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Title:

The fire resistance performance of two single-acting, single-leaf doorsets incorporating various items of hardware tested in accordance with BS EN 1634-1:2014

Report No:

348445/R Issue 2



Prepared for:

Simonswerk UK Ltd.
Burcott Works,
Spring Street,
Tipton,
West Midlands,
DY4 8TF.

Date: 11th August 2021

Notified Body No:

UKAS TESTING
0249

Summary

Objective

To determine the fire resistance performance of two single-acting, single-leaf timber based doorsets incorporating various items of hardware, mounted within a low density rigid supporting construction in accordance with BS EN 1634-1: 2014.

Test Sponsor

Simonswerk UK Ltd. Burcot Works, Spring Street, Tipton, West Midlands, DY4 8TF.

Summary of Tested Specimens

For the purpose of the test the doorsets were referenced Doorset A and Doorset B.

Doorset A (30 minute) briefly had overall nominal dimensions 2080 mm high by 1005 mm wide incorporating a door leaf with overall dimensions 2040 mm high by 932 mm wide by 44 mm thick. The door leaf was a Halspan three layer particleboard construction, with 8 mm hardwood lippings to the vertical edges and was hung within a softwood frame on two TECTUS TE541 FVZ 3D hinges with the frame covered with plasterboard to the exposed face.

Doorset B (60 minute) briefly had overall nominal dimensions 2089 mm high by 1010 mm wide incorporating a door leaf with overall dimensions 2040 mm high by 932 mm wide by 54 mm thick. The door leaf was a Halspan three layer particleboard construction, with 8 mm hardwood lippings to the vertical edges and was hung within a hardwood frame on two TECTUS TE527 3D hinges.

The doorsets were installed such that they opened towards the heating conditions of the test and were unlatched for the purpose of the test.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	Sustained flaming	33 minutes[#]	64 minutes
	Gap gauge	33 minutes[#]	66 minutes*
	Cotton Pad	33 minutes[#]	64 minutes
Insulation performance		33 minutes[#]	64 minutes

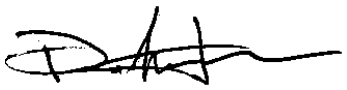
* The test duration. The test was discontinued after a period of 66 minutes.

[#] The specimen was blanked off.

Date of Test 13th February 2015

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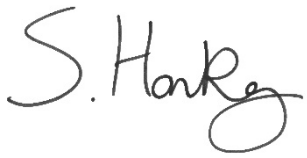
Signatories



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Principal Certification Engineer



Head of Department
S. Hankey*
Operations Manager

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

Report Issued

Date: 11th August 2021

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Revision History

Issue No: 2	Re-issue Date: 11th August 2021
Revised By: D. Fitzsimons	Approved By: W. Drazkiewicz
Reason for Revision: This document replaces issue 1 (dated 18th May 2015). Correction to the material in Item 2 i, hinge body part and ii, central knuckle part within the schedule of components on page 12. The previous material was stated incorrectly and has been verified by clients original drawings/supplied information. Changes to the formatting and font colors throughout the report in line with Warringtonfire's current branding.	

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

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Test Procedure

Introduction

The doorsets are required to provide a fire separating function and were therefore tested in accordance with BS EN 1634-1: 2014 'Fire resistance tests for doors and shutter assemblies - Part 1: Fire doors and shutters'. This test report should be read in conjunction with that Standard and with BS EN 1363-1: 2012 'Fire resistance tests - Part 1: General requirements' and BS EN 1363-2: 1999, 'Fire resistance tests - Part 2: Alternative and additional procedures'.

The specimens were judged on their ability to comply with the performance criteria for integrity and insulation, as required by BS EN 1634-1: 2014.

The specific purpose of the test was to evaluate the effects of the inclusion of items of building hardware into a previously tested doorset construction. Because of this, no direct field of application for the doorsets are included in this report.

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.

Instruction To test

The test was conducted on the 13th February 2015 on behalf of Simonswerk UK Ltd the sponsor of the test.

Test Specimen Construction

A comprehensive description of the test construction is given in the Schedule of Components. The description is based on a detailed survey of the specimens and information supplied by the sponsor of the test.

The doorsets' storage, installation, and test preparation took place in the test laboratory between the 10th February 2015 and the 13th February 2015.

Installation

The doorsets incorporating the hardware were mounted within apertures provided within a high density rigid supporting construction. The doorsets were mounted such that they opened towards the heating conditions of the test.

Representatives of **Warringtonfire** conducted the installation on 12th February 2015.

Sampling

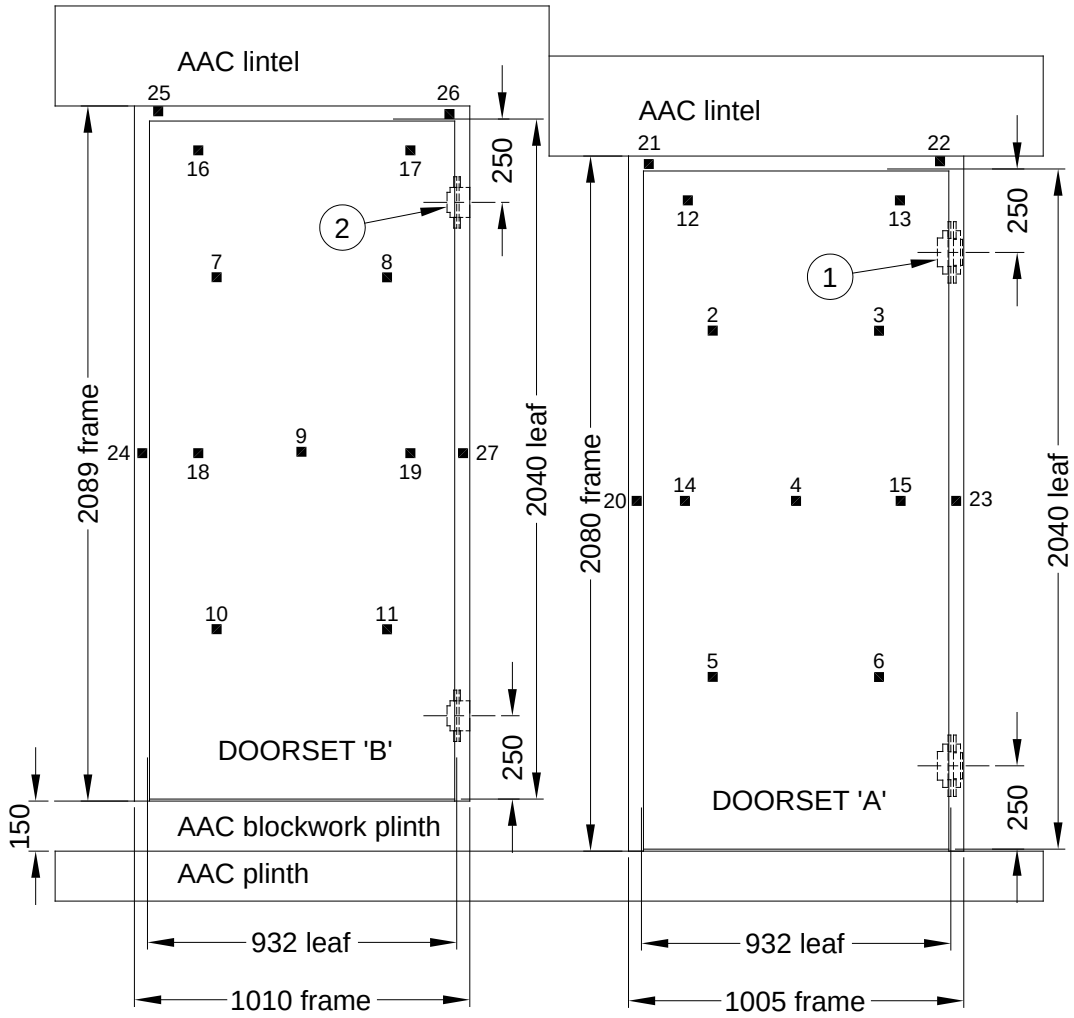
Warringtonfire was not involved in any selection or sampling procedures of the specimens or any of their components.

Conditioning

The specimens' storage, construction, and test preparation took place in the test laboratory over a total, combined time of 3 days. Throughout this period of time both the temperature and the humidity of the laboratory were measured and recorded as being within a range of from 11.5°C to 14°C and 47% to 60% respectively.

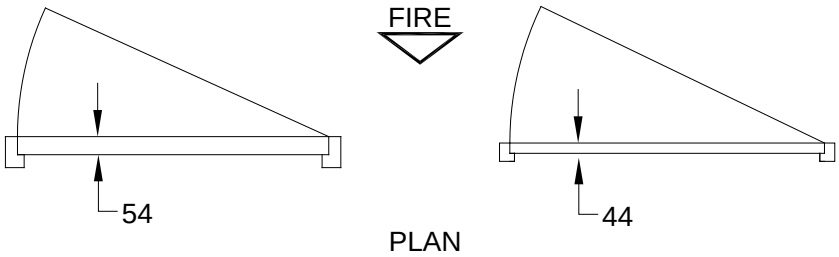
Test Specimens

Figure 1- General elevation of test specimens and unexposed face thermocouples



GENERAL ELEVATION
OF UNEXPOSED FACE

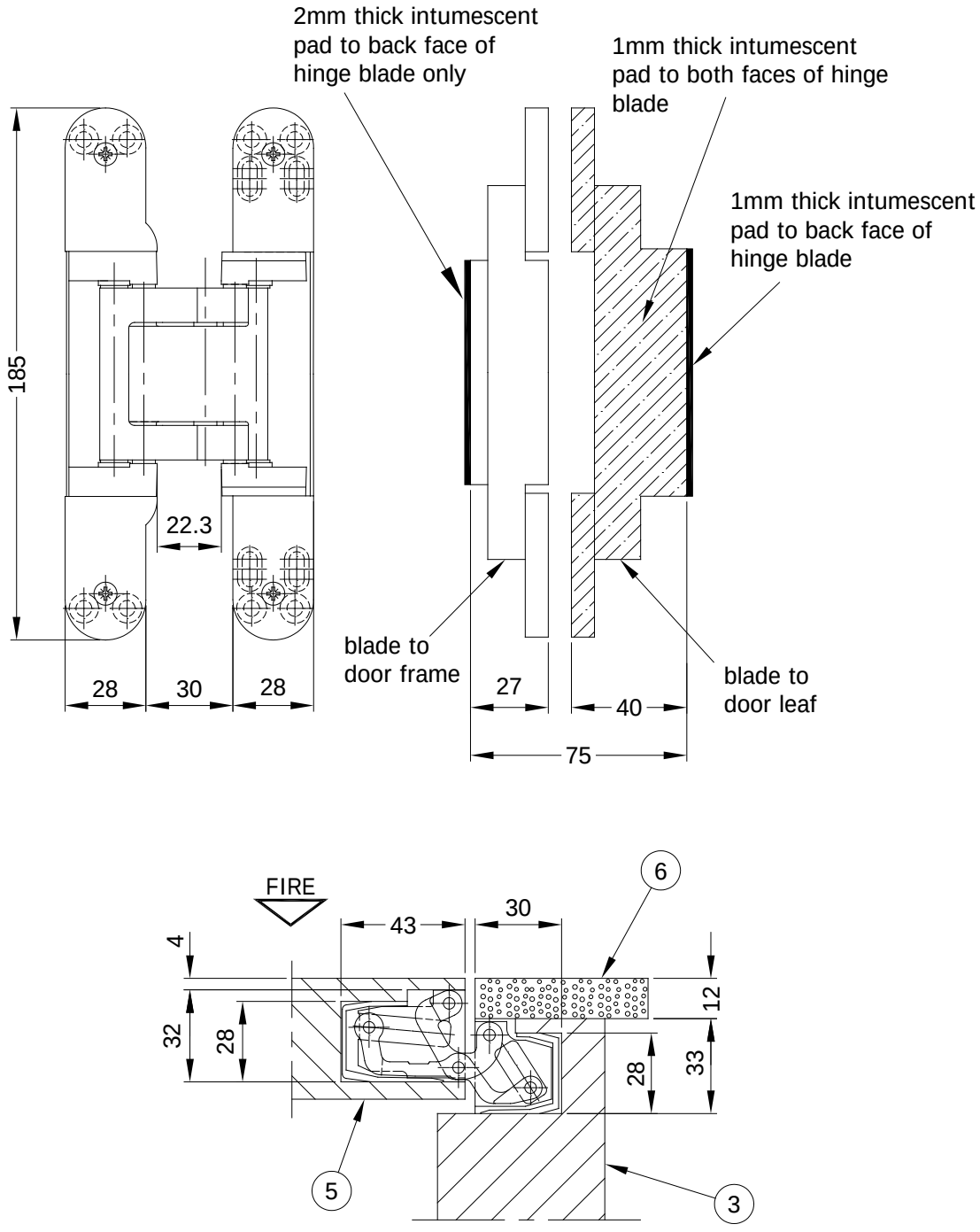
■ Positions of thermocouples
AAC = Autoclaved aerated concrete



PLAN

Do not scale. All dimensions are in mm

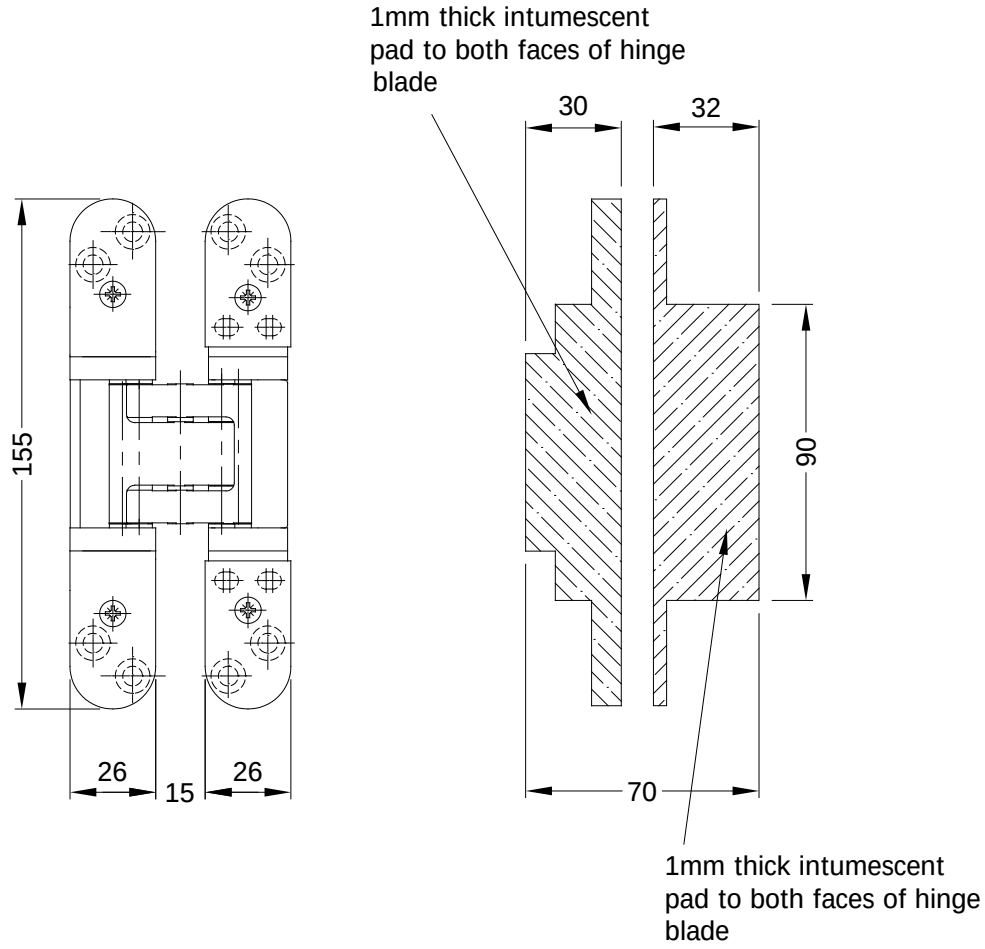
Figure 2 – Typical details of hinges for Doorset 'A'

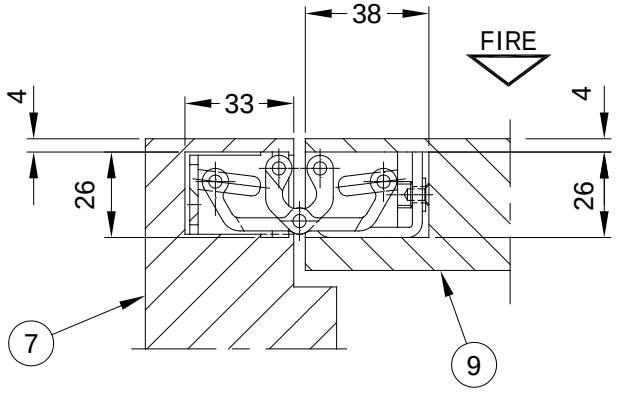


DETAILS OF HINGES (ITEM 1)
DOORSET 'A'

Do not scale. All dimensions are in mm

Figure 3 – Typical details of hinges for Doorset 'B'

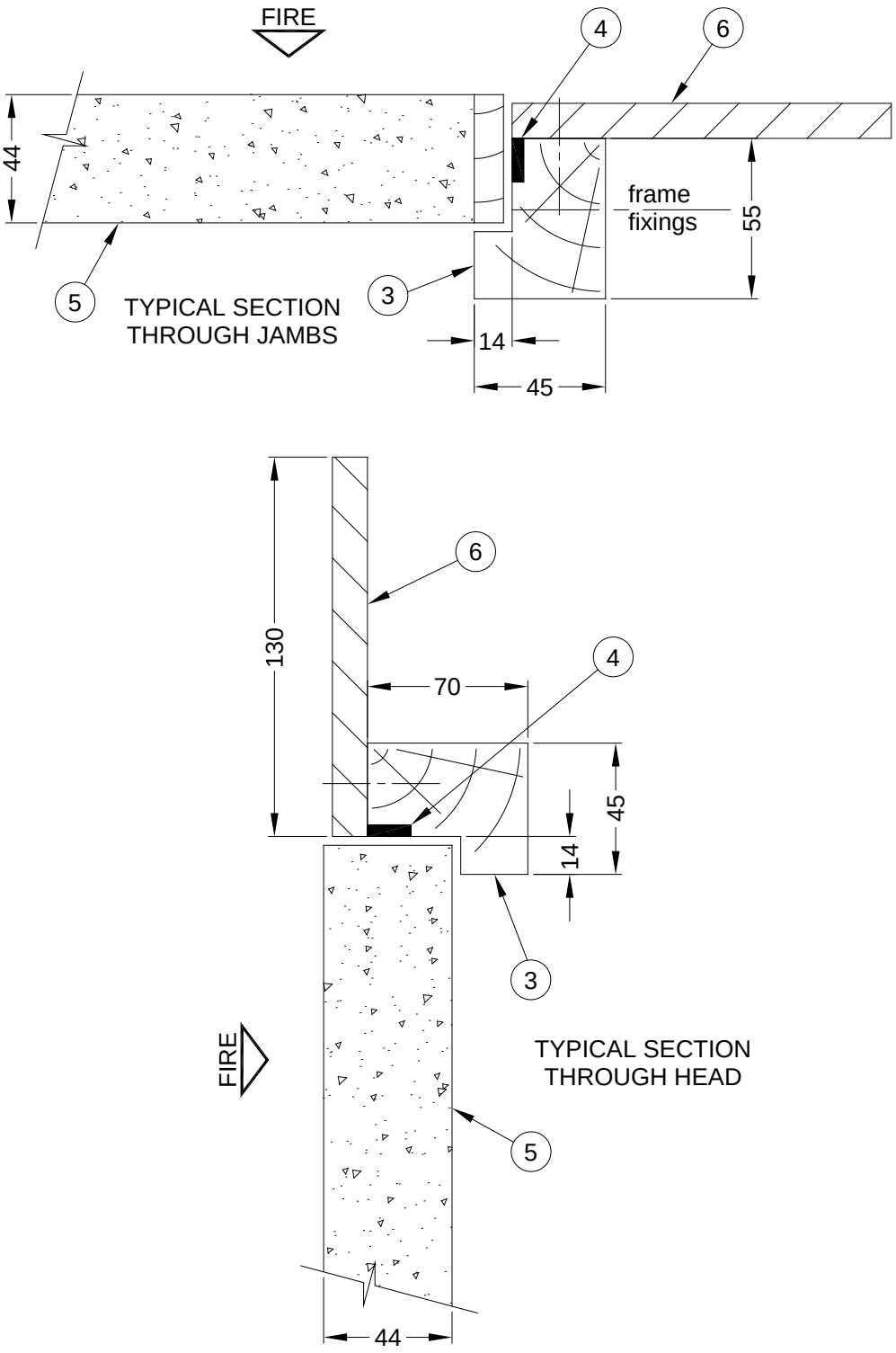




DETAILS OF HINGES (ITEM 2)
DOORSET 'B'

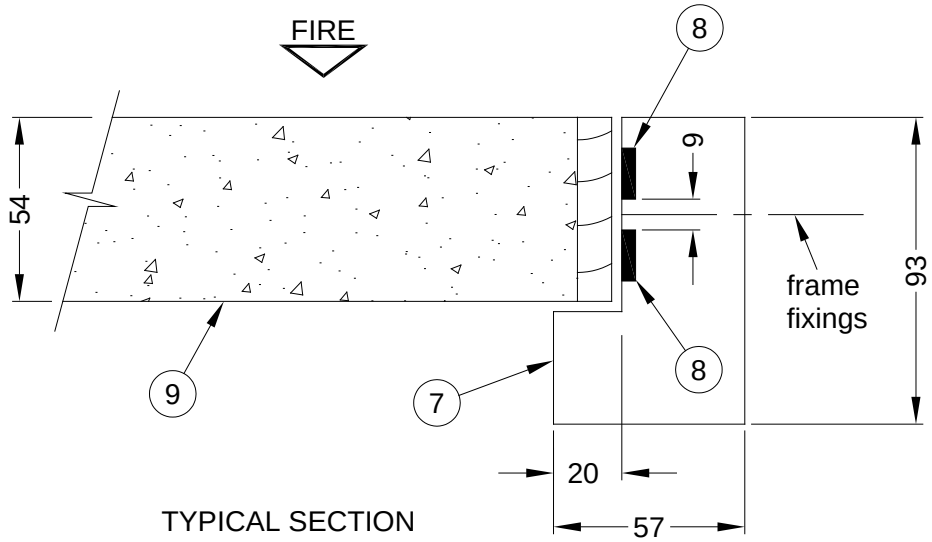
Do not scale. All dimensions are in mm

Figure 4 – Details of Doorset 'A'

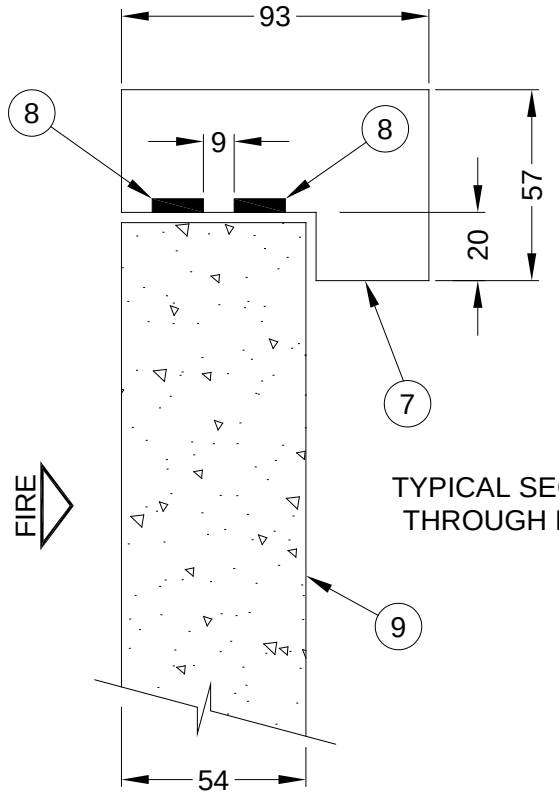


Do not scale. All dimensions are in mm

Figure 5 – Details of Doorset 'B'



TYPICAL SECTION
THROUGH JAMBS



TYPICAL SECTION
THROUGH HEAD

Do not scale. All dimensions are in mm

Schedule of Components

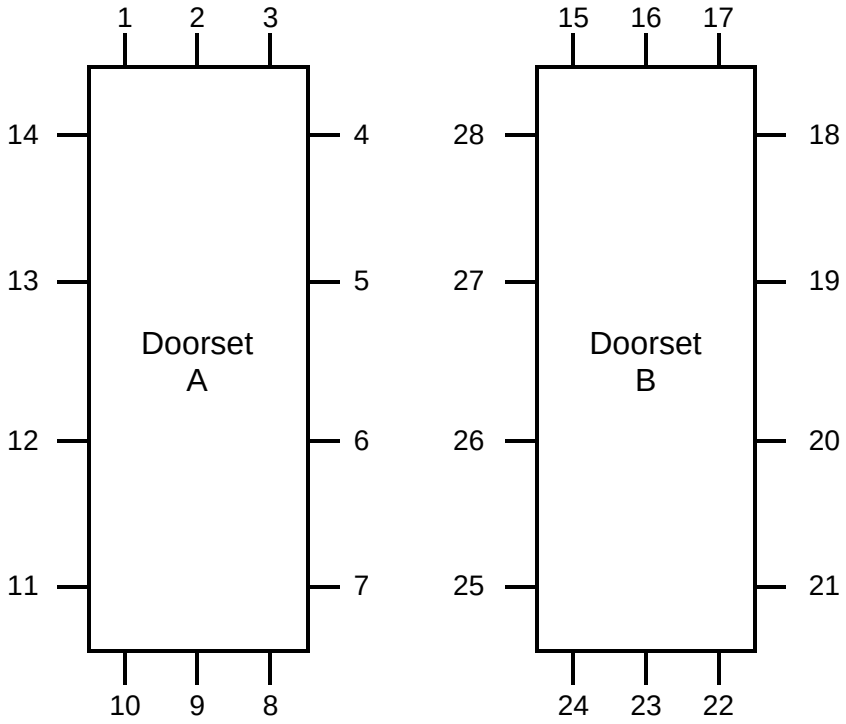
(Refer to Figures 1 to 5)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

Item		Description
1. Hinges – Doorset 'A'		
Manufacturer	:	Simonswerk GmbH
Type	:	Concealed hinge system
Reference	:	TECTUS TE 541 3D FVZ
Material		
i. hinge body parts	:	Zinc die cast
ii. central knuckle parts	:	Aluminium
Overall sizes	:	See Figure 2
Fixing method	:	Hinges screw fixed within routed slots in both door frame and door leaf. Hinges supplied pre-fitted with intumescent pads to external faces of hinges.
Details of Fixings		
i. type	:	Countersunk head woodscrews
ii. material	:	Stainless steel
iii. sizes	:	40 mm long x 5 mm diameter
iv. number off per blade	:	4 no. screws
Details of Intumescent Protection		
i. manufacturer	:	Lorient Polyproducts Ltd.
ii. manufacturers product reference	:	ITO-TECTUS-TE541 FVZ (kit)
iii. material type	:	Mono Ammonium Phosphate
iv. thickness	:	Single pad 1 mm thick self adhesive fixed to external faces of hinge body to door leaf. Single pad 2 mm thick self adhesive fixed to rear face only of hinge body to door frame. See Figure 2.
2. Hinges – Doorset 'B'		
Manufacturer	:	Simonswerk GmbH
Type	:	Concealed hinge system
Reference	:	TECTUS TE 527 3D
Material		
i. hinge body parts	:	Mild Steel
ii. central knuckle parts	:	Mild Steel
Overall sizes	:	See Figure 3
Fixing method	:	Hinges screw fixed within routed slots in both door frame and door leaf. Hinges supplied pre-fitted with intumescent pads to external faces of hinges.
Details of Fixings		
i. type	:	Countersunk head woodscrews
ii. material	:	Stainless steel
iii. sizes	:	40 mm long x 4.4 mm diameter
iv. number off per blade	:	4 no. screws
Details of Intumescent Protection		
i. manufacturer	:	Lorient Polyproducts Ltd.
ii. manufacturers product reference	:	ITH-TECTUS-TE525 -10 (kit)
iii. material type	:	Mono Ammonium Phosphate
iv. thickness	:	Single pad 1 mm thick self adhesive fixed to external faces of all hinge blades. See Figure 3.

Item		Description
Timber Doorset 'A' (supplied by Warringtonfire) consisting of items 3 to 6		
3. Door frame jambs and head		
Material	:	Timber, softwood
Nominal Density	:	510 kg/m^3
Overall section size	:	45 mm x 55 mm
Jambs to head jointing method	:	Butt joint with 2 no. steel screws
Fixing method to masonry surround		
i. type	:	Countersunk head steel screws into plastic plugs through jambs.
ii. size	:	100 mm long x 5.6 mm (No.12) diameter screws
iii. quantity	:	4 no. screws along full height of closing jamb. 5 no. screws along hinged jamb (2 no. screws at 260 mm centres about each hinge position and one at mid height).
4. Door frame intumescent seal		
Manufacturer	:	Pyroplex
Reference	:	CF355
Material	:	Graphite based intumescent within a polyvinyl chloride (PVC) carrier.
Overall section size	:	15 mm wide x 4 mm deep carrier
Fixing method	:	Single seal self-adhesive fixed within a groove along the door frame jambs and head. Seal was interrupted at each hinge position.
5. Door leaf		
Manufacturer	:	Halspan
Reference	:	'Optima' door blank
Material	:	3-layer particle board. Door blank fitted with 8 mm thick Sapele hardwood lipping along the vertical edges by warringtonfire using formaldehyde adhesive.
Thickness	:	44 mm
6. Door frame architrave		
Material	:	Plasterboard
Thickness	:	12 mm
Size	:	130 mm wide
Fixing method	:	Fixed to door frame jambs and head using 40 mm long steel screws at 300 mm centres.
Timber Doorset 'B' (supplied by Warringtonfire) consisting of items 7 to 9		
7. Door frame jambs and head		
Material	:	Hardwood, species Sapele
Overall section size	:	57 mm x 93 mm
Jambs to head jointing method	:	Mortise & tenon with 2 no. steel screws
Fixing method to masonry surround		
i. type	:	Countersunk head steel screws into plastic plugs through jambs.
ii. size	:	100 mm long x 5.6 mm (No.12) diameter screws
iii. quantity	:	4 no. screws along full height of closing jamb. 5 no. screws along hinged jamb (2 no. screws at 260 mm centres about each hinge position and one at mid height).

Item		Description
8. Door frame intumescent seal		
Manufacturer	:	Pyroplex
Reference	:	CF355
Material	:	Graphite based intumescent within a polyvinyl chloride (PVC) carrier.
Overall section size	:	15 mm wide x 4 mm deep carrier
Fixing method	:	2 no. seals self-adhesive fixed within grooves 9 mm apart along the door frame jambs and head. Inner seal was continuous. Outer seal was interrupted at each hinge position.
9. Door leaf		
Manufacturer	:	Halspan
Reference	:	'Prima' door blank
Material	:	3-layer particle board. Door blank fitted with 8 mm thick Sapele hardwood lipping along the vertical edges by Warringtonfire using formaldehyde adhesive.
Thickness	:	54 mm

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	13	14
	2.5	3.7	2.8	2.9	3.2	3.6	4.0	3.5	3.2	2.5	3.3	3.6	4.0	3.5
B	15	16	17	18	19	20	21	22*	23*	24*	25	26	27	28
	2.5	1.9	0.4	0.3	2.6	2.8	0.8	1.8	1.7	1.6	0.2	3.4	4.8	3.4
A	Mean		3.4		Maximum			4.0		Minimum			2.5	
B	Mean		2.1		Maximum			4.8		Minimum			0.2	

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	13	14
	2.3	2.3	1.6	1.6	0.4	0.1	0.5	n/a	n/a	n/a	0.8	0.8	1.6	1.6
B	15	16	17	18	19	20	21	22*	23*	24*	25	26	27	28
	3.8	4.2	4.5	5.2	6.5	5.9	6.0	n/a	n/a	n/a	4.2	3.2	2.4	2.1

* Dimension not included in calculations
# Dimension not measured

ALL DIMENSIONS ARE IN mm

Instrumentation

General	The instrumentation was provided in accordance with the requirements of the Standard.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2012 Clause 5.1 using six plate thermometers, distributed over a plane 100 mm from the surface of the test construction.
General	Thermocouples were provided to monitor the unexposed surface of the specimens and the output of all instrumentation was recorded at no less than one minute intervals as follows:
Thermocouples 2 to 6 (Doorset A) & Thermocouples 7 to 11(Doorset B)	At five positions on each doorset, one approximately at the centre and one at the approximate centre of each quarter section of the doorset.
Thermocouples 12 to 15 (Doorset A) & Thermocouples 16 to 19 (Doorset B)	At four positions on each door leaf, positioned at 100 mm in from the door leaf vertical edges, two at mid-height, and two at 100 mm below the top edge of the leaf.
Thermocouples 20 to 23 (Doorset A) & Thermocouples 24 to 27 (Doorset B)	At four positions on the unexposed face of each door frame, at two positions on the top horizontal frame member, one positioned approximately 50 mm from each vertical edge and one on each vertical member, positioned at mid height. The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.
Roving Thermocouple	A roving thermocouple was available to measure temperatures on the unexposed surface of the specimens at any position which might appear to be hotter than the temperatures indicated by the fixed thermocouples.
Integrity Criteria	Cotton pads and gap gauges were available to evaluate the integrity of the specimens.
Furnace Pressure	The furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1363-1: 1999. Clause 5.2. The calculated pressure differential relative to the laboratory atmosphere at the top of each doorset was 14 (±3) Pa.

Test Observations

Time		All observations are from the unexposed face unless noted otherwise.
mins	secs	The ambient air temperature in the vicinity of the test construction was 12ºC at the start of the test with a maximum variation of -1ºC during the test.
00	00	**The test commences.**
00	21	Very light steam/smoke release from the head of both doorsets.
02	29	Steam/smoke release from both vertical edges of both doorsets.
04	25	Light discolouring of the leaf on the leading edge of doorset B on the left side.
05	25	The leading edge of Doorset B is now discoloured black.
07	25	Smoke release is now increasing around the top hinge on both doorsets.
08	30	Around the top hinge on both doorsets can now be seen discolouring.
10	00	Smoke release is now only evident from the head and around the top hinge on both doorsets.
23	00	A very tiny glowing spot can now be seen over the top hinge on both doorsets.
25	00	A cotton wool pad integrity test is performed over the glowing spot on Doorset A. The pad didn't discolour or ignite.
25	30	A silver liquid is now dripping/spitting from the top hinge of Doorset A.
29	50	The glowing spot on Doorset A continues to increases in size. A cotton wool pad integrity test is performed over the area. The pad discoloured but didn't ignite.
32	40	A small flicker of flame is now seen around the top hinge on Doorset A.
33	10	Doorset A is blanked off to allow the test to continue on Doorset B.
45	00	No significant visible change.
54	00	Small flickers of flames can be seen at the bottom of the doorset as the bottom of the leaf can be seen beginning to char.
62	00	A small glowing spot can now be seen in the top corner of the leading edge. A cotton wool pad integrity test is performed over the area. The pad discolours but fails to ignite.
64	30	**Sustained flames at the head of the leading edge of the Doorset A, the Doorset is now deemed to have failed the sustained flame integrity criteria. The area is sprayed with water to allow the test to continue on the hinge edge.**
66	00	**The test is discontinued.**

Test Photographs

The exposed face of the doorsets prior to testing



The unexposed face of the doorsets prior to testing



The unexposed face of the doorsets after 5 minutes of testing



The unexposed face of the doorsets after 15 minutes of testing



The unexposed face of both doorsets after 25 minutes of testing



The unexposed face of the doorsets after 33 minutes of testing



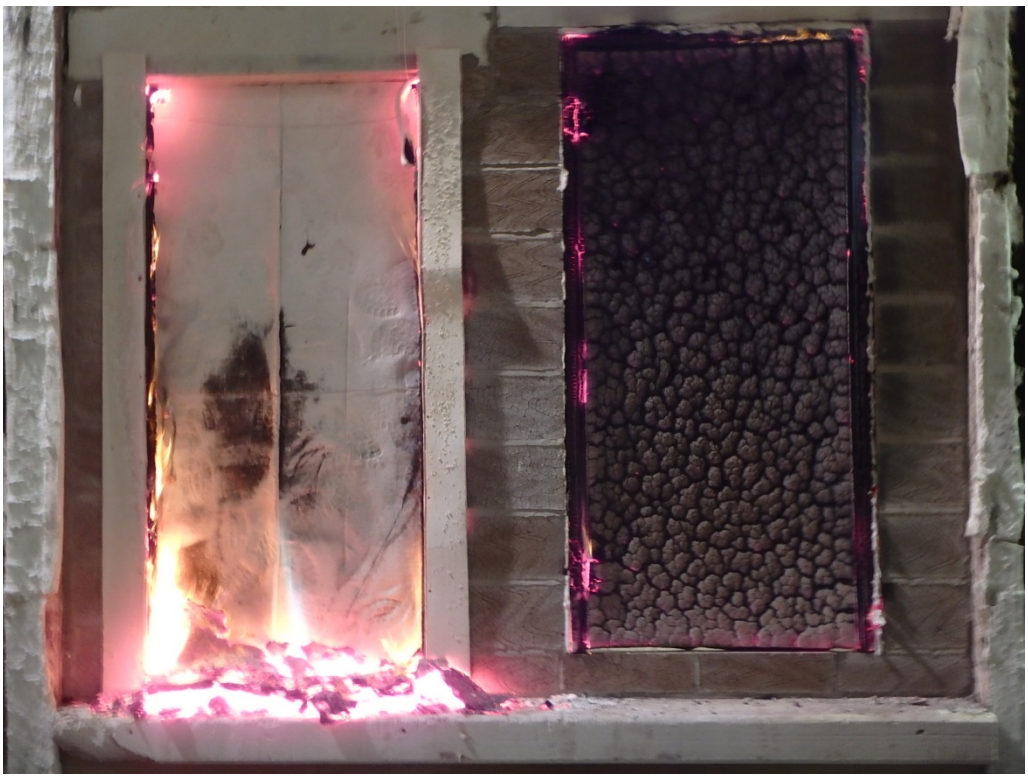
The unexposed face of doorset B after 50 minutes of testing



The unexposed face of doorset B after 64 minutes of testing



The exposed face of the test construction immediately after the test



Temperature and Deflection Data

Mean furnace temperature, together with the temperature/time relationship specified in the Standard

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	18
2	445	454
4	544	633
6	603	598
8	646	638
10	678	680
12	706	701
14	728	731
16	748	745
18	766	765
20	781	787
22	796	799
24	809	804
26	820	824
28	832	836
30	842	846
32	852	849
34	860	862
36	869	871
38	877	877
40	885	886
42	892	892
44	899	898
46	906	906
48	912	913
50	918	920
52	924	925
54	930	932
56	935	942
58	940	942
60	945	950
62	950	955
64	955	959
66	960	961

Individual and mean temperatures recorded on the unexposed surface of Doorset A

Time Mins	T/C Number 2 Deg. C	T/C Number 3 Deg. C	T/C Number 4 Deg. C	T/C Number 5 Deg. C	T/C Number 6 Deg. C	Mean Temp Deg. C
0	11	11	12	12	12	12
1	11	12	12	12	12	12
2	11	12	12	12	12	12
3	12	12	12	12	12	12
4	12	12	12	12	12	12
5	12	12	12	12	12	12
6	12	12	12	13	13	12
7	12	12	12	13	13	12
8	12	12	12	12	13	12
9	12	12	13	13	13	13
10	13	13	13	13	13	13
11	14	14	13	13	14	14
12	15	15	14	14	15	15
13	16	16	15	15	16	16
14	17	18	16	16	18	17
15	19	19	17	17	19	18
16	20	21	18	19	21	20
17	22	23	19	20	22	21
18	23	24	20	21	24	22
19	24	26	21	23	25	24
20	26	27	23	24	27	25
21	27	29	24	26	28	27
22	29	31	26	27	30	29
23	31	32	28	29	31	30
24	32	34	29	31	33	32
25	34	36	31	32	35	34
26	36	37	33	34	36	35
27	38	38	35	36	38	37
28	39	40	37	38	40	39
29	41	42	39	40	42	41
30	43	43	41	41	43	42
31	45	45	43	43	45	44
32	47	46	45	45	47	46
33	49	48	47	47	48	48

Individual and mean temperatures recorded on the unexposed surface of Doorset B

Time Mins	T/C Number 7 Deg. C	T/C Number 8 Deg. C	T/C Number 9 Deg. C	T/C Number 10 Deg. C	T/C Number 11 Deg. C	Mean Temp Deg. C
0	13	14	14	14	14	14
2	14	16	14	14	14	14
4	18	18	15	15	14	16
6	18	17	17	20	16	18
8	17	16	16	17	15	16
10	16	16	15	16	15	16
12	16	16	15	16	15	16
14	16	16	16	16	16	16
16	17	17	17	17	16	17
18	18	19	17	18	17	18
20	20	21	19	20	18	20
22	21	23	20	22	19	21
24	23	25	22	24	21	23
26	26	27	25	26	22	25
28	28	30	27	29	24	28
30	31	33	30	31	26	30
32	34	35	33	34	27	33
34	37	38	36	36	29	35
36	40	41	39	39	31	38
38	43	43	42	42	32	40
40	45	46	45	44	34	43
42	48	48	47	47	35	45
44	50	50	50	50	37	47
46	53	53	53	53	38	50
48	56	55	56	55	40	52
50	58	58	58	58	42	55
52	61	60	61	61	44	57
54	63	62	64	64	46	60
56	66	65	66	66	48	62
58	68	67	68	69	50	64
60	71	69	70	71	53	67
62	73	71	72	73	55	69
64	75	73	74	75	58	71
66	76	75	75	77	61	73

Individual temperatures recorded on the unexposed surface of Doorset A
100 mm in from door leaf edge

Time Mins	T/C Number 12 Deg. C	T/C Number 13 Deg. C	T/C Number 14 Deg. C	T/C Number 15 Deg. C
0	14	14	14	10
1	15	14	14	10
2	15	16	14	10
3	18	20	14	10
4	18	34	14	10
5	17	33	14	10
6	17	35	15	10
7	17	35	15	10
8	17	39	15	10
9	17	43	15	10
10	18	44	15	11
11	20	47	16	12
12	22	49	16	13
13	24	51	17	14
14	26	53	18	15
15	29	54	20	17
16	31	55	21	18
17	33	54	22	20
18	35	53	23	21
19	37	54	25	23
20	39	57	26	24
21	41	59	27	26
22	42	65	29	27
23	44	71	31	29
24	46	77	33	31
25	47	82	34	32
26	49	84	36	34
27	50	80	38	36
28	51	76	40	37
29	53	75	42	39
30	54	79	44	41
31	56	89	46	43
32	57	96	48	44
33	58	104	50	46

Individual temperatures recorded on the unexposed surface of Doorset B
100 mm in from door leaf edge

Time Mins	T/C Number 16 Deg. C	T/C Number 17 Deg. C	T/C Number 18 Deg. C	T/C Number 19 Deg. C
0	10	11	13	11
2	25	13	15	12
4	31	17	*	15
6	24	17	*	15
8	21	16	*	13
10	20	15	*	13
12	19	15	*	13
14	19	18	*	13
16	21	22	*	14
18	25	27	*	15
20	29	32	*	16
22	33	37	*	18
24	37	41	*	21
26	40	45	*	23
28	43	48	*	25
30	46	50	*	28
32	48	53	*	31
34	50	54	*	34
36	52	55	*	37
38	54	56	*	40
40	55	57	*	42
42	56	58	*	45
44	58	59	*	47
46	59	60	*	50
48	60	61	*	53
50	62	63	*	56
52	63	64	*	59
54	65	66	*	61
56	66	67	*	64
58	68	69	*	66
60	70	70	*	68
62	72	72	*	69
64	75	74	*	71
66	72	77	*	72

*Thermocouple Malfunction

Individual temperatures recorded on the unexposed surface of Door Frame A

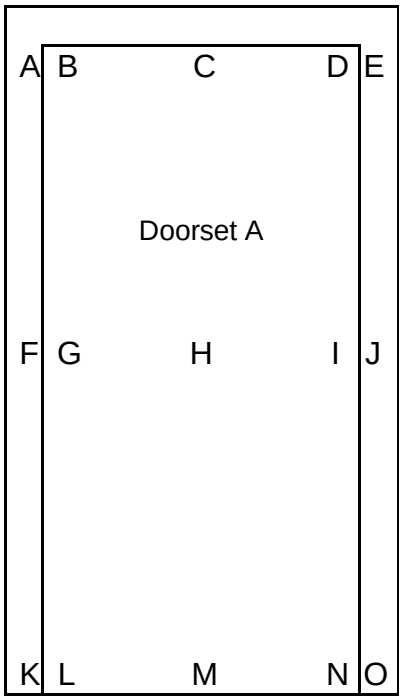
Time Mins	T/C Number 20 Deg. C	T/C Number 21 Deg. C	T/C Number 22 Deg. C	T/C Number 23 Deg. C
0	9	9	11	12
1	9	13	13	12
2	9	18	15	12
3	9	26	18	12
4	9	46	34	12
5	10	48	46	12
6	11	45	47	12
7	10	44	47	12
8	10	41	52	12
9	11	35	30	12
10	11	32	23	12
11	11	29	32	13
12	12	28	38	13
13	13	28	41	13
14	13	28	43	14
15	14	28	44	14
16	15	28	45	15
17	16	28	46	16
18	16	28	47	16
19	17	28	48	17
20	18	28	49	18
21	19	28	49	18
22	19	28	50	19
23	20	29	52	20
24	21	30	54	21
25	22	30	56	21
26	22	31	59	22
27	23	31	63	23
28	24	32	70	23
29	25	33	76	24
30	25	34	81	25
31	26	35	86	25
32	27	35	90	26
33	28	36	95	27

Individual temperatures recorded on the unexposed surface of Door Frame B

Time Mins	T/C Number 24 Deg. C	T/C Number 25 Deg. C	T/C Number 26 Deg. C	T/C Number 27 Deg. C
0	12	12	12	12
2	12	19	14	12
4	14	34	21	12
6	14	34	26	13
8	13	32	28	13
10	13	33	30	13
12	13	32	34	13
14	13	32	37	13
16	14	32	41	13
18	14	31	43	14
20	14	32	48	14
22	15	35	51	15
24	15	38	51	15
26	16	39	53	16
28	16	38	54	17
30	17	38	53	17
32	17	39	52	18
34	18	40	52	19
36	19	39	*	19
38	20	40	*	20
40	20	40	*	21
42	21	41	*	22
44	23	42	*	23
46	23	47	*	24
48	25	51	*	25
50	26	52	*	25
52	27	54	*	26
54	28	57	*	27
56	28	60	*	29
58	30	62	*	29
60	31	68	*	30
62	32	80	*	31
64	33	101	*	32
66	35	76	*	34

*Thermocouple Detached from Specimen

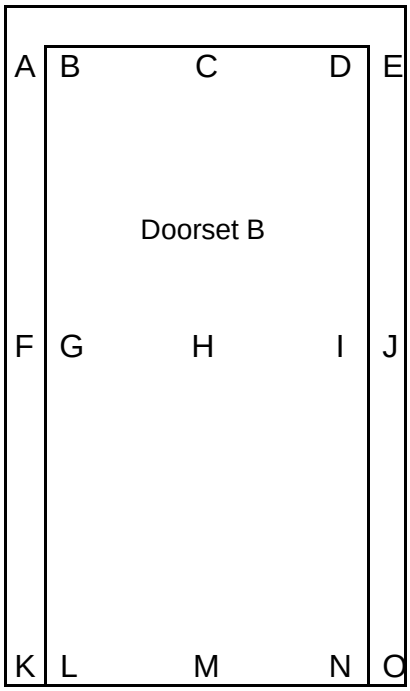
Horizontal deflections of the door leaves and door frames during the test



Doorset A															
Deflections – mm															
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	-4	2	0	2	0	0	-4	-2	-2	0	-5	0	4	-10	3
10	-4	4	-2	2	0	0	-4	-1	-2	0	-5	-5	-6	-12	2
15	-3	4	0	3	0	0	-5	-5	-2	0	-7	0	-6	-14	3
20	-2	2	-2	5	0	0	-6	2	-1	0	-5	0	-6	-10	3
25	-4	3	-3	7	0	1	-3	0	-4	0	-5	0	-6	-10	3
30	-4	4	-5	7	0	7	-8	-16	-5	0	-5	0	-5	-15	3

A positive value indicates a deflection towards the heating conditions of the test

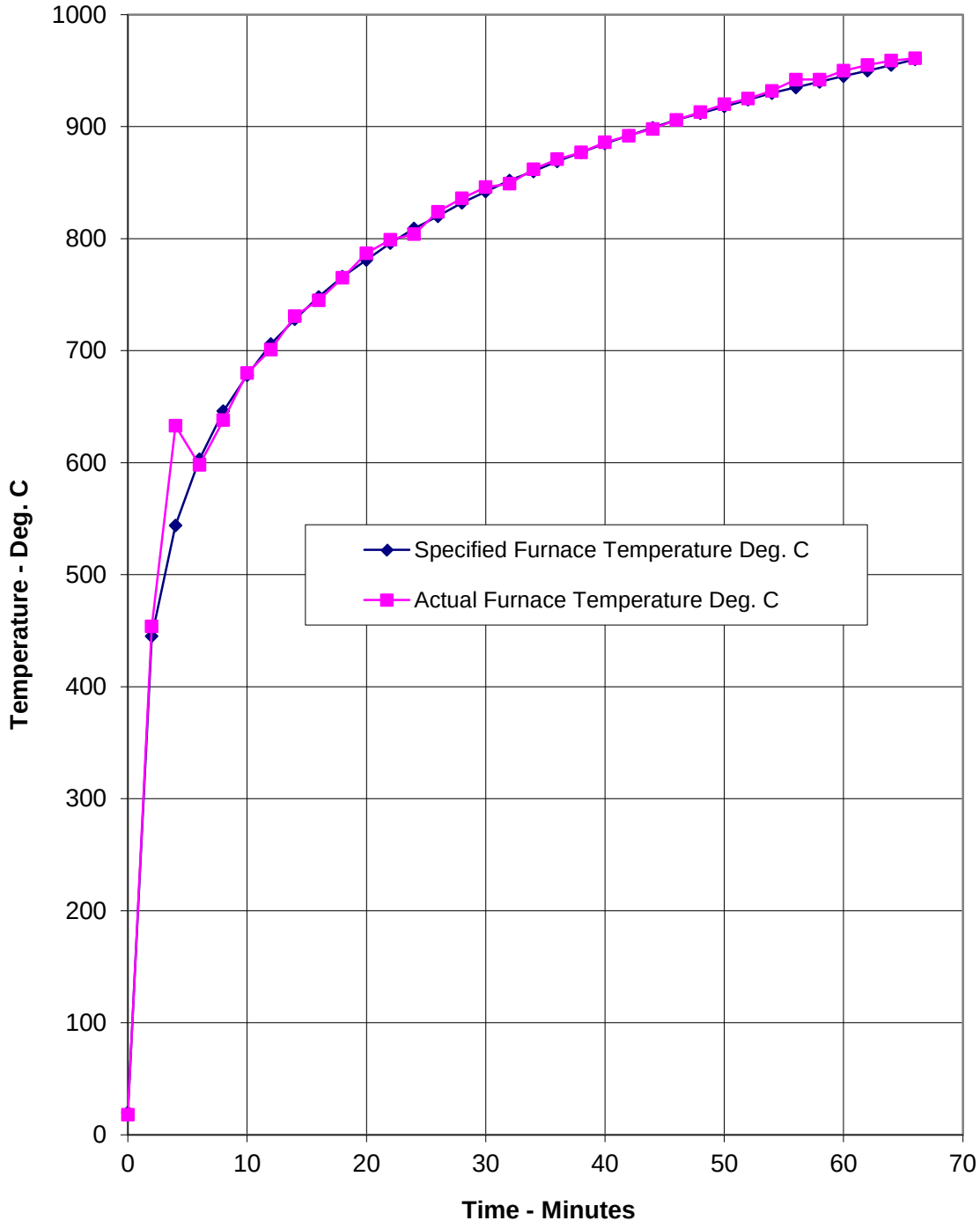
Horizontal deflections of the door leaves and door frames during the test (continued)



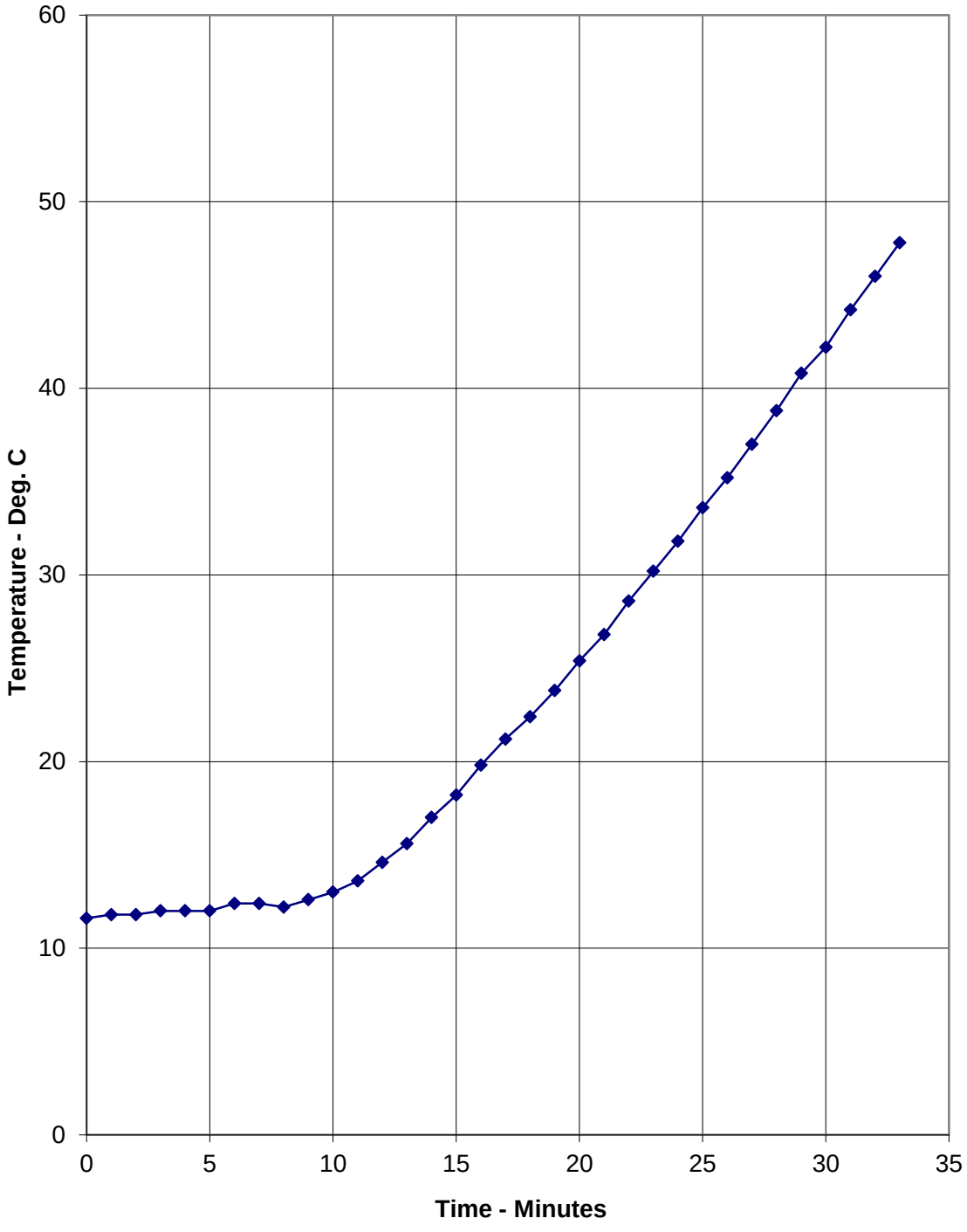
Doorset B															
Deflections – mm															
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	-2	0	-3	-3	5	0	-6	-4	-3	0	1	-1	-4	-4	0
20	3	0	-3	4	3	0	-6	-2	-1	6	1	-2	-4	1	0
30	3	0	-3	3	0	0	-7	-3	-6	-12	1	-6	-4	1	1
40	8	8	-2	3	3	8	-11	-12	-10	-14	-5	-1	-4	-2	0
50	8	15	-6	7	5	6	-12	-26	-12	-14	-5	2	-7	9	2
60	13	20	-8	8	5	-1	-16	-12	-16	-13	-3	2	-14	6	2

A positive value indicates a deflection towards the heating conditions of the test

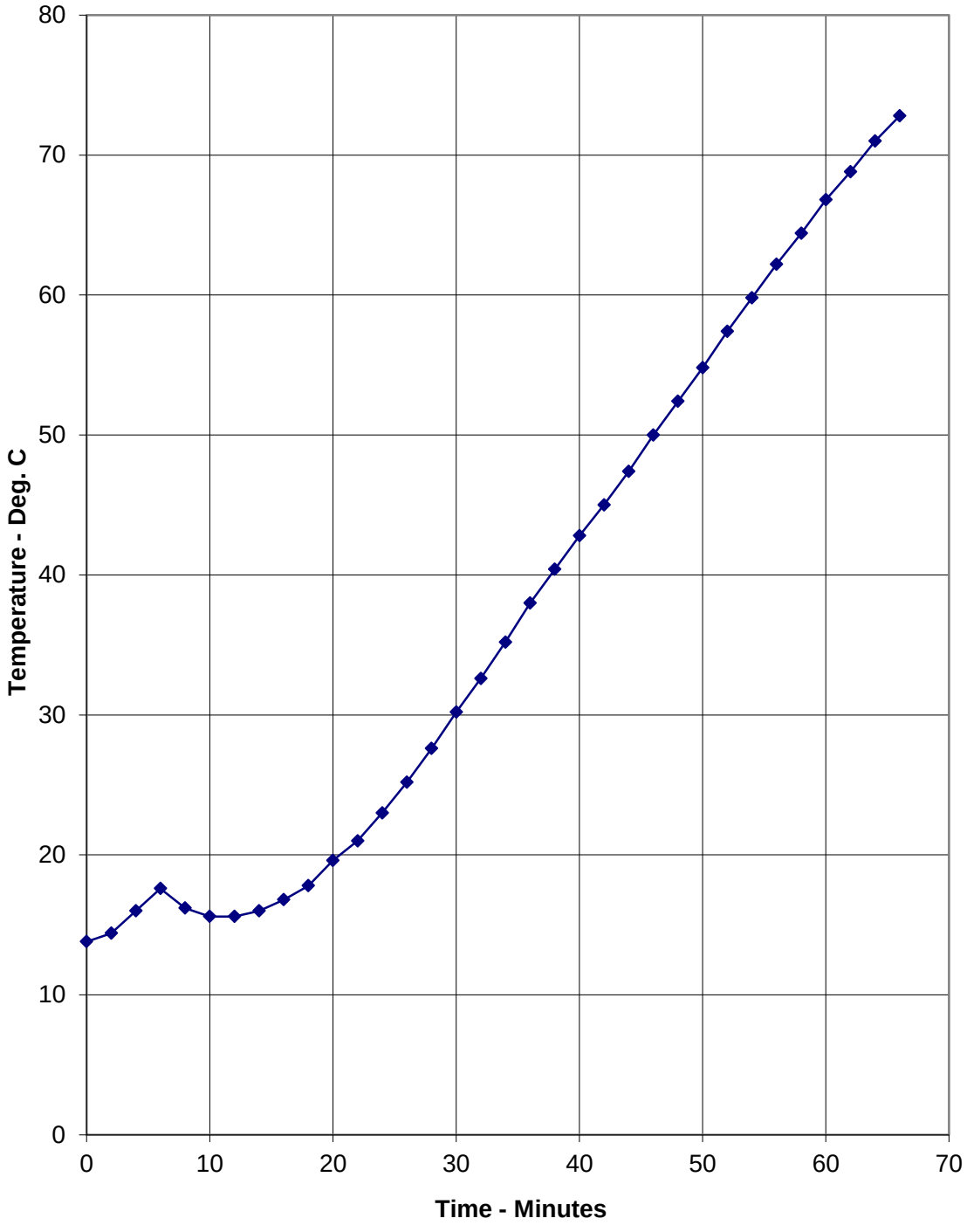
Graph showing mean furnace temperature, together with the temperature/time relationship specified in the Standard



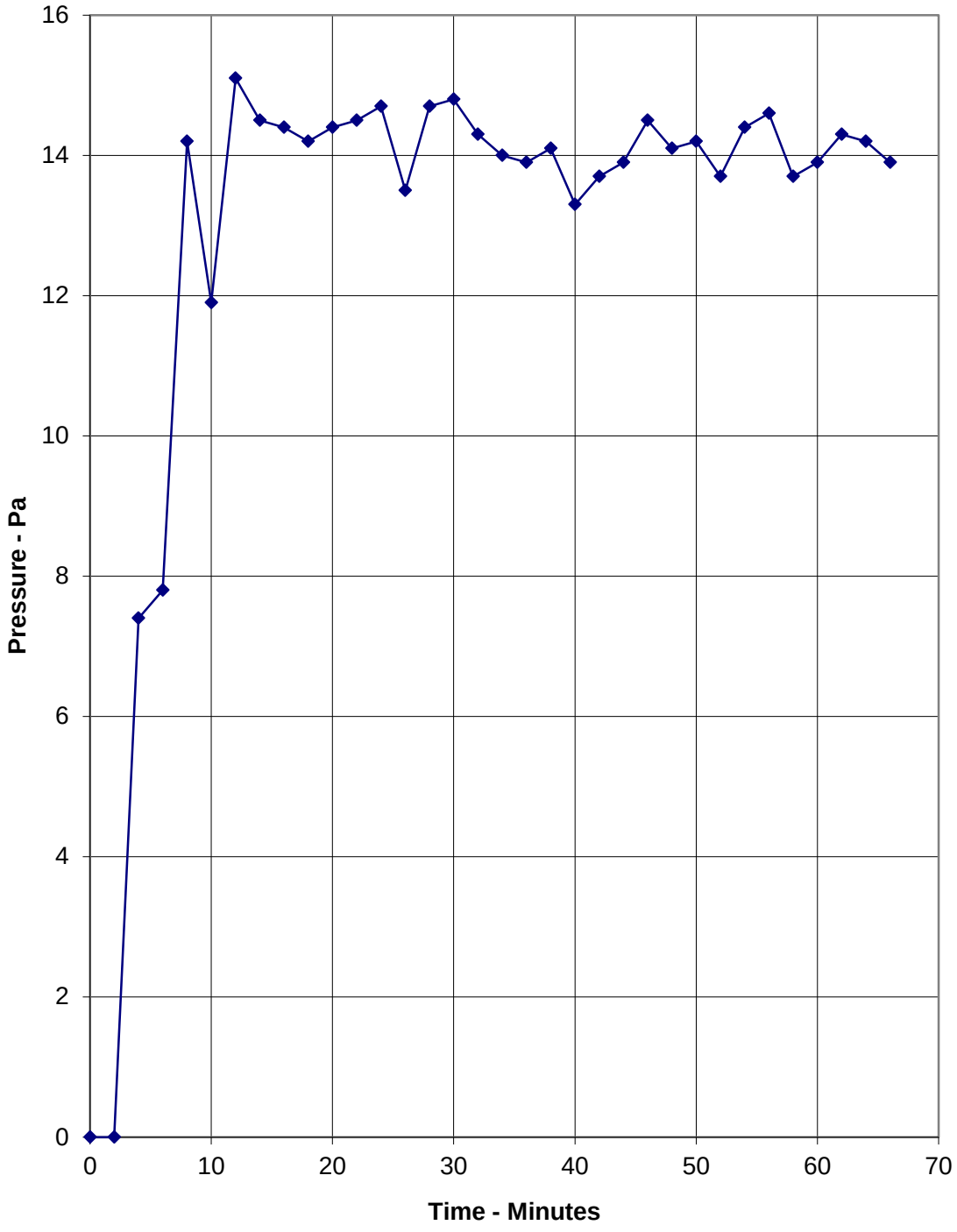
Graph showing mean temperatures recorded on the unexposed surface of Doorset A



Graph showing mean temperatures recorded on the unexposed surface of Doorset B



Graph showing recorded furnace pressure at the head of Doorset B



Performance Criteria and Test Results

Integrity

It is required that the specimen retains its separating function, without either causing ignition of a cotton pad when applied, or permitting the penetration of a gap gauge as specified in BS EN 1634-1: 2014, or resulting in sustained flaming on the unexposed surface. **These requirements were satisfied for the periods shown below:**

	Doorset A	Doorset B
Sustained flaming	33 minutes#	64 minutes
Gap gauge	33 minutes#	66 minutes*
Cotton pad	33 minutes#	64 minutes

Insulation

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 (except on the door frame, where the maximum temperature rise shall not exceed 360°C). Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1634-1: 2014. **These requirements were satisfied for the periods shown below:**

Doorset A	Doorset B
33 minutes#	64 minutes

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

The specimen was blanked off.

Ongoing Implications

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: 2012 and where appropriate BS EN 1363-2: 1999. 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. Annex A of BS EN 1363-1: 2012 provides guidance information on the application of fire resistance tests and the interpretation of test data.

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

Conclusions

Evaluation against objective

Two single-acting, single-leaf doorsets incorporating various items of hardware have been subjected to a fire resistance test in accordance with BS EN 1634-1: 2014, Fire resistance tests for door and shutter assemblies, BS EN 1363-1: 2012 General requirements and BS EN 1363-2: 1999, Alternative and additional procedures.

The evaluation of the doorsets against the requirements of BS EN 1634-1: 2014 showed that each doorset satisfied the requirements for the following periods.

Test Results:		Doorset A	Doorset B
Integrity performance	Sustained flaming	33 minutes#	64 minutes
	Gap gauge	33 minutes#	66 minutes*
	Cotton Pad	33 minutes#	64 minutes
Insulation		33 minutes#	64 minutes

* The test duration. The test was discontinued after a period of 66 minutes.
# The specimen was blanked off.