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PANEL PRODUCTS

Title:

The fire resistance performance of two, single-leaf, single-acting doorsets, when tested in accordance with BS 476: Part 20/22: 1987

WF Report No:

414533

Prepared forogoiding **Falcon Panel Products** Ltd

Clock House



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		Times to Failure	

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.

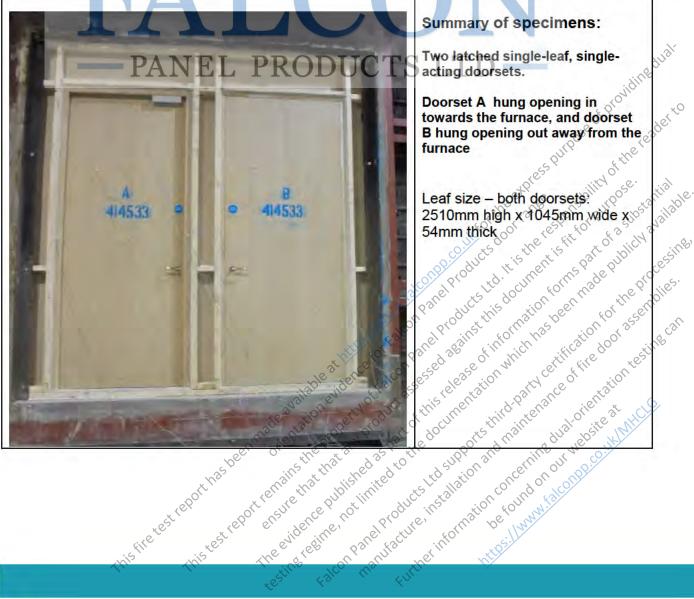
Results:

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

Times to failure:

	Doorset A	Doorset B
Integrity	67 (sixty seven) minutes	80 (eighty) minutes*
Insulation	67 (sixty seven) minutes **	80 (eighty) minutes*

- * No failure at test termination
- ** Failure by virtue of integrity failure



Summary of specimens:

Two latched single-leaf, single-

Doorset A hung opening in of other towards the furnace and in of other B hung. B hung opening out away from the furnace

Leaf size – both doorsets. Veiler Hoducts Ltd. It is the responsible for this release of information forms part of a second this release of information forms bar of a stock? 2510mm high x 1045mm wide x

1 Introduction

The doorsets were manufactured and supplied for test by the client and delivered during June 2019. At the request of the client, Warringtonfire constructed a plasterboard clad timber stud supporting construction and installed the specimens into the wall.

2 Specification

Details of the specimens are shown in the Appendix.

2.1 Door leaf

The left doorset was designated doorset A and the right doorset was designated doorset B. The leaf of both doorsets measured 2510mm high x 1045mm wide x 54mm thick. Doorset A was hung to open in towards the furnace, and doorset B was hung to open out away from the furnace. The results of this test were obtained from doorsets fitted with a latch which was engaged for the duration of 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 24 readings were taken. The measurements (in mm) are given in Section 5.5 of the report.

2.3 Closer forces

Measured in accordance with FTSG Resolution No 63.

	Opening force (Nm)	Closing force (Nm)	e providi
Doorset A	50	51	2026 of Feagler
Doorset B	25	24	espuile of the
this fire test teport has t	Opening force (Nm) 50 25 25 26 27 25 25 25 25 25 25 26 27 27 28 28 28 28 28 28 28 28	Juntal Complete Country to the entropy of the entro	Less purpose of providing less to be seen to be seen to be suppose of providing the reader to be seen to be supposed to be seen to be supposed to be suppose
	*62	80	

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

Leaf - stated as being produced from Falcon Panel Products Strebord 54 door blanks

		Species/type	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Stiles and rails		None fitted	-		-	
Core	1	Falcon Panel Products Strebord particleboard*	54 thick	520- 630*	10.6-10.7	1
Facing	1	American White Oak veneer	0.5 thick	-		2
Adhesive	Lippings	Urea Formaldehyde	-	J. L.	7.5	19.
	Facing	Urea Formaldehyde	-	12-1		90
Lippings	Top edge	American White Oak*	20 thick	770**	-	3
	Vertical and bottom edges		10 thick			4

^{*} Stated by client, not verified by laboratory

Door frame

	Species/type	Dimensions (mm)	Density (kg/m³)	Moisture (% w/w)	Key to figures
Head and jambs	American White Oak*	40 wide x 102 deep	770**	8.9 S	° 5
Head to jamb jointing detail	Mortice and tenon – screwed and glued with Urea Formaldehyde	-	- vee	oress in a six	lity of the
Stop – planted (screwed)	American White Oak*	18 high x 45 wide	770**	8.9 40	6,5
Frame to supporting construction fire stopping detail	Rockwool mineral fibre for full depth of frame capped with intumescent mastic on both faces	Nominally 5 – 18 wide x 10 deep (mastic depth only, mineral fibre remains full depth of frame)	eginse infort	ment-msp ation forms p ation forms	9001
Frame to supporting construction fixing detail	4No. steel screws per jamb	60 x 100 long	ease iton who	Att Cert of Fi	entation
Architrave		05 161 Six 900	ortstring!	go gold of	sic IM
Threshold	Non combustible	2 20 35 6 The	bbo sug,	ring II We	0)-

^{*} Stated by client, not verified by laboratory

^{**} Nominal density - TRADA Timber database

English Holins Nominal density TRADA Timber database

Intumescent and sealing materials

	Make/type	Size (mm)	Location	Key to figures
Leaf – bottom edge	Norseal NOR810 drop seal	22 wide x 60 high	Fitted centrally along the bottom edge of the leaf	7
Frame reveal – head and jambs	Lorient Polyproducts Ltd LP1504DS Type 617	15 x 4	Fitted 7mm from the opening face	8
	Lorient Polyproducts Ltd LP1504 Type 617	15 x 4	Fitted 32mm from the opening face	9
Smoke seal	Lorient Polyproducts Ltd LAS1007	10 x 7	Fitted to the upstand of the stop in the frame reveal	10

Intumescent interruptions and additional hardware protection

	Make/type	Size (mm)	Location						
Around hinge blade	Partially interrupted	1	Hinge blade fully interrupts 1st seal leaving 2nd seal continuous in frame reveal						
Under hinge blade	Hinge manufacturer supplied kit Ref. 8820 (graphite)	1 thick	Fitted under hinge blade on frame and leaf						
Around closer slide channel	Partially interrupted ANEL PROD	ŪСТ	Closer slide channel partially interrupts both seals in frame head with 8mm of each remaining continuous	ing dual'					
Concealed closer protection	Manufacturers supplied intumescent kit	-	Fitted as per the manufacturer's instructions	readerto					
Under latch forend	Sealed Tight Solutions Ltd graphite	1 thick	Fitted under the latch forend						
Around latch keep	Partially interrupted	-		. Navailable.					
Under latch keep	Sealed Tight Solutions Ltd graphite	1 thick	Fitted under the latch keep	Cessins					
Around latch keep Partially interrupted - Latch keep partially interrupted seals with 4mm of 1st seal and 3mm of 2rd seal remaining continuous of 2rd seal remainin									
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^{*} Stated by client, not verified by laboratory

Hardware

* Stated by client, not verified by laboratory

	Make/type	Size (mm)	Location	Key to figures	
Hinge	3No. Simonswerk Tectus TE527FR	155 x 33 x 26 (blade size)	Fitted 200mm, 655mm and 2160mm from the head of the leaf	11	
Closer	Geze Boxer 2-4 concealed overhead type closer	286 x 53 x 34 (body size in leaf head) 440 wide arm channel in frame head	Closer body rebated into leaf head and slide channel rebated into frame head as per the manufacturer's instructions	12	
Latch - engaged	AGB mortice latch 60mm Polaris Maglock 2XT	195 x 18 (forend size) 82 x 22 (keep size)	Fitted 945mm from the bottom edge of the leaf	13	
Furniture	Olivari Conca lever type handle	Ø53 x 121 x 51 (handle size)	Fitted appropriate to the latch	14	
	Securefast Slimline deedlock electromagnetic lock	250 x 47 x 26 (body size)	Body fitted on frame head on the exposed face of doorset A and the unexposed face of doorset B. Corresponding plate through bolted on leaf head.	15	

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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 17°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 0Pa 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 as closely as possible, using the average of nine thermocouples suitably distributed within the furnace. The temperatures recorded are shown graphically in Section 5.1.

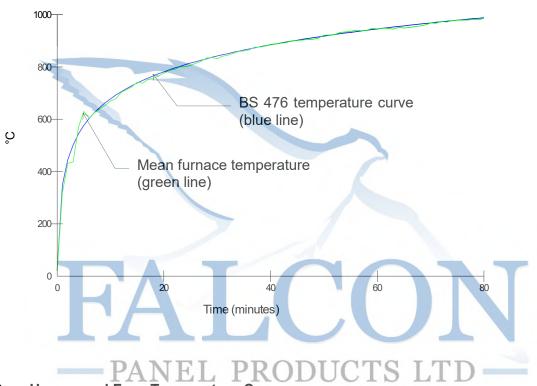
The temperature of the unexposed face of both doorsets was monitored by means of five thermocouples fixed to the surface of the door leaf, and three thermocouples attached to the frame, one at mid-height on each jamb and one centrally located above the leaf on the frame head.

Wishester teacht as been made asalation entered to factor to be a selected to the control of the The thermocouple positions are shown in Figure 4 of the appendix. The average temperature of the door leaves and maximum temperature of the doorsets are shown this test report terrains the trait and product assessed against this document is the product that the trains the trait and product assessed against this document is the product and product assessed against this document is the product and product assessed against this document is the product and product assessed against this document is the product and product assessed against this document is the product and product assessed against this document is the product against this document. graphically in Section 5.2. L PKUDUCTS avidence published as fait of the documentation which has been made publicly available. Tabling the broducts the supports third-party certification for the products the support to the s

5 **Test results**

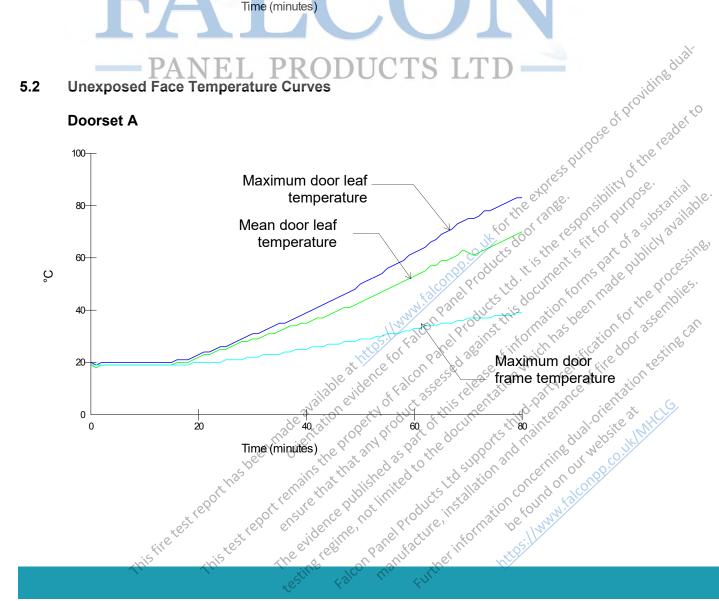
The following data and observations were recorded during the test.

5.1 **Furnace Temperature Curve**



5.2 **Unexposed Face Temperature Curves**

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Eurher information concerning dual orientation testing can

Doorset B



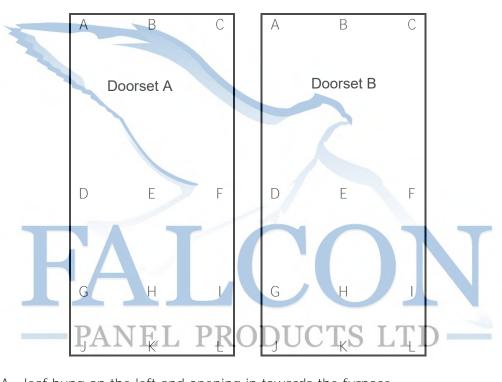
5.3 **Door Distortion Data**

The following tables show the distortion of the door leaves 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 A -	loaf huna	on the left	t and	ononina ir	towards the	furnaco
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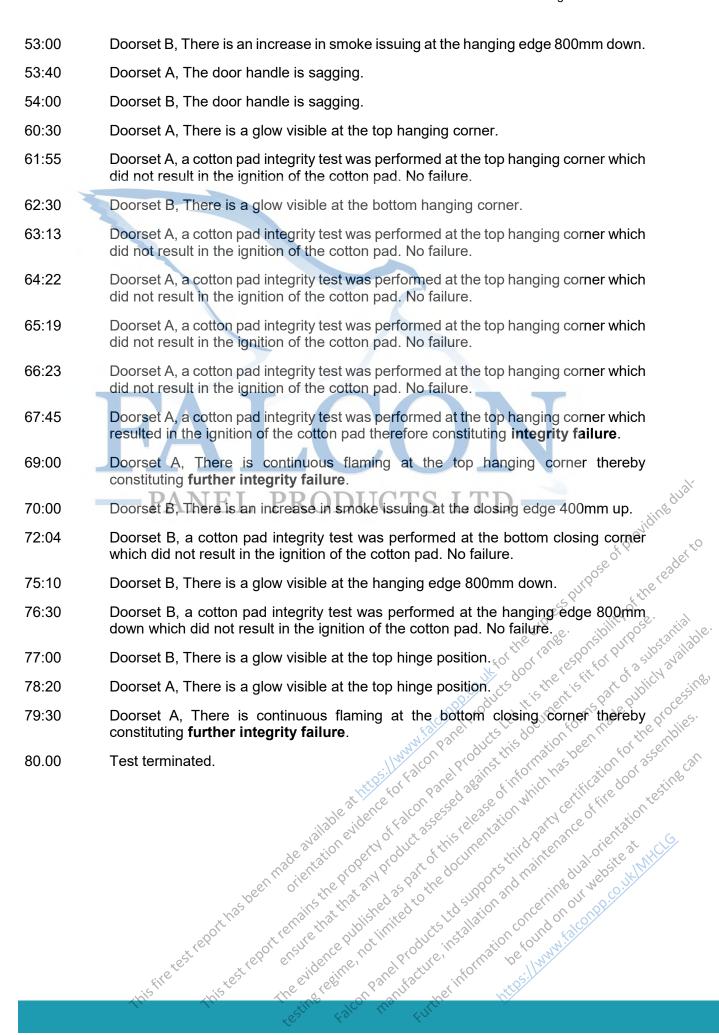
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	60	-14	-24	-14	-8	-38	-12	-2	-19	3	<u>03</u>	ري د-3	۶٬۷ _E J°.٬۵	arto blich sing,
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	60	-14	-24	-14	-8	-38	-12	-2	-19	3	3 6	-3 11-1	is the art o' blich sing,
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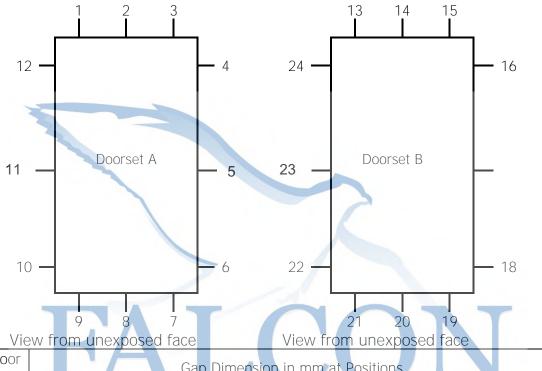
5.4 Observations

All comments relate to the unexposed face unless otherwise specified.

O0:00 Test Started O4:10 Doorset B, There is smoke issuing at the top closing corner and the threshold. O4:28 Doorset A, There is smoke issuing at the top closing corner. O4:50 Both doorsets, There is an increase in smoke issuing at the threshold. O6:00 Doorset B, There is an increase in smoke issuing at the top closing corner and 200mm across the head. O8:00 Doorset A, There is smoke issuing at the top hanging corner. O9:05 Doorset A, There is smoke issuing at the hanging edge (100mm down from the top hanging corner.) 14:10 Doorset A, There is an increase in smoke issuing around the closer. 14:40 Doorset B, There is an increase in smoke issuing around the closer. Doorset B, There is an increase in smoke issuing at the centre of the head. 16:40 Doorset B, There is an increase in smoke issuing at the right half of the head. 17:50 Doorset B, There is an increase in smoke issuing at the top closing corner and the closer. 19:00 Doorset B, There is an increase in smoke issuing at the top closing corner and the closer. 31:00 Doorset B, There is an increase in smoke issuing at the top hanging corner and the closer. 33:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 37:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 39:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 39:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 39:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 39:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 39:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 39:00 Doorset B, There is an increase in smoke issuing at the panging corner. 39:00 Doorset B, There is an increase in smoke issuing at the panging corner. 39:00 Doorset B, There is an increase in smoke issuing at the top hanging corner. 49:00 Doorset B, There is an increase in smoke issuing at the top hanging corner.	Time (minutes)	Comments
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Doorset B, There is an increase in smoke issuing across the left half of the head and discolouration on the frame head. Doorset B, There is an increase in smoke issuing at the centre of the head. Doorset B, There is an increase in smoke issuing at the right half of the head. Doorset A, There is an increase in smoke issuing at the top closing corner and the closer. Doorset B, There is an increase in smoke issuing across the head. Doorset A, There is smoke issuing at the hanging edge 700mm down. Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hinge position. Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position.	14:10	
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Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hinge position. Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position.	17:50	Doorset B, There is an increase in smoke issuing at the right half of the head.
Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hinge position. Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position.	19:00	Doorset A, There is an increase in smoke issuing at the top closing corner and the closer.
Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hinge position. Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position.	31:00	Doorset B, There is an increase in smoke issuing across the head
Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is an increase in smoke issuing at the top hinge position. Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position.	33:00	Doorset A, There is smoke issuing at the hanging edge 700mm down.
Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position.	36:00	Doorset A, There is an increase in smoke issuing at the top nanging corner.
Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position.	37:00	Doorset B, There is an increase in smoke issuing at the top hanging corner.
Doorset B, There is an increase in smoke issuing at the centre of the head only. Doorset B, There is smoke issuing at the latch position. Doorset B, There is an increase in smoke issuing at the hanging edge 700mm down. Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is smoke issuing at the left half of the head only. Doorset A, There is an increase in smoke issuing at the top hanging corner.	39:00	Doorset B, There is an increase in smoke issuing at the top hinge position.
Doorset B, There is smoke issuing at the latch position. Doorset B, There is an increase in smoke issuing at the hanging edge 700mm down. Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is smoke issuing at the left half of the head only. Doorset A, There is an increase in smoke issuing at the top hanging corner.	42:00	Doorset B, There is an increase in smoke issuing at the centre of the head only.
Doorset B, There is an increase in smoke issuing at the hanging edge 700mm down. Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is smoke issuing at the left half of the head only. Doorset A, There is an increase in smoke issuing at the top hanging corner.	46:00	Doorset B, There is smoke issuing at the latch position.
Doorset A, There is an increase in smoke issuing at the top hanging corner. Doorset B, There is smoke issuing at the left half of the head only. Doorset A, There is an increase in smoke issuing at the top hanging corner.	47:00	Doorset B, There is an increase in smoke issuing at the hanging edge 700mm down.
Doorset B, There is smoke issuing at the left half of the head only. Doorset A, There is an increase in smoke issuing at the top hanging corner.	47:40	Doorset A, There is an increase in smoke issuing at the top hanging corner
Doorset A, There is an increase in smoke issuing at the top hanging corner.	50:00	Doorset B, There is smoke issuing at the left half of the head only.
No. of the second secon	50:50	Doorset A, There is an increase in smoke issuing at the top hanging corner.



5.5 Leaf edge to frame gaps pre-test measurement



Door Ref		Gap Dimension in mm at Positions										
۸	1	2	3	4	5	6	7*	8*	9*	10	11	12
А	3.5	3.6	3.3	H.1,	1.9	2.0	3.0	3.1	3.0	2.7	2.6	3.0
D	13	14	15	16	17	18	19*	20*	21*	22	23	24
В	4.2	3.8	3.7	3.0	2.7	2.2	3.1	3.0	2.9	3.0	3.3	2.7

Door Ref		Gap Between Face of Leaf and Doorstop in mm at Position								
٨	1	2	3	4	5	6	7*	8*	9*	10 10 12 12
A	1.8	2.0	2.0	1.5	2.0	2.0	-	-	-	1.9 21.82 1.8 100 , 200 100
D	13	14	15	16	17	18	19*	20*	21*	22 (23 024, 0 5,10 3,110
В	2.0	2.0	2.0	1.7	1.9	2.0	-	-	- (1.20 1.7 (4.9)
	20.5 Just 1 to 1 Just 1 seems									
Door	Gap Between Doorframe and Supporting construction in mm at Position									

B 13 14 15 16 17 18 19* 20* 21* 22 23 24 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 A 10.0 14.0 13.0 12.0 18.0 24.0		В	13	14	15	16	17	18	19*	20*	21*	22 23 224
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 12 10 14 15 16 17 18 19* 20* 21* 22 23 24 10 10 11 10 14 10 12 13 10 12 13 10 12 13 10 14 15 16 17 18 19* 20* 21* 22 23 24 10 10 10 10 10 10 10 1		D	2.0	2.0	2.0	1.7	1.9	2.0	1	1	-	1.20 1.7 (4.9)
Door Ref Gap Between Doorframe and Supporting construction in mm at Position A 1 2 3 4 5 6 7* 8* 9* 10 11 0 12 0 11 0 14 0 13 0 12 0 13 0 24 0 0 0 0 0 0 0 0 0	_	20 Stantil Dall Oldi Cessii										
A 1 2 3 4 5 6 7* 8* 9* 10 31 72 12 110 160 110 14.0 13.0 12.0 18.0 24.0 5 5 5 5 6.0 110 16.0 110 14.0 12.0 13.0 12.0 13.0 5 5 5 6.0 110 14.0 12.0 13.0 5 5 6 6.0 110 14.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 12.0 13.0 13.0 12.0 13.0 13.0 12.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13	_	Door Ref Gap Between Doorframe and Supporting construction in min at Position										
* Dimension not included in calculations at the bottom # Gap not measured * Dimension not included in calculations at the bottom # Gap not measured * Dimension not included in calculations at the bottom # Gap not measured * Dimension not included in calculations at the bottom # Gap not measured		۸	1	2	3	4	5	6	7*	*811	9,50	10 31 612 0 36
B 13 14 15 16 17 18 19* 20° 27* 22 23 24 24 2			10.0	14.0	13.0	12.0	18.0	24.0	×05:11	49-	lel - a	12,0 11.0 16.0 0
* Dimension not included in calculations at the bottom and the bot		D	13	14	15	16	17	18 ×	19*	20*	21*	22 3 23 240 25
* Dimension not included in calculations at the bottom # Gap not measured * Gap not measured * The bottom to botto		Ь	12.0	10.0	11.0	14.0	12.0	13.0	Jen-	alco-	-163	5.0 5.9 6.0
	* #											

5.6 Times to Failure

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

	Doorset A	Doorset B			
Integrity	67 (sixty seven) minutes	80 (eighty) minutes*			
Insulation	67 (sixty seven) minutes	80 (eighty) minutes*			

^{*} No failure at test termination.

^{**} Failure by virtue of integrity failure.



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.

The results of this test were obtained using the specimens provided for testing, and the door to frame gaps recorded in Section 5.5 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 into the heating conditions of the test and the door leaf of doorset B opened away from the heating conditions of the furnace. 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.

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.

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Written and checked by:

Authorised by:

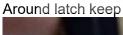
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Signature:	J.R.Jones	On the expression of a substantial of a
Name:	John Jones	Nikolas Whitelock
Title:	Technical Officer	Technical Manager
Date of issue:	19/09/2019 ************************************	25-EC 19/09/2019-EFF AFFE 3 TAZZION TEST
this fire test report	Technical Officer 19/09/2019 ************************************	Nikolas Whitelock Technical Manager 19/09/2019 Authorised by:

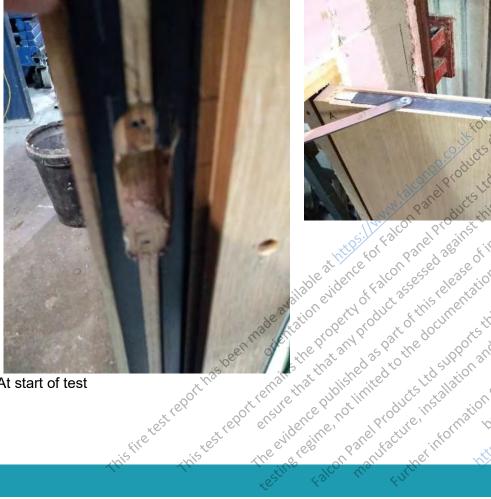
Photographs

Intumescent interruptions by hardware







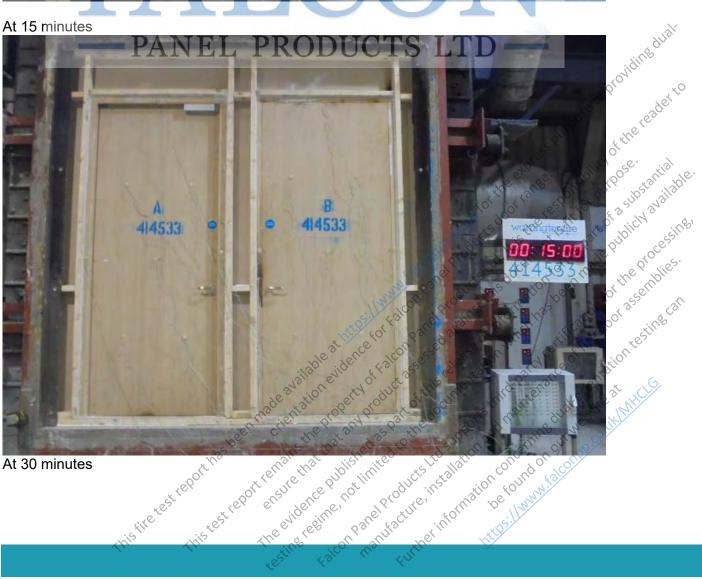


Closer body in leaf head



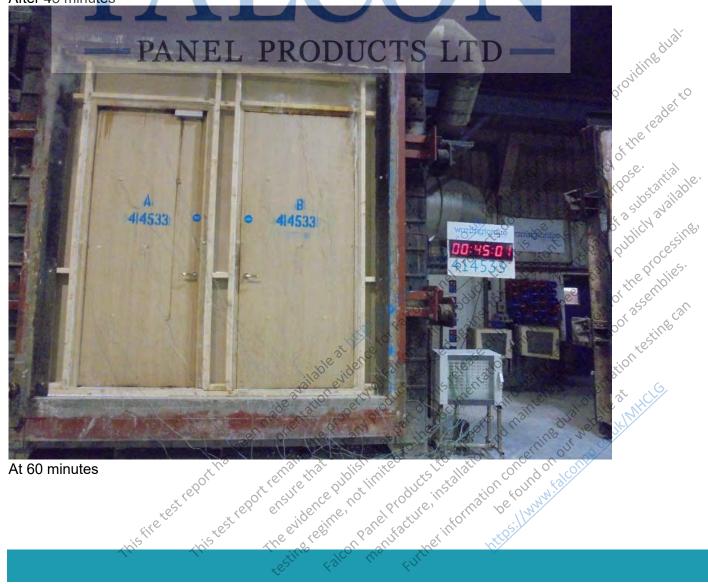
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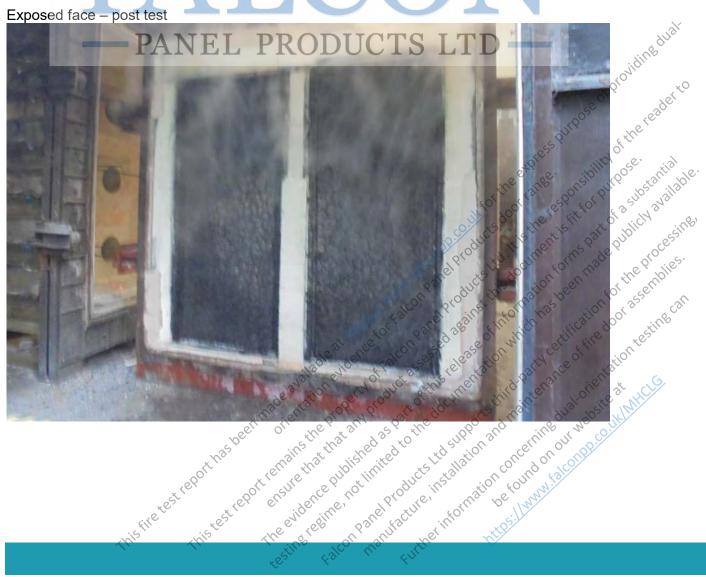
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Appendix – clients drawing and figures 1 to 4 PANEL PRODUCTS LTD Jubstantial lich angliagle. e Processing, ssemblies. restingcan The evidence not regime, not Further informatil be for Kalan Panel Prod Ranel Live in

