
51	48.4	50.9	44.0	42.7
54	53.0	55.4	49.6	47.5
57	58.2	60.7	55.3	52.1
60	62.8	65.5	60.6	55.7
63	67.2	69.7	65.1	58.7
66	70.7	72.6	68.9	61.2
67	71.7	73.7	70.4	61.6

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)	TC28	TC29	TC30	TC31
0	14.0	14.7	13.1	13.5
3	13.9	14.8	*	13.4
6	13.8	14.6	*	13.3
9	13.9	14.5	*	13.2
12	14.3	14.7	*	13.6
15	15.7	15.3	*	13.0
18	18.7	16.7	*	15.4
21	23.8	19.0	*	19.8
24	31.0	22.7	*	25.2
27	38.6	27.3	*	31.2
30	44.5	33.1	*	36.2
33	49.7	40.2	*	42.4
36	53.5	50.0	*	48.1
39	56.8	64.8	*	51.0
42	59.6	81.2	*	55.0
45	61.9	105.4	73.1	59.2
48	64.5	187.9	83.8	62.6
51	66.5	109.9	93.7	65.9
54	68.2	*	108.0	68.3
57	70.2	*	202.4	71.1
60	71.9	*	*	73.4
67	74.7	*	*	78.8

*Thermocouple malfunction

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

Time (mins)	TC23	TC24	TC25	TC26	TC27
0	11.7	13.8	14.1	14.3	13.3
3	*	13.7	16.2	15.5	13.2
6	*	13.4	15.5	15.0	13.0
9	*	13.4	15.3	15.0	13.0
12	*	14.4	15.3	17.2	13.7
15	*	17.4	16.1	21.1	16.7
18	*	22.0	17.7	23.5	19.7
21	*	25.5	19.8	26.0	21.1
24	25.3	28.9	22.2	29.4	25.2
27	27.6	32.4	24.8	31.6	27.5
30	29.5	37.4	27.1	33.3	30.5
33	31.7	41.9	29.2	35.2	32.2
36	33.4	45.7	30.9	37.7	34.4
39	35.2	55.4	32.4	39.4	35.2
42	36.5	65.9	34.4	41.6	36.0
45	37.9	68.8	35.7	44.5	37.2
48	39.3	117.8	37.3	47.8	38.2
51	40.3	88.3	38.8	51.7	39.2
54	41.1	70.1	40.3	56.0	40.0
57	42.3	63.0	42.1	61.3	40.7
60	43.2	59.7	45.0	72.6	41.3
63	44.0	59.0	64.3	65.1	41.9
66	44.5	59.9	68.2	65.2	41.9
67	44.5	61.8	65.1	65.7	42.0

Table 9 – The temperatures recorded by the disc thermocouples used evaluate the mean and maximum temperature rise of the unexposed surface of Specimen C under the normal procedure (I_2). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC36	TC37	TC38	TC39	TC40
0	15.0	14.4	15.7	14.6	14.6
5	14.8	32.7	59.1	13.7	21.8
10	16.5	59.9	66.3	15.4	59.1
15	22.6	72.2	70.1	17.1	78.8
20	26.8	74.4	67.0	19.2	72.9
25	33.2	76.2	67.7	21.0	73.2
30	37.4	80.6	67.5	23.8	76.7
35	38.7	81.3	63.0	26.1	52.8
40	40.9	81.1	57.4	28.3	40.0
45	41.4	82.0	53.3	29.6	38.4
50	43.5	83.6	54.4	31.1	30.6
55	44.3	84.1	56.9	32.1	29.5
60	45.2	83.5	61.2	33.6	27.5
65	45.7	80.7	70.2	34.9	30.6
70	46.1	78.3	65.2	36.3	23.1
75	44.5	79.8	61.0	37.4	9.2
80	46.6	83.1	58.0	38.1	11.8
85	49.7	86.2	51.7	39.0	11.6
90	53.6	95.7	55.4	39.9	14.9
95	55.6	116.8	37.9	40.7	9.7
100	59.7	152.2	52.0	41.4	14.6
105	61.2	182.2	57.4	42.3	16.1
110	63.7	**212.8**	60.1	43.0	18.3
115	66.2	238.6	67.8	43.6	18.6
120	68.8	260.4	81.2	44.3	19.9
121	68.7	263.9	82.0	44.7	20.7

Table 10 – The temperatures recorded by the disc thermocouples used evaluate the mean and maximum temperature rise of the unexposed surface of Specimen D under the normal procedure (I_2). Values are in Degrees Celsius (°C) unless otherwise stated.

Time (mins)	TC41	TC42	TC43	TC44	TC45
0	15.4	13.6	14.8	14.1	13.3
3	16.0	18.4	30.7	14.3	13.6
6	16.7	38.7	50.7	15.2	12.3
9	20.0	61.1	57.7	17.1	12.2
11	28.0	67.4	**282.6**	26.1	11.9
12	42.9	77.3	301.1	31.7	12.1
15	48.3	94.0	387.2	32.3	12.0
18	46.5	110.5	486.3	30.4	12.6
21	48.3	138.6	566.3	29.3	14.1
24	51.0	168.1	657.3	27.9	14.0
27	53.8	186.1	722.4	27.8	14.4
30	56.6	200.7	799.8	27.4	15.3
32	*	*	*	*	*

*Specimen blanked off