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Title:

The Fire Resistance Performance Of Two, Single-Acting, Single-Leaf Doorsets, When Tested In Accordance With BS 476: Part 22: 1987, Clause 6.

Date Of Test:

18/02/2021

Issue No. 2

16/08/2021

WF Report No:

WF436874

Prepared for:

Zenova Ltd

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This report is a revision to that issued as WF 436874 and dated 15/06/2021. The details of the test report WF 436874 are held on file by Warringtonfire. The original report and any previous revisions are replaced by this revised report WF 436874 Issue 2.

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Test Specimens

Summary of the Tested Specimens

For the purposes of the test the doorsets were referenced as A and B.

Both doorsets were painted with Zenova FP paint at 1.3mm thickness.

Doorset A had overall nominal dimensions of 2075 mm high by 916 mm wide, incorporating a door leaf with overall dimensions of 1985 mm high by 813 mm wide by 46 mm thick. The leaf comprised a Nan-Ya FD30 door blank hung within a Sheerframe SR77950 frame with Sheerframe SK85128 reinforcement hung on Masterdoor HNG1333 and fitted with an engaged Winkhaus AV2 locking system, chrome lever type handles and door viewer. Self-closing was achieved using a Rutland TS3204 overhead type closer.

Doorset B had overall nominal dimensions of 2065 mm high by 916 mm wide, incorporating a door leaf with overall dimensions of 1985 mm high by 813 mm wide by 46 mm thick. The leaf comprised a Nan-Ya FD30 door blank hung within a Sheerframe SR77950 frame with Sheerframe SK85128 reinforcement hung on Masterdoor HNG1333 and fitted with an engaged Winkhaus AV2 locking system, chrome lever type handles door viewer and security chain. Self closing was achieved using a Rutland TS3204 overhead type closer.

Detailed drawings of the test specimen(s) and a comprehensive description of the test construction based on a detailed survey of the specimen(s) and information supplied by the sponsor of the test are included in the Test Specimen and Schedule of Components sections of this report.

The doorsets were stated by the client to have been removed from a pre-existing building with limited traceability, therefore not all of the information required by the standard has been provided by the client

Performance Criteria and Test Results

Test Results:	Doorset A	Doorset B
Integrity	56 minutes Sustained flaming failure	45 minutes Sustained flaming failure
Insulation	56 minutes* Due to integrity failure	45 minutes* Due to integrity failure

- Integrity: It is required that there is no collapse of the specimen, no sustained flaming on the unexposed surface and no loss of impermeability.
- Insulation: It is required that the mean temperature rise of the unexposed surface shall not be greater than 140°C and that the maximum temperature rise shall not be greater than 180°C. Insulation failure also occurs simultaneously with integrity failure.

*The test was discontinued after a period of 57 minutes

Date of Test 18/02/2021

Signatories

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* For and on behalf of **Warringtonfire**.

Report Issued: 16/08/2021

Revision History

Issue No : 2	Re-issue Date:
Revised By: C.Clifford	Approved By: F.Hashim
Reason for Revision: Inclusion of paint used on doorset, Page 21 and Page 2 Test termination time amended, Page 3	

Issue No :	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	

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Test Conditions

Standard

Clause 6 of BS 476: Part 22: 1987 'Methods for determination of the fire resistance of non-loadbearing elements of construction'.

Sampling

Warringtonfire was not involved in factory sampling of the products and materials used for the test specimen described in this report, and as such the results of this test apply to the sample as received.

Installation

The doorsets were received by the laboratory during the month of February and installed within pre-prepared apertures in a timber stud supporting construction such that the leaf of doorset A opened out away from the furnace heating conditions and the leaf of doorset B opened in towards the heating conditions of the test. At the request of the client, representatives of **Warringtonfire** conducted the installation to the client's specification

Conditioning

The specimens' storage, construction, and test preparation took place in the test laboratory. **Warringtonfire** stored the specimen in climatic conditions approximate to those in normal service.

Ambient Temperature

The ambient air temperature in the vicinity of the test construction was 14ºC at the start of the test with a maximum variation of +3ºC during the test.

Furnace

The furnace was controlled so that its mean temperature/time relationship complied with the requirements of BS 476: Part 20: 1987, Clause 3.1. using nine mineral insulated thermocouples distributed over a plane 100 ± 50 mm from the surface of the test construction.

Thermocouples

Thermocouples were provided to monitor the unexposed surface of the specimens. The output of all instrumentation was recorded at no less than one minute intervals. The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.

Radiometer

Water-cooled foil heat flux meters were used to record the heat radiation from the doorsets, the heat flux meters were positioned at mid-height at a distance of 1000 mm from the doorsets.

Furnace Pressure

After the first 5 minutes of the test, the furnace pressure was maintained such that it complied with the requirements of BS 476-20:1987 clause 3.2.2 (including allowance for transient occurrences in line with clause 12 (L)) at -4.2 ± 2 Pa with respect to atmosphere, at a point 0.5m from the notional floor level, equating to 0Pa at a point 1m above the notional floor level.

Test Specimen Drawings

Figure 1 – General Elevation of the Test Construction, Thermocouple Locations and Opening Direction

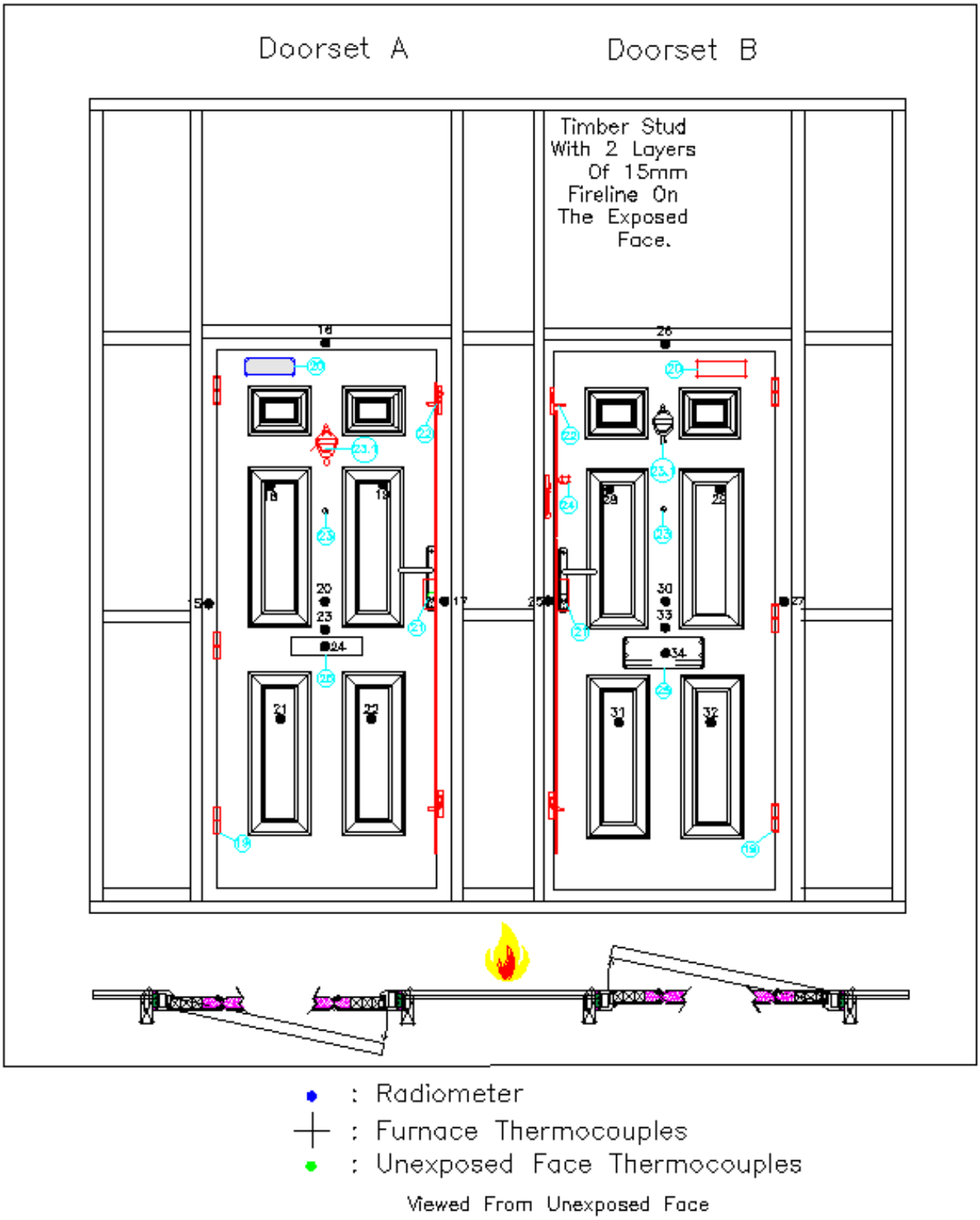


Figure 2 – General Elevation of the Test Construction – Doorset A

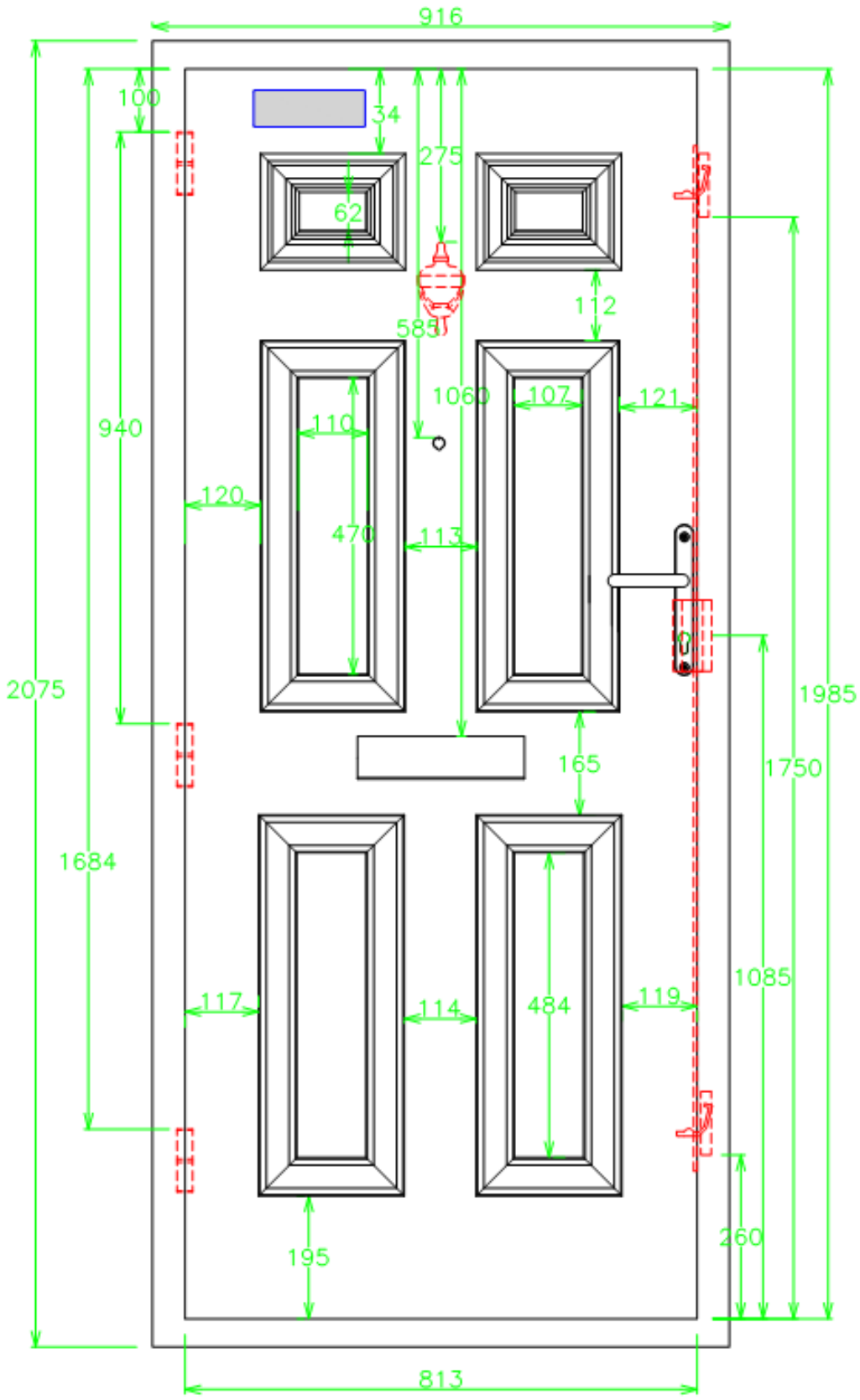


Figure 3 – General Elevation of the Test Construction – Doorset B

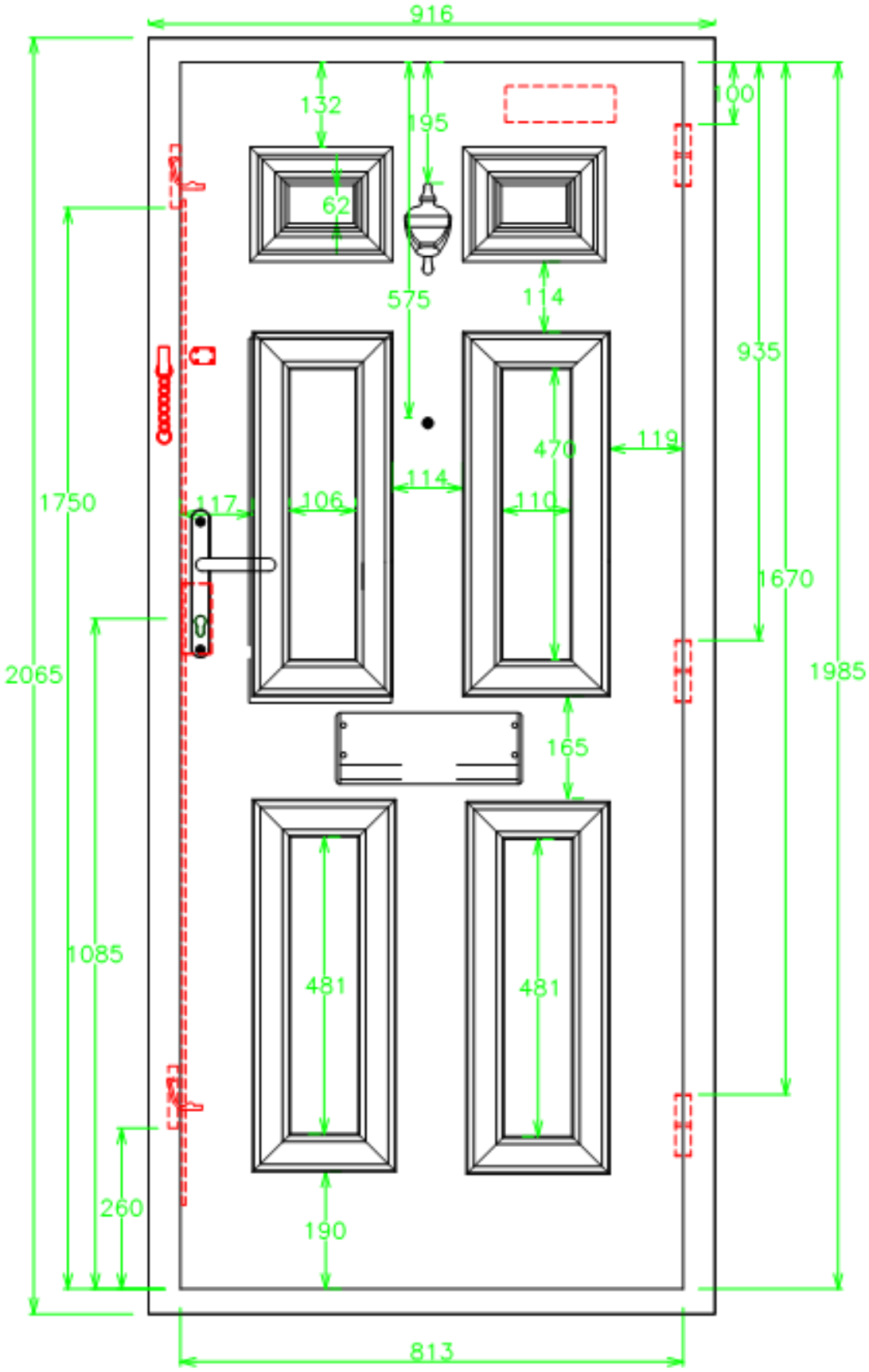


Figure 4 – Details of Door Frame, Jamb and Leaf

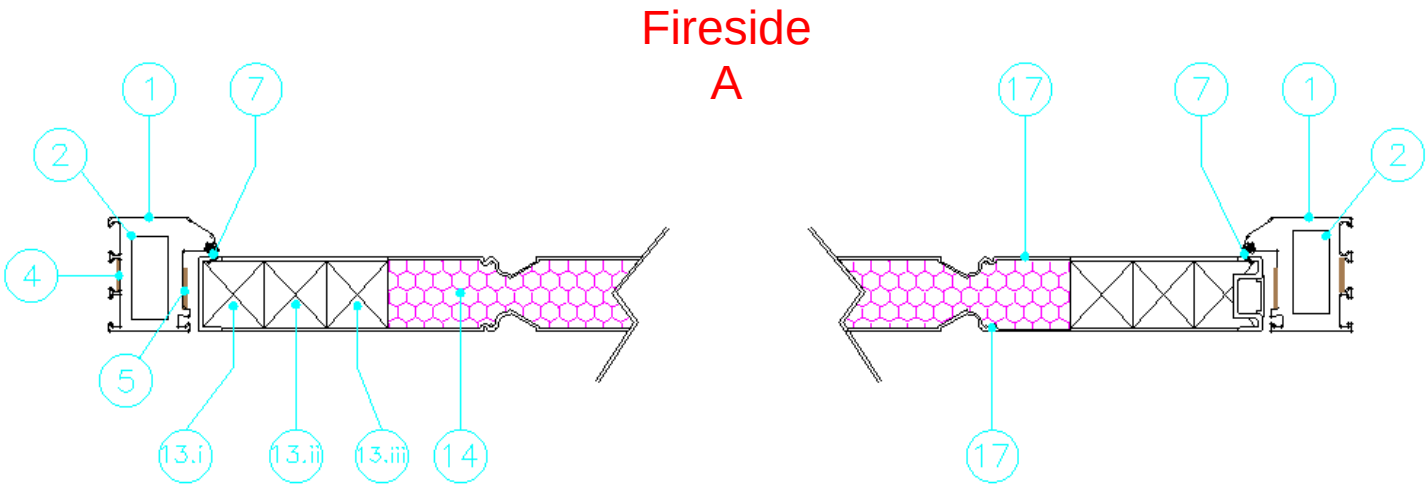


Figure 5 – Details of Door Leaf, Threshold

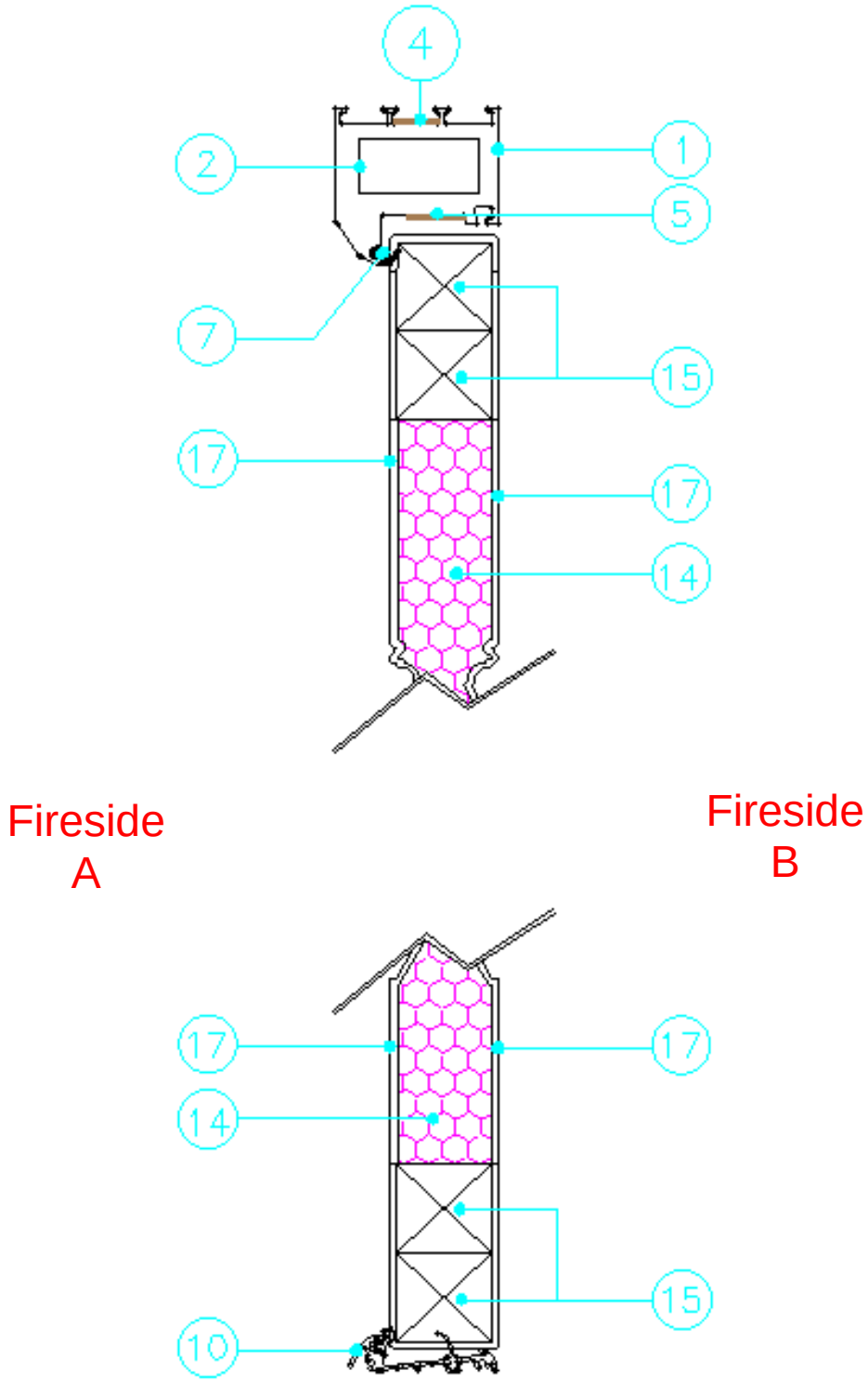
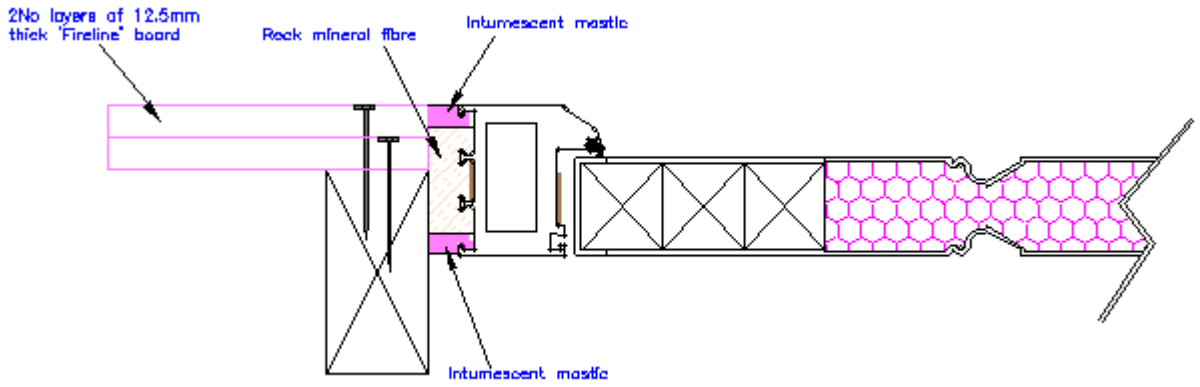
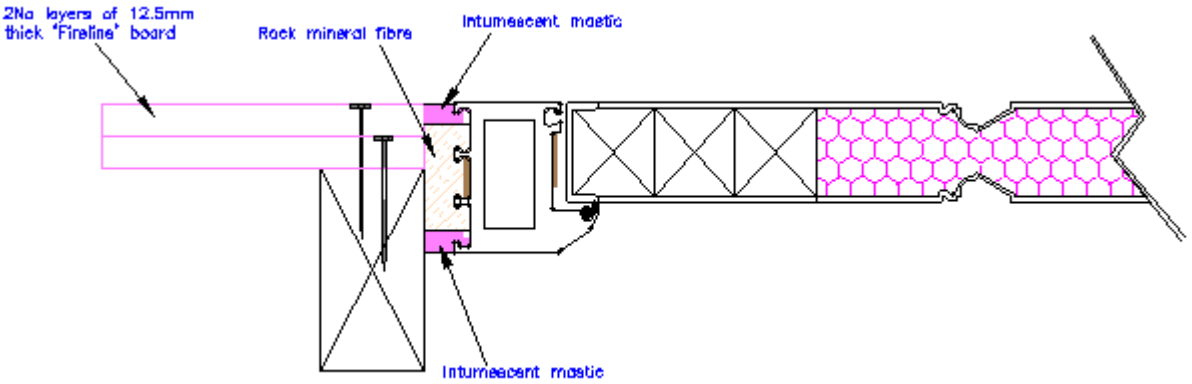


Figure 6 – Details of Supporting Construction to Frame, Fire Stopping

Doorset A



Doorset B



Schedule of Components

(Refer to Figures 1 to 5)
(All values are nominal unless stated otherwise)
* Stated by sponsor, not verified by laboratory
** The sponsor was unable to provide the information required to adequately describe the specimen(s). It should be noted that not all of the information required by the Standard has been included and the report does not, therefore, comply with the requirements of the Standard

1. Door frame	
Manufacturer	Sheerframe*
Reference	SR77950*
Material	PVC Extrusion*
Overall size	
Frame	70 mm wide x 70 mm thick with a 22mm high integral stop
Stop	22mm high integral stop
Jamb to Head jointing method, fixing detail and location	Mitred – fully fusion welded*

2. Door frame reinforcement	
Manufacturer	Sheerframe*
Reference	Ref SK5128*
Material	Steel box section*
Overall section size	30mm deep x 30mm wide x 1.5mm thick*
Fixing method and frequency	30mm deep x 30mm wide x 1.5mm thick15mm wide profiled steel brackets screwed to the back of the frame using 40mm long steel screws and to the supporting construction using 70mm steel screws*
Intumescent	??

3. Frame Fixing Method to Supporting Construction	
Manufacturer	Goldscrew
Type & material	Steel wood screws
Overall size	5mm diameter x 80mm mm long
Spacing	Fixed at 140 740 1340 and 1940 form the base of the doorset
Does the fixing penetrate intumescent seal within frame reveal	Yes
Does the fixing penetrate the reinforcement within the frame profile	Yes

4. Intumescent to rear of frame	
Manufacturer	Sealed Tight Solutions*
Reference	ST30 X 2.5*
Material	Graphite type intumescent*
Overall section size	30mm wide x 2.5mm thick*
Application method	Self-adhered*
Location (relative to the opening face of the door leaf)	Fitted at rear of the frame*

5. **Intumescent to frame reveal (1)**	
Manufacturer	Sealed Tight Solutions
Reference	ST32 x 2.5
Material	Graphite type intumescent
Overall section size	32 mm wide x 2.5mm thick
Application method	Self-adhered
Location (relative to the opening face of the door leaf)	Fitted in frame reveal 39mm from the exposed face

7. Smoke seal to frame reveal (1)	
Manufacturer	Schlegal Q-Lon
Reference	5473045
Material	Unknown polymeric material**
Overall section size	10 mm wide x 5mm high
Application method	Unknown**
Location	Fitted in the upstand groove of the stop

10. Threshold	
Manufacturer	Masterguard*
Reference	Unknown**
Material	Extruded aluminium*
Overall section size	75mm deep x25mm high*
Fixing method, location and fixing details	Unknown**
Seal 1 within threshold profile	
Type	Unknown**
Manufacturer	Unknown**
Overall size	Unknown mm wide x Unknown mm high**
Spacing	Unknown**
Fixing method	Unknown**
Seal 2 within threshold profile	
Type	Unknown**
Manufacturer	Unknown**
Overall size	Unknown mm wide x Unknown mm high**
Spacing	Unknown**
Fixing method	Unknown**
Presence of sealants	Unknown**
Presence of Adhesives	Unknown**

Fire Stopping

11. Frame to supporting construction fire stopping detail	
Manufacturer	Blue 60*
Reference	Fire Rated Frame Foam*
Material	Expanding foam*
Overall dimension	7 – 15 mm wide x full depth of frame
Application method	Gun*

Door Leaf

12. Door Leaf	
Manufacturer (blank)	Nan Ya FD30*
Reference	Unknown**
Quantity of leaves on doorset	1*
Overall leaf size prior to trimming	Unknown**
Overall leaf size supplied for testing	Unknown**
Location trimming was performed and by how much	Unknown**

13. Stiles	
Manufacturer	Unknown**
Reference	Unknown**
Material	
I. Outer	Mixed wood finger jointed lamels*
II. Middle	Mixed wood finger jointed lamels*
III. Inner	Mixed wood finger jointed lamels*
Density	
I. Outer	640 kg/m^3*
II. Middle	640 kg/m^3*
III. Inner	640 kg/m^3*
Moisture content	
I. Outer	10.1%*
II. Middle	10.1%*
III. Inner	10.1%*
Overall size	
I. Outer	41 mm wide x 38mm thick*
II. Middle	41 mm wide x 38mm thick*
III. Inner	41 mm wide x 38mm thick*
Adhesives	
Manufacturer	
Type	Unknown**
Reference	Unknown**
Curing method	Unknown**
Application method	Unknown**
Presence of Mechanical Fixings	Unknown**

14. Core element (1)	
Manufacturer	Nan Ya*
Reference	Unknown**
Material	Phenolic foam*
Location	
Density	75 kg/m^3*
Overall thickness and reduced thickness if door leaf incorporates fielded areas	38mm thick reduced to 15mm local to fielded areas*
Application method	Unknown**
Adhesives	Unknown**
Presence of Mechanical Fixings	Unknown**

15. Rails	
Manufacturer	Unknown**
Reference	Unknown**
Material	Unknown**
Top outer	Mixed wood finger jointed lamels*
Top inner	Mixed wood finger jointed lamels*
Mid	Mixed wood finger jointed lamels*
Bottom outer	Mixed wood finger jointed lamels*
Bottom inner	Mixed wood finger jointed lamels*
Density	
Top outer	640 kg/m^3*
Top inner	640 kg/m^3*
Mid	640 kg/m^3*
Bottom outer	640 kg/m^3*
Bottom inner	640 kg/m^3*
Moisture content	
Top outer	10.6%*
Top inner	10.6%*
Mid	10.6%*
Bottom outer	10.6%*
Bottom inner	10.6%*
Overall size	
Top outer	41 mm wide x 38mm thick*
Top inner	41 mm wide x 38mm thick*
Mid	41 mm wide x 38mm thick*
Bottom outer	41 mm wide x 38mm thick*
Bottom inner	41 mm wide x 38mm thick*
Adhesives	Unknown**
Presence of Mechanical Fixings	Unknown**

17. Facings	
Manufacturer	Unknown**
Reference	Unknown**
Material	Moulded GRP8*
Location	Fitted to both sides of the door leaf*
Overall thickness and reduced thickness if door leaf incorporates fielded areas	3mm thick
Application method	Unknown**
Adhesives	Unknown**

18. Leaf intumescent	
Quantity	2*
Manufacturer	Sealed Tight Solutions*
Reference	ST25 X 2.5*
Material	Graphite type intumescent*
Overall section size	25mm wide x 2.5mm thick*
Application method	Self-adhered*
Location (relative to the opening face of the door leaf)	Fitted one on top of the other in the leaf head*

Hardware

19. Hinges	
Supplier	Masterdor butt type hinges*
Reference	HNG13338*
Quantity	3*
Primary material	Steel*
Size	
i. knuckle	Unknown diameter x 102mm high **
ii. blades	100 mm high x 40mm wide x 1mm thick*
Fixings	
i. type	Unknown**
ii. material	Unknown**
iii. sizes	Unknown dimensions**
iv. number off per blade	4 per blade*
Position of each hinge relative to the head of the leaf	Fitted 100mm, 940mm and 1684mm from leaf head*
Details of intumescent protection	None fitted
Interruptions to Intumescent within the frame reveal	The hinge blade fully interrupts the seal in the frame reveal*

20. Door Closer	
Manufacturer	Rutland*
Reference	TS3204*
Material	
Body	Unknown**
Closer arm	Unknown**
Cover	Unknown**
Configuration	Unknown**
Overall size	
Body	200 mm high x 59 footprint size
Cover	Unknown**
Fixing method	Unknown**

21. Lockset / Latch	
Manufacturer	Winkhaus
Reference	Winkhaus AV2 multi point lock / latch with Eurocylinder
Material	Unknown**
Lockcase	Unknown**
Forend plate	1768 x 20 forend size, 230 x 26 centre keep size
Latch bolt	Unknown**
Lock bolt	
Top and bottom lock case	Unknown**
Top and bottom lock bolts	Unknown**
Overall sizes	
Central Lockcase	Unknown dimensions**
Forend plate	Unknown dimensions**
Latch bolt	Unknown dimensions**
Lock bolt	Unknown dimensions**
Top and bottom lock case	Unknown dimensions**
vi. Top and bottom lock bolts	Unknown dimensions**
Fixing method	Unknown**
Operation of latch bolt	Unknown**
Operation of lock bolt	Unknown**
Operation of Top and bottom lock bolts	Unknown**
Details of intumescent protection	Unknown**
Central lockcase	Unknown**
Top and bottom lock case	Unknown**
Forend plate	Unknown**
Interruptions to Intumescent within the frame reveal	STS Graphite 1mm thick encasing latch body, under latch forend
Forend plate	None fitted
Location of centre of the spindle relative to the bottom of the leaf	Centre of the lock/ latch fitted approx. 1000mm from the threshold of the leaf

22. Keeps	
Manufacturer	Winkhaus
Reference	Winkhaus AV2 multi point lock / latch with Eurocylinder
Material	
Centre Strike Plate and Keep	230mm x 26mm
Top and Bottom Strike Plate and Keep	175mm x 24mm
Overall sizes	175mm x 24mm
Centre Strike Plate	Unknown mm high x Unknown mm wide x Unknown mm deep**
Centre Keep Plate	Unknown dimensions**
Top and Bottom Strike Plate	Unknown dimensions**
Top and Bottom Keep Plate	175mm high x 24 mm wide x unknown thickness**
Fixing method	
Centre Strike Plate and Keep	Unknown**
Top and Bottom Strike Plate and Keep	Unknown**
Details of intumescent protection	None fitted

23. Door viewer	Doorset A
Manufacturer	Unknown**
Reference	Unknown**
Material	Unknown**
Overall size	
Body	Unknown dimensions**
Footprint	Unknown dimensions**
Cut out	Unknown dimensions**
Fixing method	Through bolt
Location	Fitted centrally 275mm form the head of Doorset A and 575mm from the head of Doorset B
Details of intumescent protection	None fitted

23.1 Door knocker with integrated viewer	
Manufacturer	Unknown**
Reference	Unknown**
Material	Unknown**
Overall size	
Body	Unknown dimensions**
Footprint	Unknown dimensions**
Cut out	Unknown dimensions**
Fixing method	Through bolt
Location	Fitted centrally 275mm form the head of Doorset A and 575mm from the head of Doorset B
Details of intumescent protection	None fitted

24. Security Chain	Doorset B
Manufacturer	Unknown**
Reference	Unknown**
Material	Unknown**
Face plate to leaf	Unknown**
Face plate to frame	Unknown**
Chain	Unknown**
Overall size	
Face plate to leaf	Unknown dimensions**
Face plate to frame	Unknown dimensions**
Location	Fitted on the exposed face of Doorset B
Fixing method	Unknown**
Details of intumescent protection	Unknown**

25. Letter plate	
Manufacturer	Unknown**
Reference	Unknown**
Material	Unknown**
Overall size	
Footprint	300 mm wide x 70 mm high
Channel	Unknown dimensions**
Cut out	Unknown dimensions**
Location	Fitted 1060 mm from the head of the leaf
Fixing method	Unknown**
Details of intumescent protection	Unknown**

Presence of Paint	
Location	Covering both sides of door faces, edges of doors and frames*
Manufacturer	Zenova Ltd.*
Type	Intumescent paint*
Reference	Zenova FP*
Curing method	2 Hours per coat under controlled temperature*
Application method	Brush, roller or sprayed*
Nominal thickness	1.3 mm*

Photographs of Components

Hinge intumescent interruption

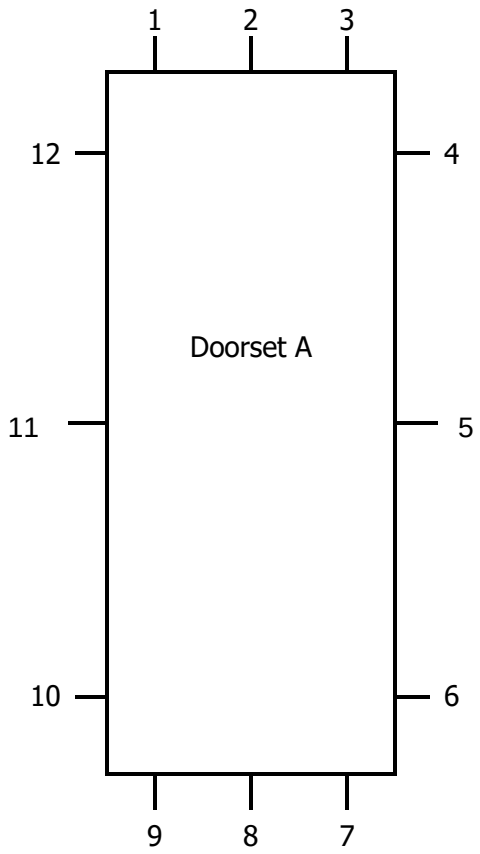
Security chain

Letter plate

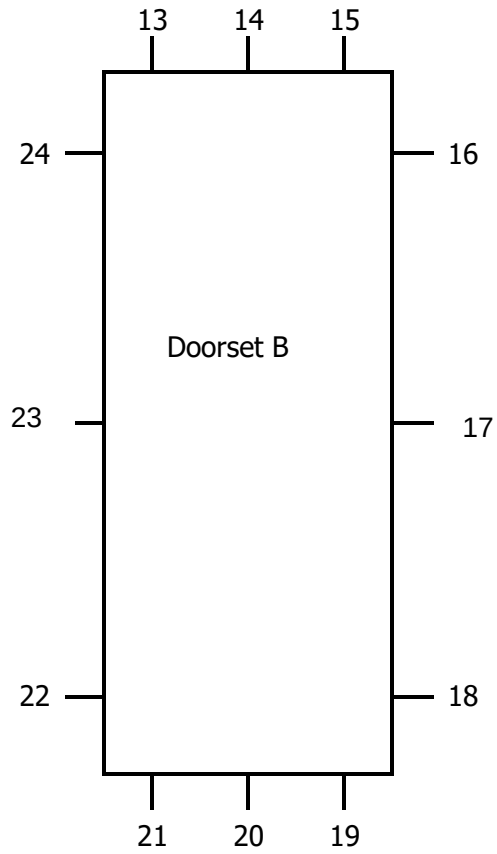
Eye Viewer

Door knocker with integrated viewer

Doorset Clearance Gaps



View from unexposed face



View from unexposed face

Door Ref	Gap Dimension in mm at Positions											
A	1	2	3	4	5	6	7*	8*	9*	10	11	12
	1.8	1.7	1.9	2.9	2.7	3.3	3.7	3.4	3.5	4.74	4.7	4.9
B	13	14	15	16	17	18	19*	20*	21*	22	23	24
	3.1	2.7	2.1	6.5	5.0	3.4	3.1	3.1	3.5	4.1	3.7	3.6

A	Mean	3.2	Maximum	4.9	Minimum	1.7
B	Mean	3.8	Maximum	6.5	Minimum	2.1

Door Ref	Gap Between Face of Leaf and Doorstop in mm at Position											
A	1	2	3	4	5	6	7*	8*	9*	10	11	12
	4.1	4.2	4.3	4.3	4.1	4.4	#	#	#	4.1	4.2	4.3
B	13	14	15	16	17	18	19*	20*	21*	22	23	24
	4.1	4.1	4.0	3.9	4.1	4.1	#	#	#	4.0	4.1	4.3

A	Mean	4.2	Maximum	4.4	Minimum	4.1
B	Mean	4.1	Maximum	4.3	Minimum	3.9

Door Ref	Gap Between Doorframe and Supporting construction in mm at Position											
A	1	2	3	4	5	6	7*	8*	9*	10	11	12
	8.0	10.0	11.0	12.0	9.0	6.0	#	#	#	11.0	13.0	9.0
B	13	14	15	16	17	18	19*	20*	21*	22	23	24
	7.0	8.0	9.0	12.0	12.0	15.0	#	#	#	16.0	15.0	15.0

A	Mean	9.9	Maximum	13.0	Minimum	6.0
B	Mean	12.1	Maximum	16.0	Minimum	7.0

* Dimension not included in calculations at the bottom
# Gap not measured

DO NOT SCALE
ALL DIMENSIONS ARE IN mm

Test Observations

Time (minutes)	Comments
00:00	Test Started
02:30	Doorset B. There is smoke issuing from the door knocker
03:00	Doorset A. There is smoke issuing from the viewing hole
04:40	Doorset A. There is smoke issuing at the letter plate, at the top hinge position, and at the top latch position
05:30	Doorset B. There is smoke issuing at the top hanging corner and at the letter plate
07:10	Doorset A. There is an increase in the smoke issuing from the middle latch position to the top closing corner, and at and around the top hinge position and the top hanging corner
08:19	Doorset A. There is smoke issuing between the middle hinge position and the top hinge position
08:30	Doorset B. There is smoke issuing at the latch position
10:30	Doorset B. There is discolouration at the top closing corner and at the top hanging corner
11:06	Doorset A. There is discolouration at the top hinge position and an increase in the smoke issuing from the middle hinge position to the top hanging corner
12:40	Doorset A. There is intermittent flaming approximately 200mm below the middle hinge position
13:49	Doorset A. A cotton pad integrity test was performed at the middle hinge position which did not result in the ignition of the cotton pad. No failure
15:11	Doorset A. A cotton pad integrity test was performed at the middle hinge position which did not result in the ignition of the cotton pad. No failure
16:15	Doorset A. A cotton pad integrity test was performed at the middle hinge position which did not result in the ignition of the cotton pad. No failure
18:05	Doorset A. A cotton pad integrity test was performed at the middle hinge position which did not result in the ignition of the cotton pad. No failure
19:04	Doorset A. A cotton pad integrity test was performed at the middle hinge position which did not result in the ignition of the cotton pad. No failure
19:49	Doorset A. A cotton pad integrity test was performed at the middle hinge position which did not result in the ignition of the cotton pad. No failure
21:21	Doorset A. A cotton pad integrity test was performed at the middle hinge position which did not result in the ignition of the cotton pad. No failure
21:31	Doorset A. There is intermittent flaming above the letter plate
22:55	Doorset A. A cotton pad integrity test was performed above the letter plate which did not result in the ignition of the cotton pad. No failure
23:00	Doorset B. There is an increase in the discolouration at the top closing corner, at the top hanging corner, at the latch position, and along the head
25:20	Doorset A. The intumescent has not reacted below the bottom hinge position (see photo)

28:00	Doorset A. There is an increase in the discolouration above the letter plate Doorset B. There is an increase in the discolouration at the top hinge position and at the top hanging edge
33:48	Doorset B. There is intermittent flaming at the bottom hanging corner
34:46	Doorset B. A cotton pad integrity test was performed at the bottom hanging corner which did not result in the ignition of the cotton pad. No failure
35:16	Doorset B. A cotton pad integrity test was performed at the bottom hanging corner which did not result in the ignition of the cotton pad. No failure at 35:31
37:40	Doorset A. There is an increase in the discolouration and the smoke issuing at the middle latch position
38:55	Doorset B. A cotton pad integrity test was performed at the bottom hanging corner which did not result in the ignition of the cotton pad. No failure
39:10	Doorset A. There is a glow visible at the middle latch position
39:38	Doorset B. A cotton pad integrity test was performed
43:00	Doorset A. There is an increase in the discolouration and the smoke issuing at the threshold
44:20	Doorset A. There is an increase in the discolouration and the smoke issuing at the top latch position
45:18	Doorset B. There is continuous flaming at the threshold therefore constituting **integrity failure**
49:10	Both doorsets. There is an increase in the smoke issuing and discolouration at the top hinge position
55:40	Doorset B. There is intermittent flaming at the top hanging corner jam
55:48	Doorset B. There is continuous flaming at the top hanging corner jam therefore constituting **further integrity failure**
55:50	Doorset A. A cotton pad integrity test was performed at the top closing corner jam which did not result in the ignition of the cotton pad. No failure
56:00	Doorset B. There is continuous flaming at the middle of the jam therefore constituting **further integrity failure**
56:22	Doorset A. There is continuous flaming at the centre of the jam therefore constituting **integrity failure**
57:00	Test termination

Test Photographs

The unexposed face of the doorsets prior to testing

The unexposed face of the doorsets after a test duration of 10 minutes

The unexposed face of the doorsets after a test duration of 20 minutes

The unexposed face of the doorsets after a test duration of 30 minutes

The unexposed face of the doorsets after a test duration of 40 minutes

The unexposed face of the doorsets after a test duration of 56 minutes

Temperature and Deflection Data

Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard

Time	Mean Furnace	ISO 834
min	°C	°C
0	20	20
1	335	349
2	421	445
3	499	502
4	555	544
5	582	576
6	589	603
7	620	626
8	642	645
9	658	663
10	671	678
11	693	693
12	717	705
13	722	717
14	734	728
15	751	739
16	748	748
17	764	757
18	777	766
19	775	774
20	778	781
21	786	789
22	783	796
23	796	802
24	801	809
25	806	815
26	799	820
27	819	826
28	816	831

Time	Mean Furnace	ISO 834
min	°C	°C
29	828	837
30	839	842
31	841	847
32	848	851
33	848	856
34	857	860
35	865	865
36	870	869
37	865	873
38	874	877
39	885	881
40	880	885
41	890	888
42	891	892
43	895	896
44	893	899
45	895	902
46	903	906
47	905	909
48	901	912
49	909	915
50	916	918
51	920	921
52	922	924
53	925	927
54	919	930
55	933	932
56	925	935
57	933	938

Individual And Mean Temperatures Recorded On The Unexposed Surface Of Doorset A

Time	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Mean
min	°C	°C	°C	°C	°C	°C
0	15	15	14	13	13	14
1	15	15	14	14	13	14
2	15	15	14	14	13	14
3	15	15	14	14	14	14
4	16	15	15	14	14	15
5	21	16	19	17	14	17
6	27	17	23	21	15	21
7	32	21	28	26	18	25
8	36	26	33	31	22	30
9	41	31	37	35	27	34
10	44	35	40	39	32	38
11	47	40	42	43	36	42
12	50	43	44	46	40	45
13	52	47	45	48	43	47
14	54	50	47	50	46	49
15	56	52	49	52	49	52
16	57	54	51	54	51	53
17	59	56	53	55	52	55
18	60	57	54	56	54	56
19	61	59	56	58	55	58
20	62	60	57	59	56	59
21	63	61	59	60	58	60
22	64	62	60	61	59	61
23	65	63	61	62	60	62
24	66	64	62	63	61	63
25	67	65	63	64	62	64
26	68	66	65	65	63	65
27	69	66	66	66	64	66
28	70	67	67	68	64	67
29	72	68	69	69	65	69
30	73	68	70	71	66	70
31	74	69	71	73	67	71
32	75	70	72	74	68	72
33	76	70	73	49	69	67
34	78	71	73	33	70	65
35	79	71	74	25	71	64
36	80	72	75	21	73	64
37	82	72	76	18	74	64
38	83	73	77	17	74	65
39	85	74	77	16	75	65
40	86	75	78	15	76	66
41	88	76	78	15	76	67
42	89	78	79	15	77	68
43	90	79	79	15	77	68
44	92	80	80	15	78	69
45	92	82	61	15	78	66

Time	Chan 18	Chan 19	Chan 20	Chan 21	Chan 22	Mean
min	°C	°C	°C	°C	°C	°C
46	93	83	44	15	79	63
47	94	84	33	15	65	58
48	95	84	26	15	51	54
49	96	85	21	15	43	52
50	97	85	17	15	37	50
51	98	85	14	15	33	49
52	99	85	13	15	31	49
53	99	85	13	15	29	48
54	100	85	12	15	28	48
55	101	85	12	15	27	48
56	102	85	12	15	27	48
57	104	84	12	15	27	48

Individual Temperatures Recorded On The Frame Of Doorset A

Time	Chan 15	Chan 16	Chan 17
min	°C	°C	°C
0	13	15	14
1	13	15	14
2	13	15	14
3	13	15	14
4	13	15	14
5	14	16	14
6	14	17	14
7	14	17	15
8	14	19	15
9	15	20	17
10	16	22	18
11	17	23	20
12	18	24	23
13	20	25	26
14	23	26	29
15	25	27	32
16	27	28	35
17	30	29	36
18	33	30	37
19	36	31	38
20	40	33	39
21	45	34	40
22	48	35	41
23	52	37	43
24	56	39	44
25	59	40	46
26	62	42	48
27	66	44	50
28	68	46	52

Time	Chan 15	Chan 16	Chan 17
min	°C	°C	°C
29	71	49	55
30	73	51	58
31	75	55	60
32	78	58	62
33	80	61	64
34	82	64	65
35	85	66	67
36	87	68	70
37	89	70	72
38	92	71	74
39	94	72	77
40	95	73	80
41	86	74	85
42	85	74	89
43	87	75	94
44	90	76	98
45	94	77	101
46	98	77	99
47	100	78	69
48	105	79	48
49	75	81	34
50	46	82	26
51	30	84	21
52	22	86	18
53	18	88	16
54	15	90	15
55	14	92	14
56	14	94	14
57	14	94	14

Individual Temperatures Recorded On The Letter Plate And 25 mm Above The Letter Plate Of Doorset A

Time	Chan 23	Chan 24
min	°C	°C
0	14	14
1	14	15
2	14	17
3	14	23
4	17	94
5	25	95
6	31	94
7	40	93
8	47	89
9	50	86
10	51	81
11	52	83
12	54	85
13	55	84
14	56	87
15	57	93
16	58	97
17	60	103
18	62	111
19	63	121
20	66	128
21	69	141
22	71	141
23	73	148
24	76	152
25	78	151
26	80	147
27	83	143
28	85	138

Time	Chan 23	Chan 24
min	°C	°C
29	88	135
30	91	133
31	91	132
32	81	132
33	84	134
34	86	136
35	87	139
36	88	141
37	88	144
38	89	146
39	89	148
40	90	150
41	91	152
42	92	154
43	94	156
44	96	157
45	86	159
46	52	161
47	34	162
48	24	164
49	19	166
50	16	167
51	15	169
52	14	171
53	14	172
54	14	174
55	14	176
56	13	177
57	13	179

Individual And Mean Temperatures Recorded On The Unexposed Surface Of Doorset B

Time	Chan 28	Chan 29	Chan 30	Chan 31	Chan 32	Mean
min	°C	°C	°C	°C	°C	°C
0	16	16	14	14	13	15
1	16	16	14	14	14	15
2	16	16	14	14	14	15
3	17	16	14	14	14	15
4	24	19	15	15	15	18
5	34	24	15	20	21	23
6	44	31	16	27	28	29
7	50	37	18	33	35	35
8	54	42	22	39	41	40
9	58	46	26	43	45	44
10	60	49	30	46	48	47
11	62	51	34	49	51	49
12	63	37	37	50	53	48
13	64	23	39	52	54	46
14	65	17	42	53	55	46
15	66	15	44	53	56	47
16	66	14	45	54	57	47
17	67	13	47	55	57	48
18	67	13	48	55	58	48
19	67	13	49	56	58	49
20	52	13	50	56	59	46
21	33	13	51	57	59	43
22	23	13	52	58	60	41
23	19	13	52	58	61	41
24	16	13	53	59	62	41
25	16	13	31	60	63	37
26	15	13	19	61	64	34
27	15	13	15	62	65	34
28	14	13	13	64	66	34
29	14	13	13	65	67	34
30	14	13	12	66	69	35
31	14	13	12	67	70	35
32	14	13	12	69	72	36
33	14	13	12	70	73	36
34	14	13	12	72	74	37
35	14	13	12	73	76	38
36	14	13	12	74	77	38
37	14	13	12	76	78	39
38	14	13	12	77	79	39
39	15	13	12	78	80	40
40	15	13	12	79	81	40
41	15	13	12	79	82	40
42	15	13	12	80	82	40
43	15	13	12	80	82	40
44	15	13	11	81	83	41

Time	Chan 28	Chan 29	Chan 30	Chan 31	Chan 32	Mean
min	°C	°C	°C	°C	°C	°C
45	15	13	12	82	84	41
46	15	13	11	83	85	41
47	15	13	11	83	87	42
48	15	13	11	84	89	42
49	15	13	11	85	91	43
50	15	13	11	87	94	44
51	15	13	11	89	96	45
52	15	13	11	92	98	46
53	15	13	11	93	101	47
54	15	13	12	92	103	47
55	15	13	12	96	108	49
56	15	16	12	99	114	51
57	17	18	13	102	121	54

Individual Temperatures Recorded On The Frame Of Doorset B

Time	Chan 25	Chan 26	Chan 27
min	°C	°C	°C
0	14	15	14
1	14	15	14
2	14	15	14
3	14	16	14
4	14	16	14
5	15	18	14
6	16	19	14
7	16	20	15
8	18	20	16
9	19	21	16
10	21	22	17
11	23	23	19
12	25	24	20
13	28	25	22
14	30	27	24
15	32	28	26
16	34	30	28
17	36	32	30
18	38	34	32
19	40	35	34
20	42	38	36
21	43	40	38
22	45	43	40
23	46	45	42
24	48	48	44
25	49	50	45
26	51	51	47
27	52	52	48
28	53	53	49

Time	Chan 25	Chan 26	Chan 27
min	°C	°C	°C
29	54	53	51
30	56	54	52
31	57	55	53
32	59	56	42
33	60	57	33
34	62	58	32
35	63	60	24
36	65	60	20
37	66	62	18
38	68	61	16
39	69	40	15
40	71	29	14
41	73	23	13
42	76	19	13
43	78	17	13
44	81	17	12
45	84	16	12
46	85	16	12
47	80	16	12
48	75	16	12
49	54	16	12
50	34	16	12
51	23	16	12
52	18	17	12
53	15	17	12
54	13	17	12
55	13	17	12
56	13	17	13
57	13	17	15

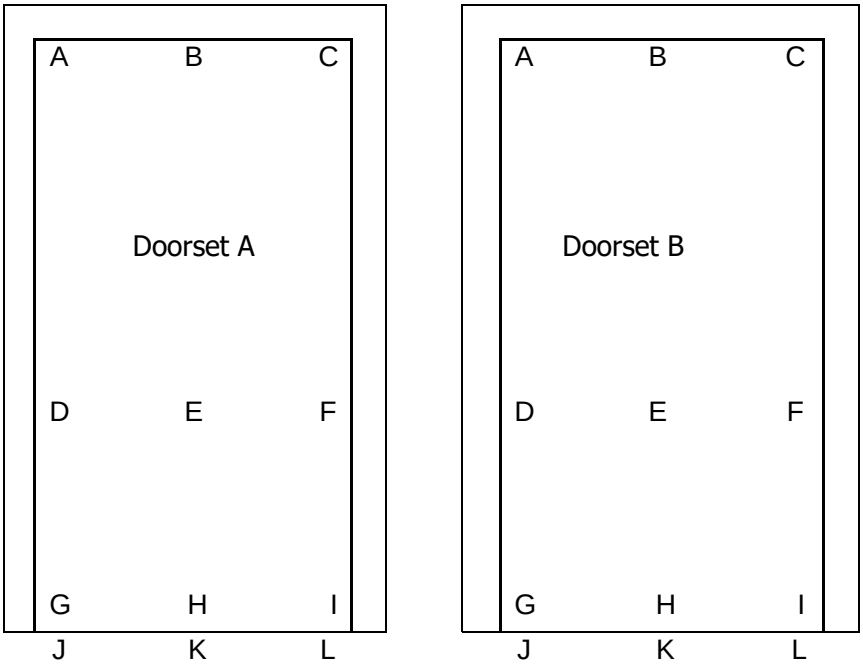
Individual Temperatures Recorded On The Letter Plate And 25 mm Above The Letter Plate Of Doorset A

Time	Chan 33	Chan 34
min	°C	°C
0	14	15
1	14	15
2	14	15
3	14	16
4	14	29
5	15	50
6	18	63
7	23	71
8	28	69
9	33	67
10	37	65
11	40	63
12	43	62
13	46	60
14	49	59
15	51	58
16	52	58
17	54	59
18	55	59
19	56	60
20	57	61
21	58	63
22	59	64
23	59	65
24	60	67
25	60	68
26	61	70
27	61	73
28	44	75

Time	Chan 33	Chan 34
min	°C	°C
29	27	77
30	19	79
31	16	82
32	14	84
33	13	86
34	13	88
35	13	91
36	13	93
37	13	96
38	13	99
39	13	101
40	13	103
41	13	106
42	13	108
43	13	111
44	13	114
45	13	116
46	13	118
47	13	121
48	13	123
49	13	126
50	13	128
51	13	130
52	13	132
53	13	134
54	13	136
55	13	137
56	14	139
57	16	141

Deflections Of The Doorsets During The Test

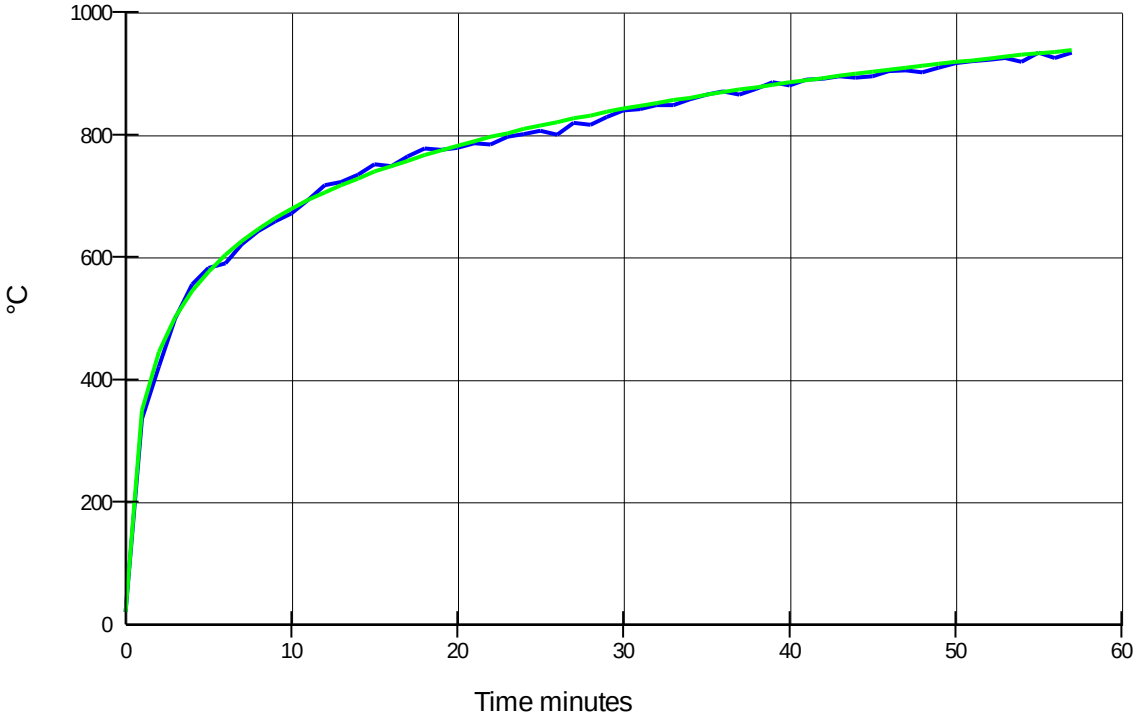
Deflections of the Doorsets During the Test



Doorset A												
Deflections – mm												
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L
0	0	0	0	0	0	0	0	0	0	0	0	0
10	2	4	6	3	6	4	1	1	3	-3	-3	-3
20	5	6	11	1	-1	0	5	-3	5	0	0	0
30	-	-	-	-	-	-	-	-	-	0	0	0

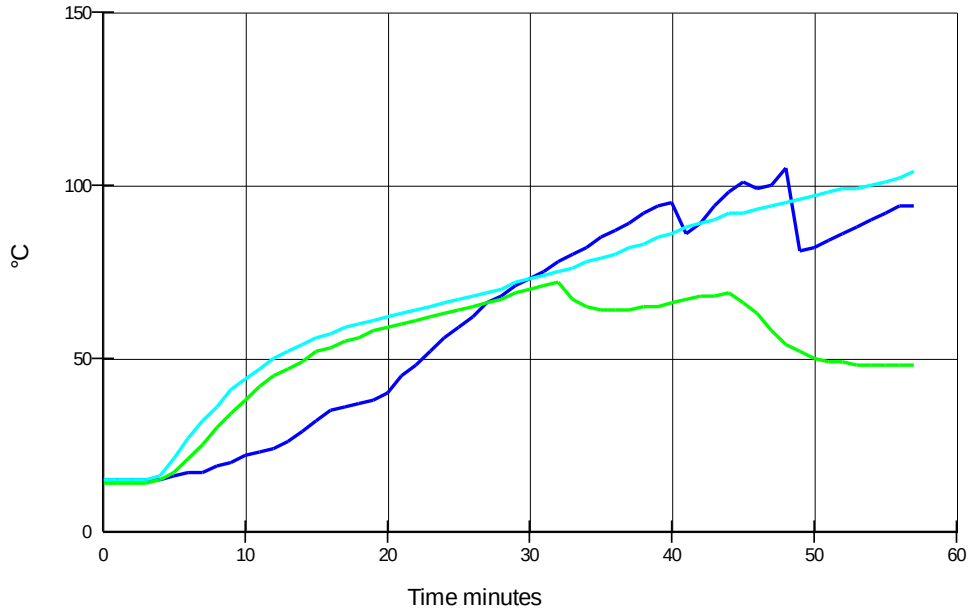
Doorset b												
Deflections – mm												
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L
0	0	0	0	0	0	0	0	0	0	0	0	0
10	6	6	5	3	4	2	2	1	3	-9	-8	-10
20	10	6	5	-2	-6	-1	-5	4	7	-7	-5	-6
30	-	-	-	-	-	-	-	-	-	-7	-5	-4

Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard



Blue line – Mean furnace temperature
Green line – ISO 834 Time/temperature curve

Graph Showing Mean Leaf and Maximum Doorset Temperatures Recorded on The Unexposed Surface of Doorset A

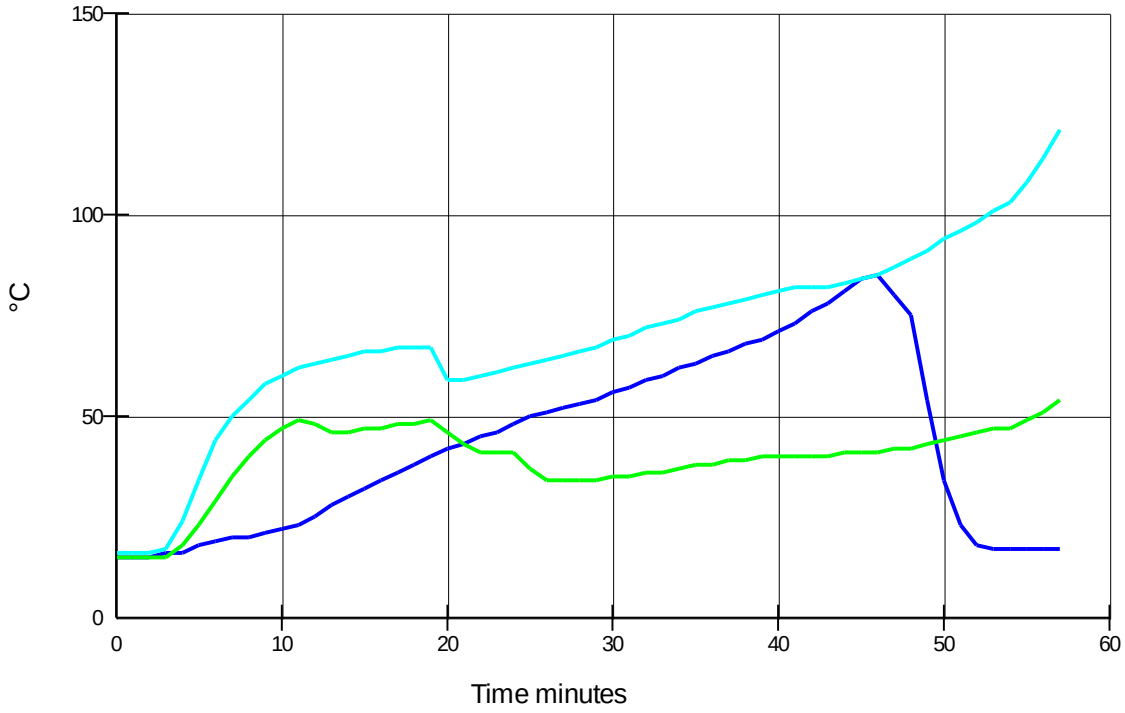


Blue line – Maximum temperature recorded on frame of the doorset

Green line – Mean temperature recorded on the leaf of the doorset

Light blue line – Maximum temperature recorded on the leaf of the doorset

Graph Showing Mean Leaf and Maximum Doorset Temperatures Recorded on The Unexposed Surface of Doorset B



Blue line – Maximum temperature recorded on frame of the doorset

Green line – Mean temperature recorded on the leaf of the doorset

Light blue line – Maximum temperature recorded on the leaf of the doorset

On-going Implications

Limitations

The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

The results of this test were obtained using the specimens provided for testing, and the door to frame gaps recorded in section 5.4 of this report. Further, where information in relation to the specimen has been provided to us but not verified by us, we have assumed that it is correct; and where comments above identify particular materials or substances comprised in the specimen those comments are based on information supplied to us and/or on general visual inspection undertaken during the process of testing of the sample, and in either case have not been verified by reference to materials testing or documentary evidence except as described above. The fire resistance performance of doors of this design may be different if any aspect of the design or construction differs from that tested. This includes, by way of example only, any difference as a result of (i) any deviation from the information supplied to us, or (ii) the employment of different door to frame gaps. The tested assembly was asymmetrical and was tested such that the door leaf of doorset A opened away from the heating conditions and the door leaf of doorset B opened towards the heating conditions of the test. The test result may not be appropriate to situations where by the samples tested have been installed in a different configuration to that which they are tested.

Review

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. No assurance can be given that this test or its results will reflect current practice, and/or be consistent with prevailing legislative / regulatory requirements, at any time after the date of this report. Warringtonfire will be able to offer the addressee of this report, at any time on request, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report. It is strongly recommended that, at the latest, such a review be sought at intervals of no more than five years.

Fire Test Study Group / EGOLF

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