

Fire resistance test report

Issuing laboratory: Warringtonfire Testing and Certification Limited

Test standard: BS 476-20:1987 and BS 476-22:1987 Clause 8

Test sponsor: Wood International Agency Ltd

Product:

Report number: 540198/R

Test date: 22 January 2024

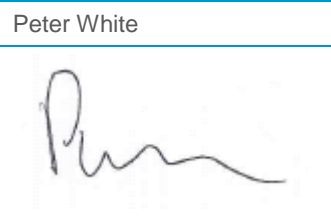

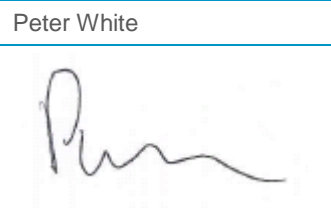

Version: 2

This report supersedes the original report dated 13 August 2024.

Warringtonfire, accredited for compliance with ISO/IEC 17025:2017 – Testing



Quality management

Version	Date	Information about the report	
1	13 August 2024	Description	Initial issue
			Prepared by
		Name	Peter White
		Signature	
		Authorised by	Sam Whittle
			
2	16 September 2024	Description	Reason for issue 2: It was noticed in the assessment that we had given this an Insulation value and was stated to be Clause 7. Upon review it has been found to be Clause 8 which also requires removal of insulation results.
			Prepared by
		Name	Peter White
		Signature	
		Authorised by	Sam Whittle
			

Signed for and on behalf of Warringtonfire Testing and Certification Limited

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Executive summary

This report documents the findings of the fire resistance test of a doorset in accordance with BS 476-20:1987 and BS 476-22:1987 Clause 8 determination of fire resistance of uninsulated doorsets and shutter assemblies with deviations as described in Table 3.

Warringtonfire Testing and Certification Limited (Warringtonfire) performed the test on 22 January 2024 at the request of Wood International Agency Ltd.

Table 1 provides a summary of the test specimen, Table 2 gives details of the supporting construction and Table 3 describes the summary of the test results.

Table 1 Test specimen

Item	Detail	Opening direction
Doorset A	Double leaf timber doorset with glazing	Towards the furnace
Latching conditions	Disengaged	

Table 2 Supporting construction

Item	Detail		
Supporting construction	150 mm thick low-density concrete wall with a low-density concrete lintel at the head.		
Dimensions	Width	3050 mm	
	Height	3050 mm	
	Thickness	150 mm	
Aperture dimensions		Width	Height
	Doorset A	1920 mm	2275 mm
Restraint conditions	Restrained on all edges		

Table 3 Summary of test results

Item	Criteria	Results
Doorset A	Integrity	36 minutes (Sustained flaming)
Notes:		
The test results for the specimen only apply to the tested orientation. The test was discontinued after 37 minutes. '*' indicates failure due to integrity failure.		

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1. Introduction

This report documents the findings of the fire resistance test of a doorset in accordance with BS 476-20:1987 and BS 476-22:1987 Clause 8 determination of fire resistance of uninsulated doorsets and shutter assemblies.

Warringtonfire performed the test on 22 January 2024 at the request of the test sponsor listed in Table 4.

Table 4 Test sponsor(s) details

Test sponsor(s)	Address
Wood International Agency Ltd	16 King Edward Road Brentwood, Essex CM14 4HL United Kingdom

2. Test specimen and supporting construction

2.1 Drawings of test assembly

The description of the test specimen and supporting construction are detailed in Section 2.2 and illustrated in Figure 1 to Figure 13. All measurements are in millimetres – unless indicated otherwise.

The drawings were supplied by the test sponsor and verified by Warringtonfire (unless stated otherwise in Section 2.2).

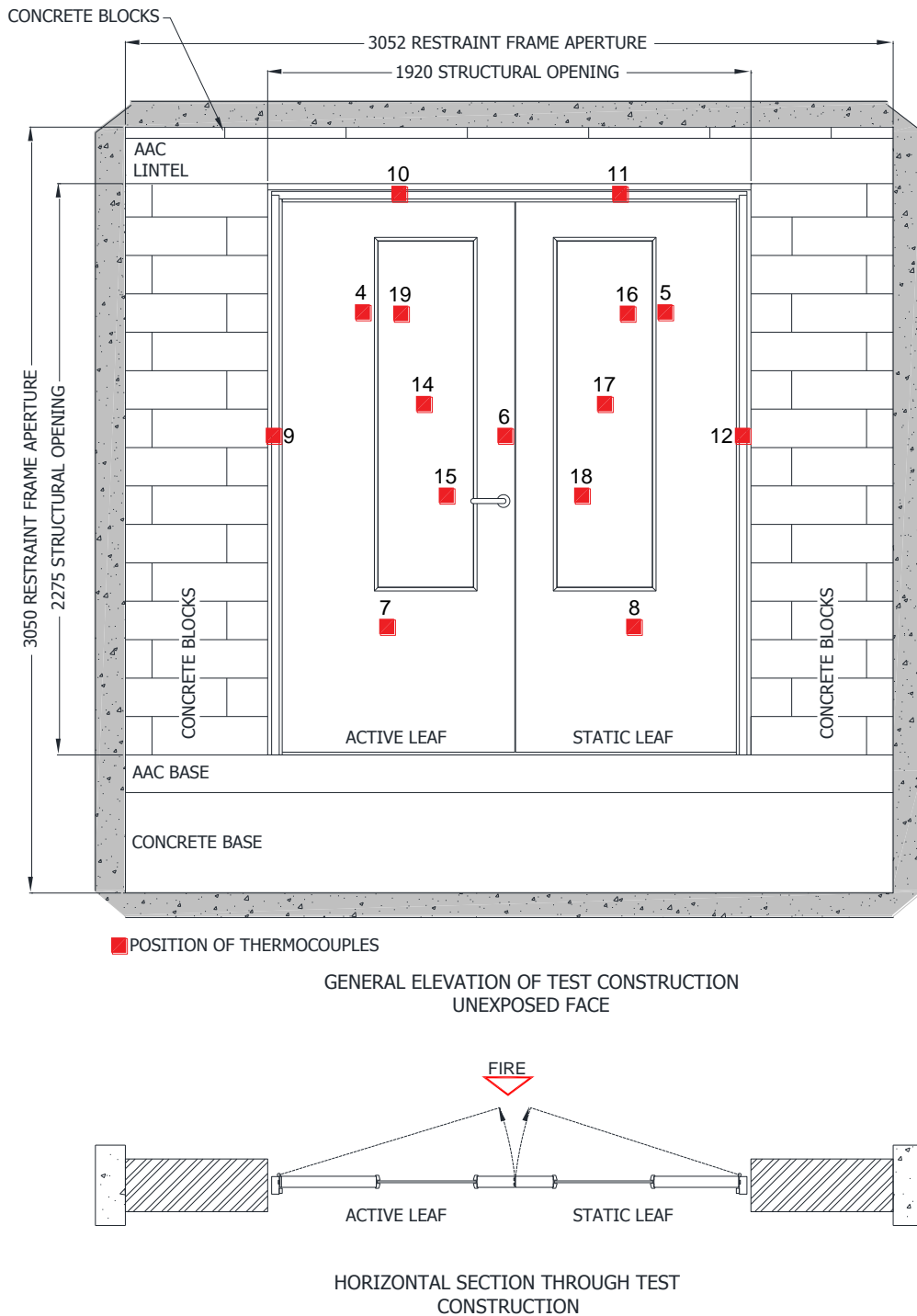


Figure 1. General Elevation of Thermocouple Positions

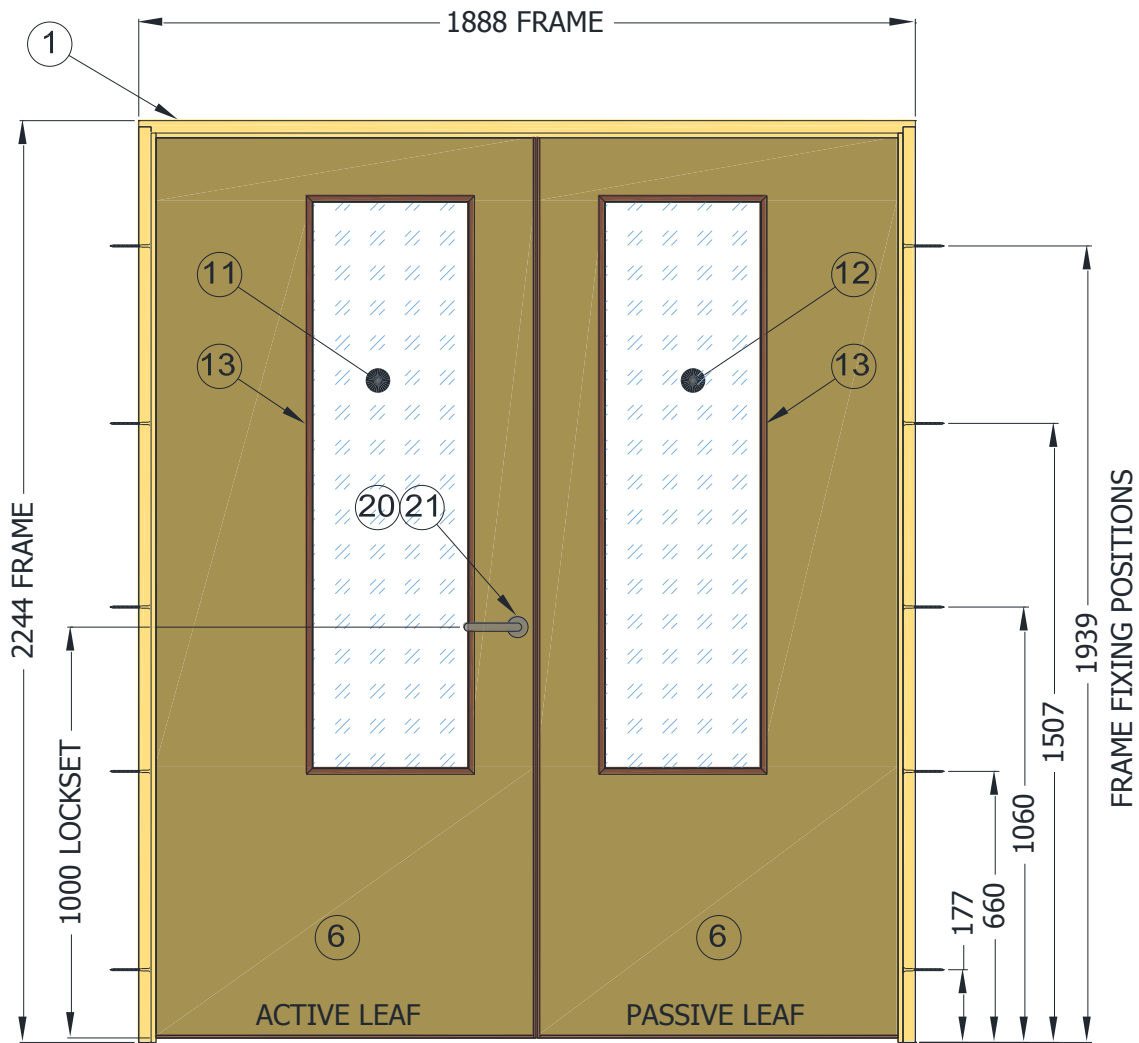


Figure 2. General Elevation of Test Construction – Unexposed Face

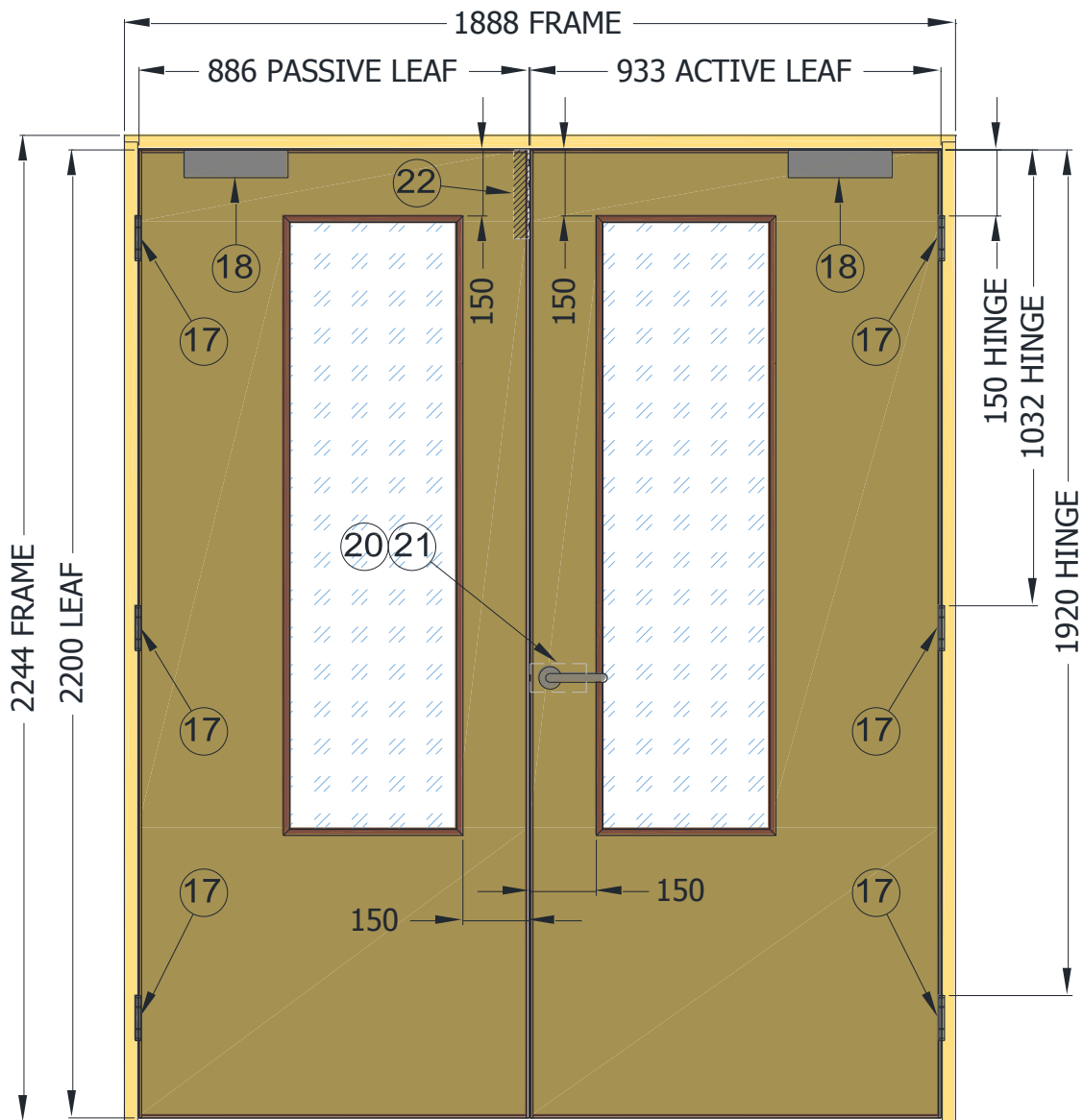


Figure 3. General Elevation of Test Construction – Exposed Face

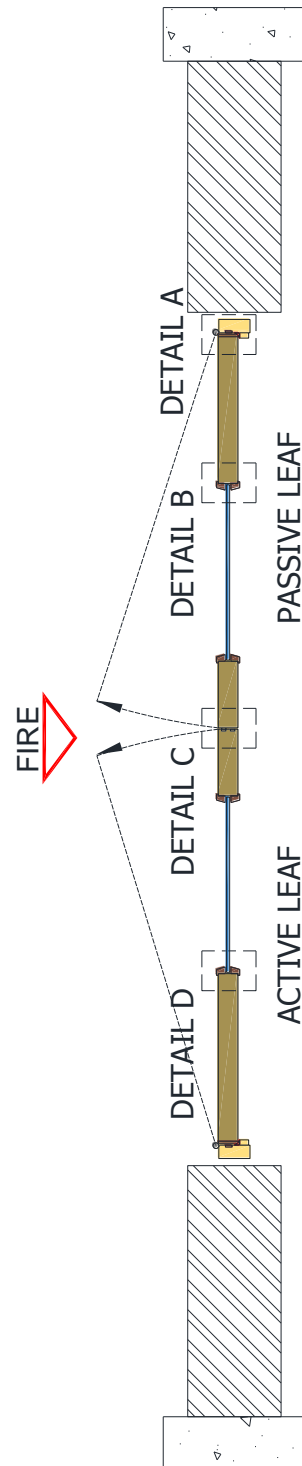


Figure 4. Horizontal Section Through Test Construction

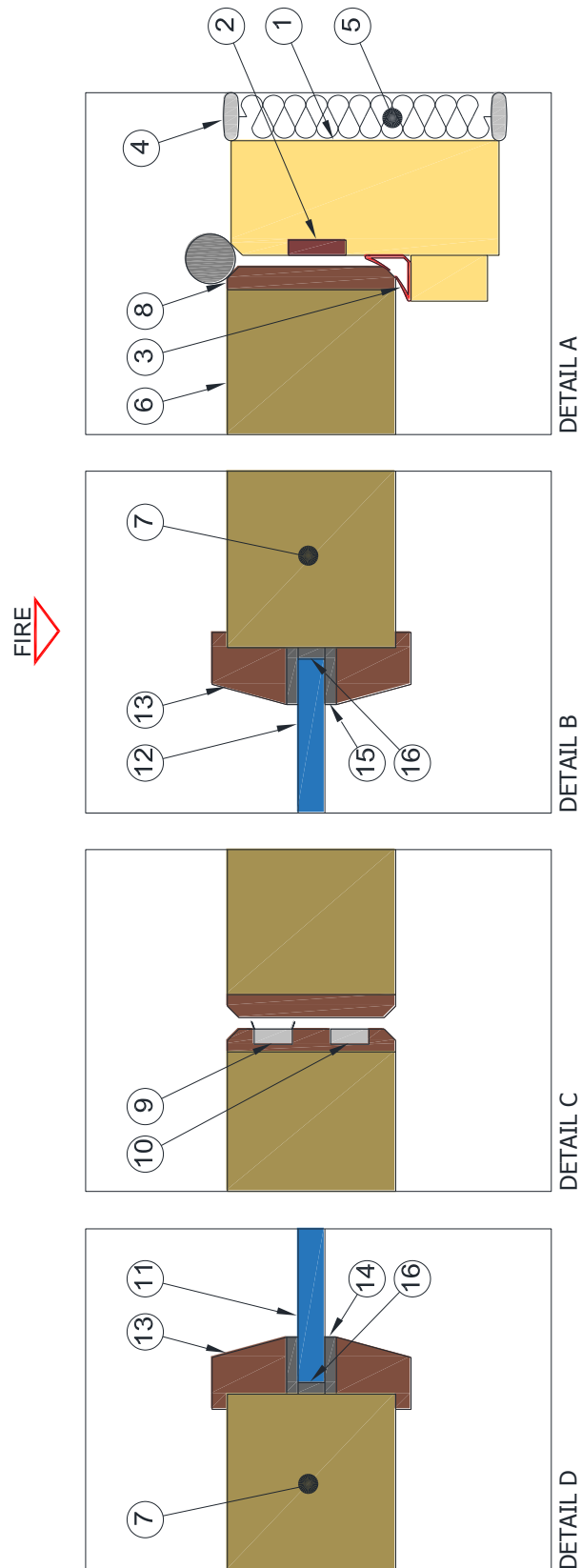


Figure 5. Horizontal Section Detail Views

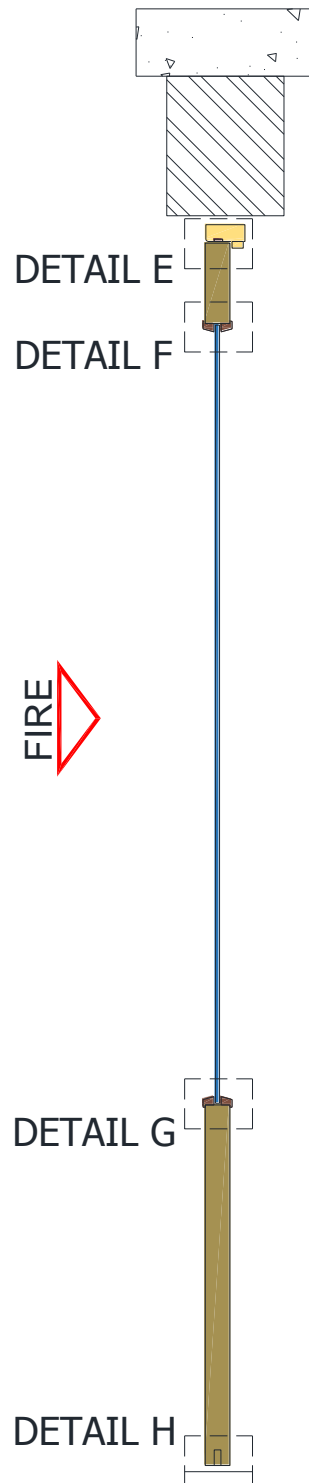


Figure 6. Typical Vertical Section Through Test Construction

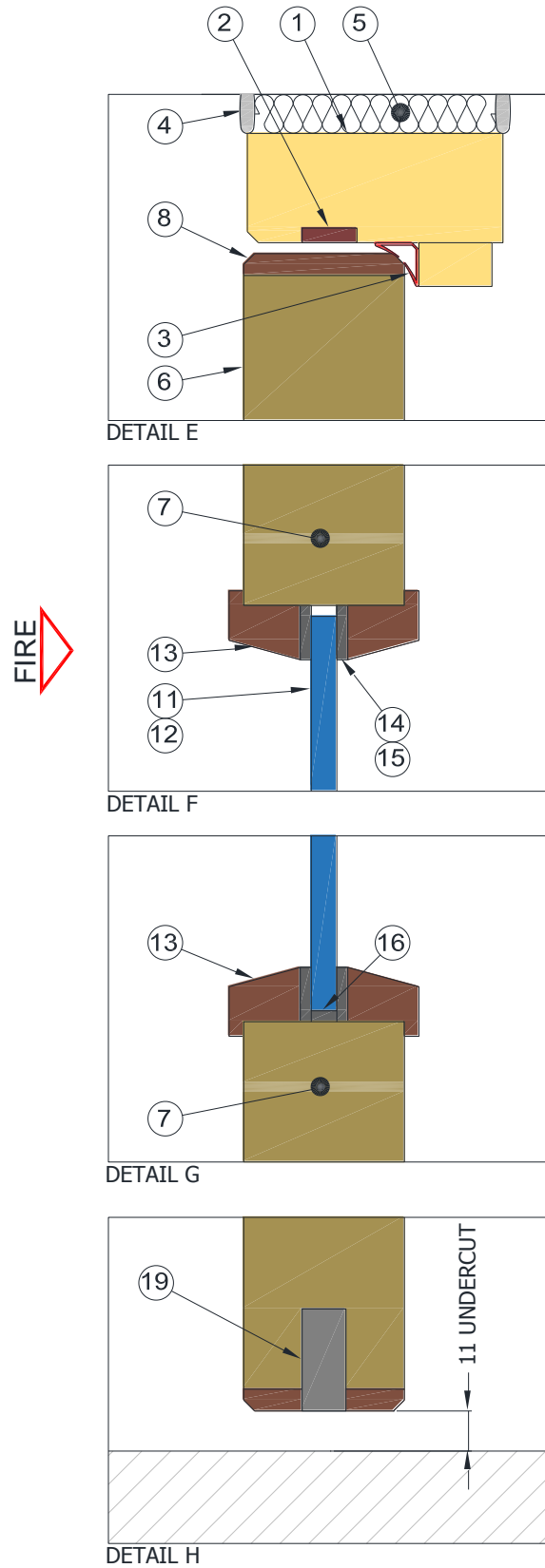


Figure 7. Vertical Section Detail Views

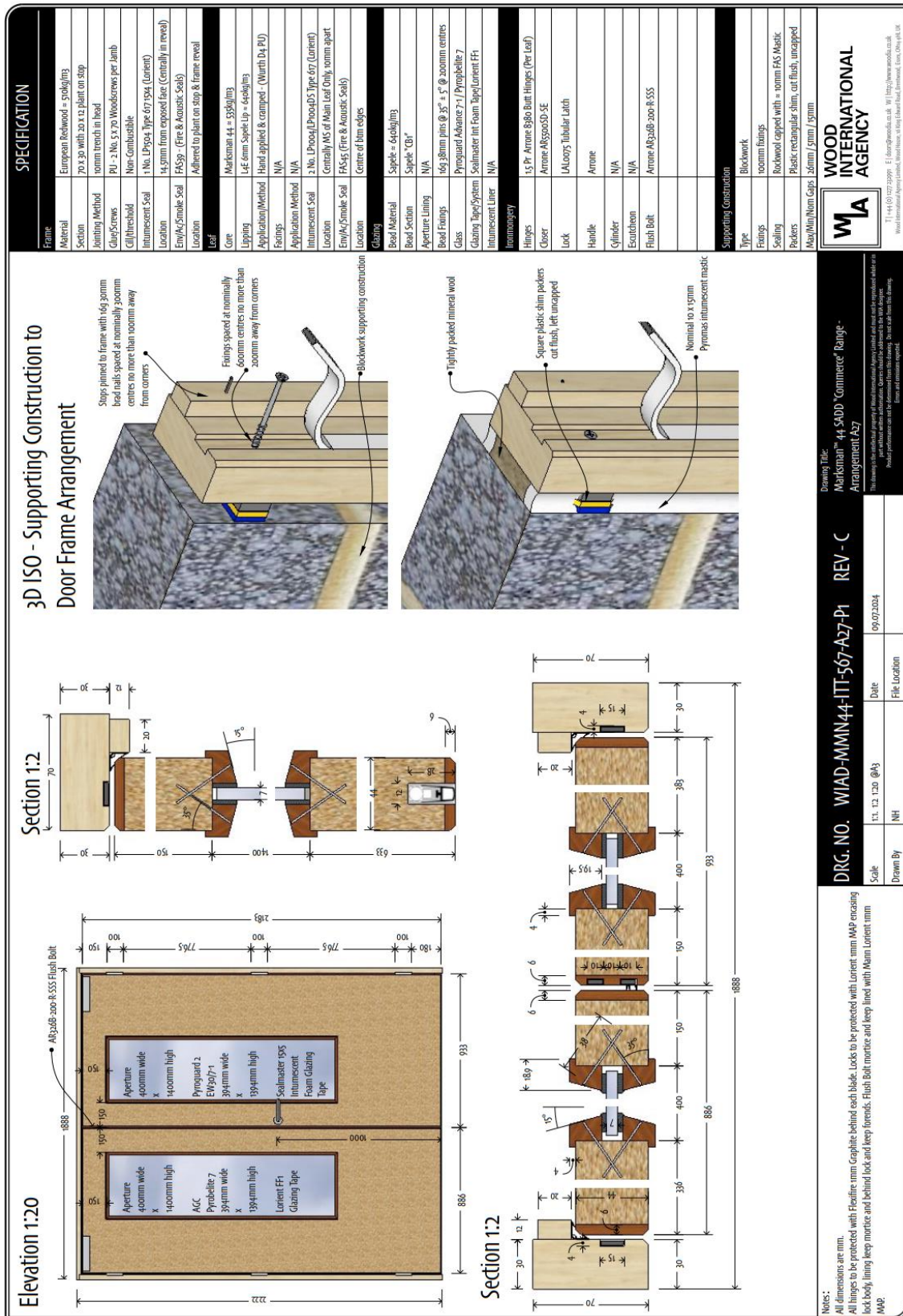


Figure 8. Client Inward Drawing – Page 1

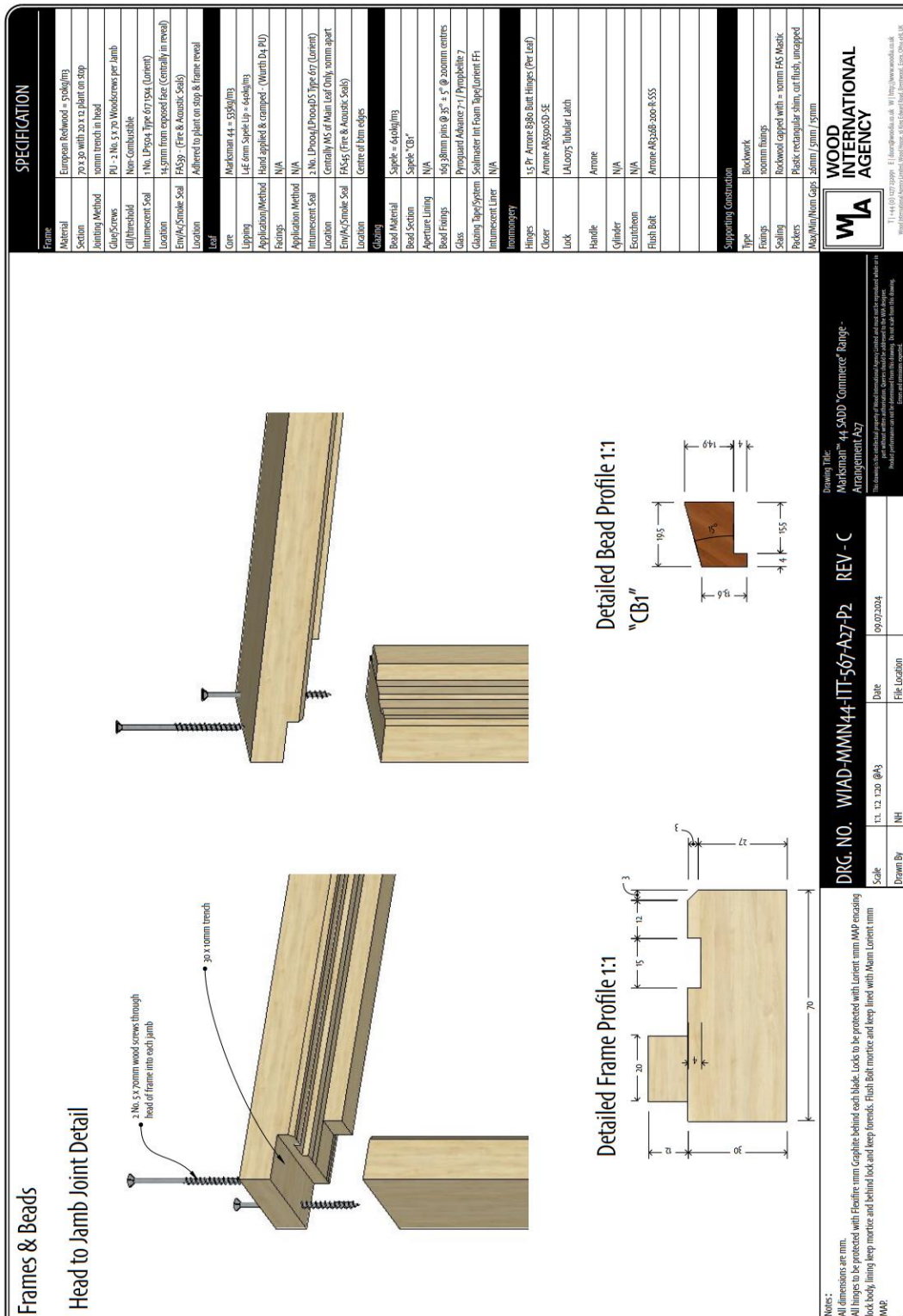


Figure 9. Client Inward Drawing – Page 2

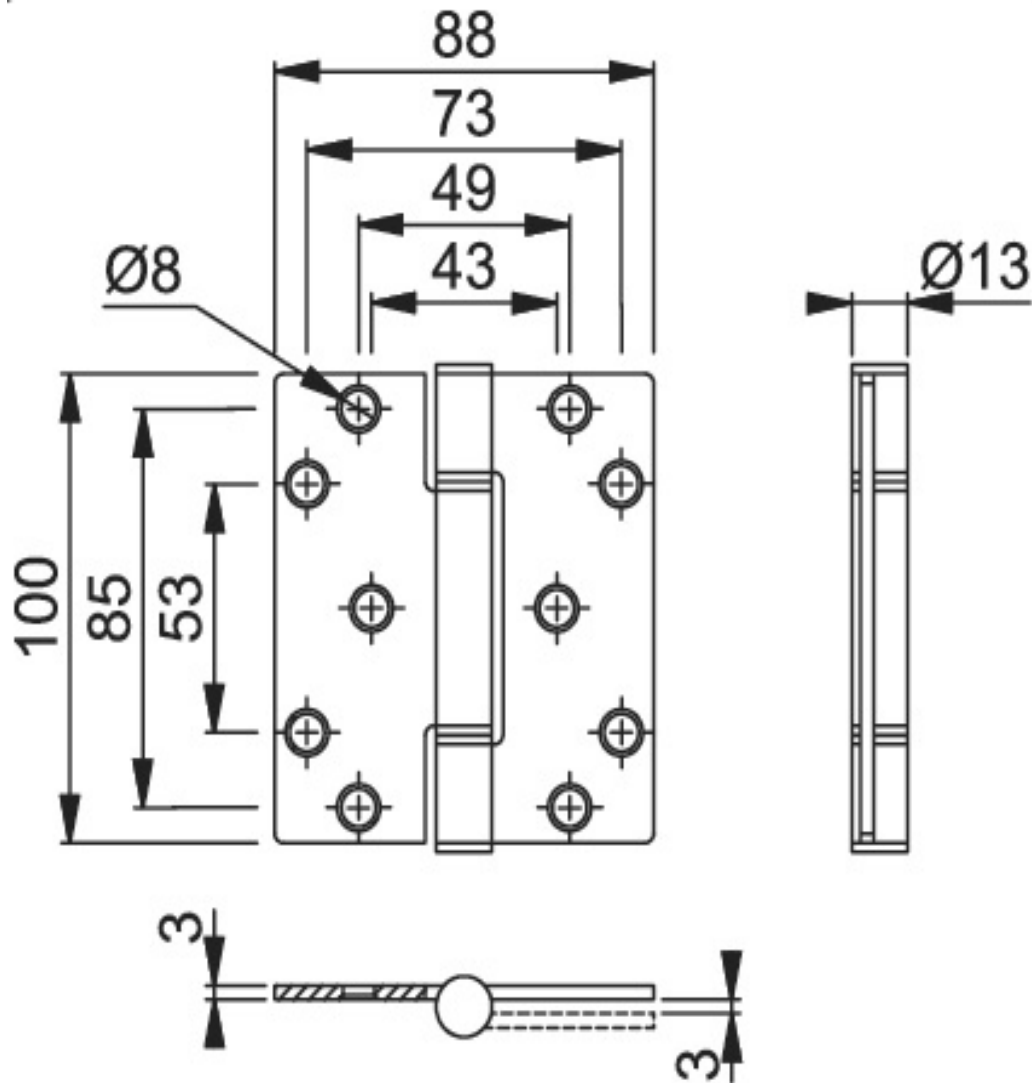


Figure 10. Item 17 – Hinges AR8380 Drawing

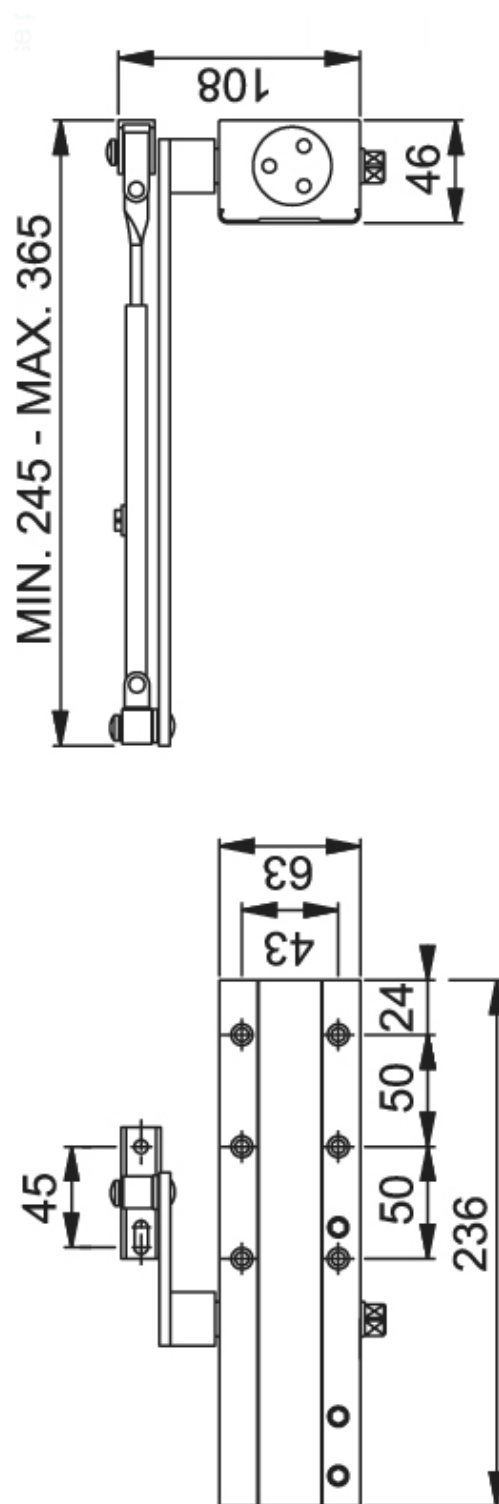


Figure 11. Item 18 – Door Closer AR5500SD-SE Drawing

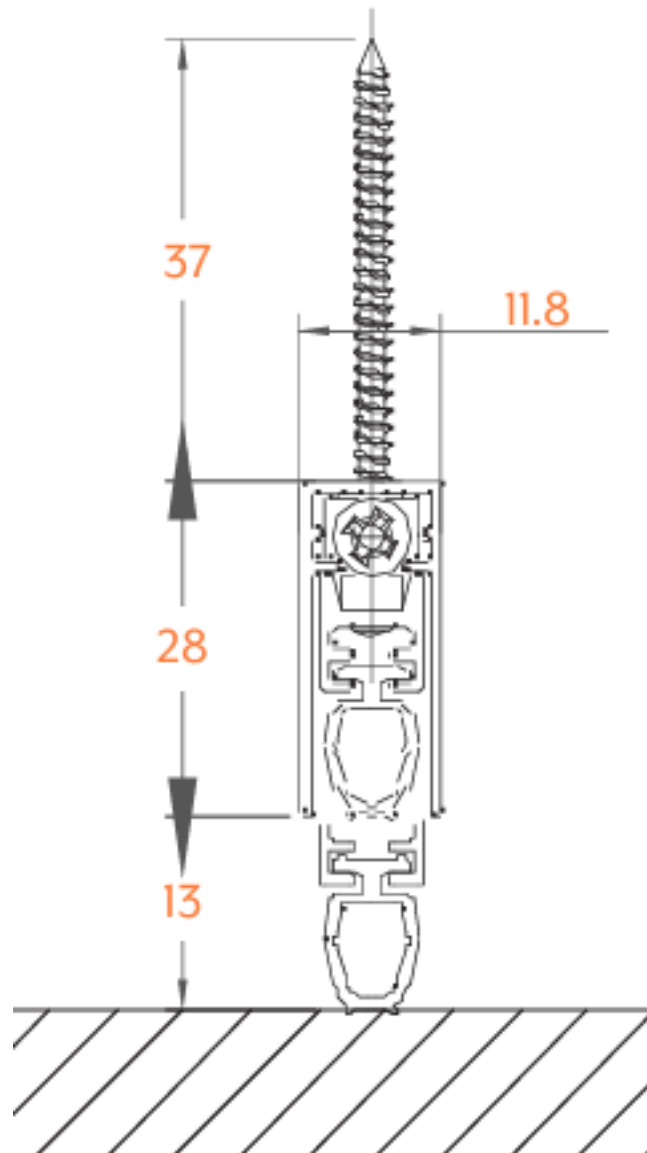


Figure 12. Item 19 – Drop Down Seal FAS45 Drawing

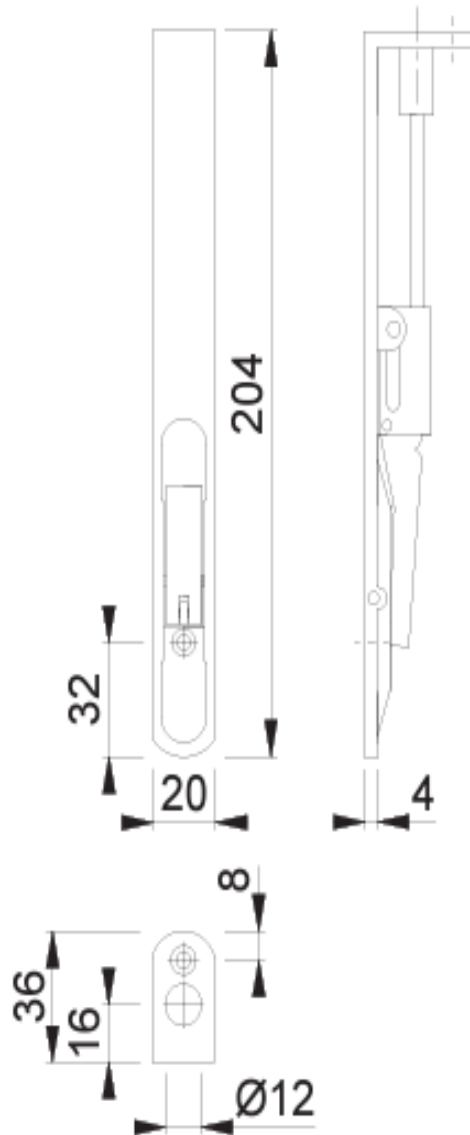


Figure 13. Item 22 – Flushbolt AR326B-200-R-SSS Drawing

2.2 Schedule of components

Table 5 details the schedule of components which describes the test specimen and lists the components used in the construction of the test specimen. These were provided by the test sponsor and surveyed by Warringtonfire.

All measurements were verified by Warringtonfire unless stated otherwise in the schedule of components. All components marked with an “*” have not been verified by Warringtonfire.

Table 5 Schedule of components

Door frame

1. Door Frame	
Manufacturer	By Dezin Carpentry
Material	Redwood Head and Redwood Jambs
Density recorded at sampling visit	487 kg/m ³
Moisture content recorded at sampling visit	15%
Moisture content recorded at test lab	Active leaf side – 11.8% measured Static leaf side – 12.6% measured
Overall size	1888 mm wide x 2244 mm high (see figure 2)
Frame (Head)	70 mm wide x 30 mm thick (see figure 9)
Frame (Jambs)	70 mm wide x 30 mm thick (see figure 9)
Stop	20 mm wide x 12 mm deep (see figure 9)
Jamb to Head jointing method, fixing detail and location	10mm Trench cut into head to accommodate Jambs (see figure 9)
Stop to Frame jointing method, fixing detail and location	Pinned to frame with 16g 30 mm brad nails spaced at nominally 300 mm centres no more than 100 mm away from corners (see figure 8)
Presence of Adhesives	No
Frame to supporting construction fixing method	7.5 mm x 100 mm concrete screws
2. Intumescent to Frame Reveal	
Quantity	1
Manufacturer	Lorient Polyproducts Ltd
Reference	Lorient 617 – LP1504
Material	PVC Encased Sodium Silicate
Overall section size	15 mm wide x 4 mm thick
Application method	Self Adhesive into groove
Location (relative to the opening face of the door leaf)	14.5 mm back from front edge (central in reveal)

3. Smoke Seal to Frame Reveal

Manufacturer	Fire & Acoustic Seals Ltd
Reference	FAS39
Material	PVC
Overall section size	12 mm wide x 12 mm high
Application method	Self Adhesive to frame reveal and planted stop
Location	Self Adhesive to frame reveal and planted stop

Fire stopping

4. Frame to supporting construction fire stopping detail

Manufacturer	Fire & Acoustic Seals
Reference	FAS Fire Door Intumescent Acrylic Sealant
Size	10 mm
Material	Polymer based sealant
Colour	White
Fixing method	Cartridge gunned around perimeter of the specimen

5. Alkaline Earth Silicate Fibre Based Insulation

Manufacturer	Rockwool
Reference	RWA45
Material	Stone mineral wool
Thickness	75 mm (uncompressed)
Density	45 kg/m ³ (stated)
Fixing method	Friction fitted to the gap at the head and jambs of the specimen between the frame and the supporting construction

Door leaf

6. Door Leaf	
Manufacturer (blank)	Wood International Agency Limited
Reference	Marksman 44
Quantity of leaves on doorset	2
Glazing location relative to the head and closing edge	150 mm from the head of the leaf and 150 mm from the closing edge of the leaf
Overall leaf size supplied for testing	Static leaf – 886 mm wide x 2183 mm high x 44 mm thick Active leaf – 933 mm wide x 2183 mm high x 44 mm thick
7. Core Element	
Manufacturer	Wood International Agency Limited
Reference	Marksman 44 (Factory W3)
Material	Graduated Density Chipboard
Density recorded at sampling visit	523 kg/m ³
Moisture content recorded at test lab	Active leaf – 9.8% measured Static leaf – 10.5% measured
Overall thickness and reduced thickness if door leaf incorporates fielded areas	44 mm thick
8. Lippings	
Manufacturer	By Deziign Carpentry
Reference	Std Lipping
Material	Sapele
Density recorded at sampling visit	644 kg/m ³
Overall size	44 mm wide (finished) x 6 mm thick with 3 mm x3 mm chamfer to outer arris
Fixing method	Hand applied and cramped
Location	To all edges
Adhesives	
Manufacturer	Würth
Type	PU
Reference	Rapid MCPUR Adhesive
Curing method	MC
Application method	Nozzle/spread
Presence of Mechanical Fixings	No

9. Intumescent Leaf Edge – 1	
Quantity	1
Manufacturer	Lorient Polyproducts Ltd
Reference	Type 617 - LP1004 DS
Material	PVC Encased Sodium Silicate
Overall section size	10 mm wide x 4 mm thick
Application method	Self Adhesive
Location (relative to the opening face of the door leaf)	7 mm from the face of the leaf on the exposed face meeting edge
10. Intumescent Leaf Edge – 2	
Quantity	1
Manufacturer	Lorient Polyproducts Ltd
Reference	LP1004
Material	PVC Encased Sodium Silicate
Overall section size	10 mm wide x 4 mm thick
Application method	Self Adhesive
Location (relative to the opening face of the door leaf)	27 mm from the face of the leaf on the exposed face meeting edge

Glazing

11. Double glazed unit / Glass – Active Leaf	
Manufacturer / Supplier	Pyroguard
Reference (Declaration of Performance)	Pyroguard Adv 2 EW30/7-1
Unit overall size	1394 mm high x 394 mm wide x 7 mm thick
Aperture location relative to the head and closing edge of the leaf	150 mm from the head of the leaf and 150 mm from the closing edge of the leaf
Aperture size (prior to any lining)	1400 mm high x 400 mm wide
Sight size	1370 mm high x 370 mm wide
Expansion allowance	3 mm all around
Presence of Timber aperture lining	No
12. Double glazed unit / Glass – Passive Leaf	
Manufacturer / Supplier	Fire Glass UK
Reference (Declaration of Performance)	Pyrobelite 7
Unit overall size	1394 mm high x 394 mm wide x 7 mm thick
Aperture location relative to the head and closing edge of the leaf	150 mm from the head of the leaf and 150 mm from the closing edge of the leaf
Aperture size (prior to any lining)	1400 mm high x 400 mm wide
Sight size	1370 mm high x 370 mm wide
Expansion allowance	3 mm all around
Presence of Timber aperture lining	No

13. Beading	
Manufacturer	By Dezin Carpentry
Reference	CB1
Material	Sapele
Overall size	19.5 mm x 18.9 mm including a 4 mm x 4 mm bolection, 15° chamfer
Fixing method, fixing material and sizes	Pneumatically fired steel pins, 16 gauge, 38 mm long
Fixing distances from corners, centres and angle relative to the face of the glass	50 mm from corners, 200 mm centres and at 35° to the face of the glass
14. Sealant Applied Between Glazing Bead and Leaf Surface – Active Leaf	
Manufacturer	DIG
Reference	15 mm x 5 mm Intumescent Foam Glazing Tape
Material	Foam Tape
Overall size	15 mm x 5 mm
Application method	Adhered to bead
Manufacturer	DIG
15. Sealant Applied Between Glazing Bead and Leaf Surface – Static Leaf	
Manufacturer	Lorient Polyproducts Ltd
Reference	FF1
Material	Graphite
Overall size	13.5 mm x 3.5 mm (plus cap)
Application method	Adhered to bead
Manufacturer	Lorient Polyproducts Ltd
16. Setting Blocks (Glazing)	
Material	Calcium Silicate
Density recorded at sampling visit	Not Measured
Overall size	7-10 mm wide x 30-50 mm deep x 3 mm thick
Location	2 to bottom and 1 to each side near top
Presence of Adhesives to seal unit	No

Hardware

17. Hinges	
Supplier	Arrone
Reference	AR8380
Quantity	3 No. per leaf
Primary material	Stainless Steel
Type	Butt Hinge
Size	
knuckle	13Ø mm x 102 mm high
blades	100 mm high x 37 mm wide x 3 mm thick
Fixings	
type	Woodscrews
material	Stainless Steel
sizes	4.5Ø mm x 31 mm long
number off per blade	5
Position of each hinge relative to the head of the leaf	See figure 3
Details of intumescent protection	1 mm Flexifire Graphite
Interruptions to Intumescent within the frame reveal	Fully interrupts frame seal
18. Door Closer	
Manufacturer	Arrone
Reference	AR5500SD-SE
Material	
Body	Aluminium
Closer arm	Aluminium
Configuration	Projected arm
Overall size	
Body	236 mm long x 63 mm high x 46 mm deep
Fixing method	4 No. M5 x 70 mm screws

19. Drop Down Seal	
Manufacturer	Fire & Acoustic Seals Limited
Reference	FAS45
Material	Satin anodised aluminium with EPDM gasket
Body	SAA
Seal	EPDM
Face plate	Plastic
Overall size	28 mm x 11.8 mm
Body	28 mm high x 11.8 mm wide
Face plate	46 mm high x 18 mm wide x 2.5 mm thick (meeting stile side) and 46 mm high x 34 mm wide x 3 mm thick (lock stile side)
Fixing method, type and locations	
Location within leaf	Centrally in bottom edge
Maximum operating drop	13 mm
20. Lockset / Latch	
Manufacturer	Hoppe UK
Reference	Arrone LAL0075 Tubular Latch
Material	Stainless steel & brass
Overall sizes	
Case size	22 mm high x 15 mm wide x 65 mm long
Forend plate	60 mm high x 25 mm wide x 2 mm (+1 mm plate) thick
Strike plate	65 mm high x 25 mm wide x 2.5 mm thick
Latch bolt	11 mm projection
Fixing method	2 No. 3.5 mm x 25 mm wood screws
Operation of latch bolt	Disengaged
Details of intumescent protection	1mm Interdens from Fire & Acoustic Seals Ltd
Interruptions to Intumescent on the door leaf edge	Both seals on active door leaf partially interrupted
Location of centre of the spindle relative to the bottom of the leaf	Centre of the spindle measures 1000 mm from the bottom of the leaf
21. Lever Handles	
Manufacturer	Hoppe UK
Reference	Arrone AR961/10-4-SP-SSS
Material	Stainless Steel
Overall size	140 mm long x 20 mm diameter x 70 mm projection with 50 mm diameter x 8 mm thick rose
Fixing method, fixing material, sizes, quantity and location	Stainless steel bolt through 2No. 49mm Long x 3.9 Dia
Details of intumescent protection	None

22. Flush Bolt	
Supplier	Hoppe UK
Reference	Arrone AR326B-200-R-SSS
Material	
body	Stainless Steel
Bolt	Stainless Steel
Strike plate	Stainless Steel
Overall size	
body	204 mm long x 20 mm wide with 36 mm return
Bolt	12 mm diameter x 15 mm projection
Strike plate	40 mm long x 18 mm wide x 3 mm thick
Cut out	202 mm long x 20 mm wide x 23 mm deep
Fixing method	2No. M3 x 30 mm screws
Intumescent protection	1mm Interdens from Fire & Acoustic Seals Ltd

Supporting Construction

AAC Concrete Lintel	
Type	Steel reinforced concrete lintel
Material	Steel reinforced autoclaved aerated concrete
Density	670 kg/m ³
Thickness	150 mm
Overall size	Steel reinforced concrete lintel
Size 1	150 mm wide x 250 mm high x 3000 mm long
Lightweight Blockwork	
Manufacturer	THERMALITE
Reference	THERMALITE Shield
Material	Lightweight concrete blocks
Thickness	150 mm wide x 215 mm high x 440 mm long
Density	946 ~ 960 kg/m ³ (measured)
Fixing method	Ordinary sand/cement mortar, mix 3:1
Alkaline Earth Silicate Fibre Based Insulation	
Manufacturer	Morgan Advanced Materials
Reference	Superwool Plus
Material	High temperature insulation wool
Thickness	25 mm, uncompressed
Density	96 kg/m ³ (stated)

2.3 Supporting construction

Table 6 details the supporting construction used for this fire resistance test.

Table 6 Supporting construction

Item	Detail		
Supporting construction	150 mm thick low-density concrete wall with a low-density concrete lintel at the head.		
Dimensions	Width	3050 mm	
	Height	3050 mm	
	Thickness	150 mm	
Aperture dimensions		Width	Height
	Doorset A	1920 mm	2275 mm
Restraint conditions	Restrained on all edges		

3. Test procedure

Table 7 details the test procedure for this fire resistance test.

Table 7 Test procedure

Item	Detail	
Test standard	The test was performed in accordance with BS 476-20:1987 and BS 476-22:1987 Clause 8 determination of fire resistance of uninsulated doorsets and shutter assemblies.	
Fire Test Study Group (FTSG) resolutions	Certain aspects of some fire test specifications are open to different interpretations. FTSG have identified a number of these areas and have agreed on resolutions which define a common agreement of interpretations between fire test laboratories that are members of the group. If such resolutions apply to this test, they have been followed.	
Deviations from test method	Due to necessary adjustments of the gas and air input to control the furnace, pressures outside the specified tolerances were recorded sporadically at short intervals. As the pressure fluctuations recorded at those intervals did not represent the pressure conditions throughout the test, their effect on the test results can be disregarded.	
Instrumentation and equipment	<p>The instrumentation was provided in accordance with BS 476-20:1987 and BS 476-22:1987 as follows:</p> <ul style="list-style-type: none"> The specimen temperature was measured by nine mineral insulated metal sheathed (MIMS) Type K thermocouples – with wire diameters not greater than 0.5 mm, an overall diameter of 1.5 mm, and the measuring junction insulated from the sheath. The thermocouples protruded a minimum of 25 mm from steel supporting tubes. The unexposed side specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5 mm soldered to 12 mm diameter x 0.2 mm thick copper discs covered by 30 mm x 30 mm x 2.0 mm thick inorganic insulating pads. 	
Pre-test conditioning	The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 6 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 7.0°C to 20.5°C and 28.5% to 63.0% respectively.	
Pre-test measurements		Doorset A - left
	Opening force	72.9 Nm
	Closing force	47.1 Nm
	Latching force	12.75 Nm
	Distance from hinge	750 mm
		Doorset A - right
	Opening force	98.25 Nm
	Closing force	42.45 Nm
	Distance from hinge	750 mm
Installation details	Delivery date of the test specimen	19 January 2024
	Start date for construction of supporting construction	17 January 2024
	Completion date for construction of	18 January 2024

Item	Detail		
	supporting construction		
	Start date for installation of test specimen	19 January 2024	
	Completion date for installation of test specimen	19 January 2024	
	Supporting construction constructed by	Representatives of Warringtonfire	
	Doorset installed by	Representatives of the test sponsor	
Symmetry	Asymmetrical: <ul style="list-style-type: none"> Doorset A opened into the furnace. The direction of exposure was decided by the test sponsor.		
Ambient laboratory temperature	Start of the test	14.0 °C	
	Minimum temperature	13.0 °C	
	Maximum temperature	14.0 °C	
Sampling / specimen selection	Appendix E includes the sampling report. A representative of BM trada sampled and selected the following components of the tested specimen:		
	Component	Date	Sampling Reference
	Single acting, double leaf doorset incorporating WIA marksman 44 door leaves lipped on four edges and hung on 3No. butt hinges in softwood frame and operated by overhead surface mounted closers and secured with tubular latch / handle and concealed flushbolt and finished with drop seal and vision panels.	23/07/2024	SC24008T

4. Test measurements and results

Table 8 summarises the results achieved by the test specimen against the performance criteria listed in BS 476-20:1987 and BS 476-22:1987 Clause 8 determination of fire resistance of uninsulated doorsets and shutter assemblies for the following parameters:

- 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 – The mean temperature rise of the unexposed surface must not be greater than 140°C and the maximum temperature rise must not be greater than 180°C. Insulation failure also occurs simultaneously with integrity failure.
- Radiation – A water-cooled foil heat flux meter was used to record the heat radiation from the doorset, the heat flux meter was positioned at a distance of 2535 mm from the doorset, so that the angle of view circumscribed the diagonal of the doorset.

Appendix A includes observations of any significant behaviour of the specimen and details of the occurrence of the relevant performance criteria.

Appendix B details the location of the instrumentation used during the test.

Appendix C includes details of the measurements taken during the test, including the radiation measurements.

Appendix D includes photographs of the test specimen before, during and after the test.

Table 8 Detailed test results

Criteria	Doorset A
Integrity	36 minutes
Sustained flaming	36 minutes
Notes:	
The test results for the specimen only apply to the tested orientation. The test was discontinued after 37 minutes. '**' indicates failure due to integrity failure.	

5. Application of test results

5.1 Validity

This document is the original version of this test report and is written in English. In case of doubt, the original version prevails over a translation. This document is issued subject to Warringtonfire's standard terms and conditions, which are available at: [Terms and Conditions | Element](#).

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use, nor can the results be extrapolated and applied to other products.

Reports are statements of fact(s) prepared in accordance with the referenced version of the standard(s) stated in Section 3 of this report. Reports are based upon the information provided to Warringtonfire. Warringtonfire takes no responsibility for the accuracy or completeness of such information.

The results stated in this report apply to the test specimens as received.

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 476-20: 1987 and BS 476-22: 1987.

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.

Any differences in relation to the aforementioned characteristics may significantly affect the performance and will therefore invalidate the application of the test results to the variant product. It is recommended that any proposed variation to the tested configuration or product should be referred to the test sponsor. The test sponsor should then obtain appropriate documentary evidence of compliance from Warringtonfire or another accredited testing authority. The supplier of the product is responsible for ensuring that the product which is supplied for use is identical to the test specimens that were tested.

The specification and the interpretation of fire test methods are both the subject of ongoing development and refinement. Changes in the applicability of the results of tests in relation to associated legislation may also occur. For these reasons the currency and the relevance of test reports should be considered by the user.

The test report also relates only to the sample(s) of the product submitted to the test. The laboratory accepts no responsibility for the representativeness of the test specimens unless so stated in the test report.

Confidence that the product that is supplied to the market will have the performance indicated in the test report can be supported by use of third-party certification schemes.

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5.2 Uncertainty of measurement

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.

Appendix A Test observations

Table 9 shows the observations of any significant behaviour of the specimen during the test.

Table 9 Test observations

Min	Sec	Observation
00	00	Commencement of test
03	20	S/S release from the top right corner of the leaf.
05	00	Doorsets unrestrained.
06	50	Black discolouration at the top hinges on both leaves.
13	00	Glazing cracking on left leaf. Intumescent sealed cracks.
28	00	Black discolouration around the perimeter of the leaves.
32	00	Glowing at the top of the meeting edge.
36	50	Sustained flaming has occurred at head of the specimen, therefore integrity failure is deemed to have occurred.
37	40	End of test

Appendix B Instrumentation locations

Figure 1 shows the instrumentation locations for this fire resistance test.

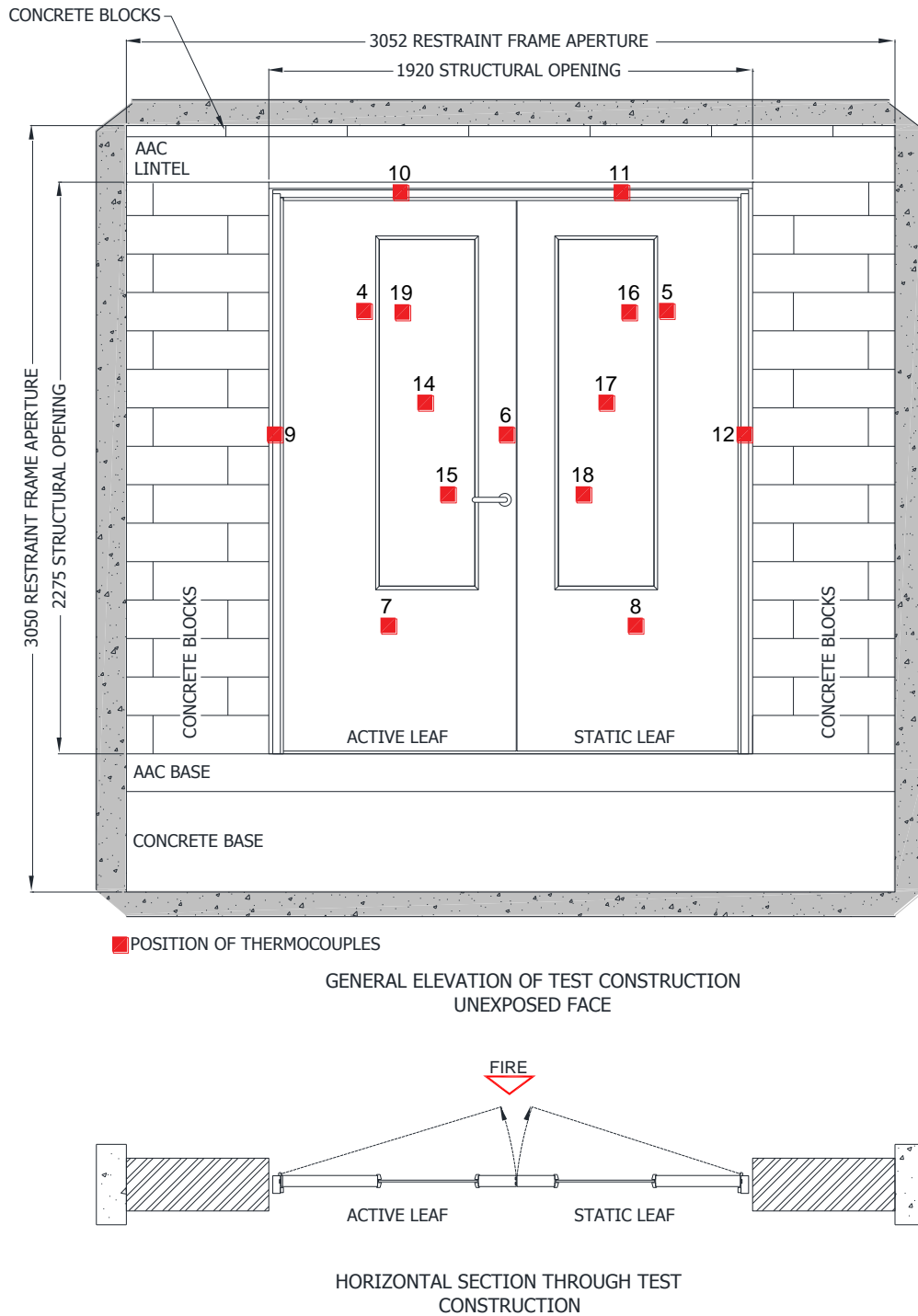


Figure 1 Instrumentation locations

Appendix C Test data

C.1 Furnace temperature and deviation

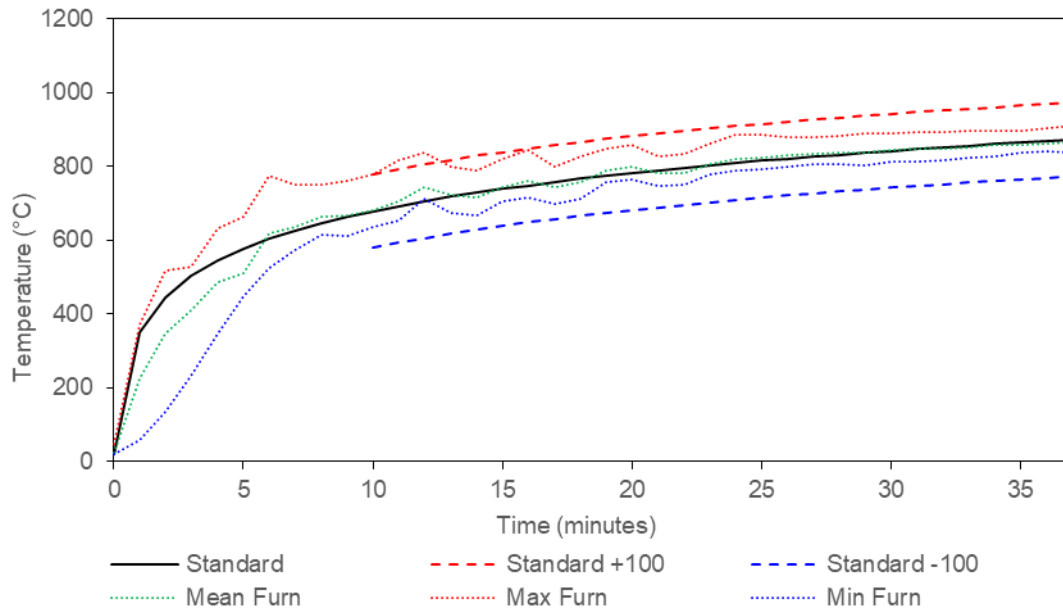


Figure 2 Furnace thermocouple temperature vs time

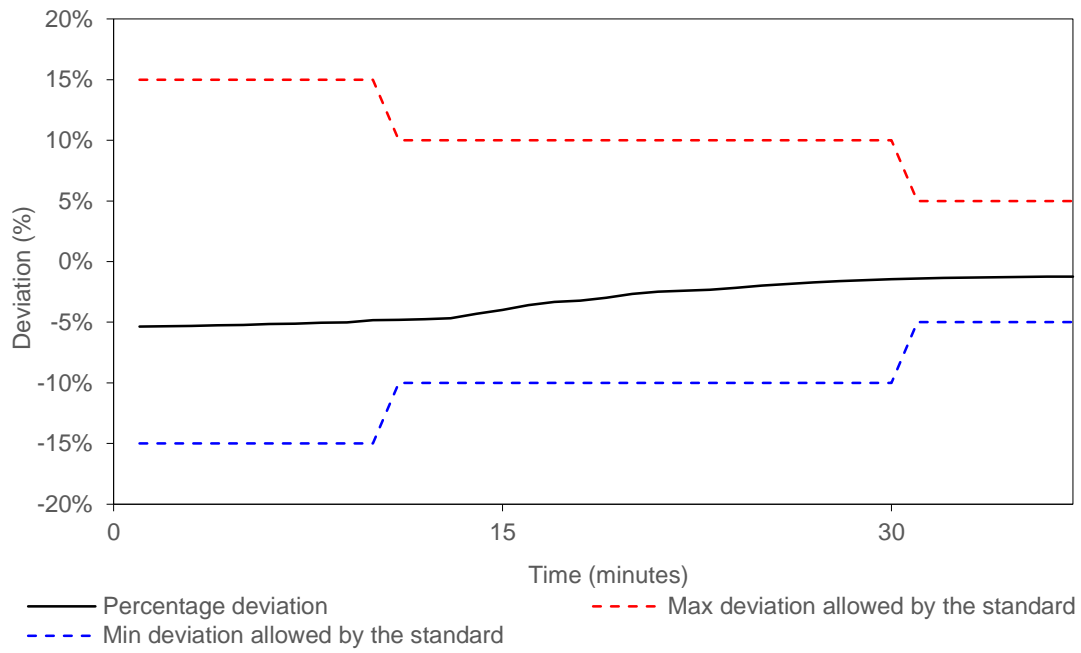


Figure 3 Percentage deviation of exposure severity vs time

C.2 Furnace pressure

The furnace pressure was taken at 2400 mm above the sill of the test specimen.

Due to necessary adjustments of the gas and air input to control the furnace, pressures outside the specified tolerances were recorded sporadically at short intervals. As the pressure fluctuations recorded at those intervals did not represent the pressure conditions throughout the test, their effect on the test results can be disregarded.

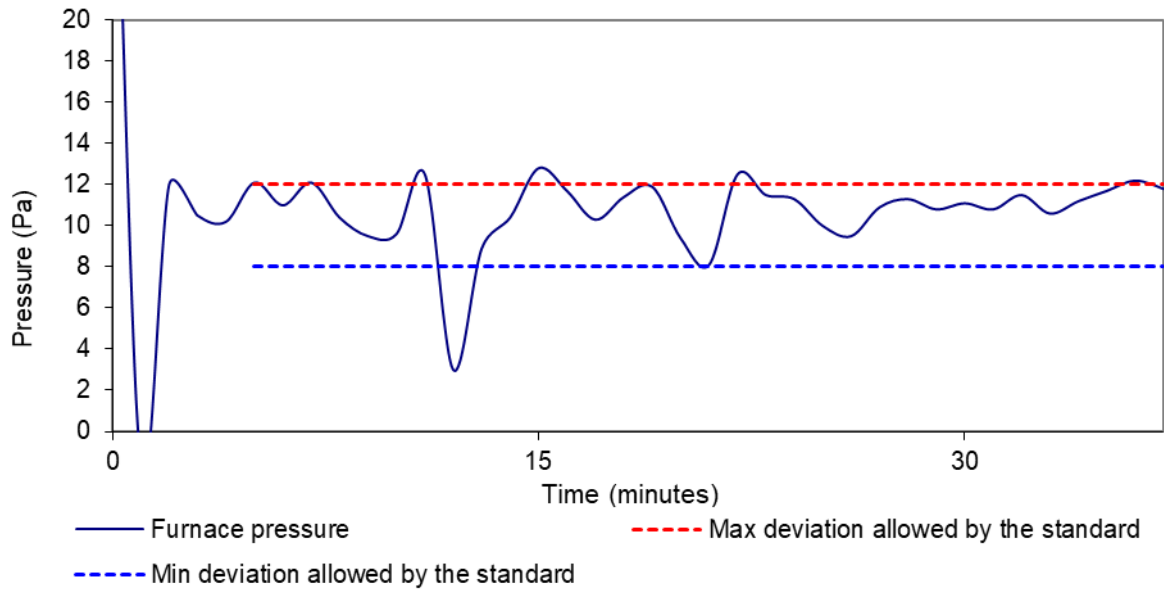


Figure 4 Furnace pressure

C.3 Specimen temperatures

Table 10 Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Doorset

Time (mins)	Tc 004 (°C)	Tc 005 (°C)	Tc 006 (°C)	Tc 007 (°C)	Tc 008 (°C)	Average (°C)
0	18.0	17.0	18.0	18.0	20.0	18.2
1	19.0	19.0	18.0	18.0	20.0	18.8
2	19.0	19.0	18.0	18.0	20.0	18.8
3	19.0	19.0	18.0	18.0	20.0	18.8
4	19.0	19.0	18.0	18.0	20.0	18.8
5	20.0	19.0	18.0	18.0	20.0	19.0
6	20.0	19.0	18.0	18.0	20.0	19.0
7	20.0	20.0	18.0	18.0	20.0	19.2
8	20.0	20.0	18.0	18.0	20.0	19.2
10	23.0	22.0	19.0	18.0	21.0	20.6
11	24.0	26.0	20.0	19.0	23.0	22.4
12	27.0	31.0	22.0	21.0	26.0	25.4
13	30.0	35.0	25.0	24.0	30.0	28.8
14	34.0	40.0	28.0	29.0	35.0	33.2
15	38.0	44.0	32.0	34.0	39.0	37.4
16	43.0	48.0	35.0	39.0	44.0	41.8
17	47.0	52.0	39.0	44.0	47.0	45.8
18	51.0	55.0	42.0	47.0	50.0	49.0
20	58.0	59.0	47.0	53.0	55.0	54.4
21	60.0	61.0	49.0	55.0	57.0	56.4
22	63.0	63.0	51.0	57.0	59.0	58.6
23	65.0	64.0	53.0	58.0	60.0	60.0
24	68.0	65.0	55.0	59.0	61.0	61.6
25	70.0	66.0	57.0	61.0	63.0	63.4
26	71.0	67.0	58.0	61.0	64.0	64.2
27	73.0	68.0	59.0	62.0	64.0	65.2
28	74.0	69.0	61.0	63.0	65.0	66.4
30	77.0	70.0	63.0	64.0	67.0	68.2
31	78.0	71.0	64.0	65.0	68.0	69.2
32	79.0	71.0	65.0	66.0	68.0	69.8
33	81.0	72.0	66.0	66.0	69.0	70.8
34	82.0	73.0	67.0	67.0	70.0	71.8
35	83.0	74.0	68.0	68.0	71.0	72.8
36	84.0	74.0	69.0	69.0	72.0	73.6
37	85.0	75.0	69.0	69.0	72.0	74.0

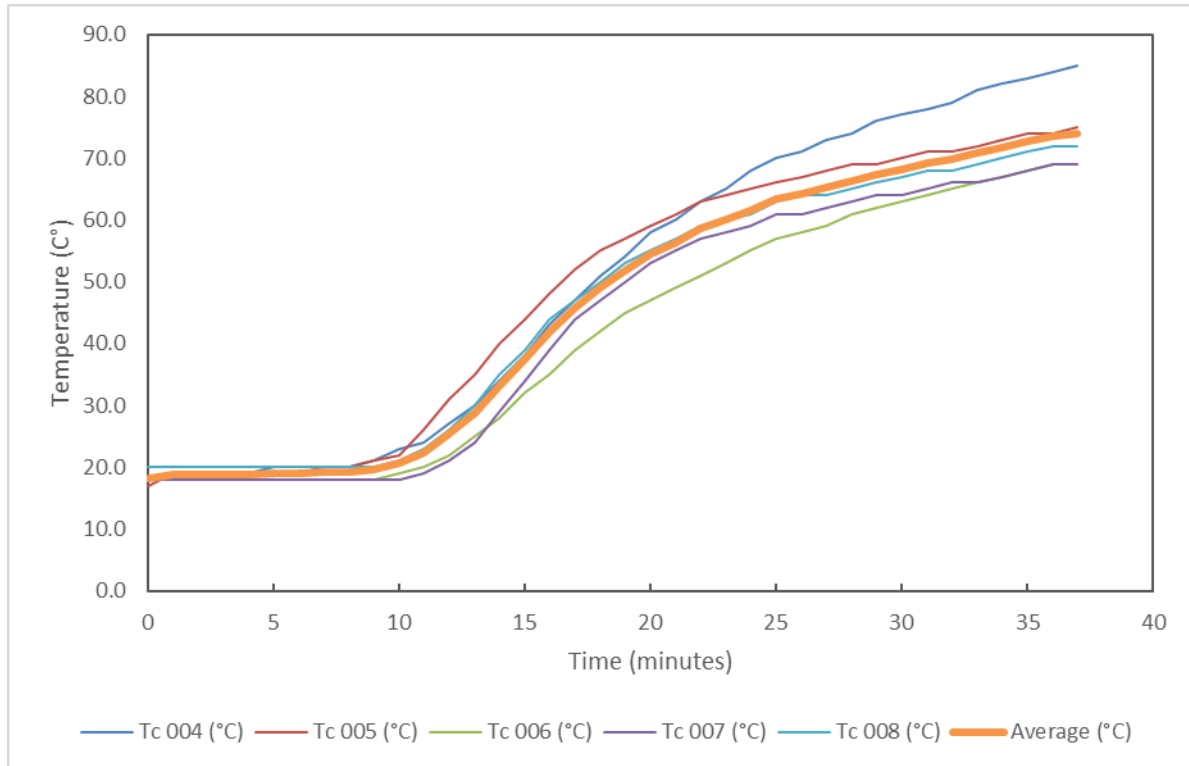


Figure 5 Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Doorset

Table 11 Individual Temperatures Recorded On The Unexposed Surface Of The Door Frame

Time (mins)	Tc 009 (°C)	Tc 010 (°C)	Tc 011 (°C)	Tc 012 (°C)
0	19.0	20.0	20.0	20.0
1	19.0	21.0	21.0	20.0
2	19.0	22.0	21.0	20.0
3	19.0	23.0	22.0	21.0
4	19.0	24.0	22.0	21.0
5	19.0	30.0	25.0	21.0
6	19.0	34.0	27.0	21.0
7	19.0	36.0	28.0	21.0
8	20.0	37.0	29.0	21.0
10	20.0	38.0	32.0	21.0
11	20.0	39.0	33.0	21.0
12	20.0	40.0	34.0	22.0
13	20.0	40.0	36.0	22.0
14	21.0	41.0	36.0	23.0
15	21.0	43.0	38.0	24.0
16	22.0	45.0	40.0	25.0
17	23.0	47.0	41.0	26.0
18	24.0	49.0	43.0	28.0
19	25.0	51.0	44.0	29.0
20	27.0	53.0	45.0	31.0
21	29.0	56.0	47.0	33.0
22	30.0	58.0	49.0	35.0
23	32.0	61.0	50.0	37.0
24	34.0	63.0	53.0	38.0
25	36.0	66.0	55.0	40.0
26	38.0	68.0	57.0	42.0
27	40.0	71.0	59.0	43.0
28	42.0	73.0	61.0	45.0
29	44.0	76.0	63.0	46.0
30	46.0	78.0	65.0	47.0
31	48.0	80.0	67.0	48.0
32	49.0	82.0	69.0	49.0
33	51.0	83.0	71.0	50.0
34	52.0	85.0	73.0	51.0
35	54.0	87.0	75.0	53.0
36	55.0	88.0	76.0	54.0
37	56.0	90.0	78.0	55.0

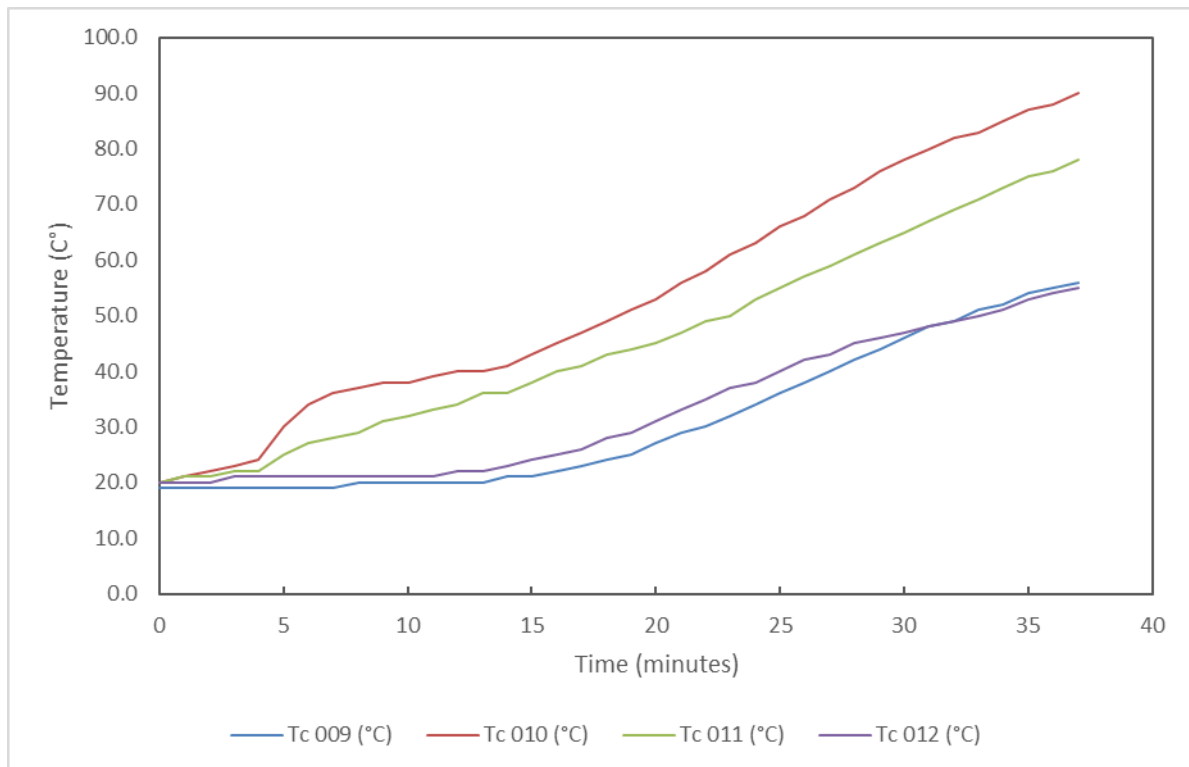


Figure 6 Individual Temperatures Recorded On The Unexposed Surface Of The Door Frame

Table 12 Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Glazing On Leaf A

Time (mins)	Tc 014 (°C)	Tc 015 (°C)	Tc 019 (°C)	Average (°C)
0	21.0	19.0	20.0	20.0
1	29.0	26.0	27.0	27.3
2	45.0	40.0	42.0	42.3
3	67.0	61.0	63.0	63.7
4	95.0	87.0	91.0	91.0
5	102.0	102.0	104.0	102.7
6	90.0	101.0	106.0	99.0
7	92.0	102.0	114.0	102.7
8	105.0	105.0	129.0	113.0
9	121.0	114.0	147.0	127.3
10	139.0	125.0	164.0	142.7
11	156.0	139.0	180.0	158.3
12	171.0	153.0	196.0	173.3
13	184.0	161.0	215.0	186.7
14	198.0	171.0	237.0	202.0
15	210.0	183.0	258.0	217.0
16	226.0	196.0	278.0	233.3
17	241.0	211.0	297.0	249.7
18	253.0	225.0	312.0	263.3
19	264.0	239.0	325.0	276.0
20	276.0	253.0	338.0	289.0
21	288.0	267.0	351.0	302.0
22	295.0	280.0	361.0	312.0
23	301.0	290.0	369.0	320.0
24	307.0	300.0	378.0	328.3
25	313.0	310.0	387.0	336.7
26	318.0	321.0	396.0	345.0
27	324.0	331.0	402.0	352.3
28	328.0	340.0	407.0	358.3
30	336.0	358.0	412.0	368.7
31	340.0	366.0	413.0	373.0
32	344.0	372.0	414.0	376.7
33	348.0	378.0	416.0	380.7
34	351.0	382.0	417.0	383.3
35	355.0	385.0	420.0	386.7
36	359.0	390.0	423.0	390.7
37	363.0	393.0	425.0	393.7

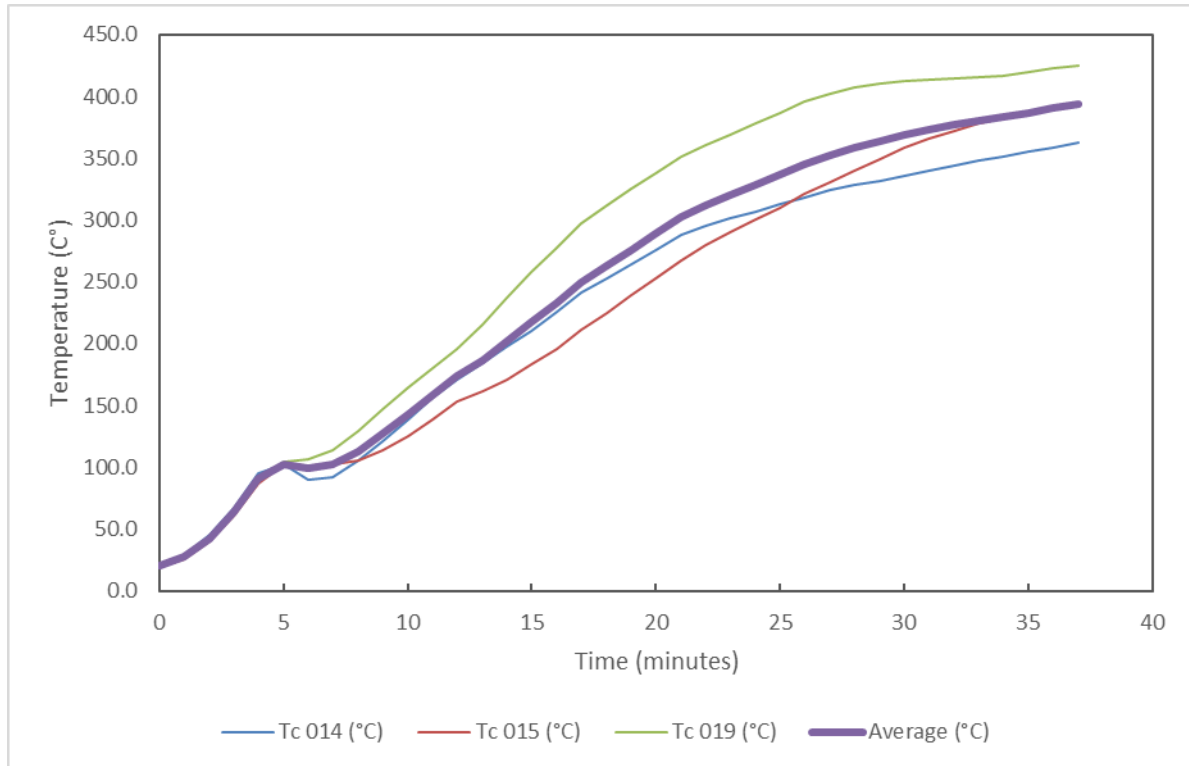


Figure 7 Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Glazing On Leaf A

Table 13 Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Glazing On Leaf B

Time (mins)	Tc 016 (°C)	Tc 017 (°C)	Tc 018 (°C)	Average (°C)
0	19.0	19.0	19.0	19.0
1	26.0	25.0	24.0	25.0
2	41.0	39.0	36.0	38.7
3	65.0	61.0	55.0	60.3
4	97.0	90.0	81.0	89.3
5	125.0	125.0	112.0	120.7
6	128.0	127.0	119.0	124.7
7	136.0	132.0	125.0	131.0
8	142.0	138.0	129.0	136.3
9	147.0	143.0	135.0	141.7
10	153.0	149.0	138.0	146.7
11	157.0	155.0	143.0	151.7
12	164.0	160.0	147.0	157.0
13	174.0	166.0	153.0	164.3
14	187.0	176.0	160.0	174.3
15	201.0	188.0	166.0	185.0
16	219.0	202.0	174.0	198.3
17	238.0	218.0	185.0	213.7
18	256.0	235.0	198.0	229.7
19	274.0	252.0	212.0	246.0
20	292.0	270.0	228.0	263.3
21	309.0	288.0	245.0	280.7
22	323.0	303.0	260.0	295.3
23	335.0	317.0	276.0	309.3
24	347.0	329.0	290.0	322.0
25	359.0	341.0	305.0	335.0
26	370.0	352.0	318.0	346.7
27	382.0	363.0	331.0	358.7
28	394.0	372.0	342.0	369.3
30	408.0	388.0	363.0	386.3
31	412.0	393.0	371.0	392.0
32	417.0	397.0	379.0	397.7
33	420.0	399.0	384.0	401.0
34	424.0	401.0	388.0	404.3
35	427.0	403.0	391.0	407.0
36	429.0	405.0	393.0	409.0
37	432.0	407.0	394.0	411.0

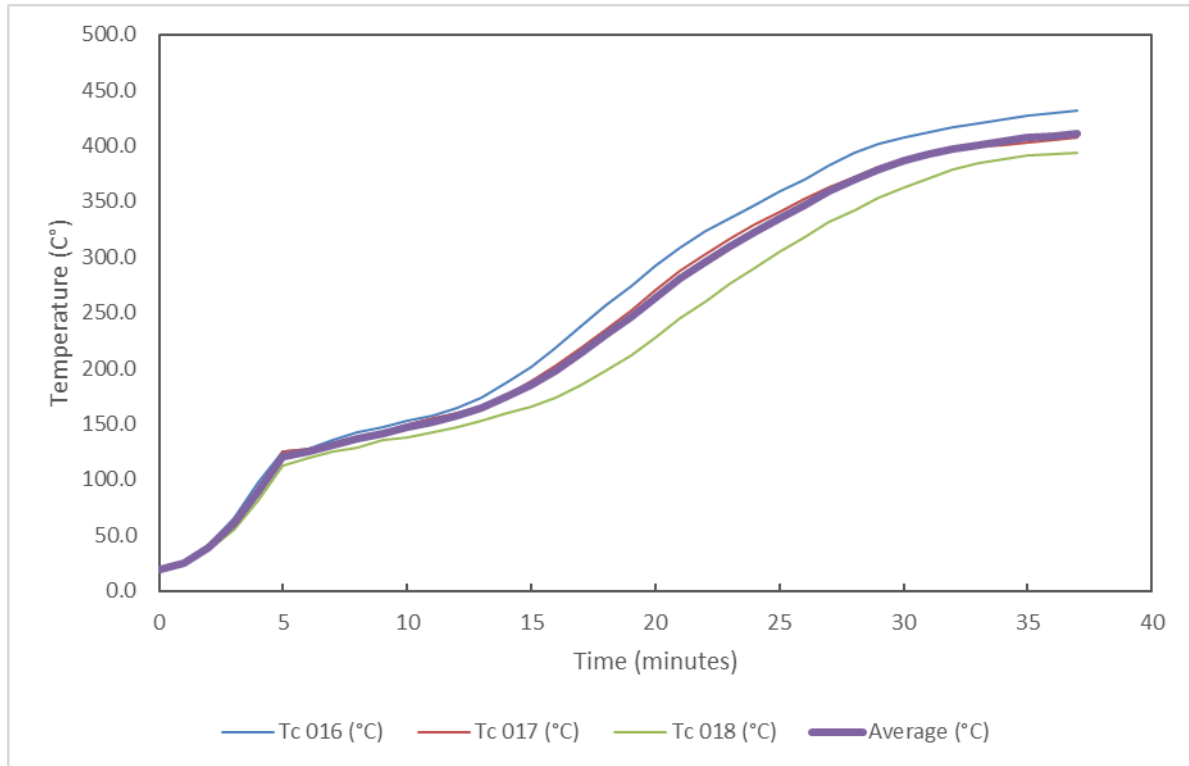


Figure 8 Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Glazing On Leaf B

C.4 Specimen Deflections

Table 14 details the deflection measurements of the test specimen at locations given in Figure 9.

Negative measurements show movement of the test specimen away from the furnace. Positive measurements show movement of the test specimen towards the furnace.

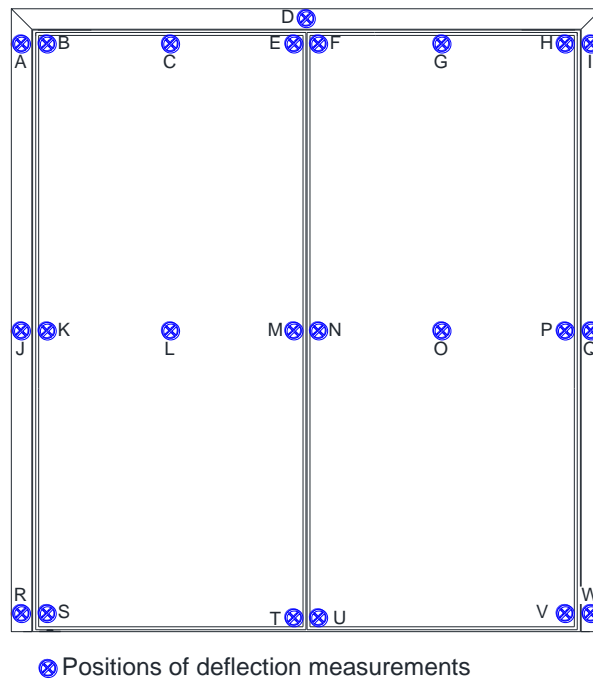


Figure 9 Position of deflection measurements

Table 14 Deflections – 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
5	-4	-1	-4	-3	-1	-1	-14	-7	-6	3	3	-12
10	3	1	1	5	8	6	10	5	1	-3	-6	-2
15	4	1	2	2	4	0	-2	12	3	12	1	-6
20	2	3	0	-2	6	5	-6	-6	-3	-8	-1	-11
25	-6	-1	-6	-3	-6	2	3	5	-1	-2	-1	-8
30	1	-4	1	0	6	3	-1	-2	4	2	0	0
35	-2	0	4	-8	-16	2	-34	-9	-7	0	-3	-8
Max	-6	-4	-6	-8	-16	6	-34	12	-7	12	-6	-12

Deflections (mm)											
Time (mins)	M	N	O	P	Q	R	S	T	U	V	W
0	0	0	0	0	0	0	0	0	0	0	0
5	-9	-10	-7	8	-4	6	-2	-2	-7	0	-1
10	-8	-6	0	1	4	-9	-1	-12	-2	-1	1
15	-5	1	4	-3	3	9	3	5	1	11	5
20	-11	-14	-5	2	-10	-6	1	-4	-2	-10	-3
25	-6	-5	-1	-3	12	-1	-2	-2	-3	6	-1
30	-5	-2	-3	-3	-18	0	2	2	5	-3	-1
35	-8	-14	-16	1	8	0	5	-2	1	1	1
Max	-11	-14	-16	8	-18	-9	5	-12	-7	11	5

C.5 Heat flux measurements

The heat flux was measured 2535 mm away from the specimen and is based on the maximum levels.

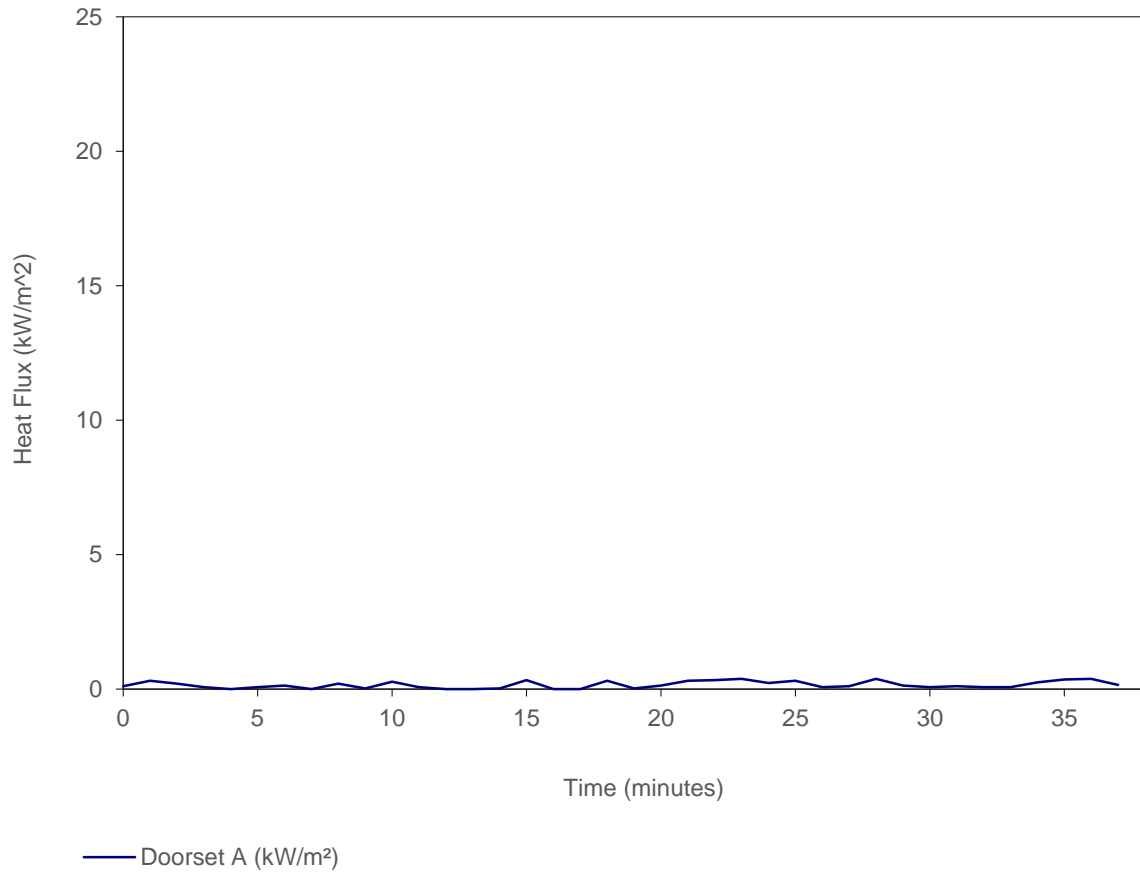


Figure 10 Heat flux measurements of the test specimen vs time

Table 15 Heat flux measurements of the test specimen vs time

Time (mins)	Doorset A (kW/m ²)
0	0.000
1	0.304
2	0.203
3	0.076
4	0.000
5	0.076
6	0.126
8	0.203
9	0.025
10	0.279
11	0.076
12	0.000
14	0.025
15	0.330
16	0.000
18	0.304
19	0.025
20	0.126
21	0.304
22	0.330
23	0.380
24	0.228
25	0.304
26	0.076
27	0.101
28	0.380
29	0.126
30	0.076
31	0.101
32	0.076
33	0.076
34	0.253
35	0.355
36	0.380
37	0.152

Table 16 Heat flux thresholds vs time

Radiation intensity	Doorset A
5 kW/m ²	Radiation intensity not reached
10 kW/m ²	Radiation intensity not reached
15 kW/m ²	Radiation intensity not reached
20 kW/m ²	Radiation intensity not reached
25 kW/m ²	Radiation intensity not reached

C.6 Gap measurements

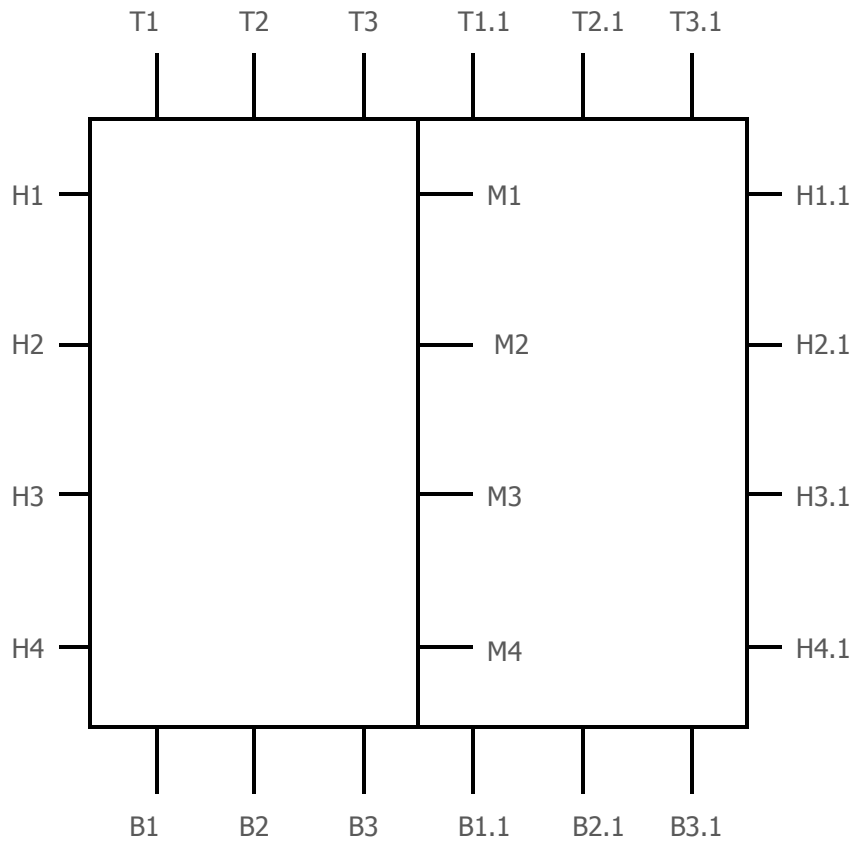


Figure 11 Gap measurements, Doorset A (unexposed side shown)

Table 17 Measured and calculated gap sizes for Doorset A

Doorset A (mm)							
Left hinge side	Primary	Leaf to stop	Right hinge side	Primary	Leaf to stop	Meeting edge	Primary
LH1	3.3	1.2	RH1	3.6	0.7	M1	2.8
LH2	3.5	0.8	RH2	3.2	1.4	M2	3.4
LH3	2.9	1.0	RH3	3.3	1.6	M3	4.1
LH4	2.9	0.7	RH4	2.8	1.6	M4	4.5
Mean	3.2		Mean	3.2		Mean	3.7
Max	3.5		Max	3.6		Max	4.5
Min	2.9		Min	2.8		Min	2.8
Top edge	Primary	Leaf to stop	Threshold	Primary			
T1	3.9	0.8	B1	4.6			
T2	3.8	0.4	B2	4.8			
T3	4.0	0.4	B3	4.9			
T4	4.0	0.7	B4	4.8			
T5	4.0	0.9	B5	4.9			
T6	3.6	0.5	B6	6.2			
Mean	3.9		Mean	5.0			
Max	4.0		Max	6.2			
Min	3.6		Min	4.6			

Appendix D Photographs



Figure 12 Unexposed face of the specimen before the start of the test



Figure 13 Exposed face of the specimen before the start of the test



Figure 14 Unexposed face of the specimen after 10 minutes of testing

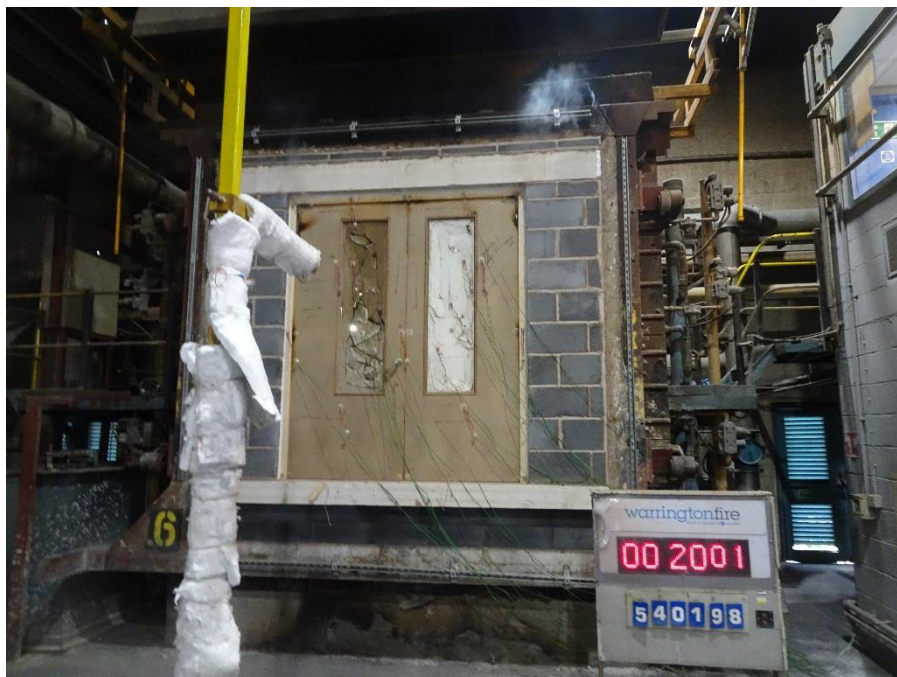


Figure 15 Unexposed face of the specimen after 20 minutes of testing

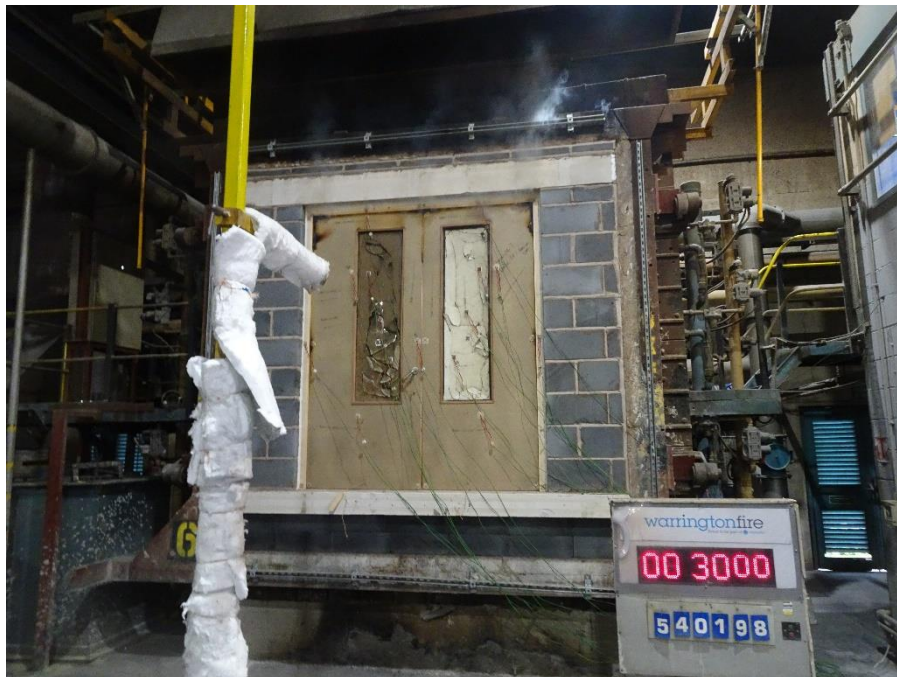


Figure 16 Unexposed face of the specimen after 30 minutes of testing



Figure 17 Unexposed face of the specimen at 37 minutes displaying sustained flaming

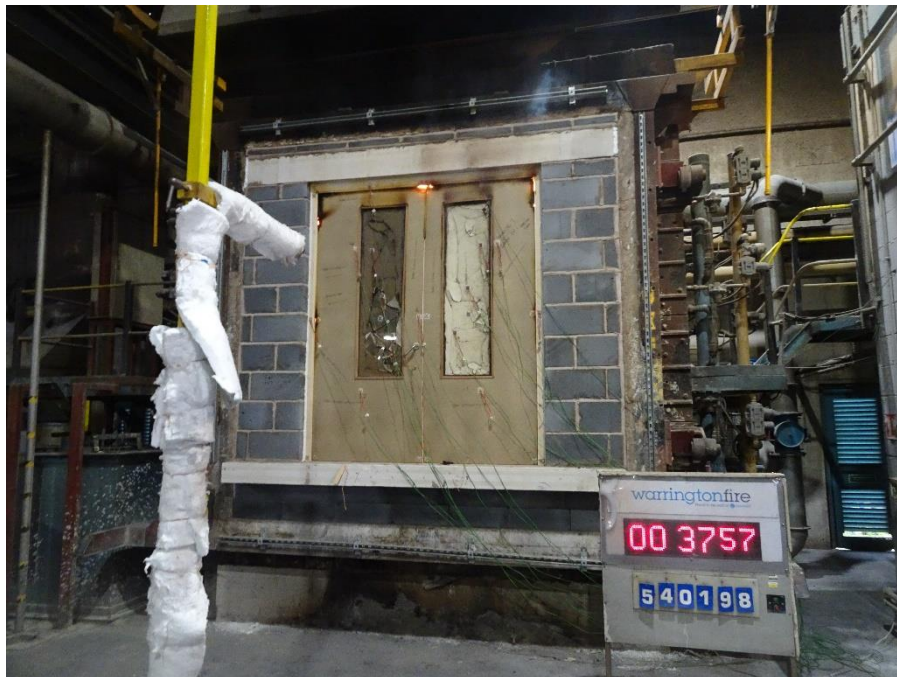


Figure 18 Unexposed face of the specimen at the termination of the test



Figure 19 Exposed face of the specimen at the end of the test

Appendix E Sampling report

		SAMPLING VISIT REPORT		Company Name	Wood International Agency Ltd
				Establishment No.	047/E003760
				BM TRADA Assessment Body ID: 1224	
Company Head Office Address	Wood International Agency Ltd Woods House 16 King Edward Road Brentwood Essex CM5 0RQ		Contact Name	Neil Harrison	
			Telephone	+44 (0) 1277 232991	
			Email Address	doors@woodia.co.uk	
Location where sampling was conducted if different from Head Office Address				Visit Date	BMT Representative
By Deziq Carpentry, Unit 11B ERW Las, Colomendy Ind Est, Denbigh LL16 5TA				23/07/2024	Michael Chorlton
Requirement		Evidence / Comments			
Opening Meeting (names of those present)		Mr Neil Harrison / Mr Shaun Harrison			
Contract Reference		SC24008T			
Technical Specification document / FoA reference Photographs to be taken of all critical areas highlighted in the Technical Specification		Technical Drawing: WIAD-MMN44-ITT-567-A27-P1 Technical Specification: WIAD- MMN44-ITT-567-A27 Marked up technical specification made by the sampler and must be read in conjunction with this sampling report.			
Description of product(s) sampled		Single acting, double leaf doorset incorporating WIA marksman 44 door leaves lipped on four edges and hung on 3No. butt hinges in softwood frame and operated by overhead surface mounted closers and secured with tubular latch / handle and concealed flushbolt and finished with drop seal and vision panels.			
Product Identification / reference numbers / codes		N/A			
Batch number(s)		N/A			
Date of manufacture		In stages between 18/01/2024 and 17/06/2024 with final review 12/07/2024			
Quantity of stock and size of sample(s) taken		1No. Doorset			
Traceability of material records ie Purchase Orders and delivery notes		<p>Items with traceability: Frame, lipping and door blank material, density & MC. Door blank sampled SC23282B. Hinges, hinge fixings and Intumescent. Door closers. Latch & keep, Intumescent and fixings. Glazing units. Glazing Intumescent seals. Frame and leaf Intumescent seals. Bead dimensions, density and MC.</p> <p>Items with limited or no traceability: Door stop fixings. Frame to supporting construction fixing type and spacing. Fire stopping and sealing material and extents. Lever handle manuf and type. Frame smoke seal.</p> <p>Please send Sampling Pack to High Wycombe Laboratory FOA Connor Payne.</p>			
Example of sampler's markings applied to the product(s) (contract reference, signature of client, date of manufacture)					
Confirmation of minimum mandatory video/live checks undertaken		<input checked="" type="checkbox"/> Glazing assembly (where applicable) <input checked="" type="checkbox"/> Hardware prep and fitting (where applicable)		<input checked="" type="checkbox"/> Finished doorset with markings <input checked="" type="checkbox"/> Sampling pack discussion	
Details of any further FPC processes witnessed during the visit.		By Deziq do not have a formalised FPC in place. All manufacture made against the technical specification utilising traditional joinery tools and methods. Dimensional checks made throughout manufacture.			
Determine the essential characteristics of the product and confirm the details of in-process checks conducted on the sample to ensure conformity.		Door leaf specification. Hardware selection, preparation, Intumescent protection and fixings. Glazing selection, preparation, Intumescent protection and bead fixings.			
State any items from the Technical Specification / FoA that were not witnessed and require further lab sampling		<input type="checkbox"/> Side screen / overpanel <input type="checkbox"/> Door closer		<input checked="" type="checkbox"/> Handles <input type="checkbox"/> Frame re-assembly <input checked="" type="checkbox"/> Other (see tech spec marked with 'not seen')	
Confirm any clauses within the Technical Specification that were found to be different on the sampled product/s. Non-conformances may be raised for pre-cert and audit test sampling		Refer to marked up technical specification. Areas in Green - verified during sampling Areas in Blue - Additional sampler notes Areas in Yellow with Asterisk - Will be reported 'As stated by customer'			
Closing Meeting (names of those present)		No formalised closing meeting possible. Marked up TST and draft sampling report sent for approval and signing.			
Declaration		I declare that the product/s witnessed during this sampling visit are representative of normal production.			
Company Representative Name (Print)			Company Representative Position		
Neil Harrison			Director		
BM TRADA Representative Signature			Company Representative Signature		
This sampling report remains the property of BM TRADA. BM TRADA shall keep confidential all information relating to the sampling process and your organisation and shall not disclose such information to any third party except as required by law or by BM TRADA's Accreditation Bodies. This sampling report will be shared with others within Warringtonfire Testing and Certification Ltd.					



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Registered Company No. 11371436

Name & address of issuing laboratory:

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Holmesfield Road, Warrington WA1 2DS, United Kingdom

Location of performance of laboratory activities:

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