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Title:

The Fire Resistance Performance of a Non-Loadbearing Ceiling Assembly Incorporating Two Access Panels Tested in Accordance with BS EN 1364-2: 2018 With Additional Guidance From BS EN 1634-1:2014 + A1:2018

Date of Test:

24 May 2024

Issue 1

02 July 2024

WF Report No.

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Prepared for:

Panel Technologies Limited

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0249

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Test Specimen

Summary of Tested Specimen

The specimen had overall nominal dimensions of 4000 mm long by 3000 mm wide.

The suspended ceiling comprised a metal framework construction protected by a plasterboard ceiling incorporating two access hatches (panels). The suspended ceiling was suspended from four 'I' beams spanning the width of the furnace. The four 'I' beams measured 75 mm wide x 145 mm deep (5/1 mm web x 6.5 mm flanges).

The perimeter framework was formed from a 'MF6' channel galvanised steel with a thickness of 0.5 mm. 'MF7' galvanised steel support channel with a thickness of 0.9 mm was through fixed to the perimeter channels. 'MF5' galvanised steel ceiling sections were then secured to the primary support channels. Three layers of 15 mm thick Gyproc FireLine ceiling board were through fixed to the internal framework with screws. Laid on top of the ceiling boards and framework to the unexposed face was a layer of 150 mm thick Rockwool stone mineral wool. The plasterboard ceiling incorporated two apertures with nominal sizes of 1807 mm long x 907 mm wide for Panel A and 907 mm long x 657 mm wide for Panel B.

Panel A was referenced '51-FR-MD-PF-3WL-40A 1800X900MM'. The frame had an overall size of 1850 mm long x 950 mm wide x 77 mm deep and was through fixed to the unexposed face of the ceiling boards with screws. The door panel was 1796 mm long x 896 mm wide x 60 mm deep (measured). The panel also comprised a layer of Siniat 12.5 mm thick Db board laid inside the panel door and retained by the panel profile at each edge and a 5 mm thick Custom Audio Designs soundproofing layer laid inside the panel frame behind the door. The panel and frame were formed from Zintec steel with a thickness of 1.2 mm and 1.5 mm respectively. The panel featured a 3-point locking system which was latched for the duration of the test.

Panel B was referenced '12-FR-MD-PF-BL 900X650MM'. The frame had an overall size of 950 mm long x 700 mm wide x 89 mm deep. The frame through fixed to the lined board with screws. The door panel was 895 mm long x 646 mm wide x 83 mm deep (stated). Panel B also comprised a layer of 40 mm thick Rockwool stone mineral wool laid inside the door. The panel featured a budget locking system which was latched for the duration of the test.

Both access panels opened towards the heating conditions of the test and were latched for the duration of the test.

Detailed drawings of the test specimen(s) and a comprehensive description of the test construction based on a detailed survey of the specimen(s) and information supplied by the sponsor of the test are included in the Test Specimen and Schedule of Components sections of this report.

Performance Criteria and Test Results

Integrity	It is required that the specimen retains its separating function, without: ▪ causing ignition of a cotton pad when applied ▪ sustained flaming on the unexposed surface **These requirements were satisfied for the periods shown below:**
Sustained flaming	120 minutes*
Cotton pad	47 minutes
Insulation	It is required that the mean temperature rise of the unexposed surface shall not be greater than 140°C and that the maximum temperature rise shall not be greater than 180°C. Insulation failure also occurs simultaneously with integrity failure. **These requirements were satisfied for the period shown below:**
Specimen	7 minutes Exceeded maximum temperature criteria TC235
	*Test was discontinued after a period of 120 minutes.
Date of Test	24 May 2024

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Signatories

Responsible Officer
S. Whittle*
Senior Technical Officer

Approved
G. Edmonds*
Technical Officer

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

Report Issued: 02 July 2024

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Revision History

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

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Reason for Revision:	

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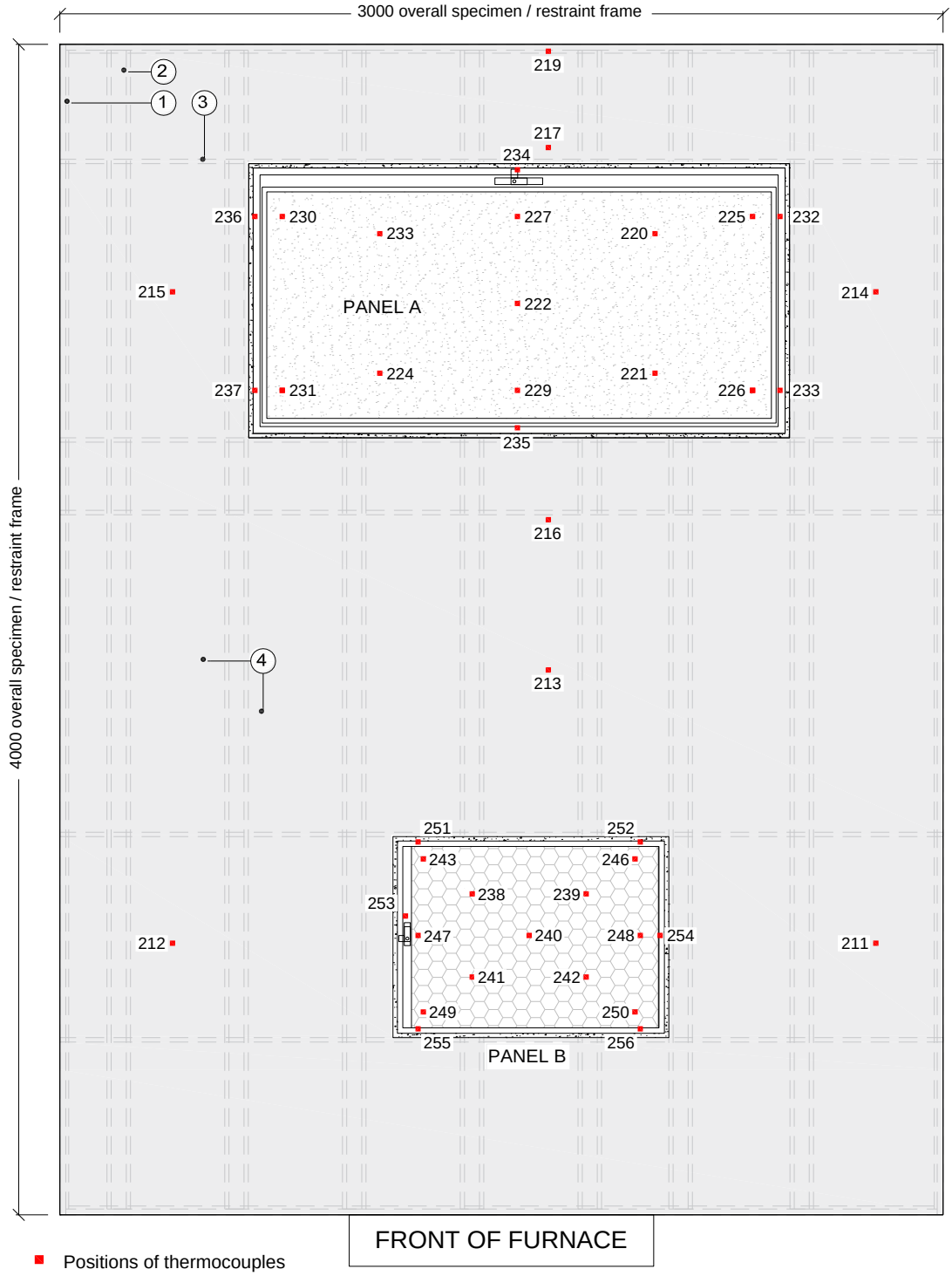
Test Conditions

Standard	BS EN 1364-2: 2018 Fire resistance tests for non-loadbearing elements - Part 2: Ceilings.
Sampling	**Warringtonfire** was not involved in the sampling or selection of the tested specimen or any of the components. The results obtained during the test only apply to the test samples as received and tested by **Warringtonfire.**
Installation	The specimen was received on the 23 May 2024 and installed into a refractory concrete lined steel restraint frame by representative of the test sponsor on the 23 May 2024.
Conditioning	The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 2 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 16.5^{o}C to 26^{o}C and 45.5% to 66.5% respectively.
Instruction to Test	The test was conducted on the 24 May 2024 at the request of Panel Technologies Limited, the test sponsor. Mr. R. Carter, representative of the test sponsor witnessed the test.
Ambient Temperature	The ambient air temperature in the vicinity of the test construction was 24ºC at the start of the test with a maximum variation of -2ºC during the test.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2020 Clause 5.1 using eight plate thermometers, distributed over a plane 100 mm below the surface of the test construction.
Thermocouples	Thermocouples were provided to monitor the unexposed surface of the specimen. The output of all instrumentation was recorded at no less than one-minute intervals. The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.
Furnace Pressure	After the first five minutes of testing and for the remainder of the test, the furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1363-1: 2020, clause 5.2.1 The calculated pressure differential relative to the laboratory atmosphere 100 mm below the specimen was 20 (± 5) Pa between 5 and 10 minutes and 20 (± 3) Pa thereafter.

Test Construction

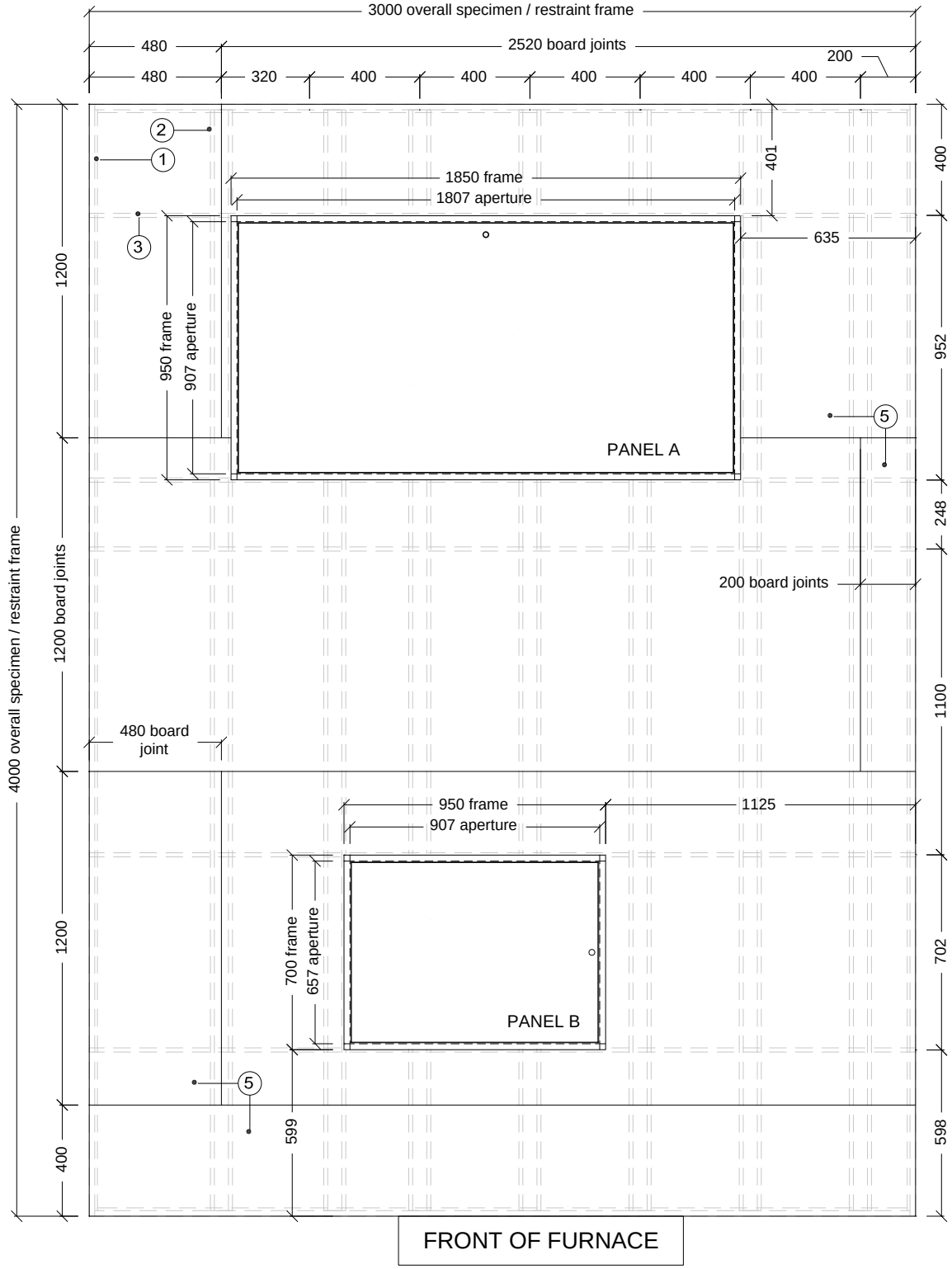
Figure 1. General plan of unexposed face showing thermocouple positions



GENERAL PLAN OF UNEXPOSED FACE SHOWING THERMOCOUPLE POSITIONS

Do not scale. All dimensions are in mm

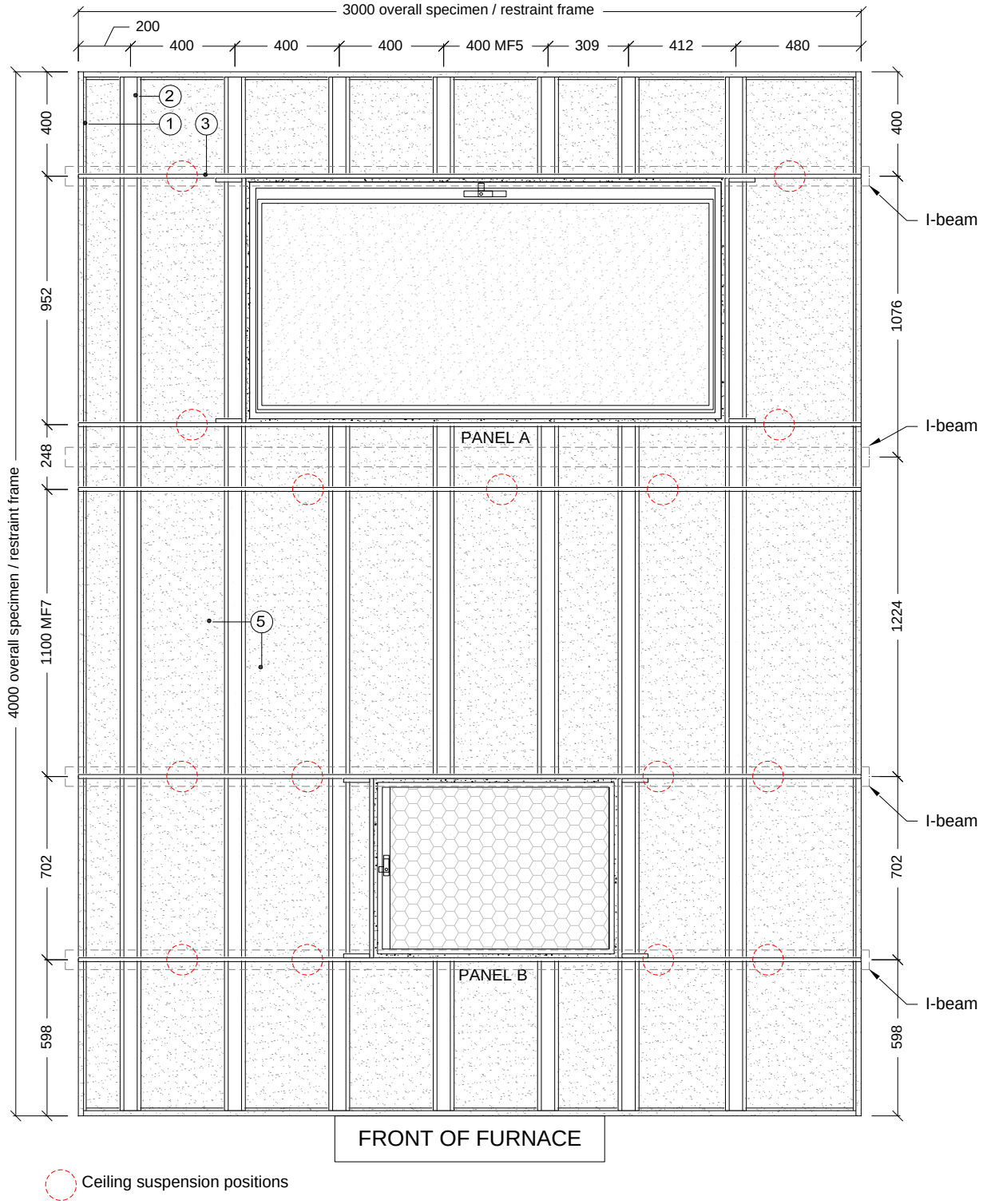
Figure 2. General plan of exposed face



GENERAL PLAN OF EXPOSED FACE

Do not scale. All dimensions are in mm

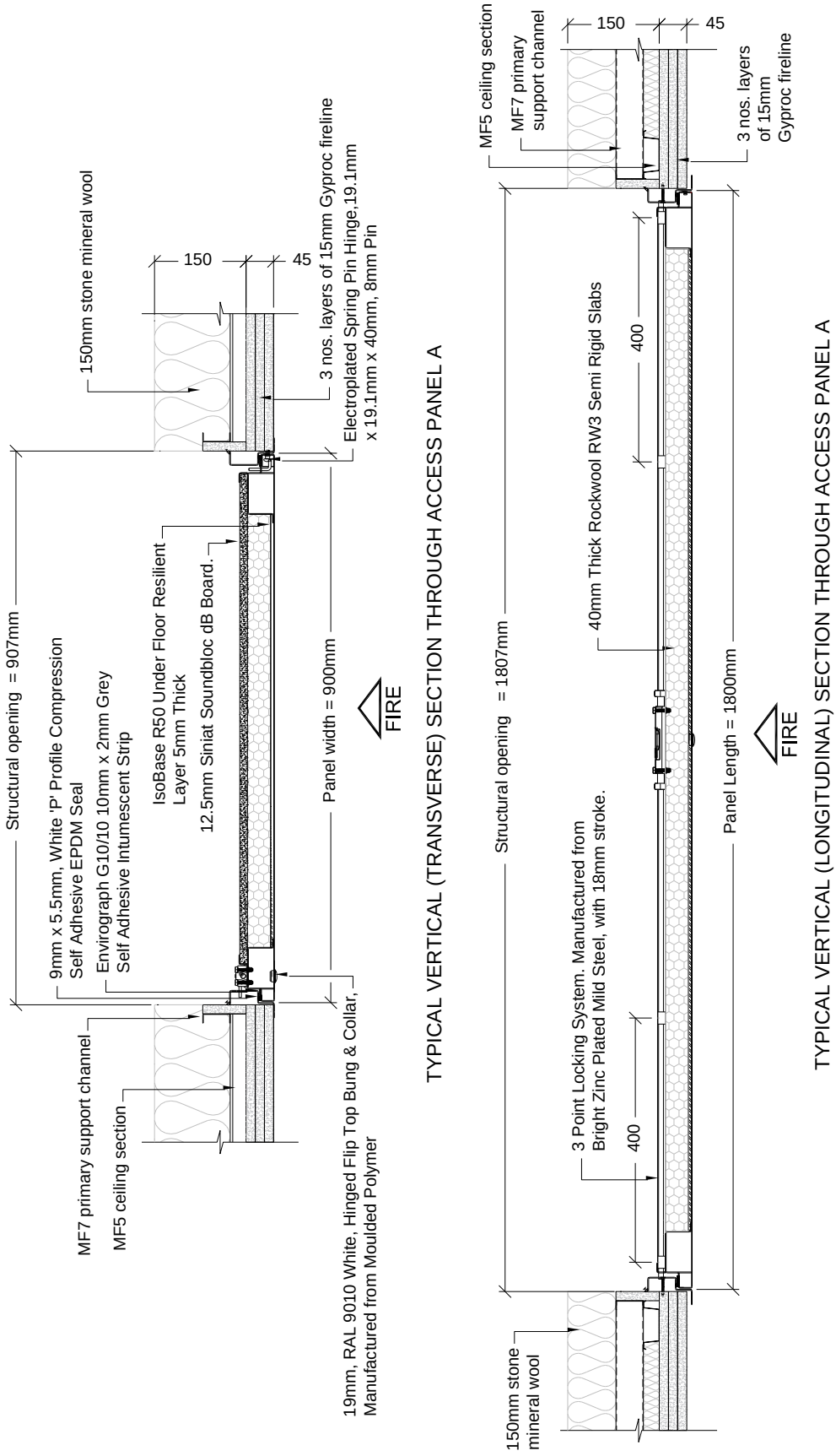
Figure 3. General plan of unexposed face showing the internal framework



GENERAL PLAN OF UNEXPOSED FACE SHOWING THE INTERNAL FRAMEWORK

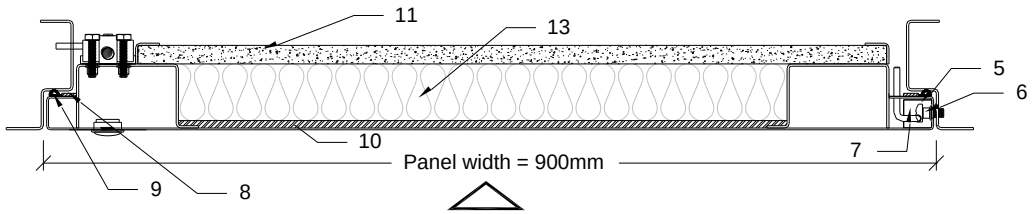
Do not scale. All dimensions are in mm

Figure 4. Typical vertical sections through access panel A

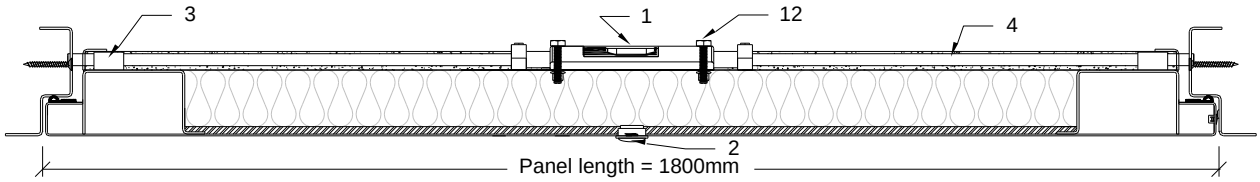


Do not scale. All dimensions are in mm

Figure 5. Details of access panel A

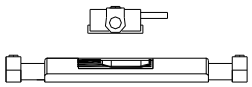


TYPICAL VERTICAL (TRANSVERSE) SECTION THROUGH ACCESS PANEL A



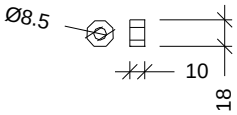
TYPICAL VERTICAL (LONGITUDINAL) SECTION THROUGH ACCESS PANEL A

1) 3 Point Locking System. Manufactured from Bright Zinc Plated Mild Steel, with 18mm stroke.

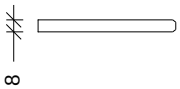


2) 19mm, RAL 9010 White, Hinged Flip Top Bung & Collar, Manufactured from Moulded Polymer

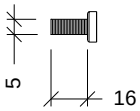
3) Round Guide Block 18mm x 10mm with a 8.5mm Ø Diameter Hole



4) 8mm Ø - 304 grade bright drawn round bar to BS EN 1.4301

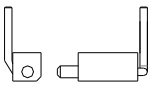


5) M5 x 16mm Bright Zinc Plated (BZP) Pan Pozi Head Cross Recess Machine Screw



6) M5 Bright Zinc Plated (BZP) Round Flat Head Serrated Open End Rivet Nuts

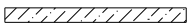
7) Electroplated 51/RF Left & Right Hand Fast Fit Hinge, 19.1mm x 19.1mm x 40mm, 8mm Pin



8) Envirograf G10/10 10mm x 2mm x 10 metre, Grey Self Adhesive Intumescent Strip

9) 9mm x 5.5mm, White 'P' Profile Compression Self Adhesive EPDM Seal

10) IsoBase R50 Under Floor Resilient Layer, 15 Metres x 1 Metres x 5mm thick



11) 12.5mm Siniat dB Board

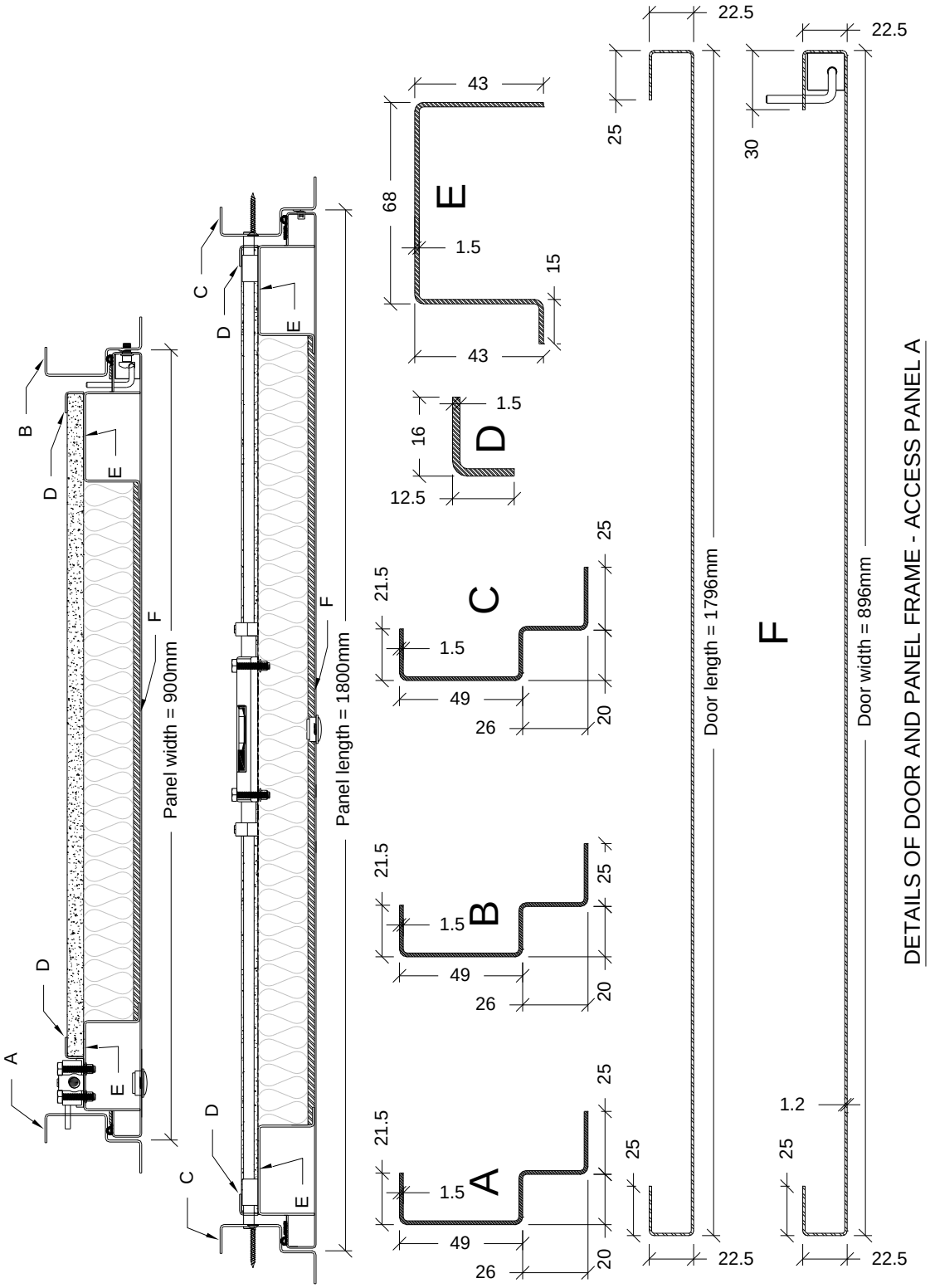
12) M5 x 25mm Bright Zinc Plated (BZP) 8.8 High Tensile Steel Hexagon Head Bolts (DIN 931)

13) 40mm Thick Rockwool RW3 Semi Rigid Slabs

DETAILS OF ACCESS PANEL A

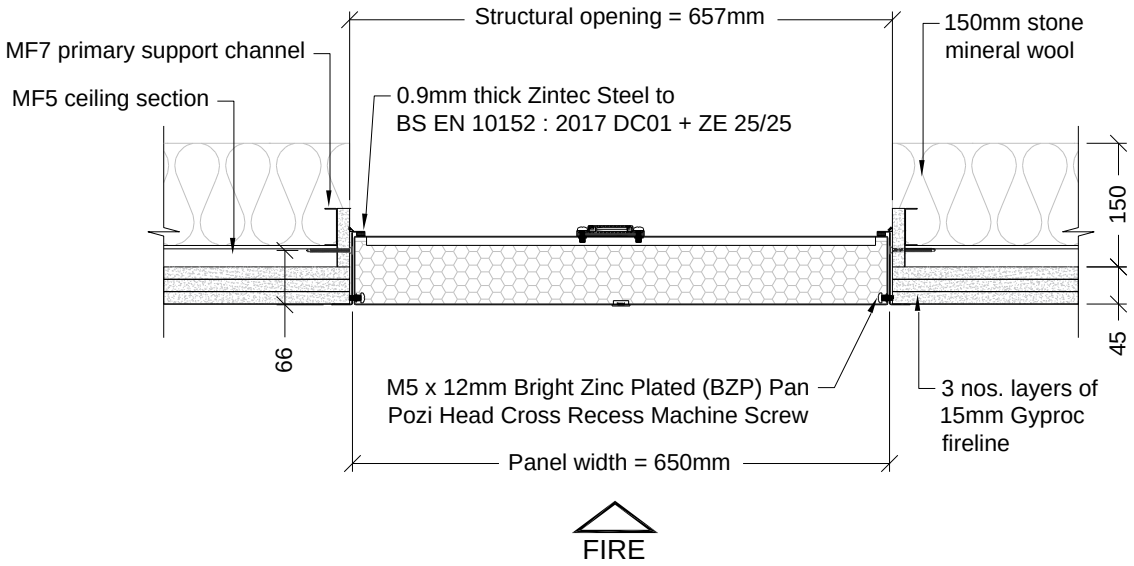
Do not scale. All dimensions are in mm

Figure 6. Details of door and panel frame – access panel A

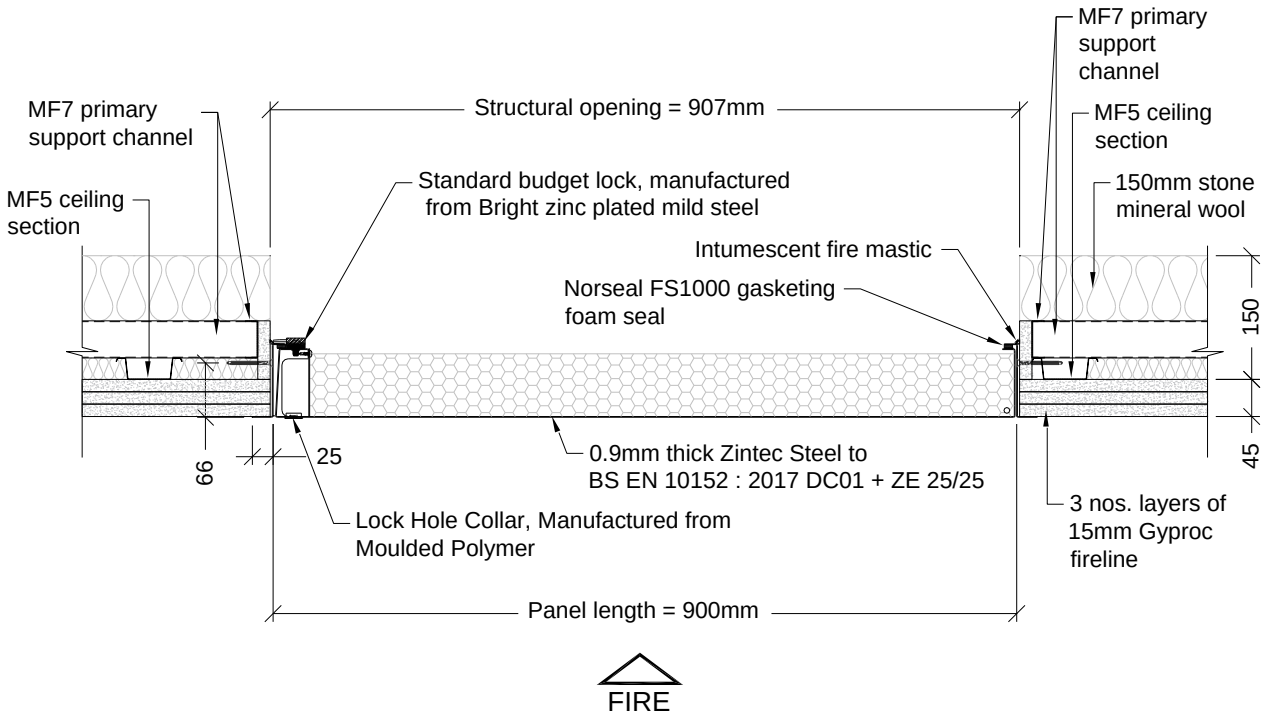


Do not scale. All dimensions are in mm

Figure 7. Typical vertical section through access panel B



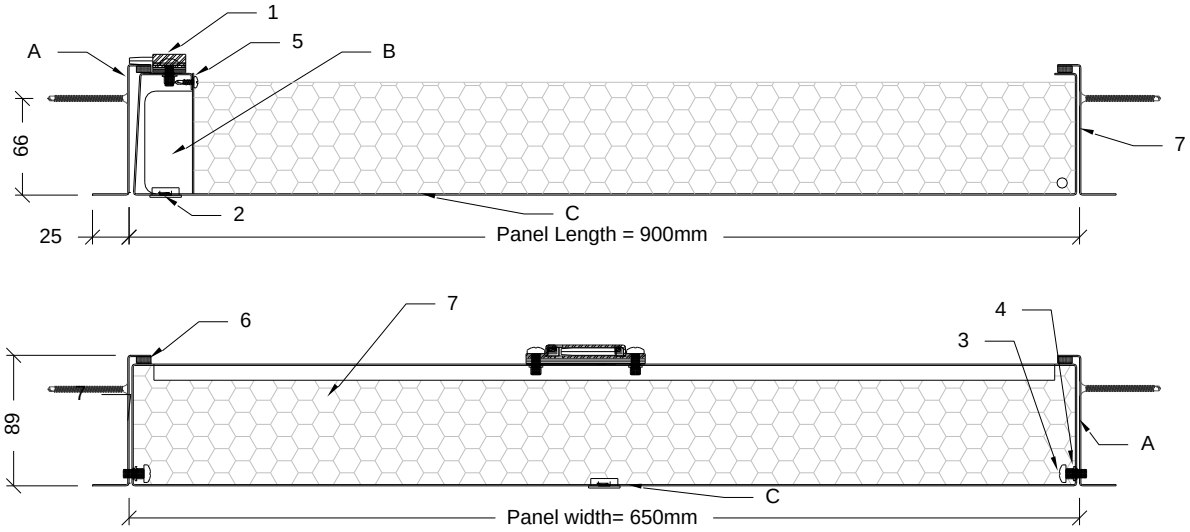
TYPICAL VERTICAL (LONGITUDINAL) SECTION THROUGH ACCESS PANEL B



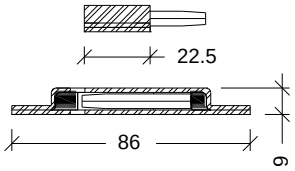
TYPICAL VERTICAL (TRANSVERSE) SECTION THROUGH ACCESS PANEL B

Do not scale. All dimensions are in mm

Figure 8. Details of access panel B

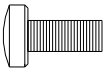


1) Standard budget lock, with fixing holes, manufactured from Bright zinc plated mild steel.



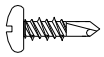
2) 19mm, RAL 9010 White, 750625 Shorty Bushing Manufactured from Nylon 66

3) M5 x 16mm Bright Zinc Plated (BZP) Pan Pozi Head Cross Recess Machine Screw

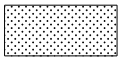


4) M5 Bright Zinc Plated (BZP) Round Flat Head Serrated Open End Rivet Nuts

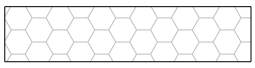
5) 3.9 x 13mm Bright Zinc Plated (BZP) Pan Pozi Head Cross Recess Machine Self Drilling Tek Screw

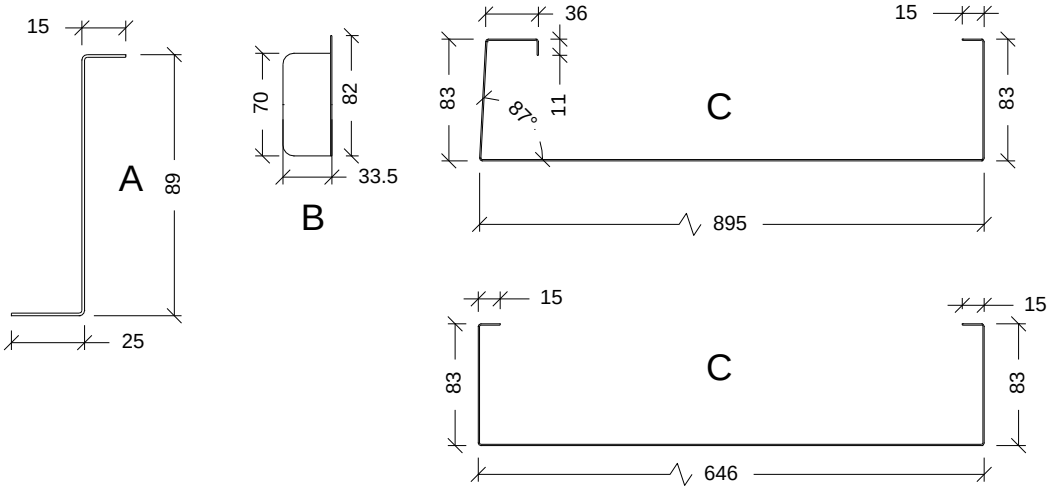


6) Intumescent Foam Tape 10mm x 4.5mm x 20M : Norseal FS1000.



7) 40mm Thick Rockwool RW3 Semi Rigid Slabs

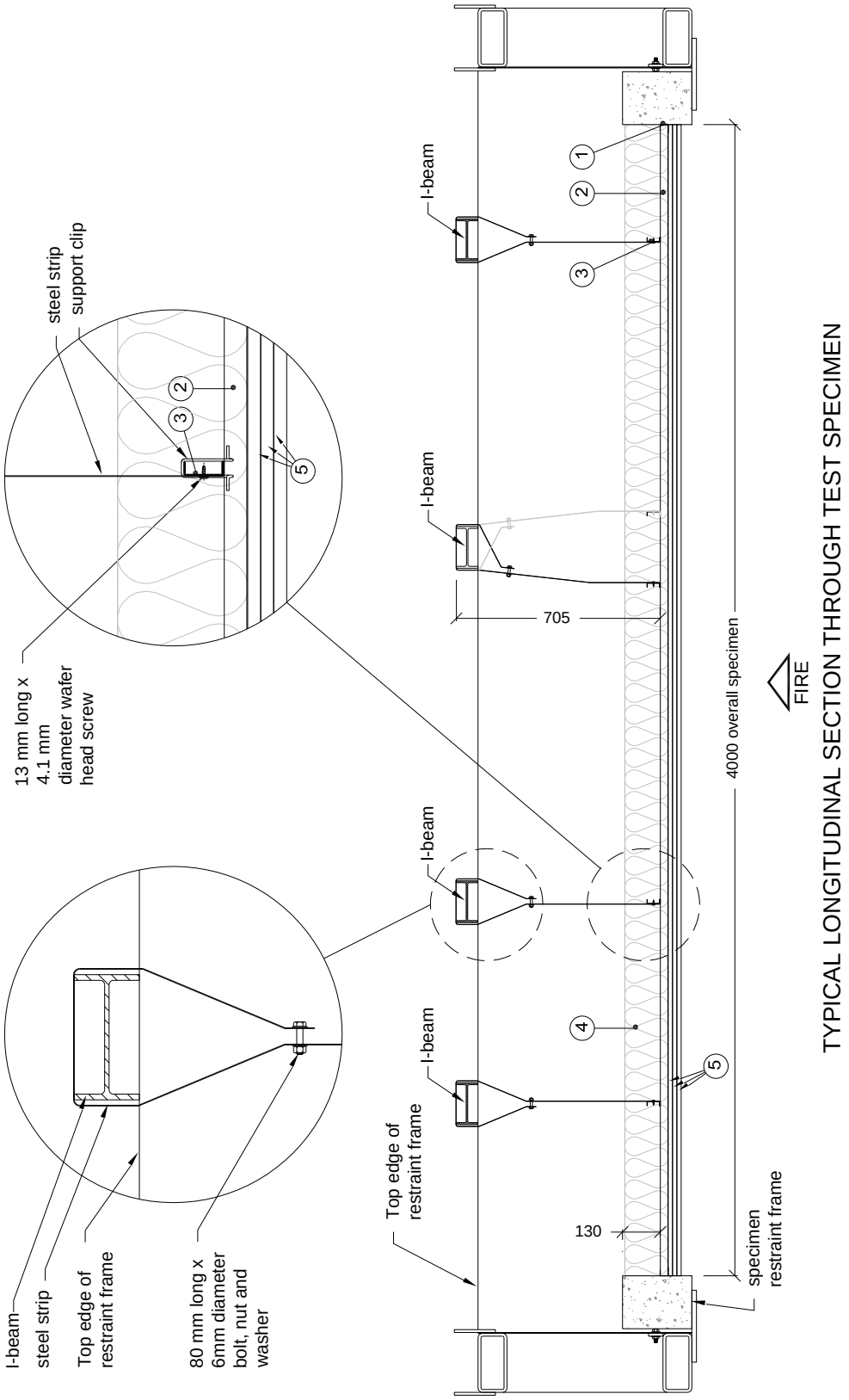




DETAILS OF DOOR AND ACCESS PANEL B

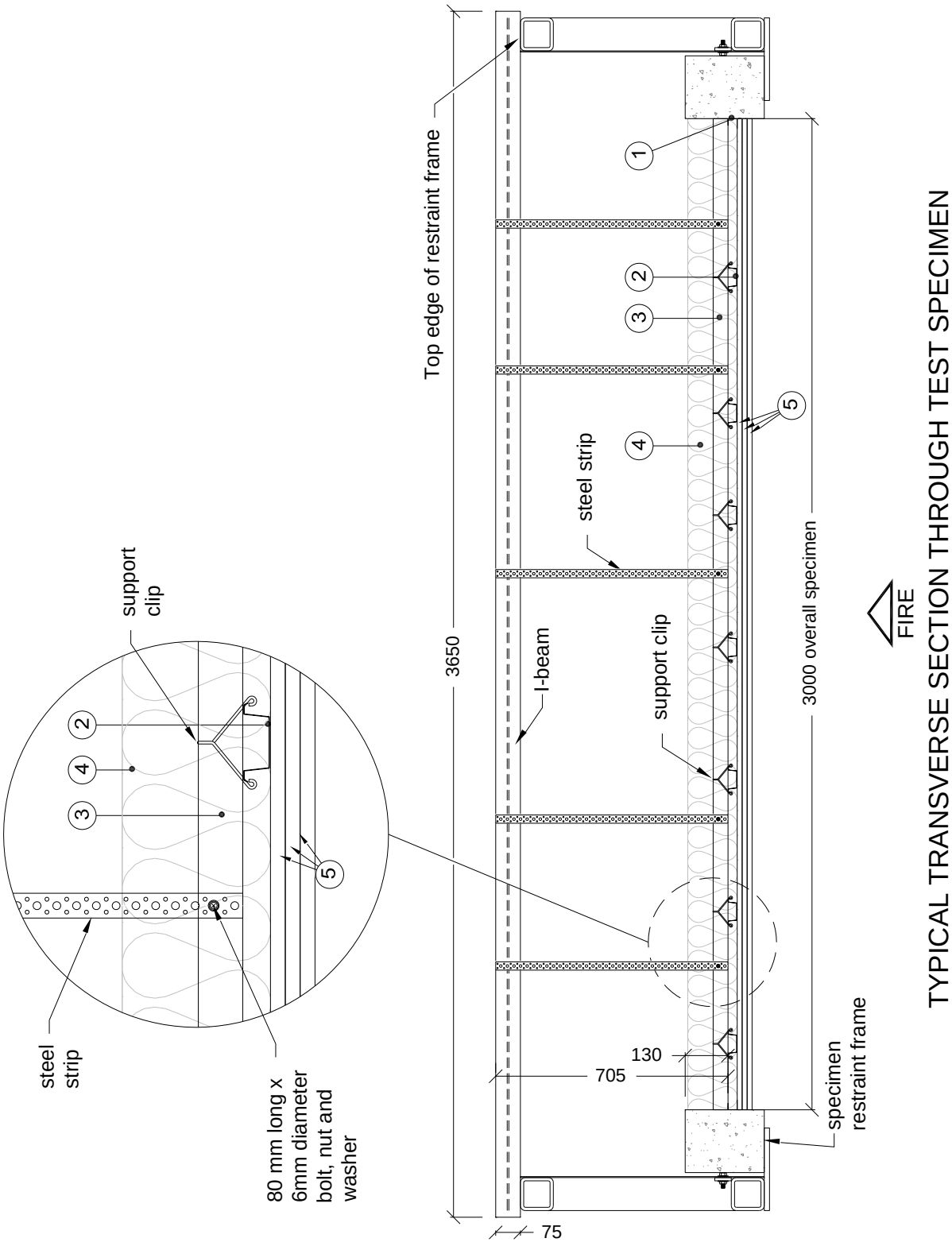
Do not scale. All dimensions are in mm

Figure 9. Typical longitudinal section through test specimen



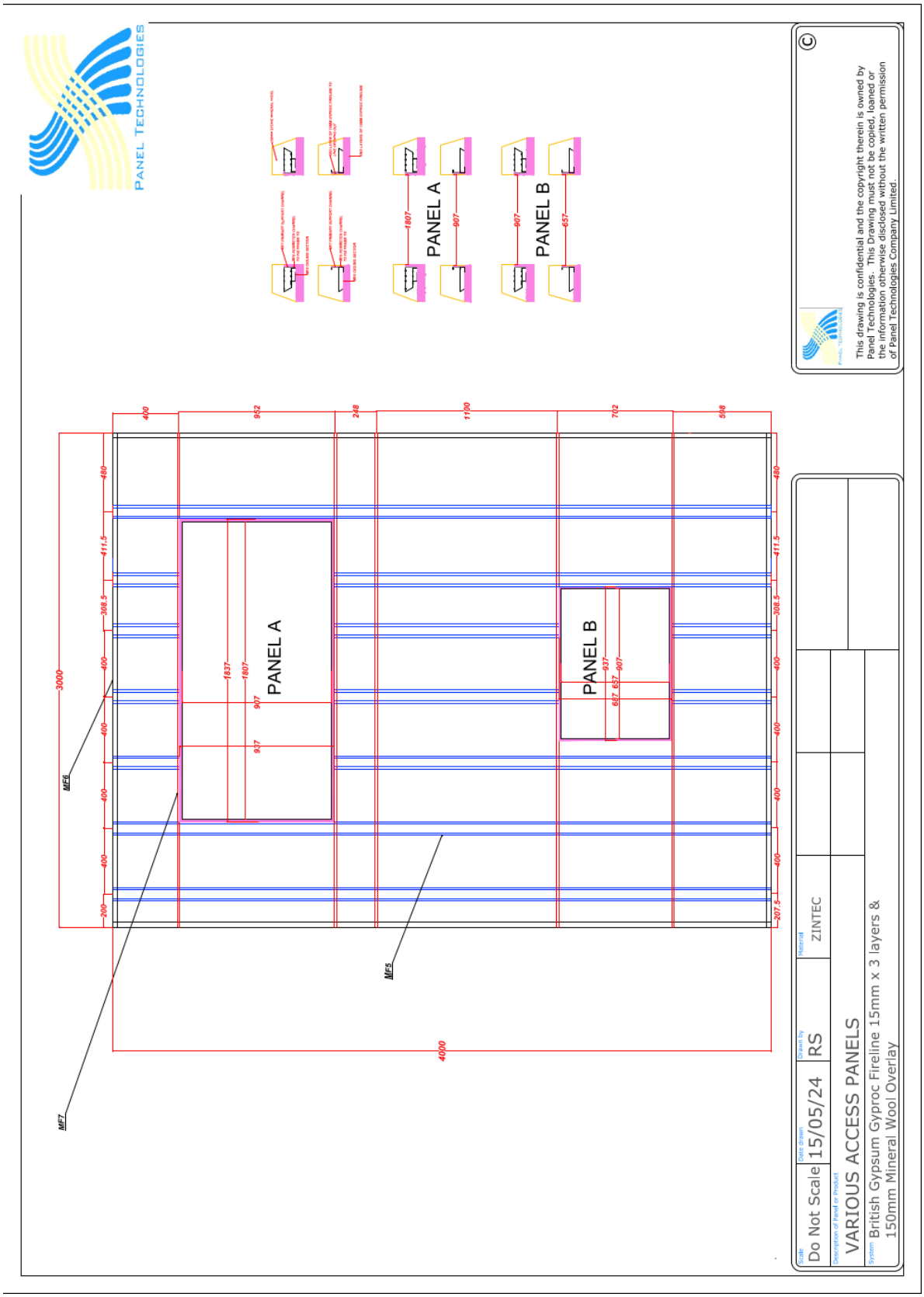
Do not scale. All dimensions are in mm

Figure 10. Typical transverse section through test specimen



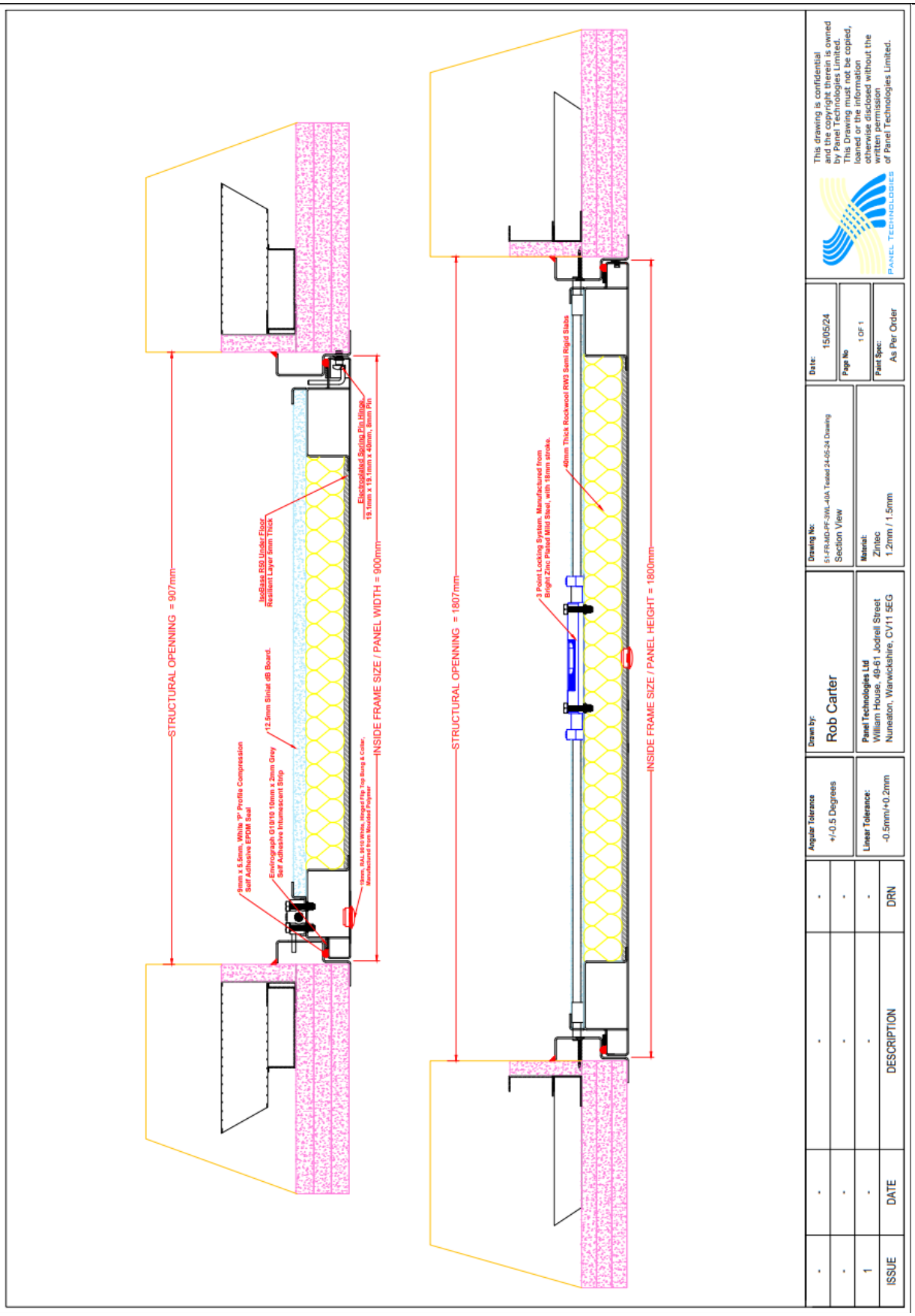
Do not scale. All dimensions are in mm

Figure 11. Client's drawing: Support Frame Layout and Opening Sections



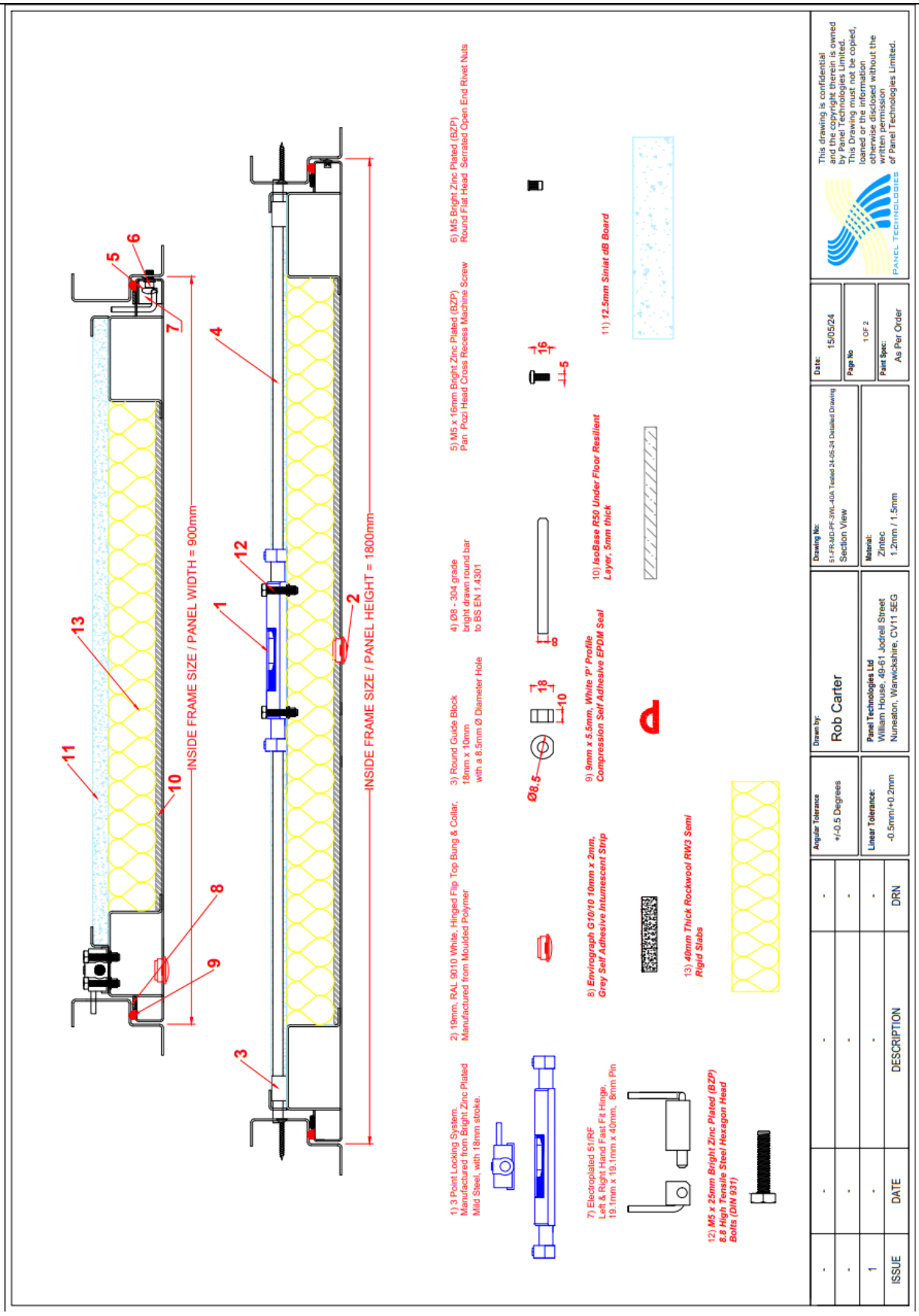
Do not scale. All dimensions are in mm

Figure 12. Client's drawing: 51-FR-MD-PF-3WL-40A 1800x900mm (Panel A) Sections



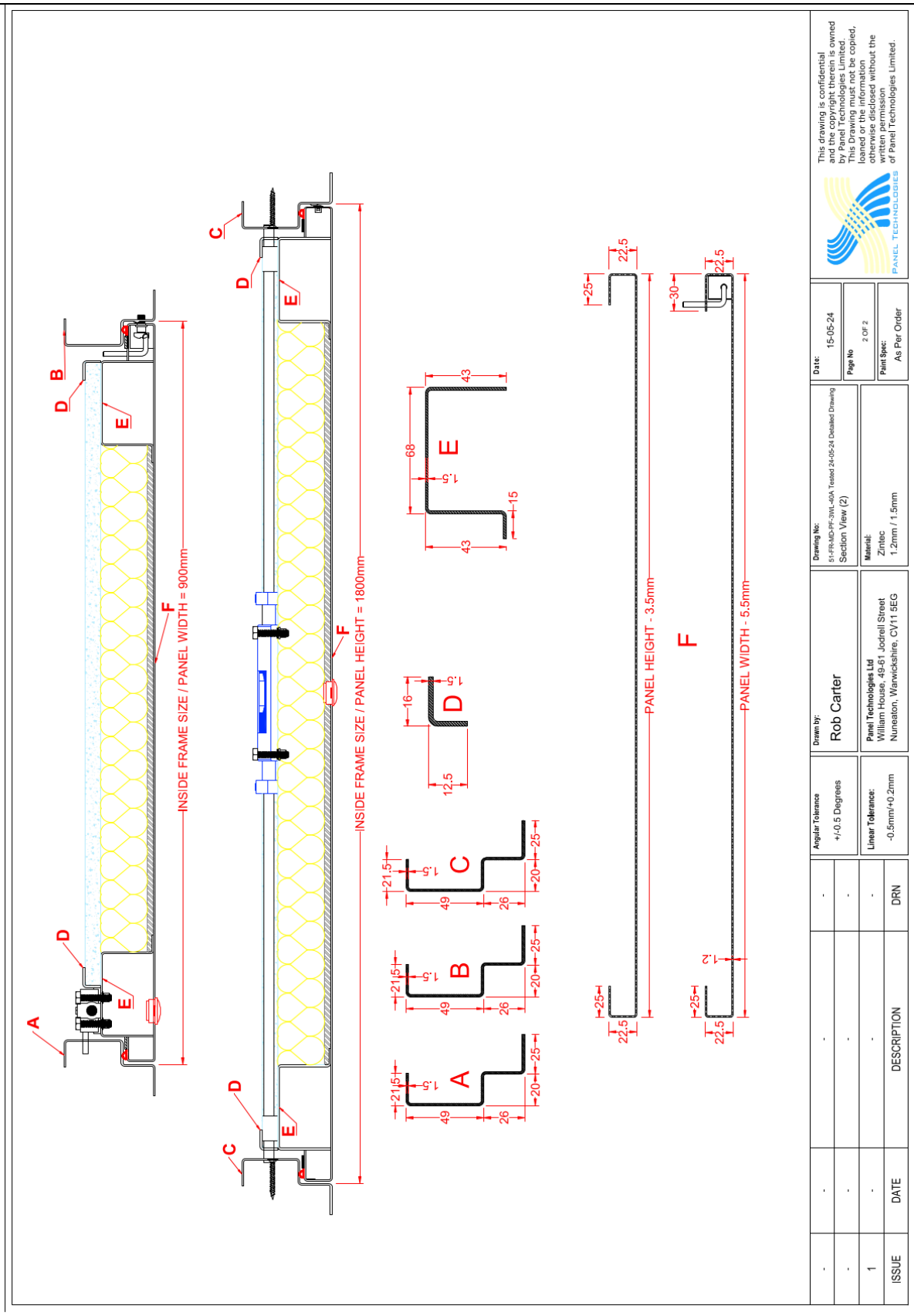
Do not scale. All dimensions are in mm

Figure 13. Client's drawing: 51-FR-MD-PF-3WL-40A 1800x900mm (Panel A) Detailed Parts



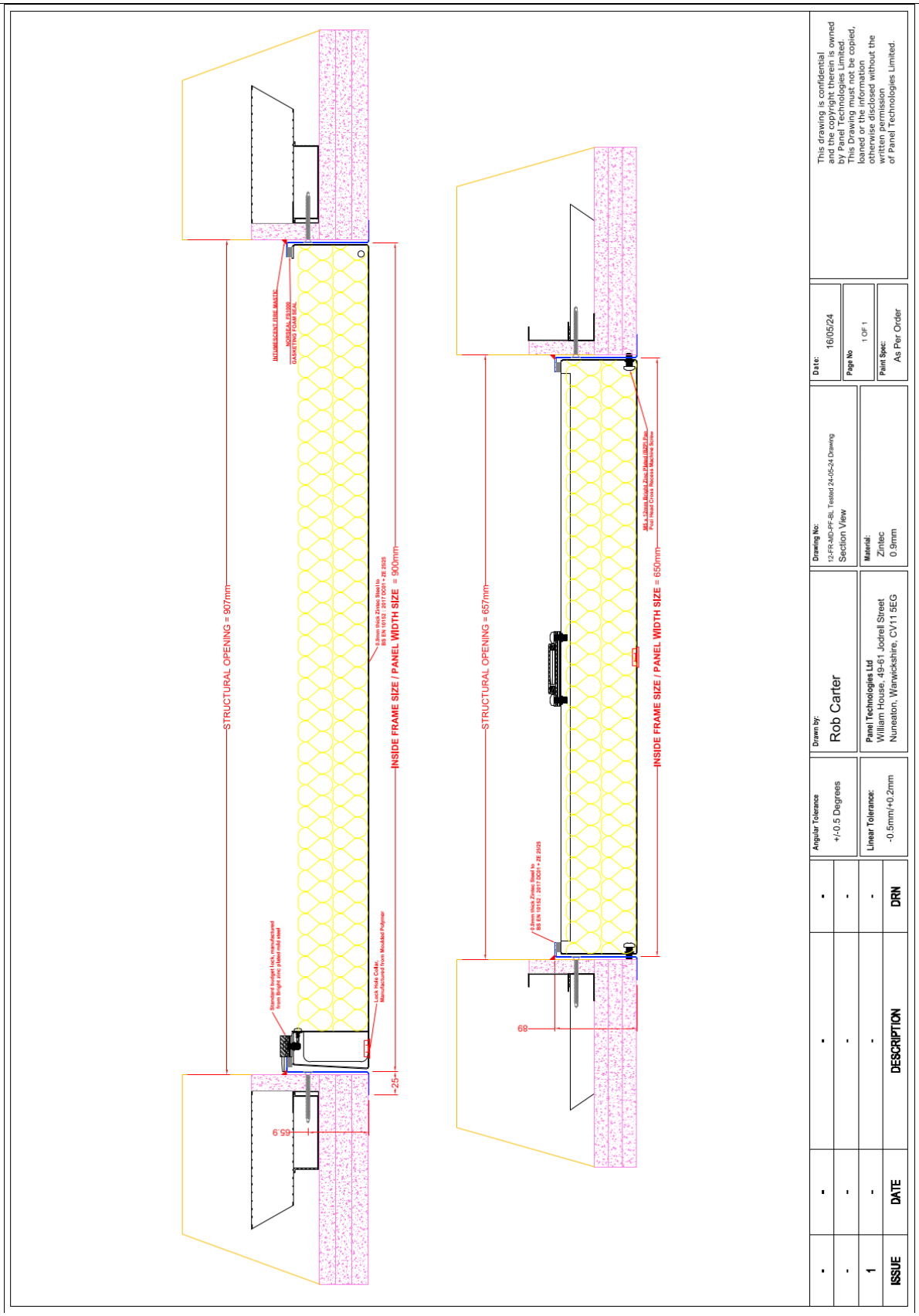
Do not scale. All dimensions are in mm

Figure 14. Client's drawing: 51-FR-MD-PF-3WL-40A 1800x900mm (Panel A) Detailed Parts



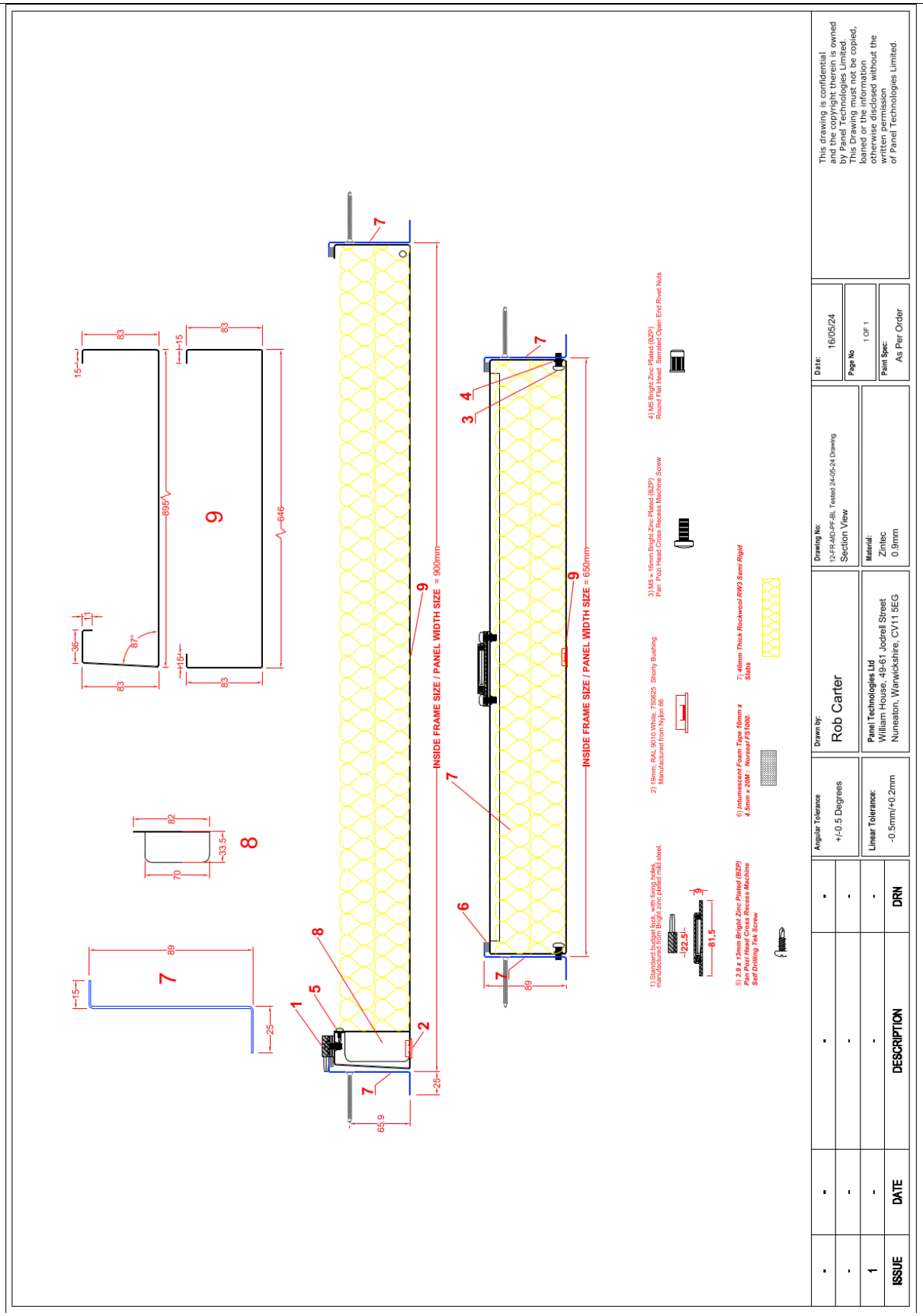
Do not scale. All dimensions are in mm

Figure 15. Client's drawing: 12-FR-MD-PF-BL 900x650mm (Panel B) Sections



Do not scale. All dimensions are in mm

Figure 16. Client's drawing: 12-FR-MD-PF-BL 900x650mm (Panel B) Detailed Parts



Do not scale. All dimensions are in mm

Schedule of Components

The schedule of components 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.

Figures 11~16 were supplied by the test sponsor

Item		Description
Suspended ceiling (comprising items 1 – 4)		
1. Perimeter channel		
Manufacturer	:	British Gypsum
Reference	:	Gypframe MF6 Perimeter Channel Section
Material	:	Galvanised steel
Thickness	:	0.5 mm
Overall size	:	20 / 30 mm wide x 28 mm deep
Fixing method	:	Through fixed to restraint frame with nail-in anchors
Fixings		
i. type	:	Zinc-coated nail-in concrete ceiling anchors
ii. size	:	47 mm long x 6 mm diameter
iii. centres	:	450 mm
2. Ceiling section		
Manufacturer	:	British Gypsum
Reference	:	Gypframe MF5 Ceiling Section
Material	:	Galvanised steel
Thickness	:	0.5 mm
Overall size	:	80 mm wide x 26 mm deep
Fixing method	:	Through fixed to perimeter channel with 2no.screws per joint
Fixings		
i. type	:	Zinc-coated wafer head screws
ii. size	:	13 mm long x 4.1 mm diameter
3. Support channel		
Manufacturer	:	British Gypsum
Reference	:	Gypframe MF7 Primary Support Channel
Material	:	Galvanised steel
Thickness	:	0.9 mm
Overall size	:	15 mm wide x 45 mm deep
Fixing method	:	Through fixed to perimeter channel with 1no. screw per joint. Connected to ceiling sections with 1no. furring connector clip per joint
Fixings		
i. type	:	Zinc-coated wafer head screws
ii. size	:	13 mm long x 4.1 mm diameter
Details of connecting clip		
i. manufacturer	:	Hough
ii. reference	:	AH199 Furring Channel Clip

Item		Description
4. Insulation		
Manufacturer	:	Rockwool
Reference	:	Roll
Material	:	Stone mineral wool
Thickness	:	150 mm (uncompressed)
Density	:	22 kg/m³ (stated), 28 kg/m³ (measured)
Fixing method	:	Laid on top of the ceiling boards and framework to the unexposed face
5. Ceiling boards		
Manufacturer	:	British Gypsum
Reference	:	Gyproc FireLine
Material	:	Glass-reinforced gypsum board with paper liners
Thickness	:	45 mm (3 layers of 15 mm)
Density	:	776 kg/m³ (stated), 821 kg/m³ (measured),
Fixing method	:	Through fixed to the internal framework with screws. Board joints were staggered with respect to the adjacent layer. Joint and edges were sealed at the outer layer. Joints and screw heads were taped and filled at the outer layer. Additionally, aperture A and B were lined with one layer of board, fixed with an additional layer of screws, that were the same fixings as those for the outer layer of board. The screws were fixed at 250 mm centres (nominal).
Fixings (inner layer)		
i. type	:	Black phosphate-coated steel self-tapping screws
ii. size	:	25 mm long x 3.5 mm diameter
iii. centres	:	150 mm (edge), 150 mm (field)
Fixings (middle layer)		
i. type	:	Black phosphate-coated steel self-tapping screws
ii. size	:	45 mm long x 3.5 mm diameter
iii. centres	:	150 mm (edge), 150 mm (field)
Fixings (outer layer)		
i. type	:	Black phosphate-coated steel self-tapping screws
ii. size	:	60 mm long x 3.5 mm diameter
iii. centres	:	150 mm (edge), 150 mm (field)
Joint and edge sealant		
i. manufacturer	:	Hilti
ii. reference	:	Firestop Acrylic sealant CFS-S ACR
Tape		
i. manufacturer	:	Gyproc
ii. reference	:	Joint Tape
Filler		
i. manufacturer	:	British Gypsum
ii. reference	:	Gyproc ProMix Lite ready mixed jointing compound

Item		Description
6. Access panel A		
Details of aperture	:	1807 mm long x 907 mm wide
Details of access panel		
Manufacturer	:	Panel Technologies
Reference	:	51-FR-MD-PF-3WL-40A 1800X900MM
Material		
i. frame	:	Zintec steel
ii. door	:	Zintec steel
Overall size		
i. frame	:	1850 mm long x 950 mm wide x 77 mm deep (measured)
ii. door	:	1796 mm long x 896 mm wide x 60 mm deep (measured)
Thickness		
i. frame	:	1.5 mm
ii. door	:	1.2 mm
Fixing method	:	Frame through fixed to the lined board with screws
Fixings (frame to aperture)		
i. type	:	Zinc-coated self-drilling screws
ii. size	:	75 mm long x 4.2 mm diameter
iii. centres	:	215 ~ 320mm centres (on shorter side) and 340mm centres (on longer side)
Details of soundproofing layer		
Manufacturer	:	Custom Audio Designs
Reference	:	A325 ISOBASE R50 Under Floor Resilient Layer
Material	:	Polyolefin foam sheet
Thickness	:	5mm
Density	:	34 kg/m^3
Fixing method	:	Cut to size and laid inside the panel frame behind the door
Details of insulation		
Manufacturer	:	Rockwool
Reference	:	RW3 Semi Rigid Slabs
Material	:	Stone mineral wool
Thickness	:	40 mm (uncompressed)
Density	:	60 kg/m^3 (stated)
Fixing method	:	Friction fitted inside the panel frame on top of soundproofing layer
Details of plasterboard insert		
Manufacturer	:	Siniat
Reference	:	dB Board
Material	:	Aerated Calcium sulphate di-hydrate with fillers and enclosed inside liners made from recycled waste paper with bound edges. Core and papers are bonded with starch. Edge glue is PVA.
Thickness	:	12.5mm
Density	:	880 kg/m^3 (stated)
Fixing method	:	Laid inside the panel door and retained by the panel profile at each edge. Fixed in position through the panel profile with screws.
Fixings		
i. type	:	Zinc-coated steel screws
ii. size	:	75 mm long x 4.2 mm diameter
iii. centres	:	250mm centres (on shorter side) and 280mm centres (on longer side)

Item		**Description**
Detail of seal		
Manufacturer	:	C.R.A. International
Reference	:	P Strip
Type	:	White “P” Profile compression self-adhesive EPDM seal
Material	:	Ethylene propylene diene M-class rubber
Overall size	:	9 wide mm x 5.5 mm deep
Fixing method	:	Self-adhered to the edge of the door panel
Detail of Intumescent strip		
Manufacturer	:	Envirograph
Reference	:	G10/10
Type	:	Grey Self Adhesive Intumescent Strip
Overall size	:	10 mm wide x 2 mm deep
Fixing method	:	Self-adhered to the edge of the door panel
Details of hinge		
i. type	:	Electroplated 51/RF Left & Right Hand Fast Fit Hinge
ii. overall size	:	19.1 mm x 19.1 mm x 40 mm, 8mm pin
iii. fixing method	:	Screw type (pin hinged at both ends)
Details of lock		
i. type	:	3 Point Locking System (bright zinc plated mild steel, with 18 mm stroke)
ii. overall size	:	110 mm long x 33 mm wide x 17 mm deep x 8 mm diameter bar
iii. fixing method	:	Bolted to door with M5 x 25 mm BZP Hexagon Head Bolts. When engaged, the central catch overlapped the frame profile by 5 mm. The round bar overlapped the frame profile by 10 mm at each end
Details of lock insert		
i. type	:	19 mm, RAL 9010 White, hinged flip top bung & collar, manufactured from moulded polymer
ii. overall size	:	21.5 mm diameter x 11 mm deep
iii. fixing method	:	Push fit
Details of sealant		
i. type	:	Rockwool Firepro Acoustic Intumescent Sealant
ii. application method	:	Cartridge gunned around the perimeter of the mating faces of the frame between the frame and the ceiling boards. A further bead was applied between the outer edge of the frame and the ceiling boards around its perimeter on the exposed face.

Item		Description
7. Access panel B		
Details of aperture	:	907 mm long x 657 mm wide
Details of access panel		
Manufacturer	:	Panel Technologies
Reference	:	12-FR-MD-PF-BL 900X650MM
Material		
i. frame	:	Zintec steel
ii. door	:	Zintec steel
Overall size		
i. frame	:	950 mm long x 700 mm wide x 89 mm deep
ii. door	:	895 mm long x 646 mm wide x 83 mm deep (stated), 895 mm long x 646 mm wide (measured)
Thickness		
i. frame	:	0.9 mm
ii. door	:	0.9 mm
Fixing method	:	Frame through fixed to the lined board with screws
Fixings (frame to aperture)		
i. type	:	Zinc-coated self-drilling screws
ii. size	:	50 mm long x 3.5 mm diameter
iii. centres	:	215 ~ 320mm centres (on shorter side) and 340mm centres (on longer side)
Details of insulation		
Manufacturer	:	Rockwool
Reference	:	RW3 Semi Rigid Slabs
Material	:	Stone mineral wool
Thickness	:	40 mm (uncompressed)
Density	:	60 kg/m^3 (stated)
Fixing method	:	Laid inside the door frame
Detail of Intumescent strip		
Manufacturer	:	Norseal
Reference	:	FS1000
Type	:	Intumescent Foam Tape
Overall size	:	10 mm wide x 4.5 mm deep
Fixing method	:	Self-adhered to the edge of the frame
Details of hinge		
i. type	:	M5 x 16mm Bright Zinc Plated (BZP)
ii. overall size	:	Pozi Head Cross Recess Machine Screw
iii. fixing method	:	Screw type (pin hinged at both ends)
Details of lock		
i. type	:	Bright zinc plated mild steel budget lock
ii. overall size	:	85 mm long x 22.5 mm wide x 9 mm deep
iii. fixing method	:	Through fixed to door with 2no. M5 x 8 mm bright zinc plated (BZP) pozi head cross recess Tritap screws. When engaged, the catch overlapped the frame profile by 5mm
Details of lock insert		
i. type	:	19 mm, RAL 9010 White collar, manufactured from Nylon 66
ii. overall size	:	21.5 mm diameter x 6.5 mm deep
iii. fixing method	:	Push fits
Details of sealant		
i. type	:	Rockwool Firepro Acoustic Intumescent Sealant

Item		Description
ii. application method	:	Cartridge gunned around the perimeter of the mating faces of the frame between the frame and the ceiling boards. A further bead was applied between the outer edge of the frame and the ceiling boards around its perimeter on the exposed face.
Additional installation notes		
i. ceiling supports	:	Five MF7 Primary Support Channels closest to the furnace door were each suspended from four mild steel I-beams with steel straps. The I-beams were 3650mm long and resting at the top of the testing steel frame. The I-beams section measured 75 mm wide x 145 mm deep (5.1 mm web x 6.5 mm flanges). The perforated steel strap measured 21 mm wide x 1.12 mm thick. It was fixed to the MF7 channels with one 13 mm long x 4.1 mm diameter wafer head screw per joint and wrapped once around the I-beam above and secured with an 80 mm long x 6 mm diameter bolt, nut and washer at each joint. The distance from the base of the MF7 Primary Support Channel to the top of the I-beam, i.e. the strap lengths were 705 mm.

Test Observations

Time		All observations are from the unexposed face unless noted otherwise.
mins	secs	
00	00	**The test commences.**
03	00	Steam/smoke release from both of the access panels on the unexposed side of the specimen.
04	00	Discolouration starting to appear on all 4 corners of panel A.
10	00	When viewed from the exposed face of the specimen, the paper layer on the plasterboard has started to burn away. The jointing compound is beginning to come away and there are flames flickering around the perimeter edge of panel A.
16	00	When viewed from the exposed side of the specimen, the jointing compound is continuing to detach.
21	00	There is discolouration starting to appear around the frame of panel B.
27	00	When viewed from the exposed face of the specimen, the jointing compound has fully detached in some areas exposing the joint positions and screws.
47	00	**Cotton pad applied the frame of Panel A. Cotton pad integrity failure deemed to have occurred, cotton pad ignited.**
50	00	When viewed from the exposed side of the specimen, the joints in the plasterboard have started to open up to approximately 5 mm.
51	00	Charring and cracking have started to appear on the plasterboard layer on access panel A.
53	00	Glowing visible down the hinge edge of panel A between the door and frame.
71	00	Glowing around the perimeter edge of panel A in between door and frame. The paper layer on the panel is continuing to burn away.
78	00	Both A and B panels seem to be bowing from the centre.
85	00	When viewed from the exposed face of the specimen, some of the sections of plasterboard appear to be bowing.
87	00	Increased steam/smoke release through the joints in the insulation on the unexposed face.
93	00	When viewed from the exposed side of the specimen, the long edge of the hinge side of panel A seems to have dropped into the furnace slightly.
96	00	The MF7 and plasterboard is slightly bowing on the hinge edge of panel A and there is discolouration on the joint positions on the insulation.

100	**00**	There is a gap forming of approximately 2-3mm in between the aperture and frame of panel A.
104	**00**	Additional information only. Cotton pad was applied to the frame of panel B. Cotton pad failed to ignite.
108	**00**	When viewed from the exposed face of the specimen, there is partial detachment of the plasterboard.
110	**00**	The aperture lining on panel A has split.
111	**00**	Increased Steam/smoke release from the joint positions on the insulation on the unexposed face of the specimen.
113	**00**	There appears to be a flicker of flame along the bottom corner of the hinged edge on panel A.
114	**00**	The aperture and lining is now also bowing on panel B.
116	**00**	The aperture on the leading edge of panel A is starting to split.
117	**00**	When viewed from the exposed face of the specimen, various sections of plasterboard are starting to detach.
118	**00**	Glowing has started in the insulation adjacent to panel B in the ceiling.
120	**00**	**Test discontinued at request of the test sponsor.**

Test Photographs

The exposed face of the specimen prior to testing

The unexposed face of the specimen prior to testing

The unexposed face of the specimen after a test duration of 30 minutes

The unexposed face of the specimen after a test duration of 60 minutes

The unexposed face of the specimen after a test duration of 120 minutes

The exposed face of the specimen shortly after the test

Temperature and Deflection Data

Mean Furnace Temperature, Together with The Temperature/Time Relationship Specified In The Standard BS EN 1363-1: 2020

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	37
4	544	559
8	646	642
12	706	697
16	748	747
20	781	777
24	809	802
28	832	824
32	852	845
36	869	863
40	885	886
44	899	904
48	912	913
52	924	924
56	935	934
60	945	946
64	955	956
68	964	966
72	973	972
76	981	978
80	988	985
84	996	991
88	1003	998
92	1009	1008
96	1016	1016
100	1022	1023
104	1028	1029
108	1033	1035
112	1039	1039
116	1044	1042
120	1049	1047
121	1050	1082

Individual Temperatures and Mean Recorded On The Unexposed Surface Of The Ceiling Insulation

Time Mins	T/C Number 211 Deg. C	T/C Number 212 Deg. C	T/C Number 213 Deg. C	T/C Number 214 Deg. C	T/C Number 215 Deg. C	Mean Temp Deg. C
0	28	29	28	28	27	28
4	28	29	28	29	27	28
8	28	29	28	29	27	28
12	29	29	28	30	28	29
16	30	29	29	34	29	30
20	32	31	30	41	30	33
24	36	35	33	48	36	38
28	44	41	39	52	43	44
32	54	49	50	56	49	52
36	61	56	60	61	54	58
40	65	60	65	65	56	62
44	67	61	67	65	56	63
48	67	61	66	65	55	63
52	67	60	66	64	56	63
56	67	60	66	63	56	62
60	66	59	65	62	56	62
64	67	60	65	62	57	62
68	70	63	68	63	60	65
72	72	66	69	64	63	67
76	74	70	72	66	64	69
80	76	73	72	70	67	72
84	78	76	73	72	69	74
88	79	78	72	75	71	75
92	80	79	71	77	72	76
96	82	79	69	77	73	76
100	81	79	67	76	73	75
104	82	79	64	76	73	75
108	79	76	60	75	70	72
112	76	73	57	74	69	70
116	70	67	52	72	66	65
120	63	65	57	70	62	63
121	63	68	59	70	63	65

Individual Temperatures and Mean Recorded On The Unexposed Surface Of Panel A

Time Mins	T/C Number 220 Deg. C	T/C Number 221 Deg. C	T/C Number 222 Deg. C	T/C Number 223 Deg. C	T/C Number 224 Deg. C	Mean Temp Deg. C
0	27	28	27	27	28	27
4	27	28	27	27	28	27
8	34	36	32	33	34	34
12	50	57	46	49	50	50
16	69	77	63	68	72	70
20	85	90	80	83	87	85
24	90	95	88	89	92	91
28	95	99	92	92	95	95
32	98	101	96	96	98	98
36	102	107	99	99	101	102
40	105	110	103	103	104	105
44	109	116	105	108	108	109
48	113	121	111	114	114	115
52	119	138	118	121	121	123
56	143	199	132	142	140	151
60	218	273	178	211	205	217
64	289	320	255	270	273	281
68	341	356	313	316	316	328
72	373	383	349	345	344	359
76	378	401	373	359	368	376
80	337	375	338	339	356	349
84	324	360	310	318	326	328
88	321	349	324	314	320	326
92	320	346	325	314	326	326
96	323	347	316	316	328	326
100	325	345	323	320	332	329
104	326	346	325	323	335	331
108	328	348	325	324	336	332
112	331	353	323	327	338	334
116	336	352	324	328	340	336
120	336	352	333	330	342	339
121	339	351	335	333	342	340

Individual Temperatures and Mean Recorded On The Unexposed Surface Of Panel B

Time Mins	T/C Number 238 Deg. C	T/C Number 239 Deg. C	T/C Number 240 Deg. C	T/C Number 241 Deg. C	T/C Number 242 Deg. C	Mean Temp Deg. C
0	27	28	27	29	28	28
4	30	36	30	32	31	32
8	38	40	32	37	34	36
12	50	45	35	39	39	42
16	84	67	46	51	56	61
20	164	137	88	108	109	121
24	190	189	159	174	160	174
28	196	195	158	181	162	178
32	200	195	152	177	159	177
36	205	196	149	174	159	177
40	213	201	150	176	162	180
44	223	209	154	181	168	187
48	238	223	163	191	178	199
52	250	239	175	204	189	211
56	257	248	183	213	197	220
60	261	255	187	218	203	225
64	266	261	194	222	207	230
68	269	268	199	225	211	234
72	272	272	203	227	213	237
76	272	273	204	229	214	238
80	275	277	206	231	217	241
84	279	280	209	234	219	244
88	282	283	212	236	222	247
92	287	287	216	239	224	251
96	291	289	217	242	229	254
100	297	293	222	245	231	258
104	302	298	225	251	236	262
108	306	300	226	253	239	265
112	311	308	231	259	242	270
116	315	313	234	263	248	275
120	319	310	230	269	252	276
121	320	310	231	271	255	277

Individual Temperatures Recorded on The Unexposed Surface Of The Ceiling Insulation

Time Mins	T/C Number 216 Deg. C	T/C Number 217 Deg. C	T/C Number 219 Deg. C
0	27	26	27
4	27	28	27
8	28	27	28
12	30	30	28
16	36	38	28
20	43	46	29
24	50	50	31
28	55	56	34
32	58	61	40
36	62	63	46
40	66	63	50
44	63	63	51
48	63	63	51
52	65	63	51
56	63	62	51
60	63	64	52
64	64	63	53
68	65	65	54
72	66	67	56
76	67	70	59
80	67	69	62
84	68	70	65
88	70	71	66
92	72	71	67
96	74	73	68
100	75	72	68
104	72	84	67
108	67	93	67
112	62	105	65
116	57	125	65
120	60	153	63
121	64	159	64

Individual Temperatures Recorded on The Unexposed Surface Of The Specimen Surface of

Access Panel A 100mm away from the Leaf Edges

Time Mins	T/C Number 225 Deg. C	T/C Number 226 Deg. C	T/C Number 227 Deg. C	T/C Number 229 Deg. C	T/C Number 230 Deg. C	T/C Number 231 Deg. C
0	28	29	28	28	26	29
4	29	30	29	28	25	29
8	36	43	38	38	29	41
12	57	73	63	63	38	75
16	74	85	83	83	47	85
20	86	90	91	91	51	88
24	91	93	96	98	48	91
28	96	98	100	102	52	94
32	100	104	106	109	58	98
36	105	113	112	116	77	105
40	110	119	121	125	72	112
44	118	144	129	144	77	119
48	132	224	170	195	92	136
52	207	289	235	251	106	210
56	286	341	283	289	168	287
60	319	357	319	324	234	328
64	343	360	344	346	197	356
68	368	349	374	376	163	376
72	356	341	375	364	288	366
76	341	372	356	350	345	345
80	335	383	344	336	291	342
84	332	380	338	326	326	339
88	334	375	340	330	208	337
92	345	387	340	329	211	344
96	346	392	343	331	164	346
100	358	289	344	335	215	349
104	363	265	347	342	190	354
108	367	266	348	346	278	355
112	372	262	354	350	328	357
116	373	268	356	353	301	359
120	374	259	355	356	292	359
121	372	263	361	365	198	359

Individual Temperatures Recorded on The Unexposed Surface Of The Frame of Panel A

Time Mins	T/C Number 232 Deg. C	T/C Number 233 Deg. C	T/C Number 234 Deg. C	T/C Number 235 Deg. C	T/C Number 236 Deg. C	T/C Number 237 Deg. C
0	32	33	31	32	30	32
4	80	83	71	108	78	83
7	128	142	112	184	127	127
8	142	159	131	225	141	147
12	199	221	194	320	203	217
16	243	268	236	402	249	263
20	285	312	274	468	290	311
24	322	356	300	503	316	353
28	347	392	327	522	341	383
32	378	413	343	543	370	399
36	399	429	363	560	386	394
40	418	441	374	572	397	400
44	433	454	392	584	413	407
48	446	481	400	617	426	422
52	454	489	407	633	437	442
56	459	498	422	653	448	447
60	460	486	427	667	451	455
64	467	487	439	680	459	468
68	477	490	453	686	469	478
72	482	492	465	696	477	490
76	486	497	479	706	482	498
80	489	502	492	710	486	503
84	492	506	500	715	493	509
88	496	512	508	730	496	514
92	504	518	510	764	502	524
96	509	526	520	786	508	531
100	516	532	526	796	511	532
104	521	538	538	803	517	539
108	527	544	552	811	521	542
112	533	552	568	822	524	544
116	538	558	588	811	528	544
120	542	563	601	818	535	547
121	542	567	605	827	535	548

Individual Temperatures Recorded on The Unexposed Surface Of The Specimen Surface of

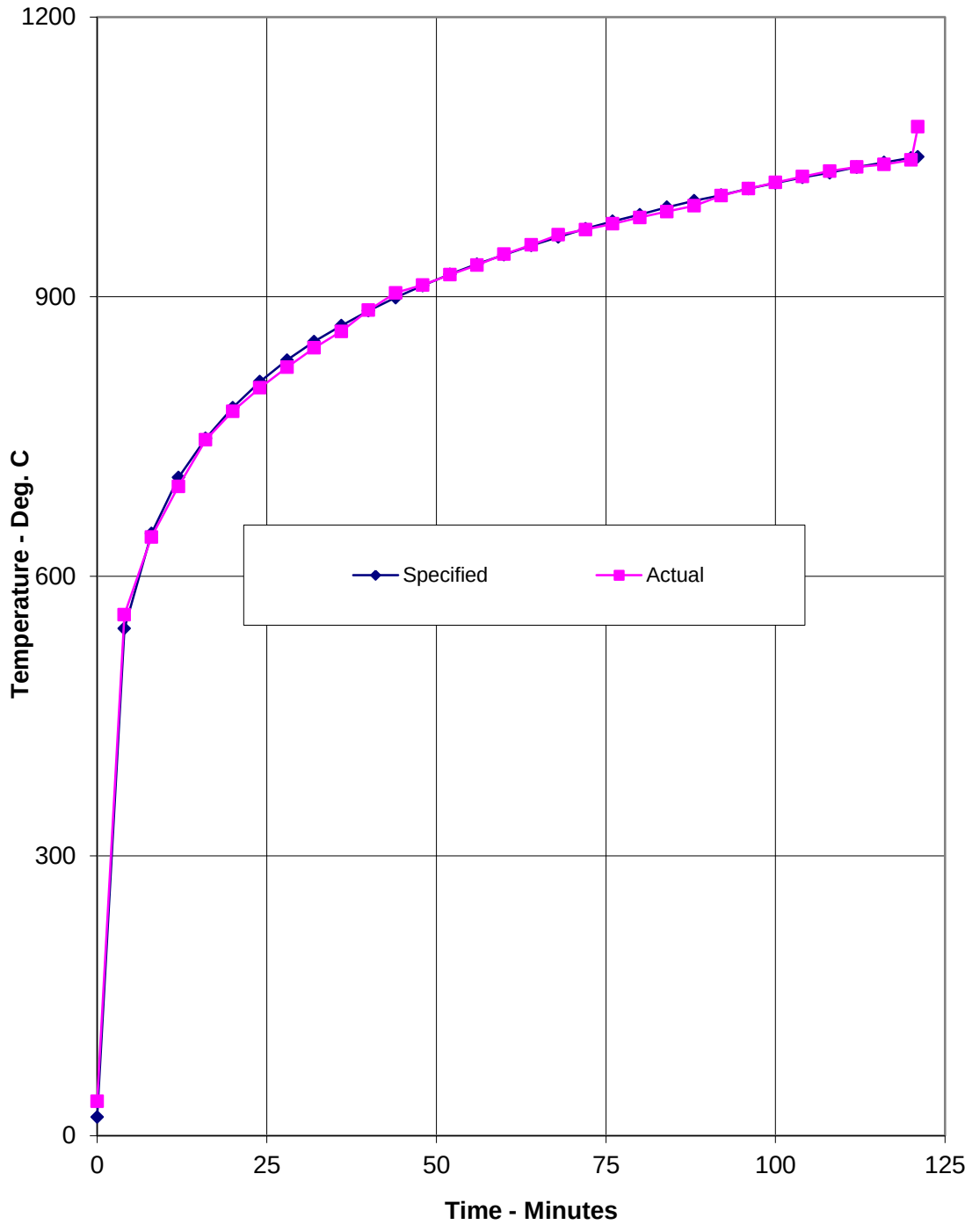
Access Panel B 100mm away from the Leaf Edges

Time Mins	T/C Number 243 Deg. C	T/C Number 246 Deg. C	T/C Number 247 Deg. C	T/C Number 248 Deg. C	T/C Number 249 Deg. C	T/C Number 250 Deg. C
0	25	27	28	27	29	25
4	28	30	36	32	37	31
8	40	37	47	35	40	33
12	50	44	52	39	39	39
16	78	65	77	51	53	61
20	168	131	176	97	106	118
24	204	185	217	155	140	158
28	207	192	220	173	141	163
32	209	192	218	177	138	164
36	213	193	220	180	140	167
40	219	199	225	185	142	173
44	229	206	233	193	149	182
48	245	222	248	207	161	196
52	260	239	259	224	169	212
56	269	251	269	236	176	224
60	274	259	274	244	176	233
64	283	266	276	252	182	238
68	291	274	277	258	186	243
72	295	279	277	261	187	244
76	298	281	276	263	190	247
80	302	284	277	266	194	250
84	307	288	278	269	194	250
88	318	291	282	272	195	256
92	327	295	285	275	201	258
96	346	298	289	279	203	265
100	359	304	295	282	208	270
104	357	310	300	286	211	275
108	370	313	310	289	215	282
112	363	321	315	294	223	288
116	367	327	322	298	230	296
120	422	324	329	299	321	304
121	434	323	338	299	406	307

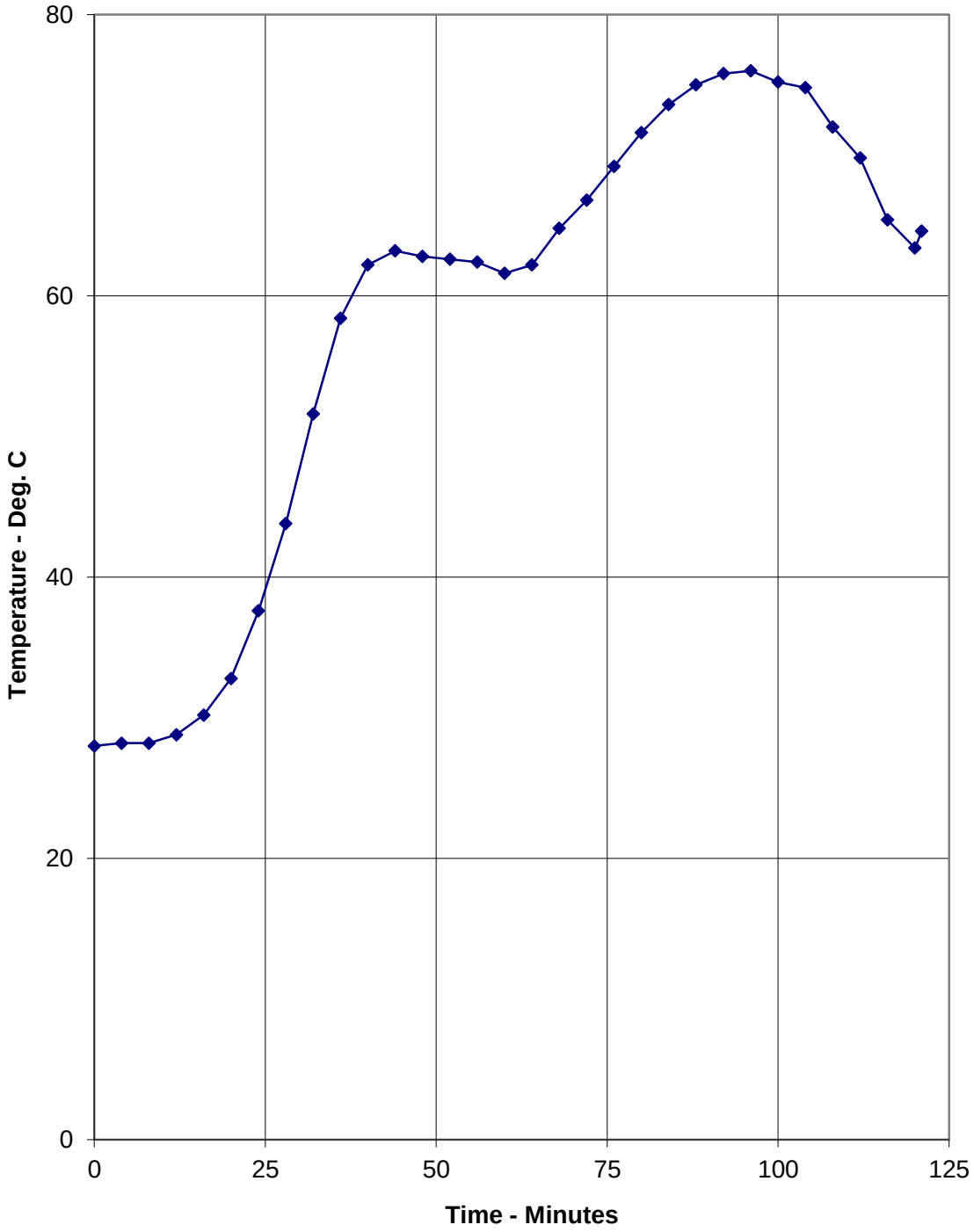
Individual Temperatures Recorded on The Unexposed Surface Of The Frame of Panel B

Time Mins	T/C Number 251 Deg. C	T/C Number 252 Deg. C	T/C Number 253 Deg. C	T/C Number 254 Deg. C	T/C Number 255 Deg. C	T/C Number 256 Deg. C
0	32	32	21	32	31	32
4	69	76	122	108	93	78
8	118	128	185	161	141	128
12	170	172	237	194	186	175
16	217	210	294	233	224	212
20	269	242	335	264	260	251
24	305	267	358	288	288	277
28	330	285	373	300	305	295
32	346	297	382	310	320	307
36	354	309	390	322	336	318
40	366	322	404	333	356	332
44	381	327	412	332	370	340
48	399	325	429	327	385	346
52	410	323	445	327	393	350
56	421	326	463	330	402	355
60	433	331	486	332	408	360
64	446	337	513	337	418	366
68	460	343	525	341	426	371
72	470	349	534	345	435	377
76	478	355	542	349	440	384
80	493	360	545	355	448	389
84	507	367	551	358	453	394
88	524	375	558	360	458	400
92	539	382	563	362	467	404
96	545	392	567	365	476	410
100	562	400	568	367	495	415
104	566	409	561	371	513	423
108	567	416	557	374	533	432
112	579	423	564	380	587	448
116	602	424	582	387	698	469
120	630	447	683	395	789	483
121	621	459	708	402	801	487

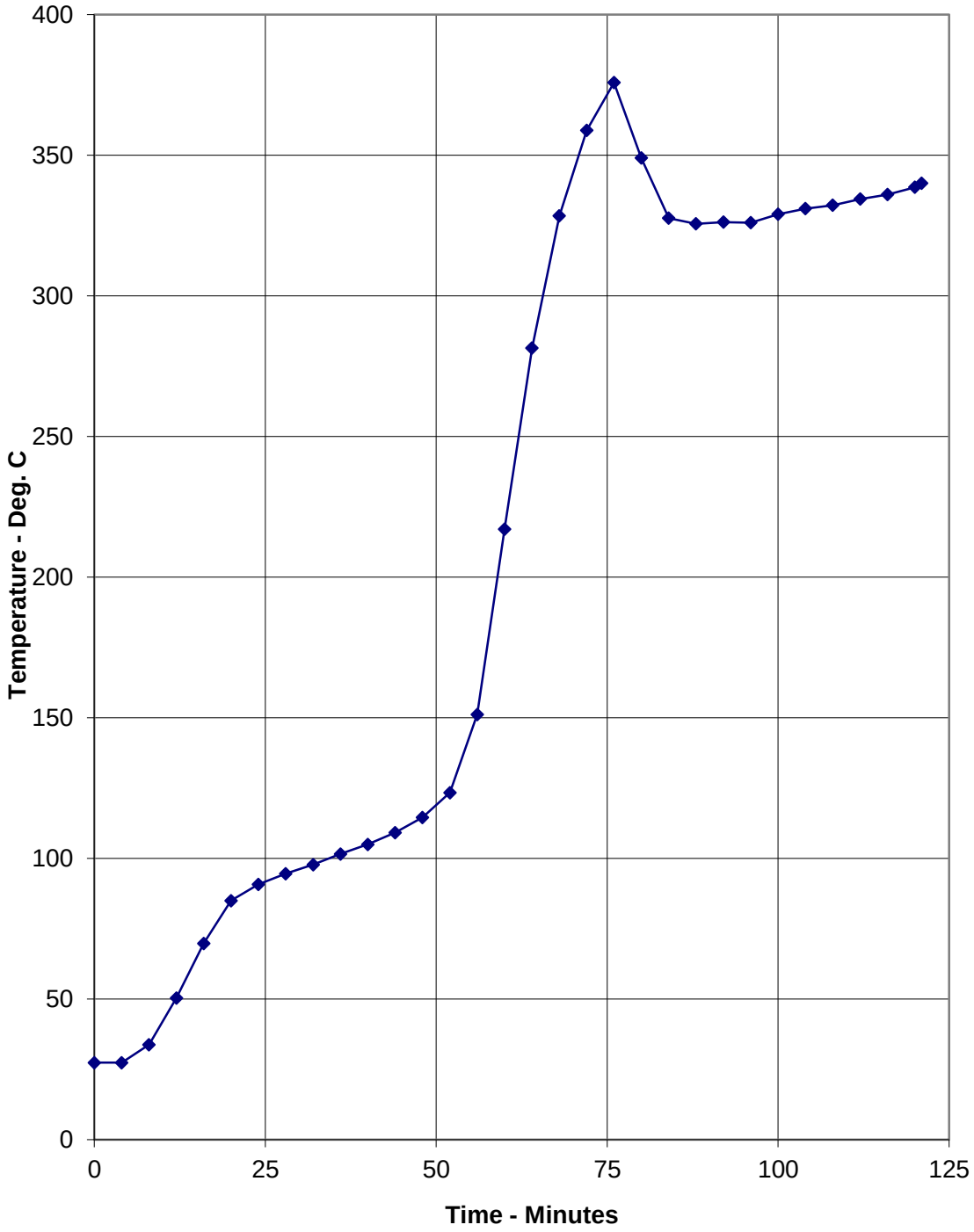
Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard BS EN 1363-1: 2020



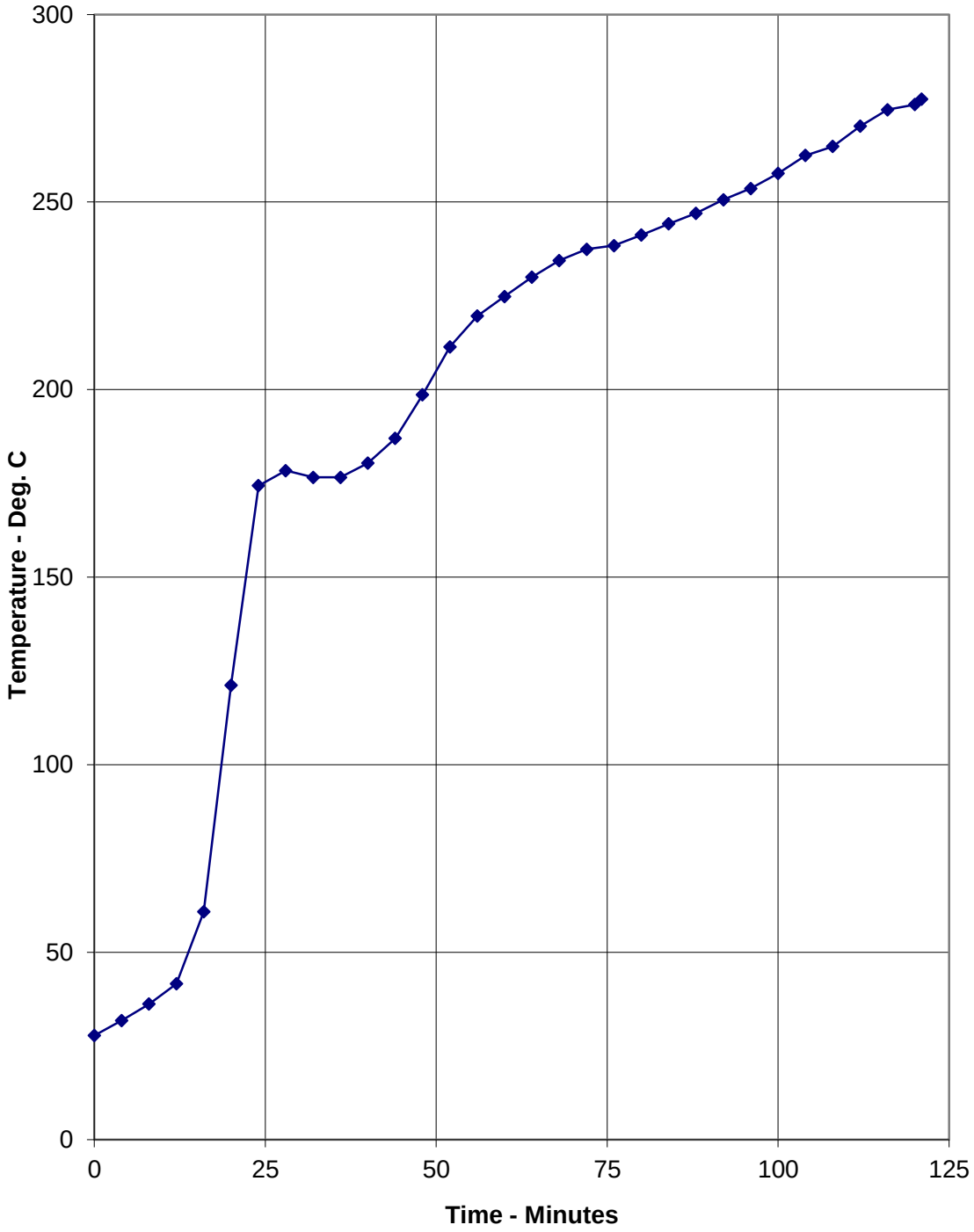
Graph Showing Mean Temperature Recorded On The Unexposed Surface Of The Ceiling



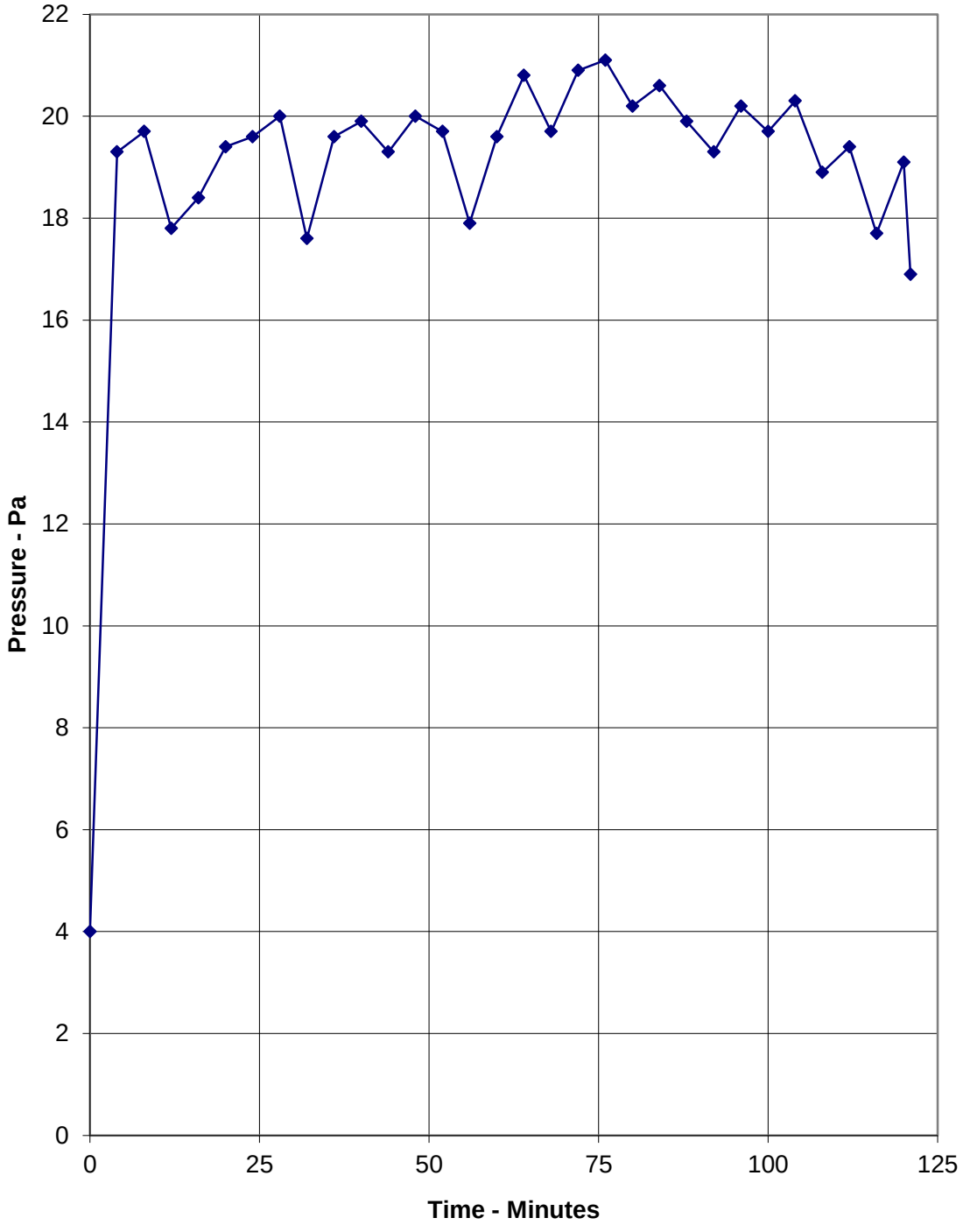
Additional Information: Graph Showing Mean Temperature Recorded On The Unexposed Surface Of Panel A



Additional Information: Graph Showing Mean Temperature Recorded On The Unexposed Surface Of Panel B



Graph Showing Recorded Furnace Pressure 100 mm Below The Specimen



On-going Implications

Limitations

This report details the method of construction, the test conditions and the results obtained when the specific elements of construction described herein were tested following the procedure outlined in BS EN 1363-1: 2020, and where appropriate BS EN 1363-2: 1999. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report. Annex A of BS EN 1363-1: 2020, provides guidance information on the application of fire resistance tests and the interpretation of test data.

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

EGOLF

Certain aspects of some fire test specifications are open to different interpretations. EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed

Field of Direct Application

General

Test results obtained for fire from above are not applicable for the situation with fire from below, and vice versa.

The results of the fire test are directly applicable to constructions of the sample tested, where only one or more of the modifications listed below are made.

Self-supporting ceilings exposed to fire from below or from above:

a) For ceilings where both length and width are less than 4 m × 3 m, and which were tested at full size, the results may be applied to ceilings of the same size or less than that tested.

Size

b) For ceilings of full-size span less than 4 m but of width equal to or greater than 3 m (tested at full size span and 3 m width) and in which the most onerous direction lies in the 4 m direction of the furnace, the results may be applied to ceilings of the same span or less than that tested. There shall be no restriction on application of the result in the width direction. The provisions with respect to most onerous configuration as given in 6.3.2 shall be followed in the direct application of results.

c) For ceilings of full size span greater than or equal to 4 m but of width less than 3 m (tested at 4 m span and full size width) and in which the most onerous direction lies in the 4 m direction of the furnace, the results may be applied to ceilings up to the tested span, increased by 10 %, provided an overrun time in the fire test result is available compared to the intended classification period. The required overrun time is shown in Table 1.

The width is restricted to equal or less than that tested. The provisions with respect to most onerous configuration as given in 6.3.2 shall be followed in the direct application of results.

d) For ceilings where both length and width are greater than or equal to 4 m × 3 m in practice, and which were tested at 4 m × 3 m size, and in which the most onerous direction lies in the 4 m direction of the furnace, the results may be applied to ceilings up to the tested span, increased by 10 %, provided an overrun time in the fire test result is available compared to the intended classification period. The required overrun time is shown in Table 1.

There shall be no restriction on application of the result in the width direction. The provisions with respect to most onerous configuration as given in 6.3.2 shall be followed in the direct application of results.

Overrun Time

Table 1 — Overrun time

Intended classification period (min)	Overrun time
15	≥ 3 min
30, 45 and 60	≥ 6 min
≥ 90	≥ 10 % of the intended classification period

Fittings	Fittings which may be installed are those which have been included in the test specimen. The distance between the fittings cannot be smaller than tested.
Cavities above self-supporting ceilings	The test results are valid for cavities of any height.
Cables, pipes, etc. above the ceiling	The test results are only applicable to the inclusion of cables, pipes, etc. above the ceiling provided they are installed in such a manner that they give no additional mechanical load to the ceilings during the fire.
Suspended ceiling with fire from below	Test results obtained on a test specimen of 4 m × 3 m or greater, may be applied to ceilings of any dimension, provided that the distribution per unit area of the hangers is not reduced, and the distance between hangers is not increased. The distance between grid members and the load on the hanger, shall not be increased. Provisions for expansion in the ceiling system shall be increased pro rata with the extension in sizes, while the gap at the perimeter shall be the same as tested.
Fittings	Fittings which may be installed are those which have been included in the test specimen. The distance between the fittings cannot be smaller than tested.
Cavity	The test results are valid for cavities of any height.
Length of supporting hangers	The test results are applicable to ceilings suspended by hangers of any length.
Cables, pipes, etc. above the ceiling	The test results are only applicable to the inclusion of cables, pipes, etc. above the ceiling provided they are installed in such a manner that they give no additional mechanical load to the ceilings during the fire.
Ceilings incorporating self-supporting and suspended parts with fire from below	If the tested width is equal or greater than 3 m and provided that one edge parallel to span is free, the test results are applicable to same span or less than that tested and an unlimited width. This applies to both types of the tested ceiling separately. The distance between hangers, the distance between grid members and the load on the hanger shall not be increased. Provisions for expansion in the ceiling system shall be increased pro rata with the extension in sizes, while the gap at the perimeter shall be the same as tested.
Fittings	Fittings which may be installed are those which have been included in the test specimen. The distance between the fittings cannot be smaller than tested.
Cavity	The test results are valid for cavities of any height.
Length of supporting hangers	The test results are applicable to ceilings suspended by hangers of any length.
Cables, pipes etc. above the ceiling	The test results are only applicable to the inclusion of cables, pipes etc. above the ceiling provided they are installed in such a manner that they give no additional mechanical load to the ceilings during the fire.