

Fire resistance test report

Issuing laboratory: Warringtonfire Testing and Certification Limited

Test standard: BS 476-20:1987 and BS 476-22:1987 Clause 6

Test sponsor: Wood International Agency Ltd

Product: Marksman 44 Doorset System

Report number: 544268

Test date: 31 May 2024

Version: 2

This report supersedes the original report dated 04 September 2024

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



Quality management

Version	Date	Information about the report	
1	4 September 2024	Description	Initial issue
			Prepared by
		Name	Peter White
		Signature	Graham Edmonds
2	16 September 2024	Description	The density on page 22 Item 8 updated to Measured 526-529kg/m3. And also, Item 9 Measured 413-654kg/m3. Also removed lipping shown on Figure 7 as this wasn't present in the test.
			Prepared by
		Name	Peter White
		Signature	Sam Whittle

Signed for and on behalf of Warringtonfire Testing and Certification Limited

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 6 determination of fire resistance of insulated doorsets and shutter assemblies with deviations as described in Table 3.

Warringtonfire Testing and Certification Limited (Warringtonfire) performed the test on 31 May 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	Unlatched timber double doorset.	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	2250 mm
Restraint conditions	Restrained on all edges		

Table 3 Summary of test results

Item	Criteria		Results
Doorset A	Integrity		42 minutes
	Results	I	42 Minutes*
Notes:			
The test results for the specimen only apply to the tested orientation. The test was discontinued after 43 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 6 determination of fire resistance of insulated doorsets and shutter assemblies.

Warringtonfire performed the test on 31 May 2024 at the request of the test sponsor listed in Table 4.

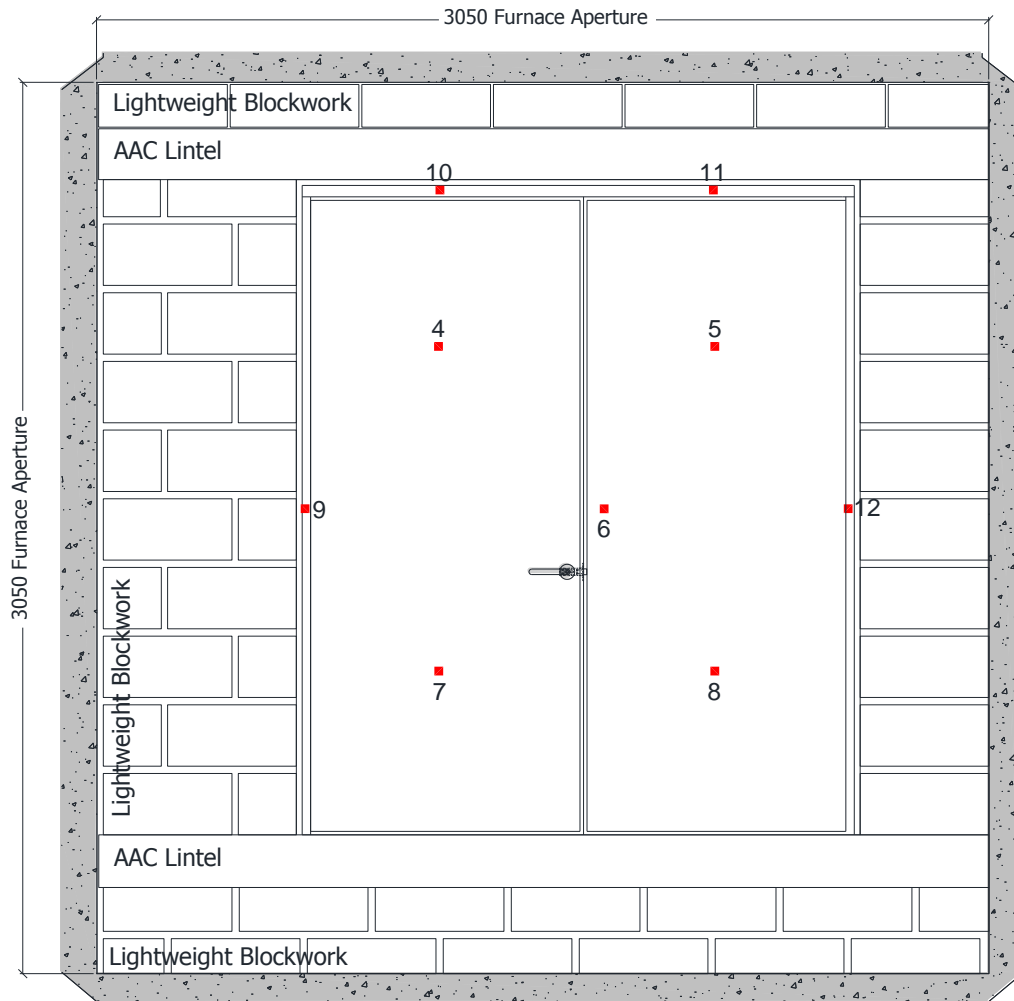
Table 4 Test sponsor(s) details

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

2. Test specimen and supporting construction

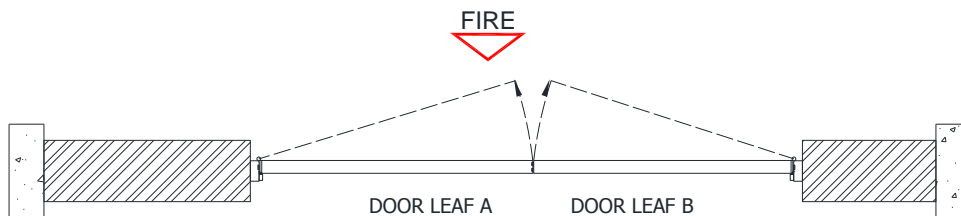
2.1 Drawings of test assembly

The description of the test specimen and supporting construction are detailed in Section 2.2 and illustrated in Figure 1 to Figure 317. All measurements are in millimetres – unless indicated otherwise.



Reference Legend	
Item	Description
■	Surface Thermocouple positions

GENERAL ELEVATION OF THERMOCOUPLE POSITIONS
UNEXPOSED FACE



HORIZONTAL SECTION THROUGH TEST CONSTRUCTION

Figure 1 General Elevation & Horizontal Section - Thermocouple Positions – Unexposed face

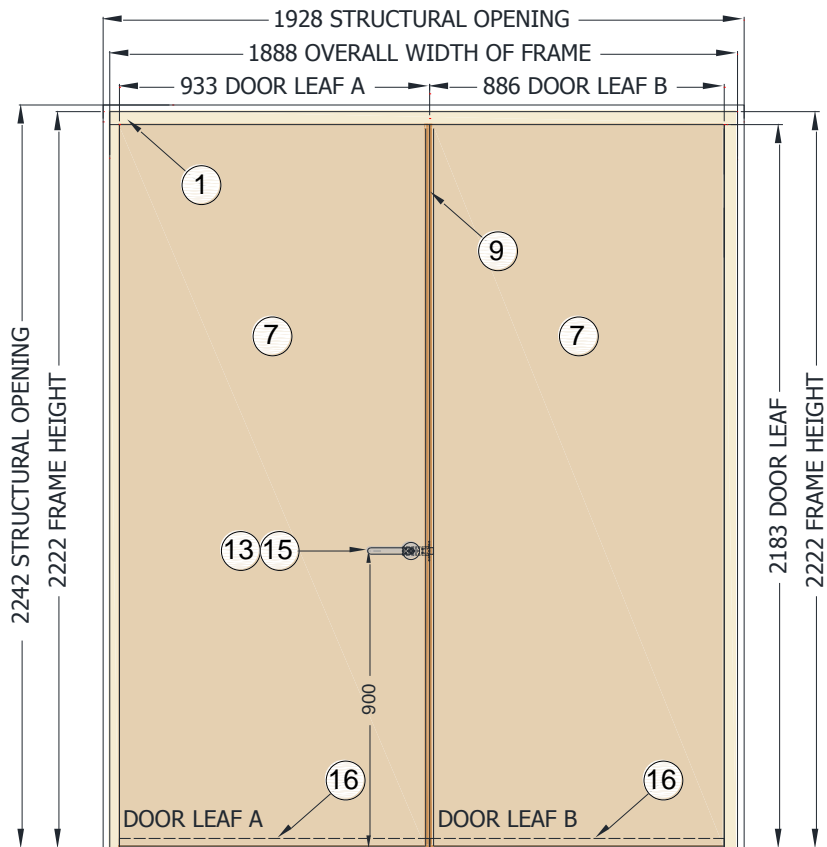


Figure 2 General Elevation of Doorset – Unexposed Face

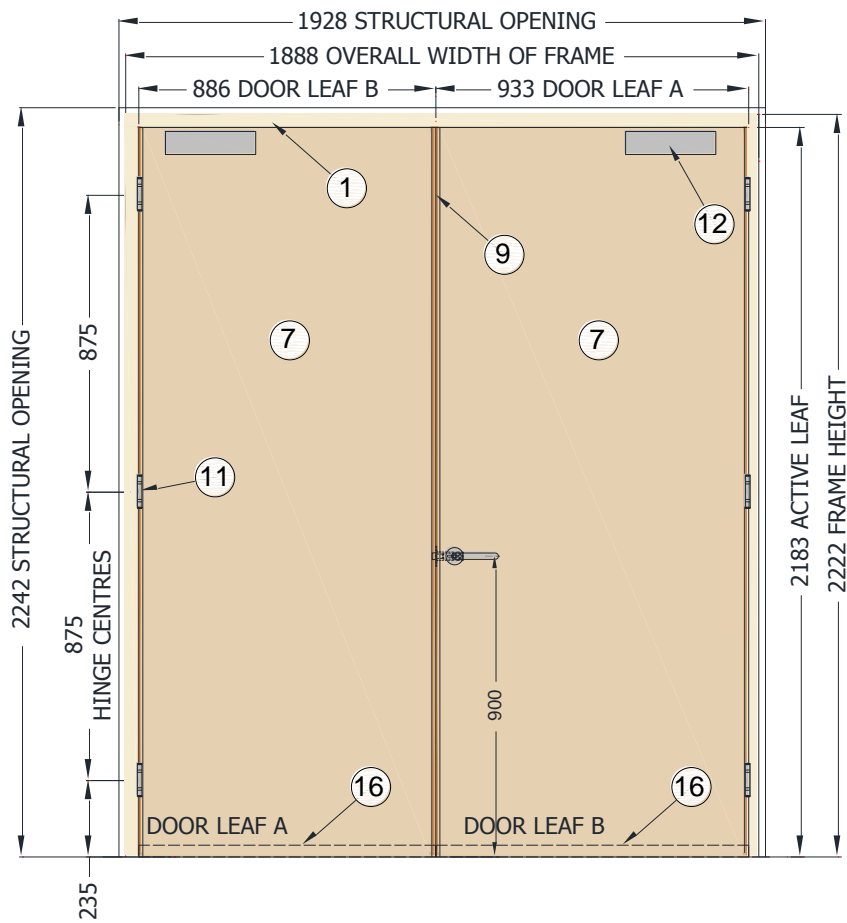


Figure 3 General Elevation of Doorset – Exposed Face

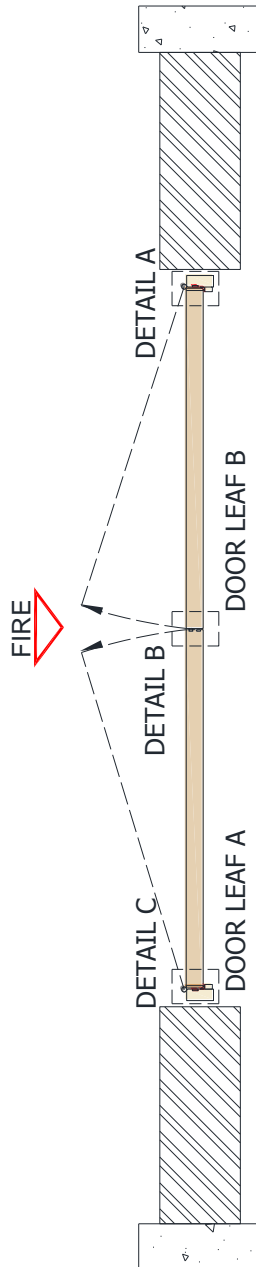


Figure 4 Typical horizontal section through Doorset

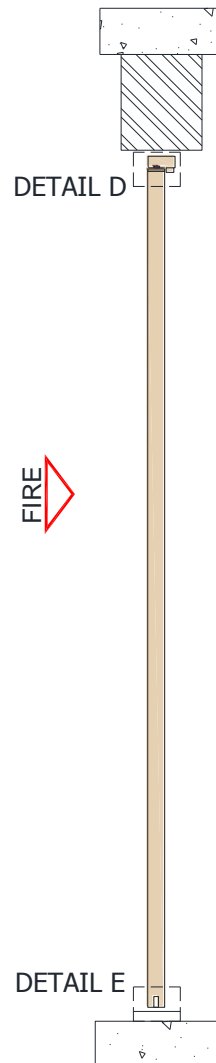
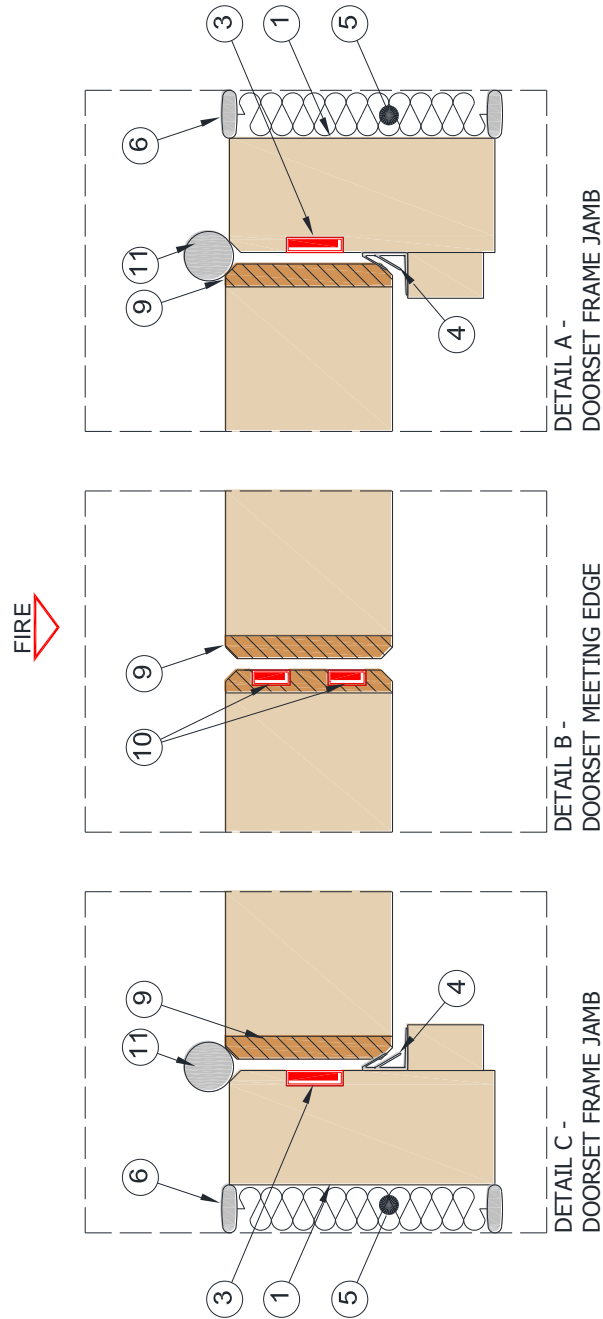


Figure 5 Typical horizontal section through Doorset



vFigure 6 Typical vertical section through Doorset

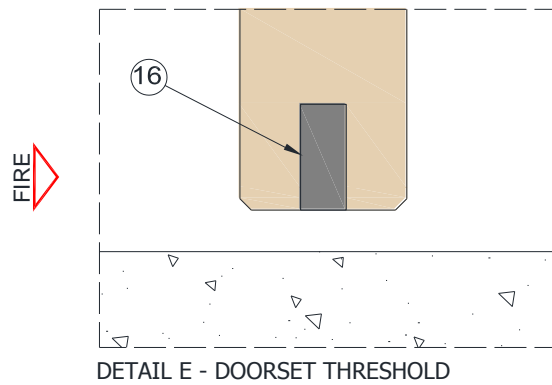
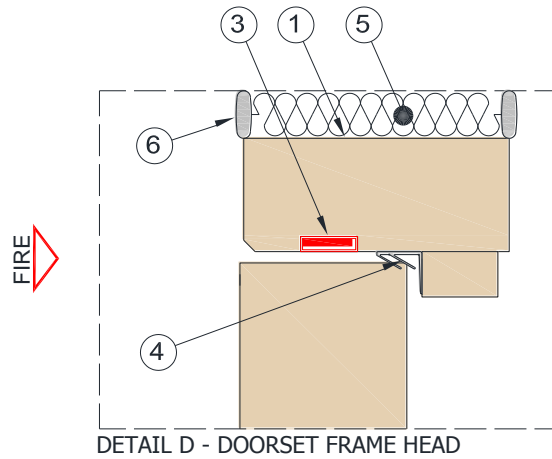


Figure 7 Typical horizontal cross sectional detail views - A-D

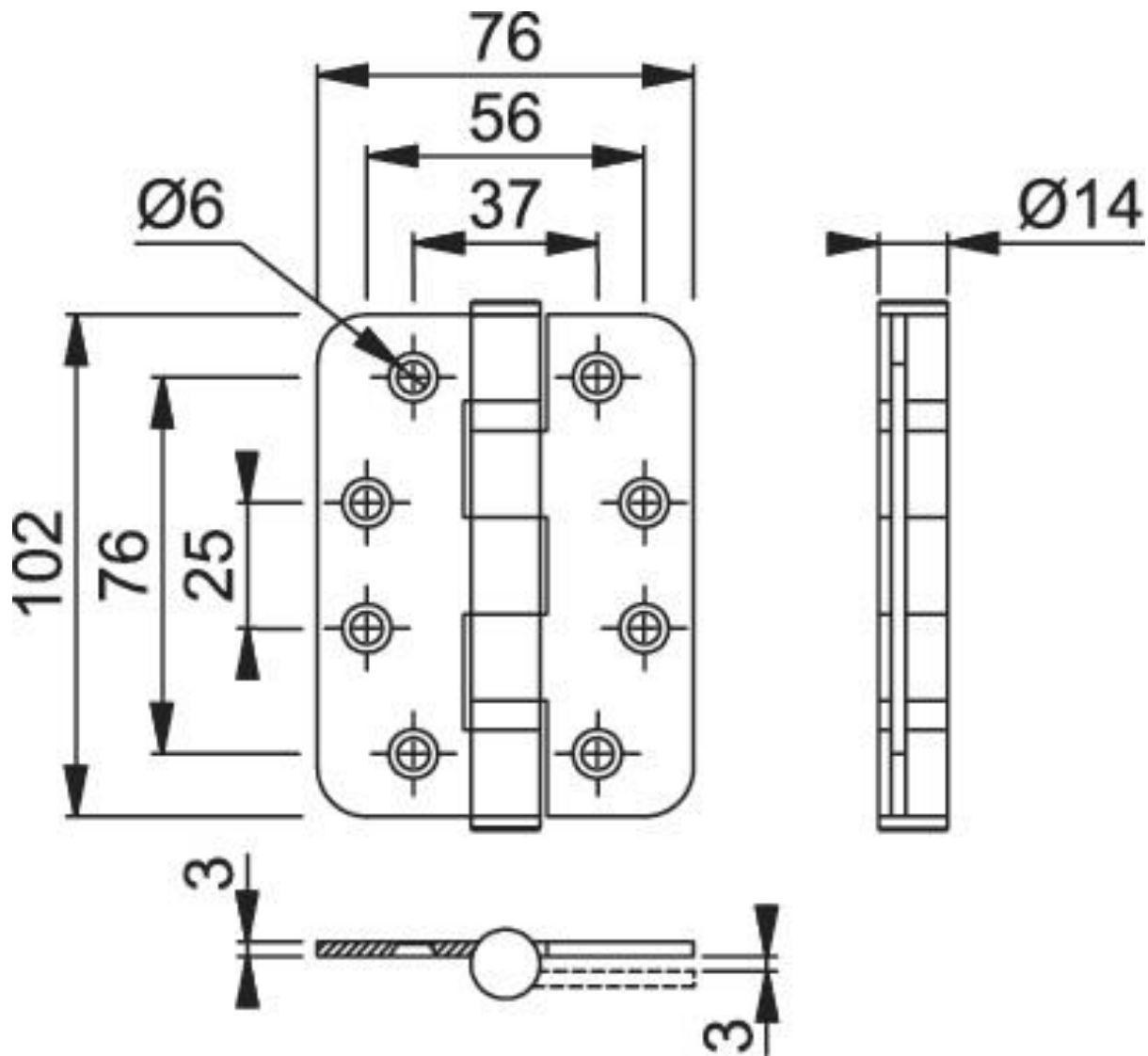


Figure 8 Details of item 13

SCISSOR ARM DOOR CLOSERS

TS.9205

Designed to last, the TS.9205 is a popular and highly efficient door closer with both optional back check and delayed action, and assisting BS8300.

- Power Adjustable EN2-5.
- 16 finishes available for next day delivery, including an anti-corrosion Marine 316.
- Slimline body & cover with only 40mm projection.
- EN2-5 parallel arm an optional using short parallel arm bracket (Product Code: PAB 1)



FD30 to FD120
Timber Doors



Opening Angle
180°



Two-Stage
Speed Regulation



Guarantee



Max Door
Width



Max Door
Weight

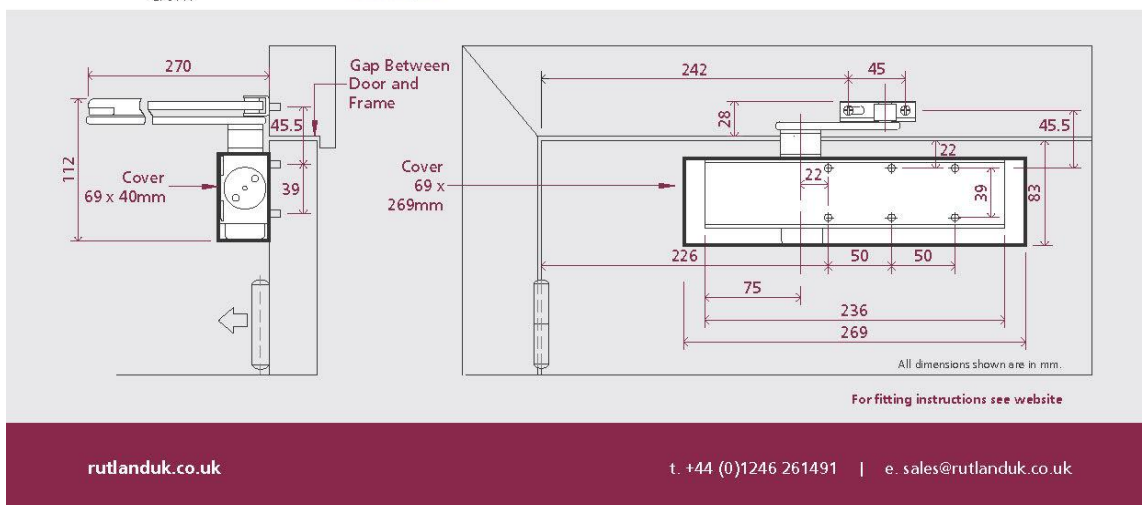


Finishes

See page 96 for more detail

SE Silver	SNP Satin Nickel	PNP Polished Nickel	PVD Polished Brass	SSS Satin Stainless
PSS Polished Stainless	BK Black	AB Antique Brass	AC Antique Copper	SB Satin Brass
LB Light Bronze	MB Medium Bronze	DB Dark Bronze	WB Weathered Bronze	M Marine 316

Product Features	TS.9205
Delayed Action	✓
Back Check	✓
Opening Angle	180° (Fig 1)
Fig.1 Pull Side Door Width	390-1250mm
Fig.66 Push Side Door Width	390-1100mm
Fig.1 BS8300 Min Door Width	835mm
Fig.66 BS8300 Min Door Width	728mm
Max Door Weight	<110kg
Power Adjustment	By Spring
Hold Open (not for fire doors)	o
Dimensions (including cover)	W269 x H69 x D40mm
Certification Compliance	
Certifire	✓
UKCA	✓
CE	✓
BS EN 1154	✓
BS EN 1634	✓
UL10C	-
UL228	✓
ANSI BHMA	-
EPD 3.09E+01 kg CO ₂ eq	✓
Key: ✓ Yes - No o Option	

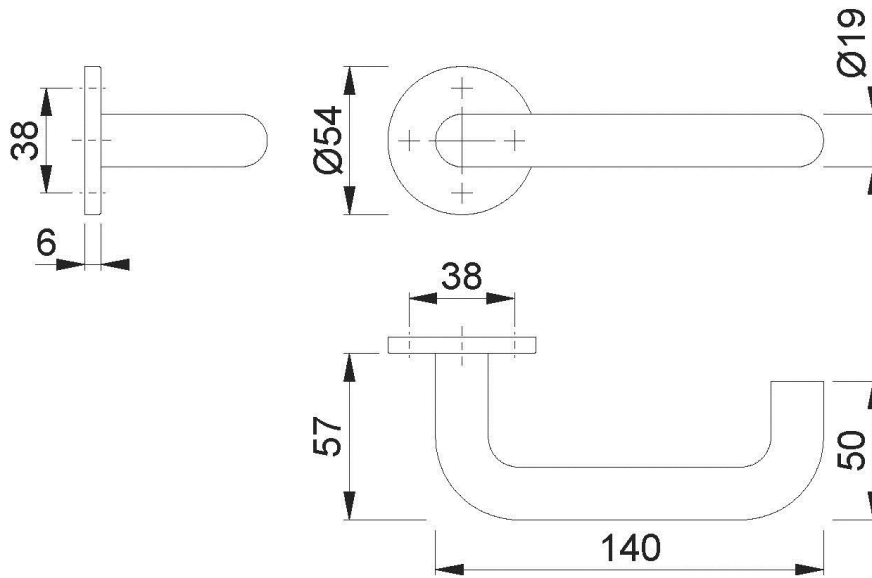


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Figure 9 Details of item 14

AR961/60-SP (Return To Door Lever On Rose)



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Scale 1:2	Name J. Renhard	Date 20.05.15	Drawing No: c0023191z000	ARRONE The Complete Range
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Updated on 20.05.15 J.Renhard (Product Development)

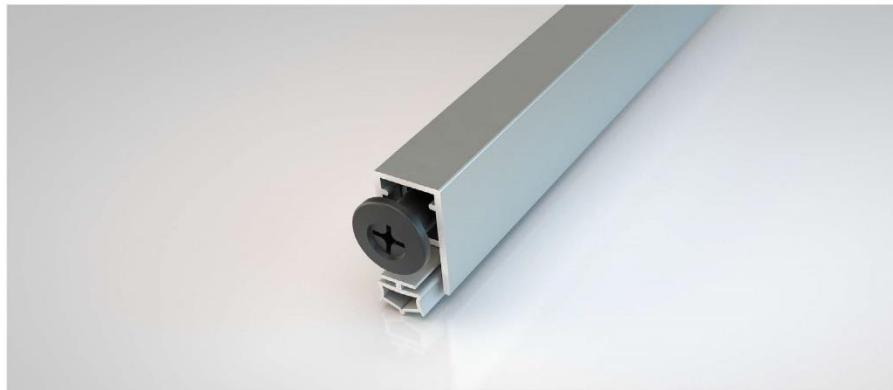
Figure 10 Details of item 19

NORSEAL

SPECIALIST SEAL SOLUTIONS

NOR810S

NORSOUND BY NORSEAL



Application
Bottom edge of acoustic timber doorsets

Fixing
Rebated, screw fixed

Performance
Suitable for use on most fire doors
Meets smoke requirements BS 8214

Material
Aluminium, TPE gasket

Actuation
Single

Colour
Mill finish, Grey gasket

Lengths (mm)
325, 425, 525, 625, 725, 825, 925, 1025, 1125, 1225

Maximum length (mm)
1225

Gap coverage (mm)
12

Cutback (mm)
150 (425 limited to 140, 325 limited to 40)

Order codes
NOR810S + Length eg. *NOR810S325* (325mm)

Dimensions



Figure 11 Details of item 19

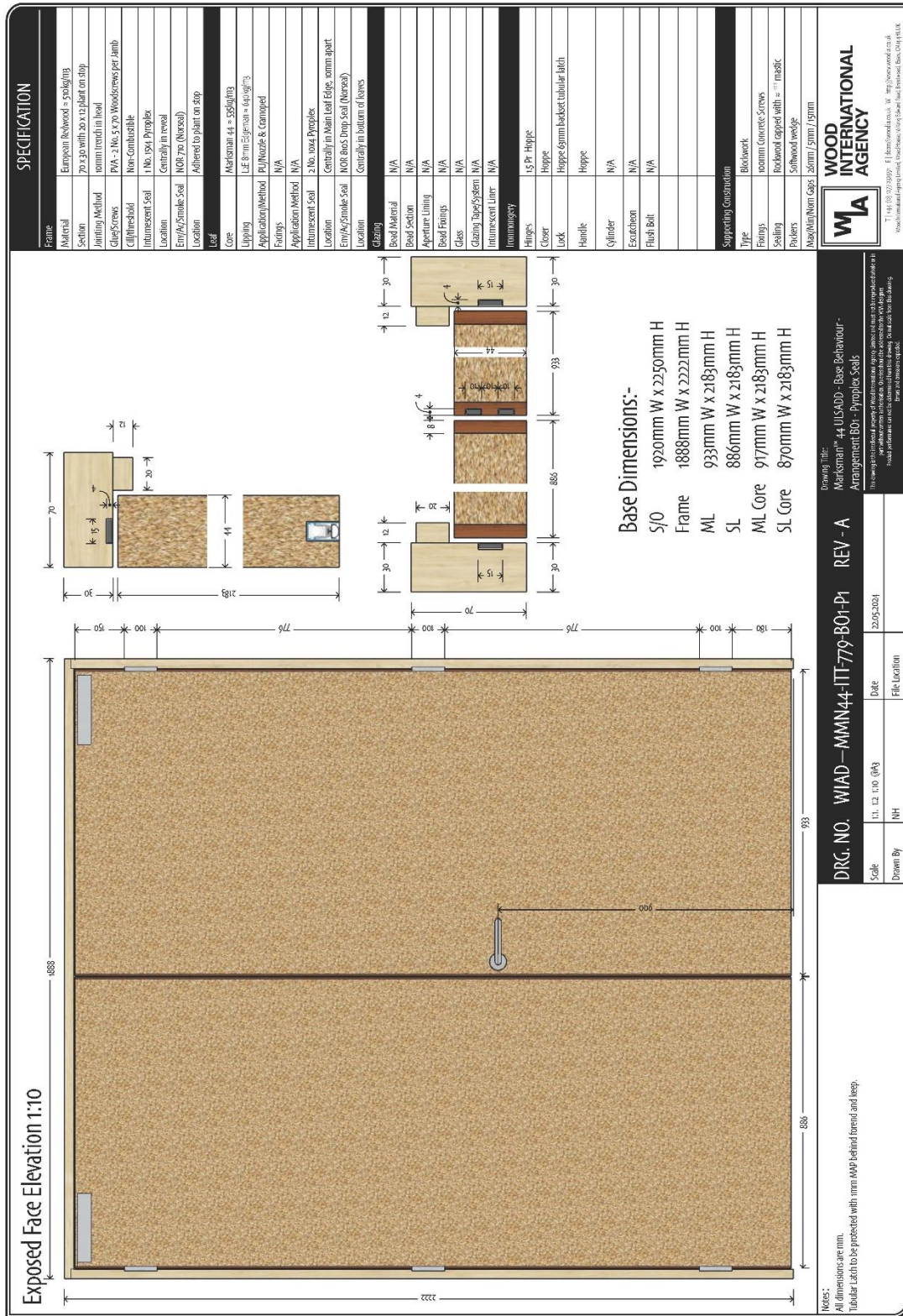


Figure 12 Client drawing WIAD-MMN44-ITT-787-Y88-P1

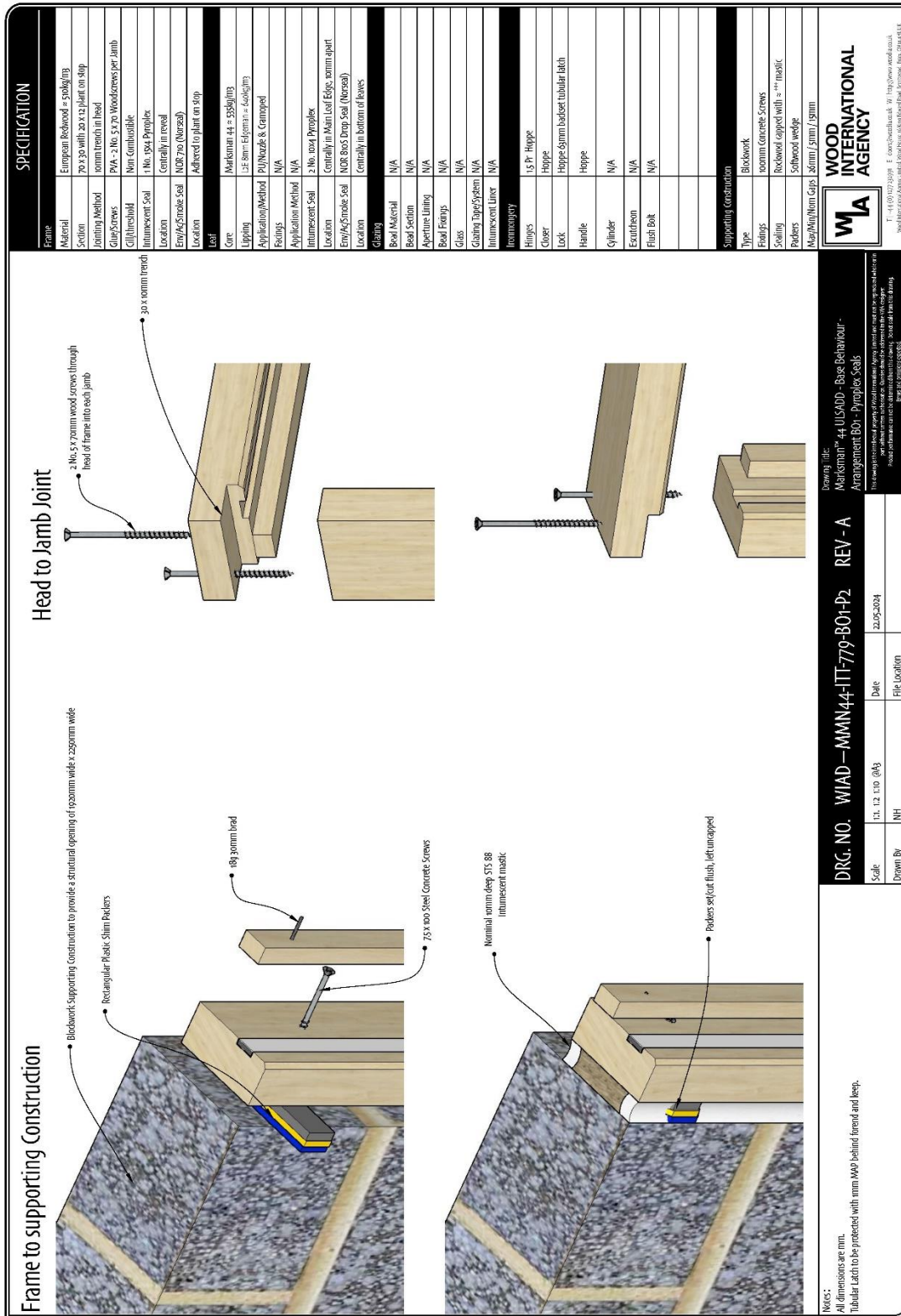


Figure 13 Client drawing WIAD-MMN44-ITT-787-Y88-P4

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 (Door Assembly A)	
Supplier	Dezign Carpentry
Reference	Standard internal door casing
Material	European Redwood
Density	Nominally 510 kg/m ³ Measured 532kg/m ³ during sampling
Moisture content	12.5 %
Overall size	2222 mm x 1888 mm x 70 mm
Frame Head & Jambs	70 mm x 30 mm
Planted Stop	20 mm wide x 12 mm deep
Jamb to Head jointing method, fixing detail and location	Trench, using 80 mm long x 5 mm diameter countersunk head wood screws, through screwed and plugged
Stop fixing method, detail and location	Through fixed, using 18g 30 mm brad nails, 300 mm centres
2. Frame Fixing Method to Supporting Construction	
Manufacturer	RAWLPLUG
Reference	R-S1-FF-08100/12
Type & material	Zinc plated with Nylon Plug
Plug size	8 mm diameter x 100 mm
Screw size	4.8 mm diameter x 105 mm long
Spacing	
Location	150 mm from top of corner of jamb, no more than 600 mm centres
Packing Material	Rectangular plastic shim packer
Packing Material Dimensions	28 mm wide x various thicknesses to suit
Does the fixing penetrate intumescent seal within frame reveal	No
Frame to structural opening gaps	20 mm at jambs, 20 mm at head
Packing Material	
Door Head	Alkaline Earth Silicate Fibre Based Insulation
Door Jambs	Sealed Tight Solutions Intumescent Mastic

3. Intumescent to frame reveal	
Manufacturer	Pyroplex
Reference	8700
Material	PVC Encased Graphite
Overall section size	15 mm x 4 mm
Application method	Self-adhered into grooves within rebate of frame. Strips were interrupted at Hinges positions
Location (relative to the opening face of the door leaf)	15 mm In from Opening Face
Presence of Adhesives	Self-Adhesive
4. Smoke Seal	
Manufacturer	Norseal
Reference	NOR 710
Certifire Number	CF629
Material	Flexible and rigid PVC
Overall section size	10mm x 10.2mm
Application method	By hand- Self-adhesive tape applied to back of seal
Location	Affixed to stop upstand

Fire stopping

5. Frame to supporting construction fire stopping detail	
Manufacturer	Morgan Advanced Materials
Reference	Superwool Plus, Alkaline Earth Silicate Fibre Based Insulation
Material	High temperature insulation wool
Overall dimension	25 mm, uncompressed
Density	96 kg/m ³ (stated)
Location	Door Head
6. Sealant to fire stopping detail	
Manufacturer	Sealed Tight Solutions
Reference	ST88
Material	Intumescent Mastic
Application method	Cartridge gunned around perimeter of the door frame to both faces
Location	Door Jambs

Door leaf

7. Door leaf	
Manufacturer	By Deziign Carpentry
Reference	Marksman 44
Moisture content	
Door leaf A	7.1 %
Door Leaf B	7.3 %
Overall leaf size supplied for testing	
Door leaf A	933 mm x 2183 mm x 44 mm, Operation: Opening towards furnace
Door Leaf B	886 mm x 2183 mm x 44 mm, Operation: opening towards furnace
8. Core element	
Manufacturer	Wood International Agency Limited
Reference	Marksman 44
Material	Graduated Density Particleboard
Thickness	44 mm
Density	Nominally 535 kg/m ³ Measured 526 - 529kg/m ³ during sampling
Location	Centre of door leaf
Manufacturer	Wood International Agency Limited
9. Lippings / Edge banding	
Manufacturer	By Deziign Carpentry
Reference	Standard Lipping
Material	Sapele
Density	Nominally 640 kg/m ³ Measured 413-667kg/m ³ during sampling
Moisture content	12-15%
Overall size	44 mm wide x 8 mm thick
Fixing method	Wurth Rapid PU/Nozzle & Cramped
Location	Vertical edges only
10. Intumescent Seal to Door Leaf meeting edge	
Quantity	2 no.
Manufacturer	Pyroplex
Reference	8500
Material	PVC encased graphite
Overall section size	15 mm x 4 mm
Application method	By hand- Self-adhesive tape applied to back of seal by supplier
Location	Centrally in main leaf meeting stile edge, 10 mm apart

Hardware

11. Hinges	
Supplier	Hoppe
Reference	AR8182-SSS
Quantity	6
Primary material	Stainless Steel
Type	Ball Bearing Butt Hinge
Size	
a. knuckle	14mm diameter
b. blades	102 mm x 76 mm O/A (30mm each blade) mm wide 3 mm thick
Fixings	
a. type	Countersunk head wood screws
b. material	Stainless Steel
c. sizes	30 mm x 4.5 mm
d. number off per blade	4
Position of each hinge relative to the head of the leaf	150 mm, 1025 mm, 1900 mm
Details of intumescent protection	No protection applied
12. Door Closer	
Manufacturer	Rutland
Reference	TS.9205BC.SRFB.SESE
Material	
Body	Cast Aluminium
Closer arm	Stainless Steel
Cover	Stainless Steel
Configuration	Scissor Arm Overhead Closer
Overall size	
Body	55 mm high x 236 mm wide x 39 mm deep
Cover	69 mm high x 269 mm wide x 40 mm deep
Fixing method	4 No. 4.5 x 50mm Woodscrews into face of door, 2 No. woodscrews into head of frame

13. Lockset	
Manufacturer	Hoppe
Reference	Arrone LAL0075 Tubular Latch-Heavy Duty 63mm
Material	Mild Steel
Overall sizes	
Lockcase	25 mm high x 15 mm wide x 63 mm deep
Forend plate	60 mm high x 25 mm wide x 1.5 mm thick
Latch bolt	22 mm high x 10.5 mm wide x 10 mm projection
Fixing method	2 No. 29mm long x 4mm diameter Woodscrews
Latch fitting	Bolt through function
Intumescent protection	Mono ammonium phosphate
Thickness/material	2 No. woodscrews 25 x 3.5, 1mm MAP behinds forend and keep
14. Keeps	
Manufacturer	Hoppe
Reference	Arrone LAL0075 Tubular Latch-Heavy Duty 63mm
Material	Mild Steel
Overall size	65 mm high x 25 mm wide x 1 mm thick
Fixing method	2 No. 25mm x 3.5mm Stainless Steel Woodscrews
Interruptions to Intumescent within the frame reveal	No seals present (seals are in main leaf meeting edge which leave ≈2.5mm seal either side of forend).
Intumescent protection	Sealed Tight Solutions
Thickness/material	1 mm graphite sheet
15. Handle	
Manufacturer	Hoppe
Reference	AR961/10-4-SP-SSS
Material	Stainless Steel
Overall sizes	54 mm diameter x 9 mm deep rose, 140 mm long x 57 mm projection x 19 mm diameter handle with 50 mm return
Location	900 mm from head
Fixing method	4 No. bolt-through fixings 4.7mm diameter
16. Drop Down Seal	
Manufacturer	Norseal
Reference	NOR 810S
Material	Casing – Aluminium, Mechanism - Steel/Nylon – Seal - TPE gasket
Overall size	12 mm wide x 20 mm high
Fixing method	Casing is screwed into groove and mechanism is slid into casing Centrally in bottom of leaves

Supporting Construction

17. AAC Concrete Lintel	
Type	Steel reinforced concrete lintel
Material	Steel reinforced autoclaved aerated concrete
Density	670 kg/m ³
Thickness	150 mm
Overall size	150 mm wide x 250 mm high x 3000 mm long
18. 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

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	2250 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 6 determination of fire resistance of insulated 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	None	
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 4 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 17.5°C to 32.5°C and 34.5% to 71.5% respectively.	
Functionality test	Gap measurements	These measurements were completed before the start of the fire test. They are shown in Figure 21 and Table 13 in Appendix C.
Pre-test measurements		Doorset A - left
	Opening force	77.3 N
	Closing force	25.8 N
	Latching force	16.7 N
		Doorset A - right
	Opening force	70.9 N
	Closing force	27.0 N
Installation details	Delivery date of the test specimen	30 May 2024
	Start date for construction of supporting construction	28 May 2024
	Completion date for construction of supporting construction	29 May 2024
	Start date for installation of test specimen	30 May 2024

	Completion date for installation of test specimen	30 May 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	19.0 °C	
	Minimum temperature	18.0 °C	
	Maximum temperature	19.0 °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:		
	WIAD-MMN44-ITT779-BO1-P1	SC24109T	14/04/2024 and 30/05/2024 with final review 12/07/2024

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 6 determination of fire resistance of insulated 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.

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.

Appendix E includes the sampling report.

Table 8 Detailed test results

Criteria	Doorset A
Thermal insulation	
Insulation	42 Minutes*
$\Delta T_m = 140^\circ\text{C}$	42 Minutes*
$\Delta T_M = 180^\circ\text{C}$	42 Minutes*
$\Delta T_M = 180^\circ\text{C}$ on the frame	42 Minutes*
Integrity	42 minutes
Sustained flaming	42 minutes
Failure with gap gauge	42 minutes*
Cotton pad failure	42 minutes*
Notes:	
The test results for the specimen only apply to the tested orientation. The test was discontinued after 43 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

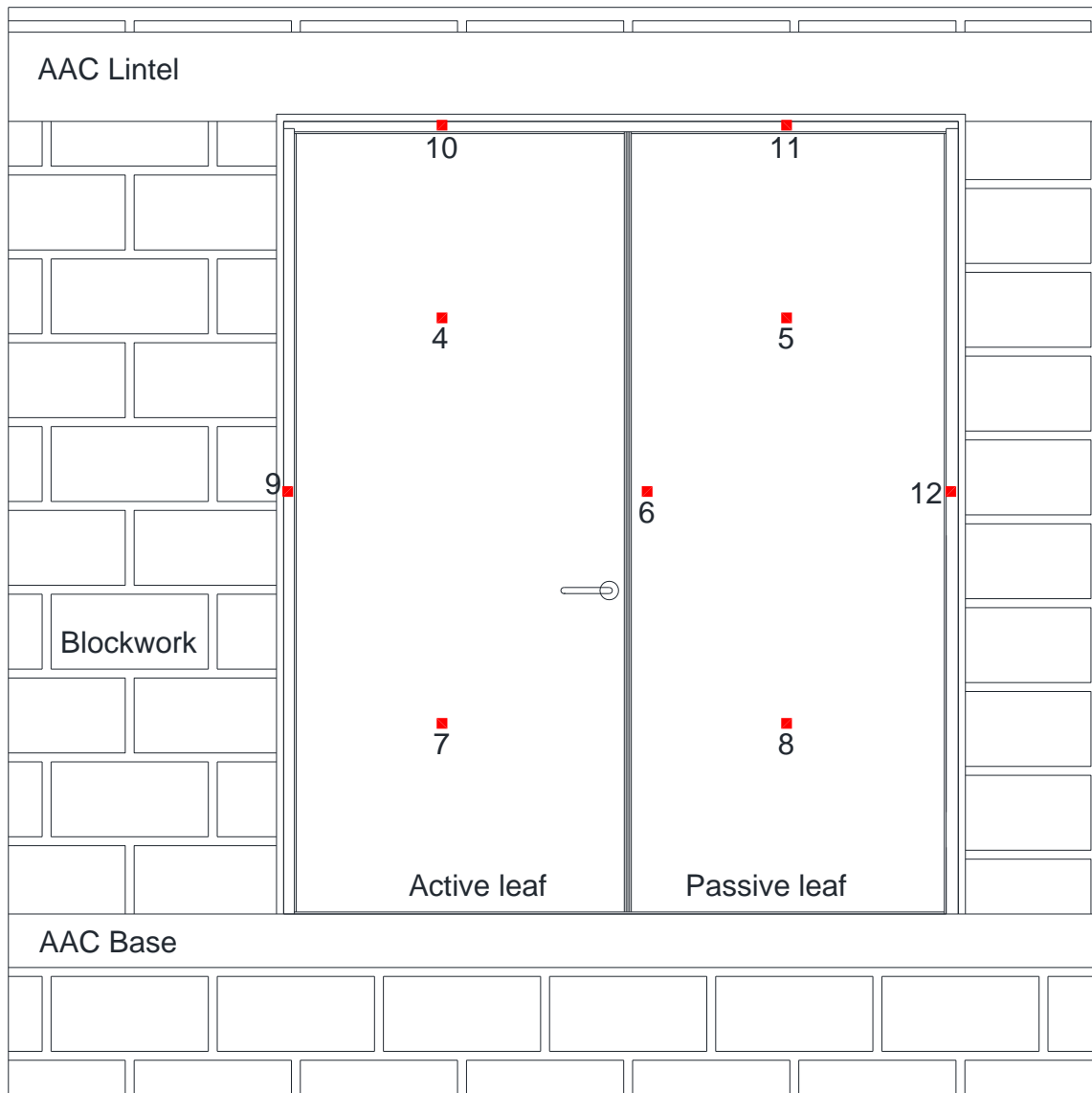
Table 9 shows the observations of any significant behaviour of the specimen during the test.

Table 9 Test observations

Min	Sec	Observation
00	00	Commencement of test
02	56	S/S release from the top of the meeting edge.
04	30	Doorsets unrestrained.
12	00	Discolouration and S/S release up the meeting edge.
21	00	Discolouration worsening at the meeting edge.
39	20	Charring visible at the top corners and the top of the meeting edge.
42	30	Sustained flaming has occurred at the top of the meeting edge.
43	00	End of test

Appendix B Instrumentation locations

Figure 14 shows the instrumentation locations for this fire resistance test.



General elevation of exposed face
showing thermocouple positions
■ Positions of thermocouples

Figure 14 Instrumentation locations

Appendix C Test data

C.1 Furnace temperature and deviation

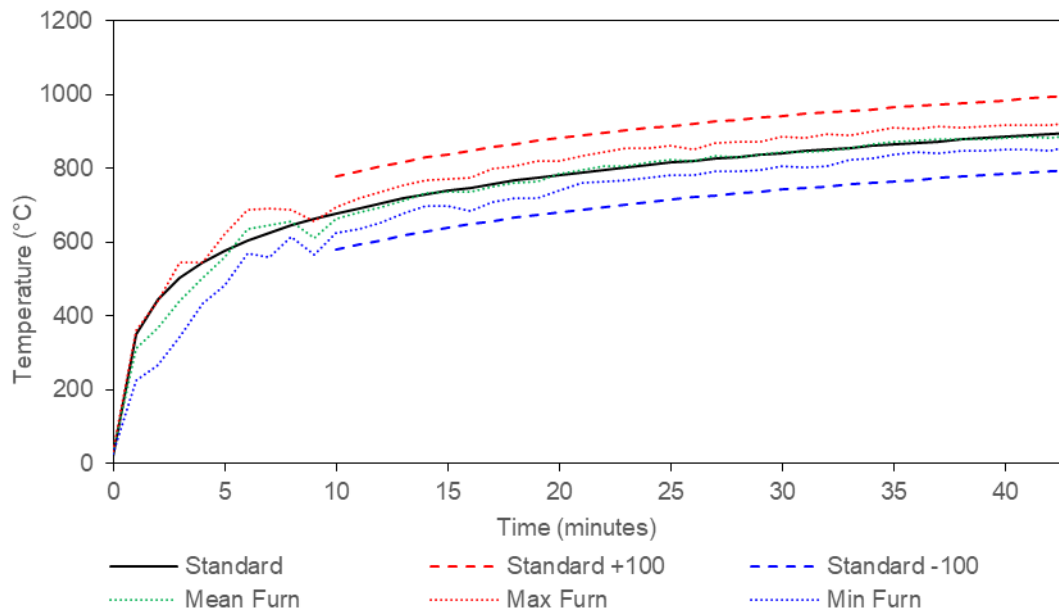


Figure 15 Furnace thermocouple temperature vs time

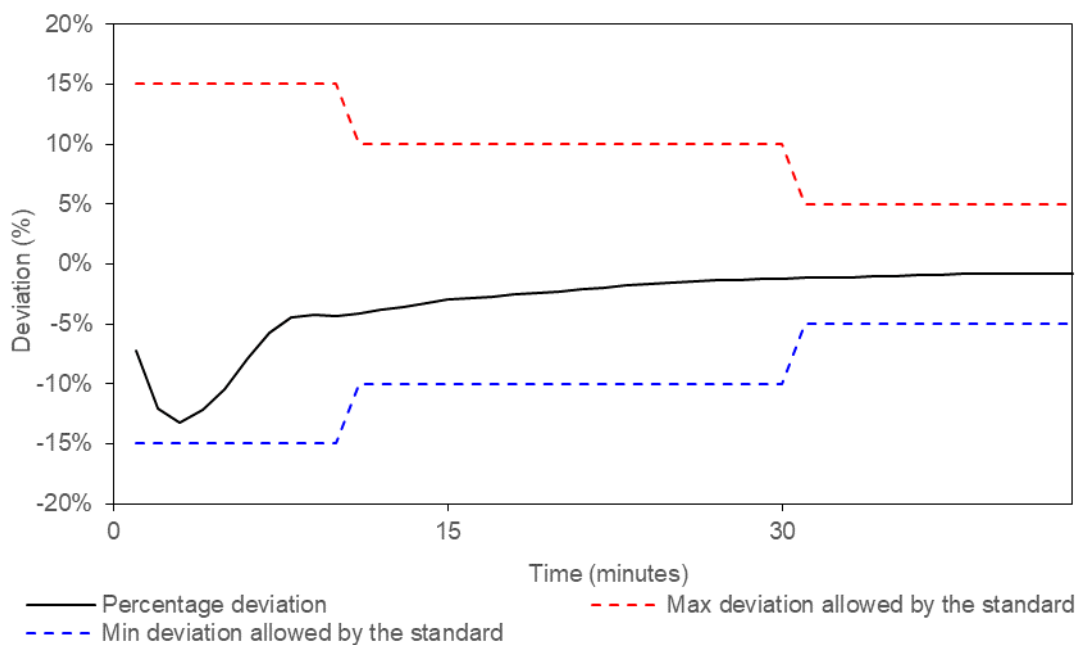


Figure 16 Percentage deviation of exposure severity vs time

C.2 Furnace pressure

The furnace pressure was taken at 2150 mm above the sill of the test specimen.

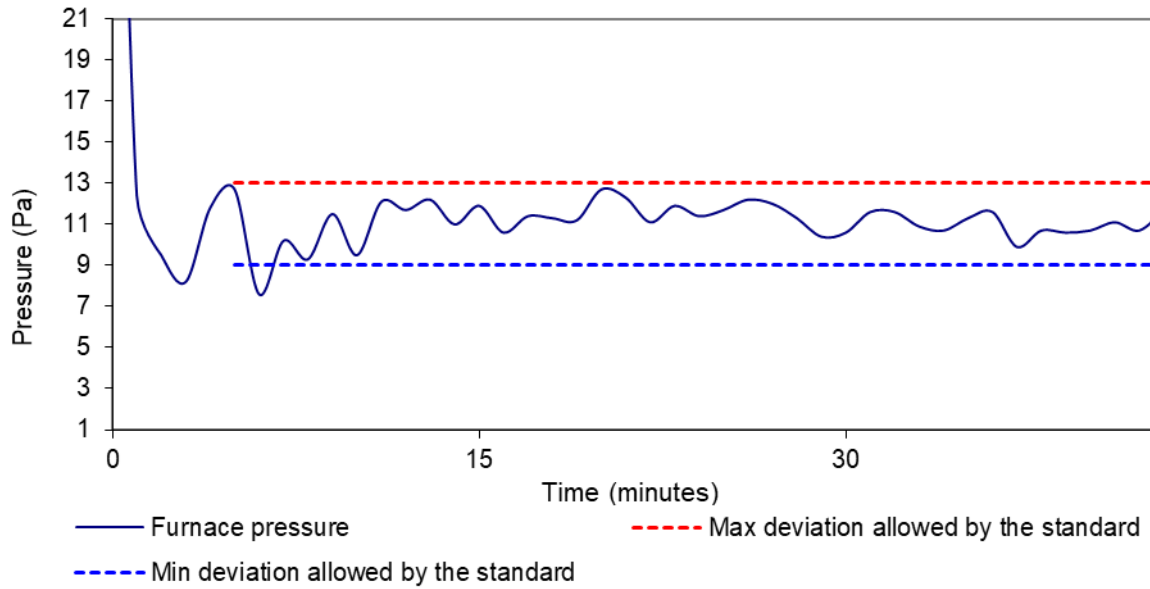


Figure 17 Furnace pressure

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)
0	22.0	22.0	22.0	22.0	24.0
2	22.0	22.0	22.0	22.0	24.0
4	22.0	22.0	22.0	22.0	24.0
6	22.0	22.0	22.0	22.0	24.0
8	22.0	22.0	22.0	22.0	25.0
10	23.0	23.0	22.0	22.0	25.0
12	27.0	26.0	25.0	24.0	28.0
14	34.0	33.0	30.0	28.0	34.0
16	42.0	42.0	37.0	32.0	41.0
18	48.0	49.0	44.0	36.0	47.0
20	53.0	54.0	49.0	41.0	52.0
22	56.0	58.0	54.0	45.0	55.0
24	59.0	61.0	58.0	48.0	58.0
26	61.0	64.0	61.0	51.0	60.0
28	63.0	65.0	64.0	54.0	63.0
30	65.0	67.0	66.0	57.0	65.0
32	66.0	69.0	68.0	60.0	67.0
34	68.0	70.0	70.0	63.0	69.0
36	70.0	72.0	71.0	65.0	71.0
38	71.0	73.0	73.0	67.0	73.0
40	73.0	75.0	74.0	70.0	75.0
42	75.0	77.0	76.0	72.0	77.0
43	75.0	78.0	77.0	72.0	78.0

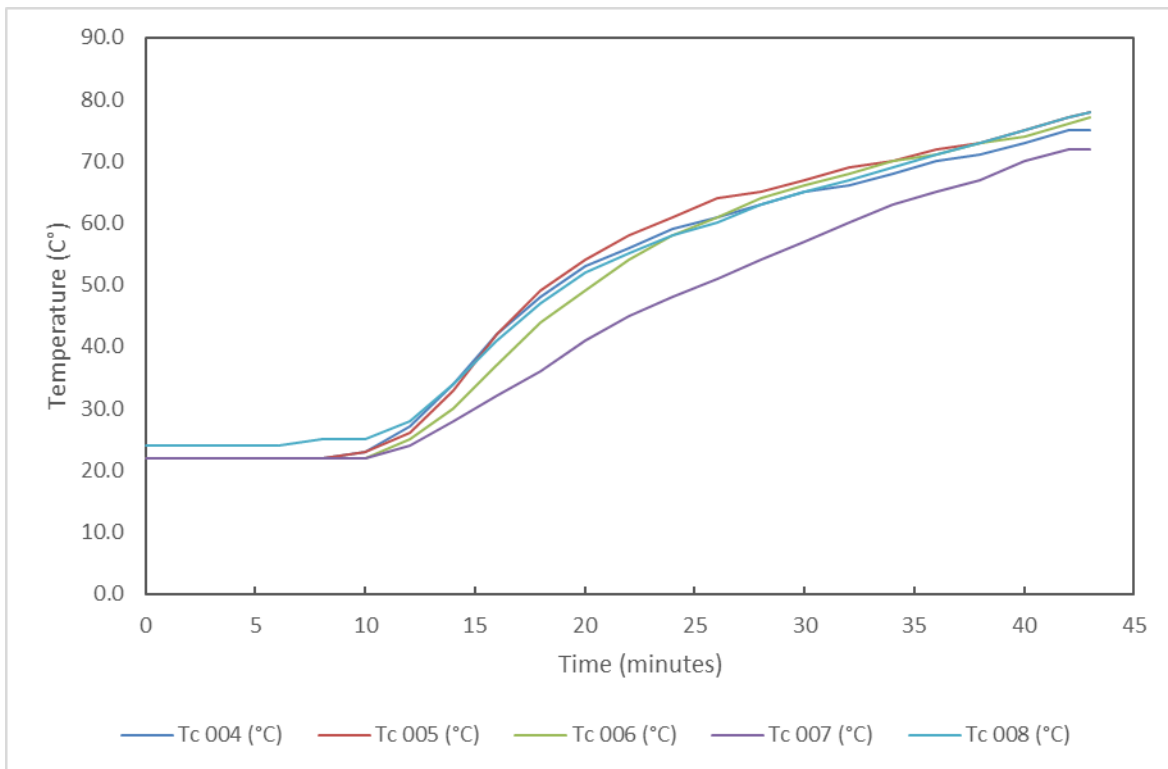


Figure 18 Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Doorset

Table 11 Individual Temperatures Recorded On The Frame Of The Doorset

Time (mins)	Tc 009 (°C)	Tc 010 (°C)	Tc 011 (°C)	Tc 012 (°C)
0	23.0	24.0	24.0	23.0
2	23.0	24.0	24.0	23.0
4	23.0	24.0	23.0	23.0
6	23.0	24.0	23.0	23.0
8	23.0	24.0	23.0	23.0
10	23.0	24.0	23.0	23.0
12	23.0	24.0	24.0	23.0
14	24.0	26.0	25.0	23.0
16	25.0	27.0	26.0	23.0
18	28.0	29.0	28.0	23.0
20	31.0	31.0	30.0	23.0
22	34.0	34.0	32.0	23.0
24	36.0	37.0	35.0	23.0
26	39.0	41.0	38.0	23.0
28	41.0	44.0	40.0	23.0
30	43.0	47.0	42.0	39.0
32	44.0	49.0	45.0	41.0
34	46.0	52.0	48.0	43.0
36	47.0	54.0	50.0	44.0
38	49.0	56.0	53.0	46.0
40	51.0	58.0	55.0	48.0
42	53.0	60.0	58.0	50.0
43	53.0	63.0	61.0	51.0

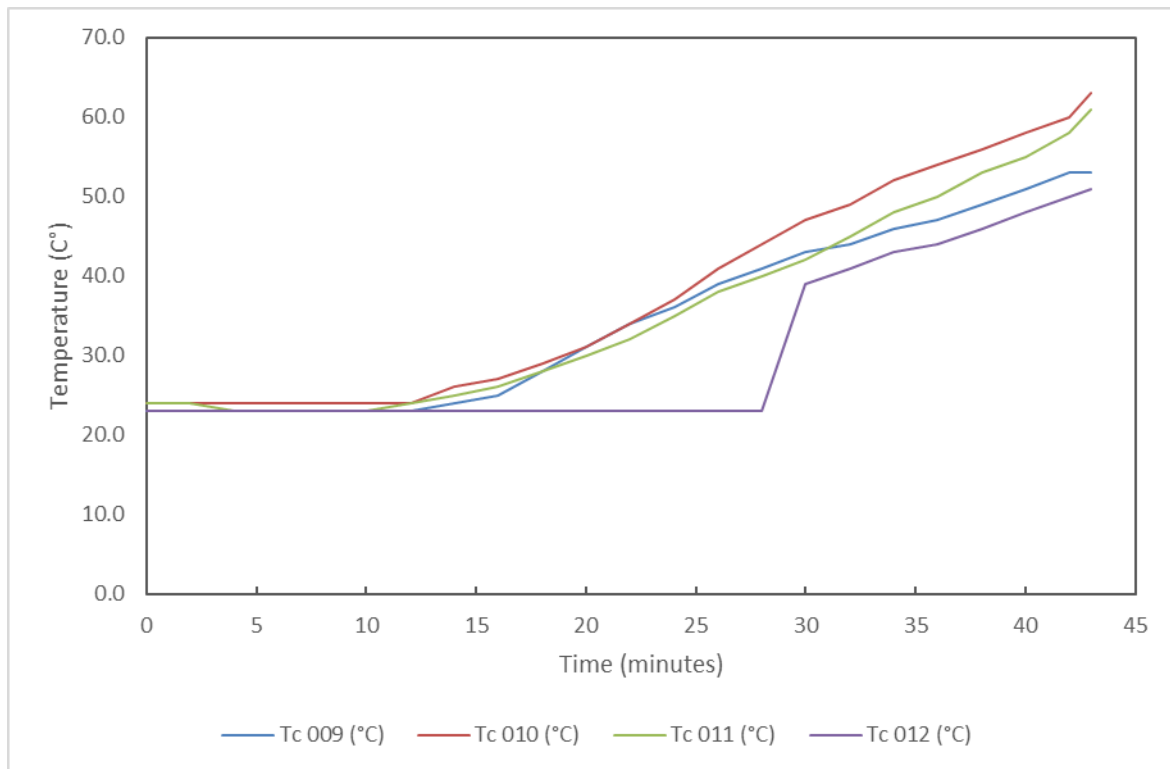


Figure 19 Individual Temperatures Recorded On The Frame Of The Doorset

C.4 Specimen deflections

Table 12 details the deflection measurements of the test specimen at locations given in **Figure 20**.

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

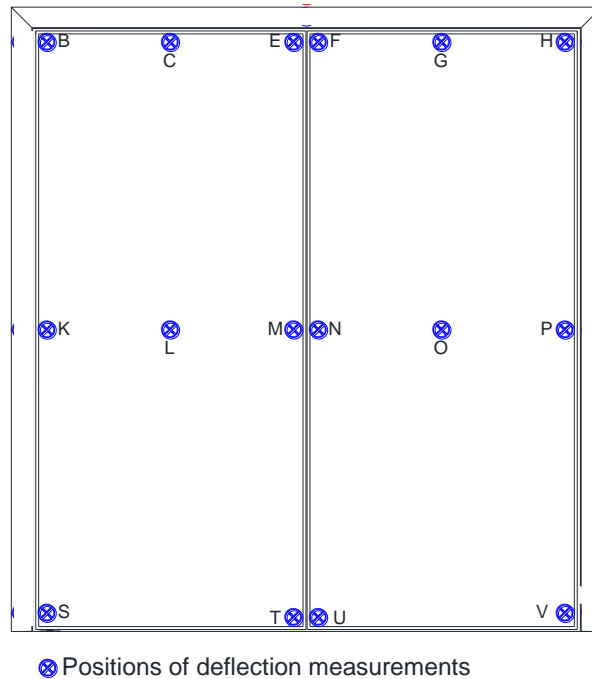


Figure 20 Position of deflection measurements

Table 12 Deflections – Doorset A

Deflections (mm)																
Time (mins)	B	C	E	F	G	H	K	L	M	N	O	P	S	T	U	V
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	1	1	-2	-1	4	-2	0	2	0	-6	-6	-8	2	0	0	0
10	4	2	4	5	-3	-3	-1	-1	1	-2	0	1	-1	0	-10	-1
15	1	-5	6	4	-4	7	3	6	2	8	-3	11	20	3	18	0
20	9	14	5	9	13	15	10	-8	-4	-5	2	3	2	15	14	8
25	1	3	5	0	-3	-4	-1	-8	-12	-9	-9	-7	2	3	5	0
30	-2	-6	-2	0	-1	7	0	-6	-10	-13	-13	-2	4	9	-1	4
35	1	2	-4	0	-27	-7	0	-12	-15	-14	-7	-2	-1	-12	-5	4
40	0	-3	-1	-1	26	6	-1	-12	-12	-12	-7	5	1	-8	1	-3
Max	9	14	6	9	-27	15	10	-12	-15	-14	-13	11	20	15	18	8

C.5 Gap measurements

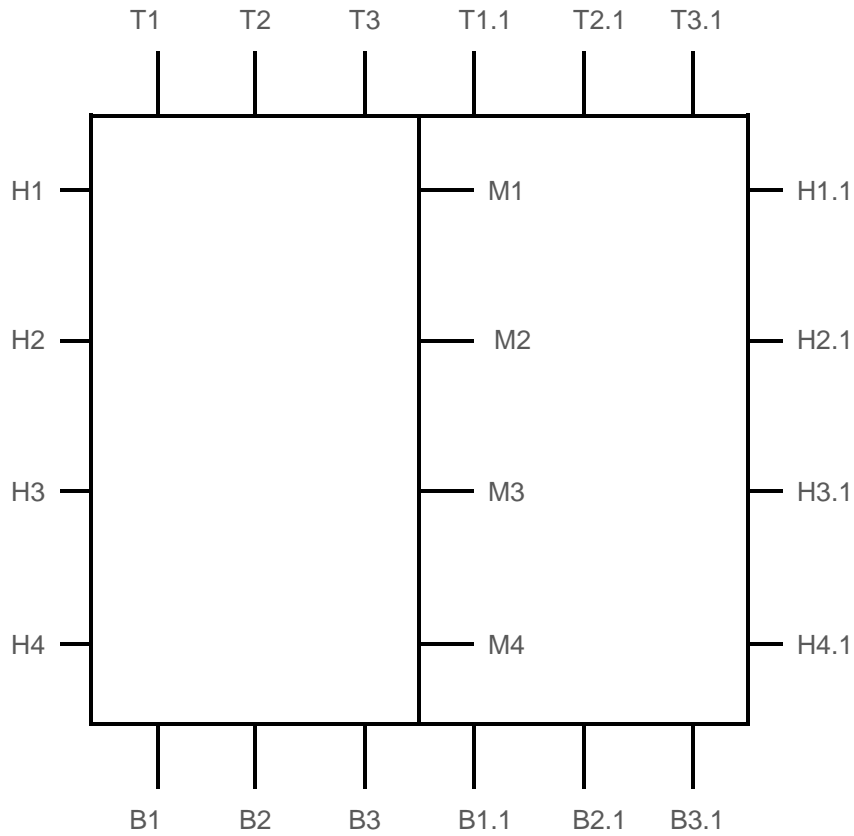


Figure 21 Gap measurements, Doorset A (unexposed side shown)

Table 13 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	3.4	0.8	RH1	3.8	0.3	M1	2.7
LH2	3.3	0.9	RH2	3.8	0.5	M2	2.2
LH3	2.9	0.3	RH3	3.4	0.6	M3	2.9
LH4	3.0	1.5	RH4	3.4	0.9	M4	3.4
Mean	3.1		Mean	3.6		Mean	2.8
Max	3.4		Max	3.8		Max	3.4
Min	2.9		Min	3.4		Min	2.2
Top edge	Primary	Leaf to stop	Threshold	Primary			
T1	2.2		B1	2.1			
T2	2.5		B2	2.3			
T3	3.2		B3	2.5			
T4	3.4		B4	3.9			
T5	3.3		B5	3.3			
T6	3.4		B6	4.0			
Mean	3.0		Mean	3.0			
Max	3.4		Max	4.0			
Min	2.2		Min	2.1			

Appendix D Photographs



Figure 22 Unexposed face of the specimen before the start of the test



Figure 23 Exposed face of the specimen before the start of the test



Figure 24 Unexposed face of the specimen at 15 minutes of testing.



Figure 25 Unexposed face of the specimen at 30 minutes of testing.



Figure 26 Unexposed face of the specimen at 42 minutes displaying sustained flaming.



Figure 27 Unexposed face of the specimen at the termination of the test.



Figure 28 Exposed face of the specimen at the end of the test.

Appendix E Sampling report

		SAMPLING VISIT REPORT		Company Name	Wood International Agency Ltd
Proud to be part of element				Establishment No.	047/E003760
				BM TRADA Approved 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 Deign Carpentry, Unit 11B ERW Las, Colomendy Ind Est, Denbigh LL16 5TA				12/07/2024	Michael Chorton
Requirement		Evidence / Comments			
Opening Meeting (names of those present)		Mr Neil Harrison / Mr Shaun Harrison			
Contract Reference		SC24109T			
Technical Specification document / FoA reference Photographs to be taken of all critical areas highlighted in the Technical Specification		Technical Drawing: WIAD-MMN44-ITT-779-B01-P1 Technical Specification: WIAD-MMN44-ITT-779-B01-P1 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 Marksman 44 door cores, lipped on 2 long edges and hung on 3No butt hinges in softwood frame and operated with overhead face fixed closers and secured with tubular latch / keep operated with handle. Finished with Drop down seals to both leaves.			
Product identification / reference numbers / codes		N/A			
Batch number(s)		N/A			
Date of manufacture		In stages between 14/05/24 and 30/05/24 with final review 12/07/24			
Quantity of stock and size of sample(s) taken		1No. Doorsets at 1111mm wide x 2405mm high.			
Traceability of material records ie Purchase Orders and delivery notes		<p>Items with traceability: Frame material and dimensions. Frame to supporting construction fixings and spacing. Frame and leaf intumescent strips. Door blanks. Lipping material, dimensions and adhesive. Hinges and fixings. Door closers. Drop seals. Tubular latch and keep type, fixings and intumescent application. Lever handle type.</p> <p>Items with limited or no traceability: Stop fixings and glue. Fire stopping and sealing details. Tubular latch and keep intumescent type. Lever handle fixings.</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 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 Deign 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.			
State any items from the Technical Specification / FoA that were not witnessed and require further lab sampling		<input type="checkbox"/> Side screen / overpanel <input checked="" type="checkbox"/> Door closer		<input 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

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