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Title:

The fire resistance performance of a single-leaf, single-acting doorset, when tested in accordance with BS 476: Part 20 and 22: 1987

WF Report No:

403587 AR1

Prepared for:

Pacific Rim Wood Ltd

Ground Floor Suite
Block B
Old Kelways
Somerton Road
Langport
Somerset
TA10 9SJ

Test date:

20th August 2018

The details of the sponsor of test report WF 403587 are held on file by Warringtonfire. This test report is additional to that issued as WF 403587 on 24/01/19 and the original report shall remain valid and is not replaced by this additional report.

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Contents

Summary of Performance

The following performance was achieved from the specimen tested. Full details of the testing and specimen construction are described in the report.

Results:

Fire resistance test in accordance with BS476: Part 20/22: 1987

Times to failure:

Integrity	**47 (forty seven) minutes***
Insulation	**47 (forty seven) minutes***

* No failure at the termination of the test at 47 minutes.

Summary of specimens:

An unlatched single-leaf, single-acting doorset hung opening out away from the furnace.

Leaf size: 2040mm high x 826mm wide x 44mm thick.

1 Introduction

The doorset was manufactured and supplied for test by the client and delivered during August 2018. Warringtonfire constructed a plasterboard clad timber stud supporting construction and at request of the client, installed the specimen into the wall.

2 Specification

Details of the specimen are shown in the Appendix.

2.1 Door leaf

The leaf measured 2040mm high x 826mm wide x 44mm thick. The doorset was hung to open out away from the furnace. The result of this test was obtained from a doorset fitted with a latch which was disengaged for the test.

2.2 Door perimeter gaps

The gaps between the edge of the door and frame were measured prior to test. A total of 12 readings were taken. The measurements (in mm) are given in Section 5.4 of the report.

2.3 Closer forces

Measured in accordance with FTSG Resolution No 63.

Opening force (Nm)	Closing force (Nm)
37	21

2.4 Sampling

Warringtonfire was not involved in factory sampling of the components used for the specimens subject to this report.

3 Description of Construction (Refers to Figures 1 to 4 of the Appendix)

Leaf – stated as produced from a Pacific Rimwood Flamebreak 430 doorblank

		Species/type	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Stiles		Mixed Tropical Hardwood*	36 thick x 35 deep incorporating a 9 x 9 tongue into the core*	480*	-	1
Rail – top and bottom		Mixed Tropical Hardwood*	36 thick x 35 deep incorporating a 9 x 9 tongue into the core*	480*	-	2
Core		Parasorianthes Falcateria/Albisia Falcate in 3 layers of lamels laid in alternate directions*	12 thick each layer – grooved to accept the stiles and rails*	140-360*	-	3
Facings		Veneer Plywood*	4 thick*	520-610*	10.5	4
Lippings – all edges		Sapele*	6 thick*	640*	-	5
Adhesive	Lippings	Technomelt Polyurethane Resin*	-	-	-	-

* Stated by client, not verified by laboratory

Frame

	Species/type	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Head and jambs	European Redwood*	32 thick x 95 deep*	510*	7.9	6
Stops – planted (pinned)	European Redwood*	32 wide x 12 high*	510*	8.9	7
Frame jointing details	Half lapped - screwed	10 x 95mm with 2No. 75 x 5mm screws per joint*	-	-	-
Frame to supporting construction fire stopping detail	Tightly packed rock mineral fibre capped with Sealed Tight Solutions ST88 intumescent acrylic mastic	7-19mm wide x 10mm deep on both faces (mastic dimensions only, mineral fibre remains full depth of the void)	-	-	-
Frame to supporting construction fixing details	4No. steel wood screws per jamb with Broadfix Polypropylene plastic packers at fixing points for full depth of frame	Ø5 x 100 long At 600-800mm centres*	-	-	-
Architrave	European Redwood	45 wide x 18 high	510**	7.7	-
Threshold	Promat Supalux	9 thick	-	-	-

* Stated by client, not verified by laboratory ** Nominal Density – TRADA Timber Database

Intumescent and sealing materials

		Make/type	Size (mm)	Location	Key to figures
Leaf edge		None fitted	-	-	-
Frame reveal	Head and jambs	Sealed Tight Solutions STS154FO plain intumescent strip*	15 x 4	Fitted 15mm from the opening face in the frame reveal	8
Perimeter seal		Sealed Tight Solutions STS1009	11 x 5	Fitted to the upstand of the stop	9

* Stated by client, not verified by laboratory

Intumescent interruptions and additional hardware protection

	Make/type	Size (mm)	Location
Around hinges	Fully interrupted	-	Hinge blade fully interrupts seal in frame reveal
Under hinge blade	None fitted	-	-
Encasing lock/ latch body	None fitted	-	-
Around latch keep	Fully interrupted	-	Latch keep fully interrupts seal in frame reveal
Under latch keeps	None fitted	-	-

* Stated by client, not verified by laboratory

Hardware – both doorsets

	Make/type	Size (mm)	Location	Key to figures
Hinges	3No. Jedo 102 bearing butt type hinge – stainless steel construction	102 x 31 x 3* (blade size)	Fitted 150mm, 940mm and 1735mm from the head of the leaf	10
Closer	Synergy s 800 EN 2-5 overhead type door closer*	236 x 60 (footprint)*	Surface fitted on the unexposed face as per the manufacturer's instructions	11
Lock/latch – disengaged	Herbine steel mortice latch/lock with eurocylinder with thumb turn Hoppe Arrone AR8100*	235 x 24 (forend size) 165 x 88 x 16* (case size) 170 x 40 (keep size)	Latch nib fitted 975-980mm from the bottom of the leaf	12
Furniture	Steel lever type handle and lock escutcheon Instinct Hardware IH 1912*	Ø51 (rose size)	Fitted appropriate to the centre lock/latch	13

* Stated by client, not verified by laboratory

4 Test Conditions

Where areas of the test specification are ambiguous or open to interpretation the Fire Test Study Group Resolutions No's 51, 63, 70, 71, 72 and 78 have been followed (further specific details are available on request). These Resolutions provide basis of common agreements between the fire test laboratories which are members of this Group.

The ambient temperature of the test area at commencement of test was 20°C.

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 -4.25 ± 2 Pa with respect to atmosphere, at a point 0.5m from the notional floor level, equating to 0 Pa at a point 1m above the notional floor level.

The furnace was controlled to follow the temperature/time relationship specified in BS 476: Part 20: 1987, using the average of nine thermocouples suitably distributed within the furnace. The temperatures recorded are shown graphically in Section 5.1.

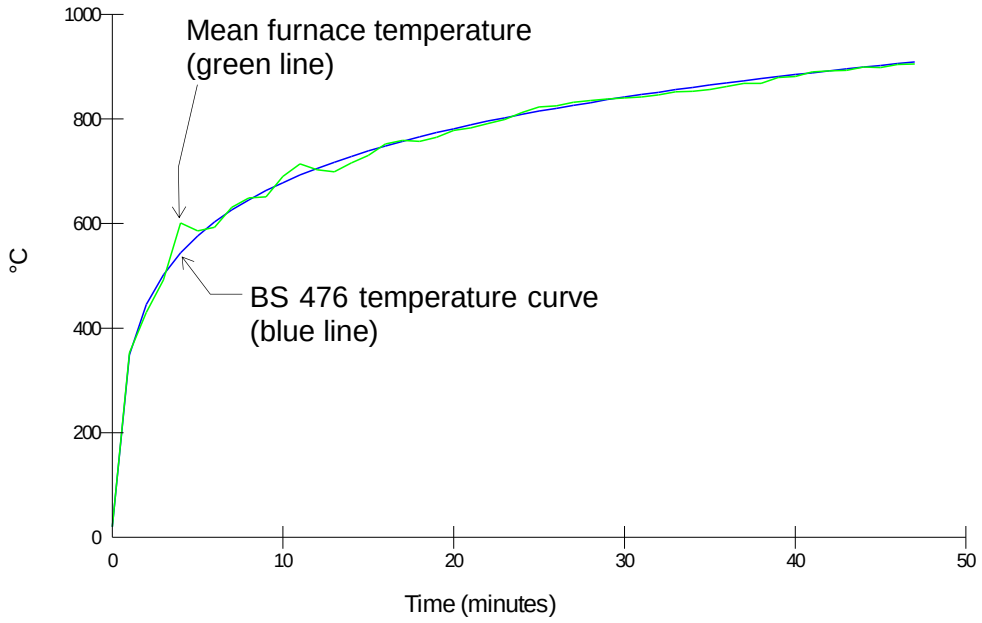
The temperature of the unexposed face was monitored by means of five thermocouples fixed to the surface of the door leaf, and three thermocouples attached to the frame, one at mid-height on each jamb and one centrally located above the leaf on the frame head.

The thermocouple positions are shown in Figure 4 of the appendix. The average temperature of the door leaf and maximum temperature of the doorset are shown graphically in Section 5.2.

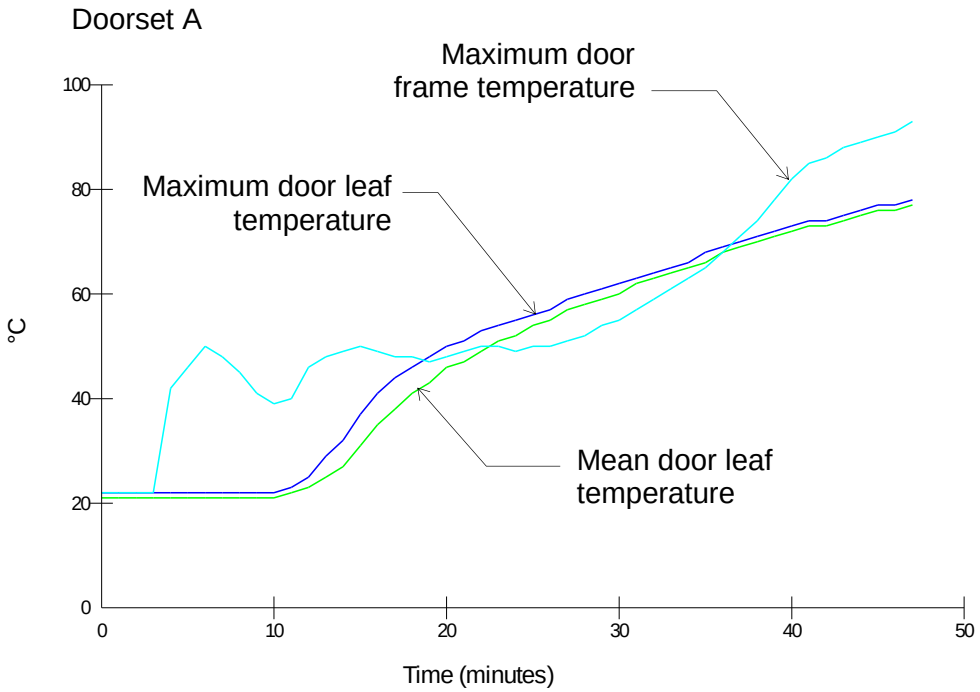
5 Test results

The following data and observations were recorded during the test.

5.1 Furnace Temperature Curve

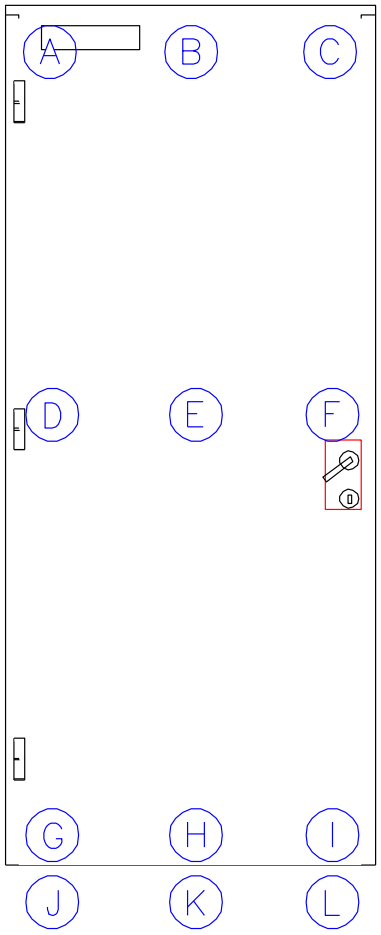


5.2 Unexposed Face Temperature Curves



5.3 Door Distortion Data

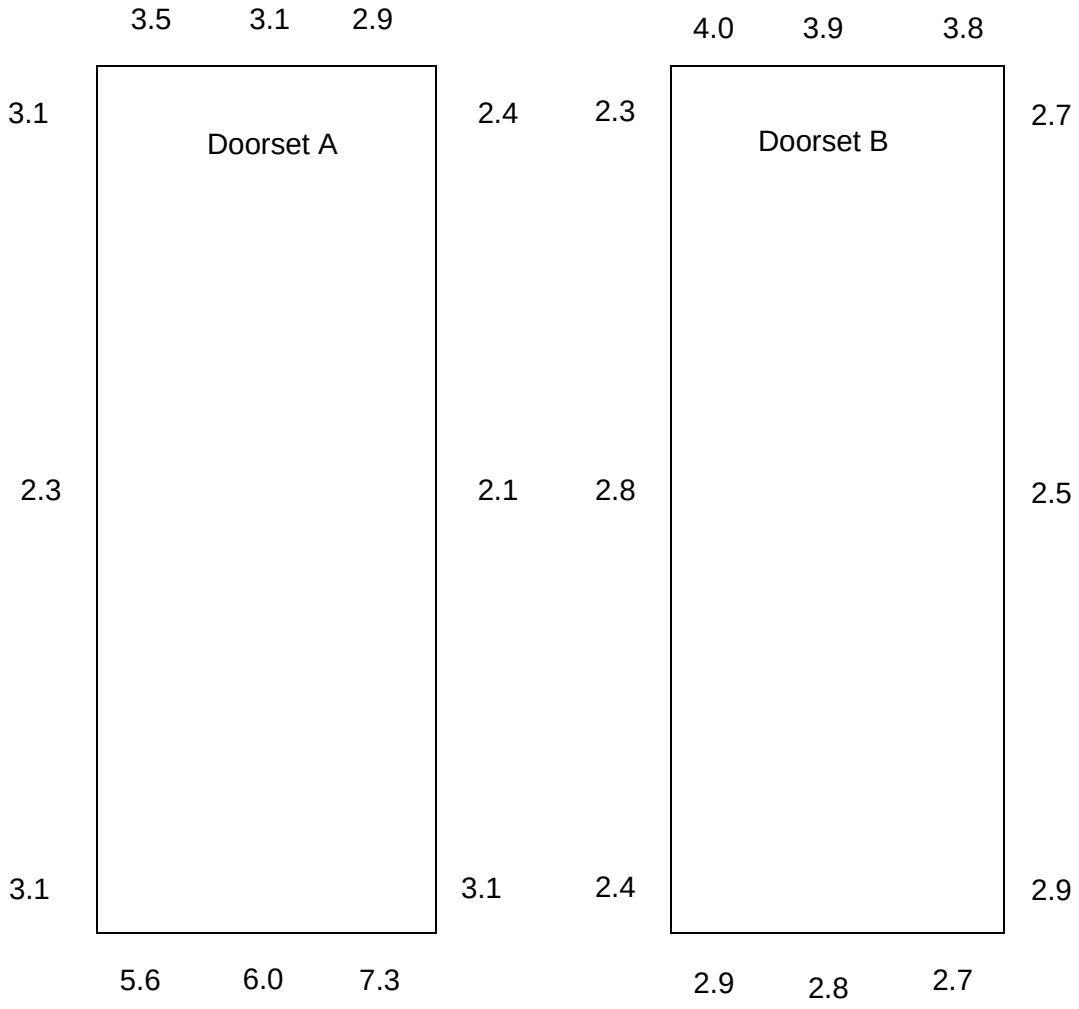
The following tables show the distortion of the door in mm with an accuracy of ±1mm.
A positive measurement indicates distortion towards the furnace.
A negative measurement indicates distortion away from the furnace.
J, K and L give vertical movement of the door, a negative reading indicates that the door has dropped.

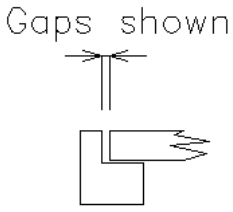


Doorset - leaf (hung on the left and opening out away from the furnace)

Time	A	B	C	D	E	F	G	H	I	J	K	L
10	2	3	3	0	2	3	0	-1	-2	0	0	0
20	3	3	6	0	-4	-2	-3	-2	0	0	0	-1
30	6	4	7	0	-9	-2	-1	-2	1	0	0	-1
40	5	3	9	-2	-21	-1	-3	-5	0	0	-1	-1

5.4 Door leaf to frame gaps





5.5 Observations

All comments relate to the unexposed face unless otherwise specified.

Time (minutes)	Comments
00:00	Test started
02:30	There is smoke issuing at the top closing corner.
04:10	There is an increase in smoke issuing across the head.
05:30	There is smoke issuing at the top hinge position.
08:50	There is smoke issuing at the top hanging corner.
09:00	There is an increase in smoke issuing at the threshold.
10:00	There is an increase in smoke issuing at the hanging edge.
12:20	There is smoke issuing at the middle hinge position.
13:00	There is an increase in smoke issuing from the middle hinge position upwards on the hanging edge.
14:00	There is smoke issuing at the middle hinge position.
17:30	There is an increase in smoke issuing at the top hinge position and latch position.
22:00	There is discoloration at the top hinge position.
47.00	Test terminated

5.6 Times to Failure

When tested in accordance with BS 476: Part 22: 1987, Method 6, determination of fire resistance of insulated doorsets and shutter assemblies, the requirements of the standard were satisfied for the following periods:

Integrity	**47 (forty seven) minutes***
Insulation	**47 (forty seven) minutes***

* No failure at the termination of the test at 47 minutes

6 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.

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 were asymmetrical and were tested such that both door leaf was tested opening away from the heating conditions of the test. The test result may not be appropriate to situations where by the sample tested haas been installed in a different configuration to that which they are tested.

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.

	Written and checked by:	**Authorised by:**
Signature:		
Name:	James Bacchus	Adam Scott
Title:	Technical Officer	Laboratory Manager
Date of issue:	06/06/2019	06/06/2019

Photographs

Intumescent interruptions by hardware

Around hinge blade

Around the latch

At the start of the test

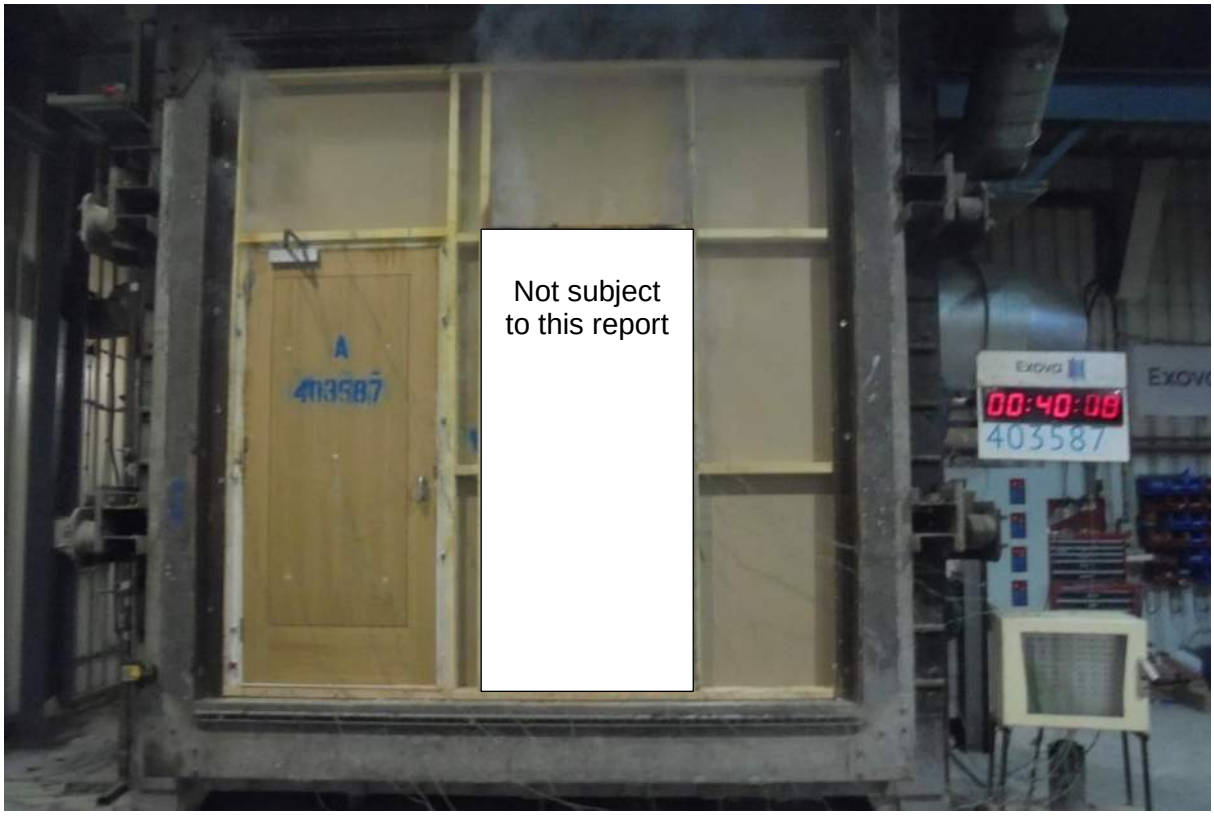
Not subject to this report

At 10 minutes

After 20 minutes

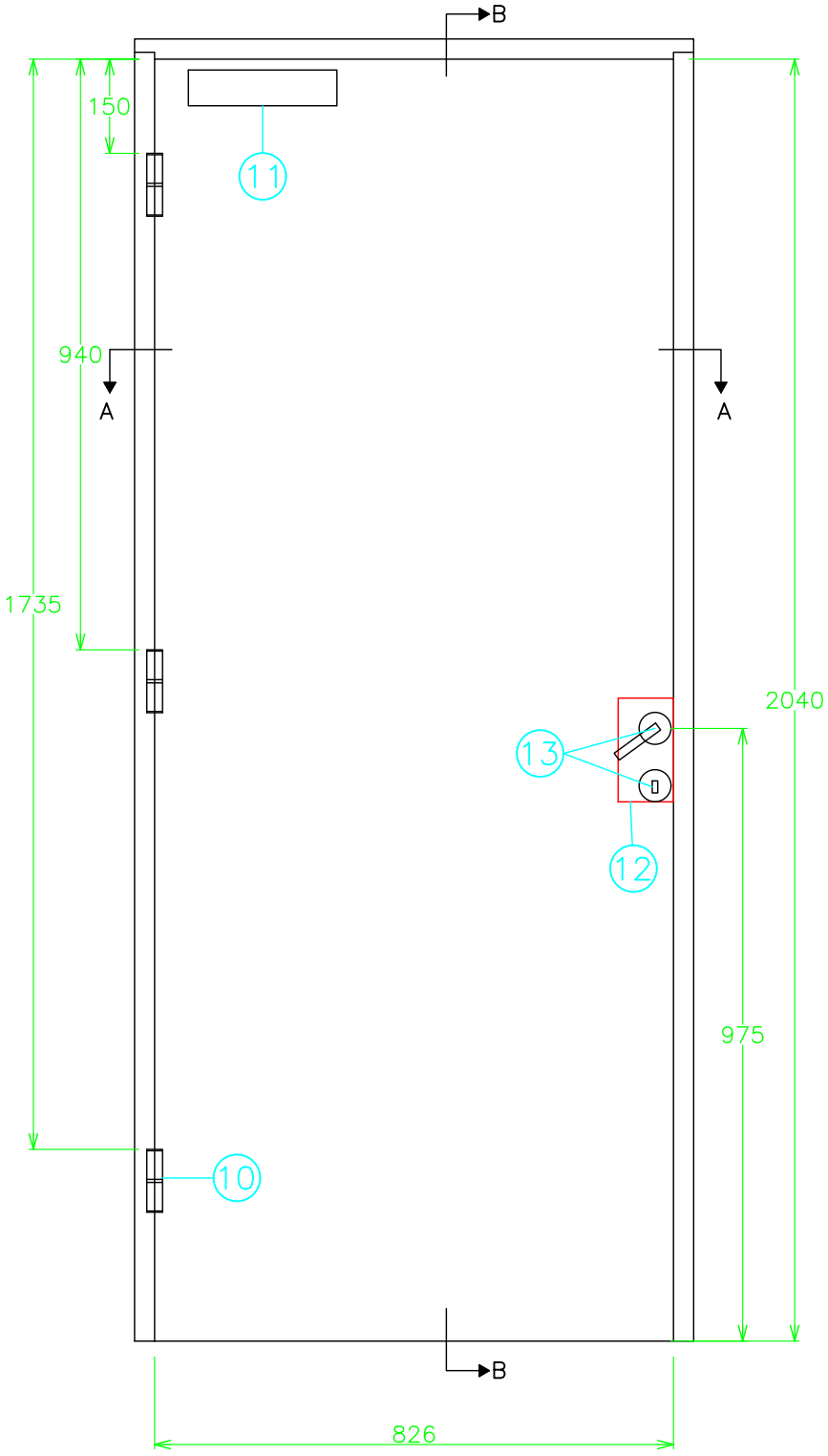
At 30 minutes

At 40 minutes



Exposed face – post test

Appendix – figures 1 to 4



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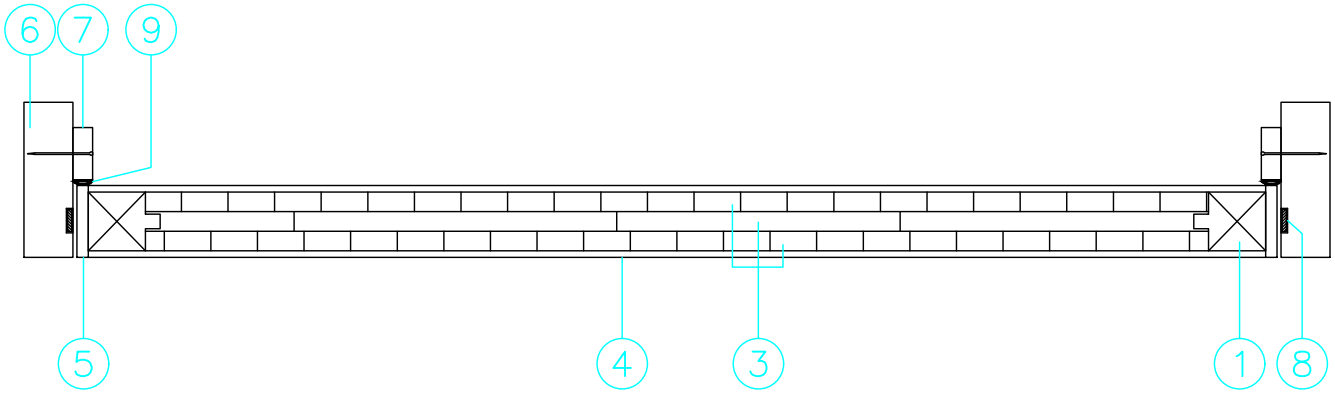
Title: Unexposed face elevation showing hardware positions
(All dimensions in mm)

Date Drawn	Drawn By	Scale
29/08/18	ARD	NTS

Project No.	
WF 403587 AR1	Appendix

Section A–A



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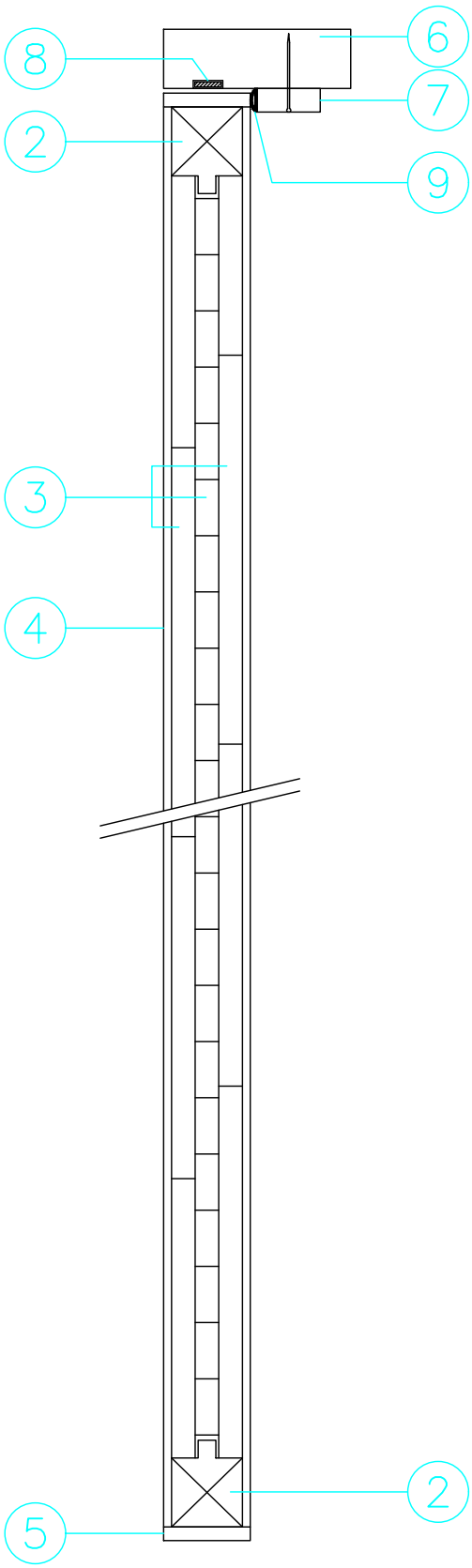
Title
Horizontal cross sections
(All dimensions in mm)

Date Drawn	Drawn By	Scale
29/08/18	ARD	NTS

Project No.	
WF 403587 AR1	Appendix

Section B–B



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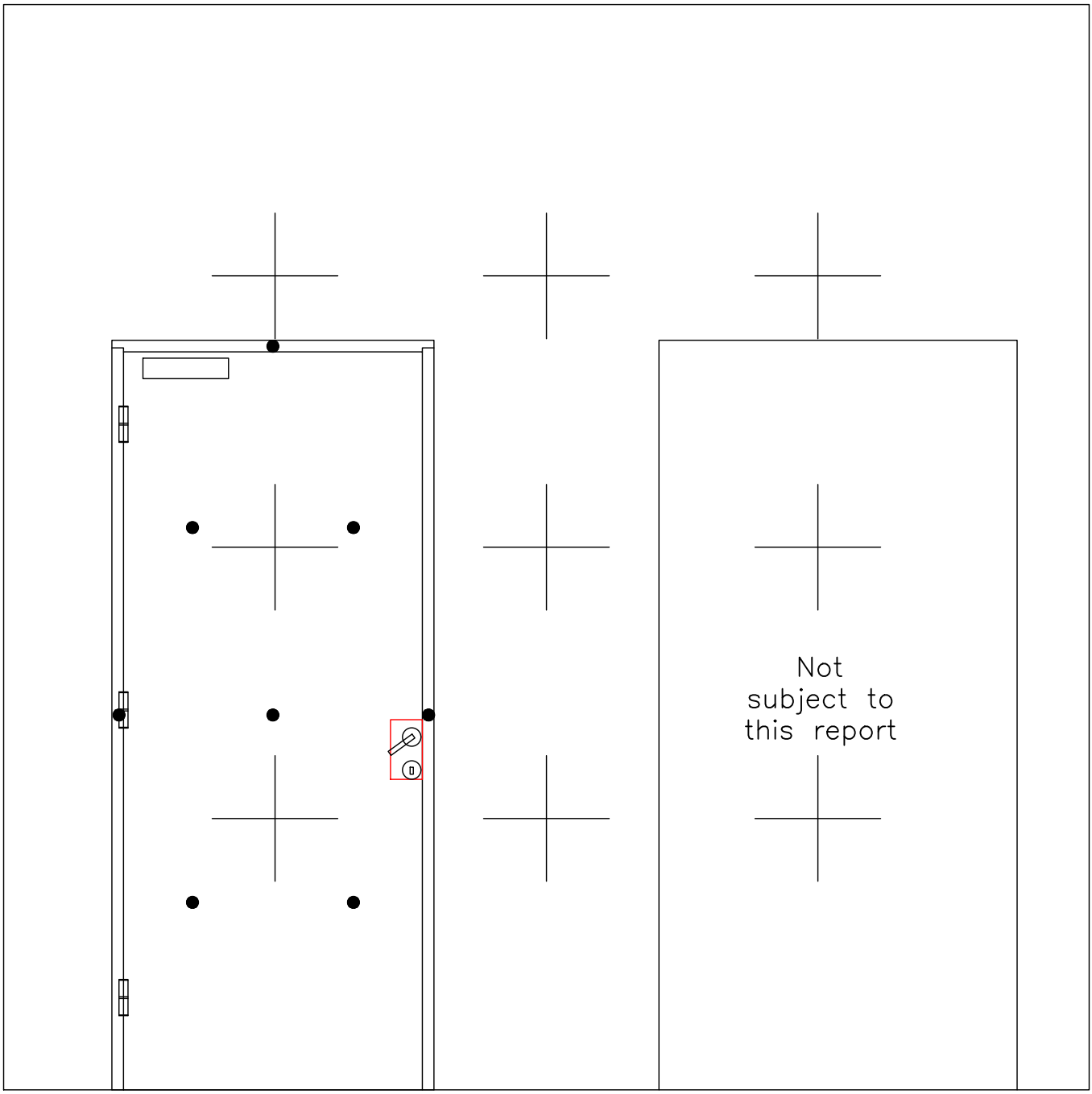
Title
Vertical cross section
(All dimensions in mm)

Date Drawn	Drawn By	Scale
29/08/18	ARD	NTS

Project No.	
WF 403587 AR1	Appendix



: Furnace Thermocouples

: Unexposed Face Thermocouples

Viewed From Unexposed Face

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Title
Thermocouple positions
(All dimensions in mm)

Date Drawn	Drawn By	Scale
29/08/18	ARD	NTS

Project No.	
WF 403587 AR1	Appendix