JENSEN HUGHES

Reaction to fire test report

Test standard: BS 8414-2:2015

Test sponsor: Cladding Safe Victoria

Product: Aluminium composite panel and substituted solid aluminium panel façade system

Job number: RTF120855

Test date: 5 June 2025 Revision: RR1.0

JENSEN HUGHES

Quality management

Revision	Date	Information about the report			
RR1.0	8 September 2025	Description	Initial issue.		
			Prepared by	Reviewed by	Authorised by
		Name	[redacted]	[redacted]	[redacted]
		Signature			

Jensen Hughes Fire Testing Pty Ltd
ABN 81 050 241 524

Formerly Warringtonfire Australia Pty Ltd[1]

[1] *Warringtonfire Australia Pty Ltd was acquired by Jensen Hughes in December 2023. Jensen Hughes Fire Testing Pty Ltd is not affiliated, associated, authorised, or endorsed by Warringtonfire Australia Pty Ltd, Warringtonfire Testing and Certification Limited or its "Warringtonfire" or "Certifire" brands.*

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Executive summary

This report documents the findings of the reaction to fire test for a non-loadbearing external wall system performed on 05 June 2025 in general accordance with BS 8414-2:2015.

Jensen Hughes performed the test at the request of Cladding Safe Victoria.

Table 1 provides details of the test assembly, and Table 2 provides a summary of the test specimen. A summary of the results is provided in Table 3.

Table 1 Test assembly

Item		Detail
Nominal non-loadbearing wall system	Height	12196 mm
	Thickness	Side protrusions – 274 mm
		Mid-section – 124 mm
Nominated width of main wall finished face	2631 mm	

Table 2 Test specimen

Item	Detail
Test specimen	The façade consisted of a steel framing that was clad on the unexposed side with 13 mm fire rated plasterboard and 16 mm fire rated plasterboard on the exposed side. This assembly was designed to mimic the concrete panel (central recessed wall) and brick column (two side protrusions) construction of the building it was recreating. The exposed side also had aluminium screens installed and 75 mm thick autoclaved aerated concrete (AAC) panels to simulate granite architectural features. The cavity behind the aluminium screens were filled with ceramic fibre wool. The side protrusions of the façade were clad with folded panels, which was fixed in place through unequal angles installed full height onto the face of the protrusions. The first floor of the side protrusions was clad with 4 mm thick aluminium panels while the second floor of the side protrusions was clad with 4 mm thick aluminium composite (ACP) panels.

Table 3 Test results

Parameter	Results
t_s, start time	5 minutes 6 seconds after ignition of crib
Peak temperature/time at Level 1, 50 mm external	857 °C at 18 minutes and 2 seconds after t_s

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Contents

1. Introduction

This report documents the findings of the reaction to fire test for a non-loadbearing external wall system performed on 05 June 2025 in general accordance with BS 8414-2:2015.

Jensen Hughes performed the test at the request of the test sponsor listed in Table 4.

Table 4 Test sponsor details

Test sponsor	Address
Cladding Safe Victoria	717 Bourke Street Docklands VIC 3808 Australia

2. Test specimen

2.1 Schedule of components

Table 5 describes the test specimen and lists the schedule of components. These were provided by the test sponsor and surveyed by Jensen Hughes.

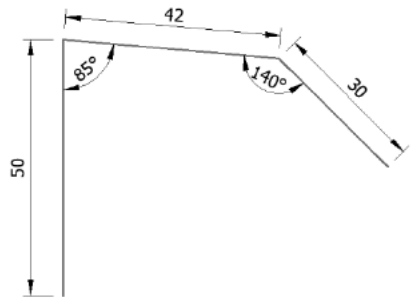
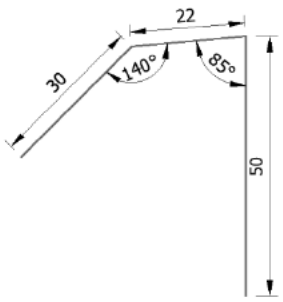
All measurements were done by Jensen Hughes – unless indicated otherwise.

Detailed drawings of the test specimen are provided in Appendix A.

Table 5 Schedule of components

Item	Description		
Cladding			
1.	Item name	Aluminium composite panel (ACP)	
	Product	[redacted]	
	Supplier	[redacted]	
	Note on Supply of Panel	On behalf of CSV, Jensen Hughes acquired the ACPs with 100 % polyethylene core. To the best of Jensen Hughes' knowledge this is a custom production which the supplier doesn't normally supply. The panels were provided on the basis that this was for research purposes and not any purpose other than fire testing.	
	Material	The material was nominated as panels consisting of two layers of aluminium sheets sandwiching a layer (core) with 100 % polyethylene (PE). Analysis conducted by the analytical centre of UNSW (Sample 24021-2 in the report in Appendix E) showed that the core consisted of polyethylene (PE) - found to be 97 % w/w - whilst the remainder of the material was found to be 3.0 % inert material.	
	Colour	Skins	Front skin – Gloss white Back skin – Light grey
		Core	Black
	Size	Total panel thickness – 4.0 mm Skin thickness – 0.5 mm (both) Uncut: 4.0 m × 1.22 m Refer to Figure 1 and Figure 2 for individual panel sizing details.	
	Batch	2023/12/05	
	Areal density	5.6 kg/m² (measured)	
2.	Item name	Aluminium panel	
	Product	4 mm thick solid aluminium panel	

Item	Description	
	Supplier	[redacted]
	Material	The material was nominated as 4 mm thick solid aluminium sheets.
	Colour	Reflective grey
	Size	Total panel thickness – 4.0 mm Refer to Figure 1 and Figure 2 for individual panel sizing details.
	Batch	Unknown
	Areal density	5.6 kg/m² (measured)
3.	Item name	16 mm fire rated plasterboard
	Product name	[redacted]
	Manufacturer	[redacted]
	Size	1200 mm wide × 3600 mm long × 16 mm thick (uncut)
	Batch date	04/05/2022
4.	Item name	13 mm fire rated plasterboard
	Product name	[redacted]
	Manufacturer	[redacted]
	Size	1200 mm wide × 3600 mm long × 13 mm thick (uncut)
	Batch date	03/04/25
5.	Item name	[redacted]
	Product name	[redacted]
	Manufacturer	[redacted]
	Size	600 mm wide × 2400 mm long × 75 mm thick (uncut)
	Density	497 kg/m³
	Batch number	1171461
6.	Item name	Aluminium wire mesh
	Supplier	[redacted]
	Uncut size	10 m long × 1220 mm wide × 0.5 mm thick with 1.4 mm square mesh size
	Batch number	Unknown
Framing		
7.	Item name	Top track/base track
	Material	Steel
	Size	92 mm × 1500 mm × 40 mm, 1.15 mm B.M.T.
	Manufacturer	[redacted]
	Batch number	932584201026
8.	Item name	Steel stud
	Size	92 mm × 2100 or 2600 mm × 40 mm, 1.15 mm B.M.T.
	Manufacturer	[redacted]
	Batch number	932584201034
	Installation	Studs at max. 600 mm. Also used as connector between the front and back steel frame.

Item	Description		
9.	Item name	Steel nogging	
	Size	92 mm × 580 mm × 40 mm, 0.75 mm B.M.T.	
	Manufacturer	[redacted]	
	Batch number	93584200859	
	Installation	Running horizontally at max. 1200 mm centres.	
Flashing			
10.	Item name	Cladding angle	
	Size	100 mm × 45 mm × 1.55 mm B.M.T.	
	Material	Galvanised steel	
	Supplier	[redacted]	
	Batch	Unknown	
11.	Item name	Horizontal flashing	
	Profiles		
		Long piece	Short piece
	Thickness	0.55 mm B.M.T.	
	Material	Galvanised steel	
	Supplier	[redacted]	
	Batch	Unknown	
	Installation	The long piece was installed at the bottom of the ACP (item 1) along the front, and the short piece was installed along the sides of the ACP.	
Insulation			
12.	Item name	25 mm ceramic fibre mineral wool	
	Size	1200 mm × 600 mm × 90 mm	
	Density	128 kg/m^3 (nominated)	
	Manufacturer	[redacted]	
	Batch	T2440016134	
Sealant/Adhesive			
13.	Item name	Glazing sealant	
	Product name	[redacted]	
	Manufacturer	[redacted]	
	Batch	0002346687 2J4 A1007	
	Density	1020 kg/m^3 (nominated)	
14.	Item name	Plasterboard sealant	

Item	Description	
	Product name	[redacted]
	Manufacturer	[redacted]
	Batch	0002560102
	Density	1518 kg/m^3
Fixings		
15.	Item name	Framing screw
	Manufacturer	[redacted]
	Product code	169063
	Description	#10g × 16 mm drill point fine thread button head screw
16.	Item name	False slab screw
	Manufacturer	[redacted]
	Batch number	Unknown
	Description	#14-10 × 65 type 17 hex head and washer screw
17.	Item name	Plasterboard screw
	Manufacturer	[redacted]
	Batch number	NP-7471-2202
	Description	#6 × 32 mm self-drilling bugle head plasterboard screw
18.	Item name	Angle screw
	Manufacturer	[redacted]
	Product code	169079
	Description	12g × 35 mm wafer head drill point fine thread screw
19.	Item name	ACP screw
	Manufacturer	[redacted]
	Batch number	Unknown
	Description	#8g × 30 mm needle point button head screw
20.	Item name	AAC screw
	Manufacturer	[redacted]
	Batch number	Unknown
	Description	14-10 × 125 mm type 17 bugle head, internal hex drive screw
Steel substrate		
21.	Item name	Steel substrate
	Size	The steel substrate was 12246 mm high × 32345 mm wide
	Description	The substrate consisted of structural steel sections and square hollow sections (SHS).
22.	Item name	False slab
	Description	3050 mm leg × 1545 mm leg × 150 mm square hollow section
Installation method		
EW	Overall size	12196 mm high × 2671 mm wide × 274 mm overall depth

Item	Description	
	Installation	• The steel framing (item 7 to 9) was constructed as detailed in Figure 15, Figure 16, Figure 17, Figure 19, Figure 20, Figure 21 and Figure 22 fixed in place between the false slabs (item 22) using plasterboard screws (item 17). • The 16 mm plasterboard (item 3) was then fixed to the steel framing on the front and sides, and the 13 mm plasterboard (item 4) was fixed to the back of the steel framing. Two apertures were then cut out on the front side and internally lined with single layer of 16 mm plasterboard to make an internal 1000 mm wide × 575 mm high opening. The back plasterboard was not cut. • Two 75 mm [redacted] panels (item 5) were fixed below the apertures using [redacted] screws (item 20). Refer to Figure 9 and Figure 11 for panel sizing and fixing locations. • The cladding angles (item 10) were then fixed in place using angle screws (item 18) at 300 mm centres. The horizontal flashing (item 11) was fixed in place using angle screws (item 18) mid-way between the top of the aluminium panel (item 2) and the bottom of the ACP (item 1). • The ACP (item 1) and aluminium panels (item 2) were then fixed to the angles using ACP screws (item 19) at 50 mm from the edges and one at mid height. • Two layers of mineral wool (item 12) were stacked to make it 50 mm thick, which was then friction fitted into the two apertures, as illustrated in Figure 9 and Figure 11. Three holes were cored through the mineral wool, as shown in Figure 8. • The apertures were then covered using wire netting (item 6) which was fixed in place using ACP screws (item 19). • Glazing sealant (item 13) was used to create an outline on the first and second floor. • Refer to Appendix A for further construction details.

2.2 Installation details

Table 6 lists the installation details for the test specimen.

Table 6 Installation details

Item	Detail
Start date for construction of the test specimen	21 May 2025
Completion date for construction of the test specimen	4 June 2025
External wall system constructed by	Representatives of Jensen Hughes
Symmetry	Asymmetrical because: • Only the unexposed side was clad with 13 mm fire rated plasterboard, while the exposed side was clad 16 mm fire rated plasterboard. • The folded panels were only used on the exposed face of the façade. • The AAC panels and aluminium wiring mesh were only installed on the exposed side. It was confirmed that the system was exposed from the side that would normally face the outside of the building.

3. Test procedure

Table 7 details the test procedure for this reaction to fire test.

Table 7 Test procedure

Item	Detail	
Statement of compliance	The test was performed in general accordance with the requirements of BS 8414-2:2015+A1:2017 for a non-loadbearing external cladding system fixed to and supported by a structural steel frame.	
Variations	• Sections of the test specimen were constructed from substitute materials that were expected to display similar material performance under test conditions. The design was such that the external dimensions mimicked the geometry of a section of the as-built structure. • Only the main wall was constructed while the wing wall was not. The geometry of the overall specimen was not in accordance with the standard. • Location of the instrumentation was not as prescribed by the standard. • The opening for the flame source did not meet the geometric and location requirements of the standard. • Level 2 TC array was not present. • There was no vertical join running up the centre. • There was no horizontal join 2400 mm above the combustion chamber. • Moisture content was 15.1 % which was higher than the maximum required limit (15 %). • The ignition source of the test was constructed from Pinus Radiata instead of Pinus Silvestris. This variation is not considered to have affected the outcome of the test.	
Environmental conditions at the start of the test	Start of the test	21 °C
	Wind speed	0.14 to 0.20 m/s
Ignition source	Crib material	Softwood (radiata pine)
	Moisture content	15.1 %
	Density	447 kg/m^3
Sampling / specimen selection	The laboratory was not involved in sampling or selecting the test specimen for the reaction to fire test. The results obtained during the test only apply to the test samples as received and tested by Jensen Hughes.	
Test duration	60 minutes	

Item	Detail
Instrumentation and equipment	The instrumentation was provided in general accordance with BS 8414-2:2015 as follows: • Exposed and cavity temperatures were measured by mineral insulated metal sheathed (MIMS) Type K thermocouples with an overall diameter of 1.5 mm with the measuring junction insulated from the sheath. • Exposed temperatures were measured by 100 mm × 100 mm × 0.7 mm plate thermometers with mineral insulated metal sheathed (MIMS) Type K thermocouples with an overall diameter of 1.5 mm with the measuring junction electrically insulated from the sheath. The thermocouple hot junction was fixed to the geometric centre of the plate by a small steel strip made from the same material-as the plate. The plate thermometers included 97 mm × 97 mm × 10 mm inorganic insulation pads. Before the first use of the plate thermometers, they were aged by being exposed to heat in a fire-resistance test furnace for 90 minutes under the standard temperature/ time curve. • The thermocouple positions are shown in Figure 28, Figure 26 and Figure 27 in Appendix C. • The wind speed was measured by an anemometer at Level 2, 1000 mm forward from the centre line of the combustion chamber. • Timber crib moisture was measured by a pin-type moisture meter.

4. Test measurements and results

Table 9 shows the peak temperatures the test specimen achieved as listed in BS 8414-2:2015+A1:2017.

The temperature measurements for the test specimen are included in Appendix C.

Table 9 in Appendix B includes observations of any significant behaviour of the specimen and details the occurrence of the various performance criteria specified in BS 8414-2:2015+A1:2017.

Photographs of the specimen are included in Appendix D.

Table 8 Test results

Parameter	Results
t_s, start time	5 minutes 06 seconds after ignition of crib
Peak temperature/time at Level 2, 50 mm external	857 °C at 18 minutes and 2 seconds after t_s

5. Application of test results

5.1 Test limitations

The results of these fire tests may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all fire conditions.

These results only relate to the behaviour of the specimen of the element of construction under the particular conditions of the test. They are not intended to be the sole criteria for assessing the potential fire performance of the element in use, and they do not necessarily reflect the actual behaviour in fires.

5.2 Variations from the tested specimen

This report details methods of construction, the test conditions and the results obtained when the specific element of construction described here was tested following the procedure outlined in BS 8414-2:2015+A1:2017.

Any significant variation with respect to size, construction details, loads, stresses, edge or end conditions, other than that allowed under the field of direct application in the relevant test method, is not covered by this report.

5.3 Uncertainty of measurements

Because of the nature of reaction to fire testing and the consequent difficulty in quantifying the uncertainty of measurements obtained from a reaction to fire test, it is not possible to provide a stated degree of accuracy of result.

Appendix A Drawings of test assembly

The drawings of the test assembly in Figure 1 to Figure 22 were generated by Jensen Hughes. The leaders in the drawings represent the items listed in section 2.1. All measurements – unless indicated – are in millimetres.

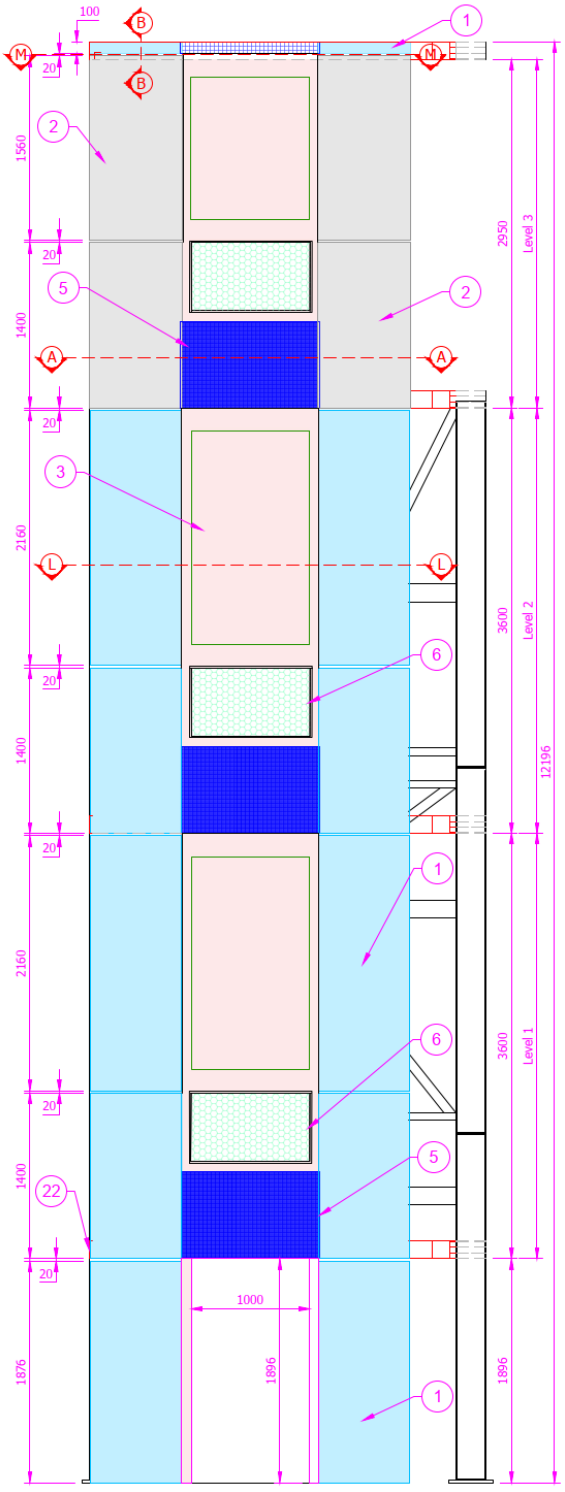


Figure 1 Overall view – exposed face of the specimen

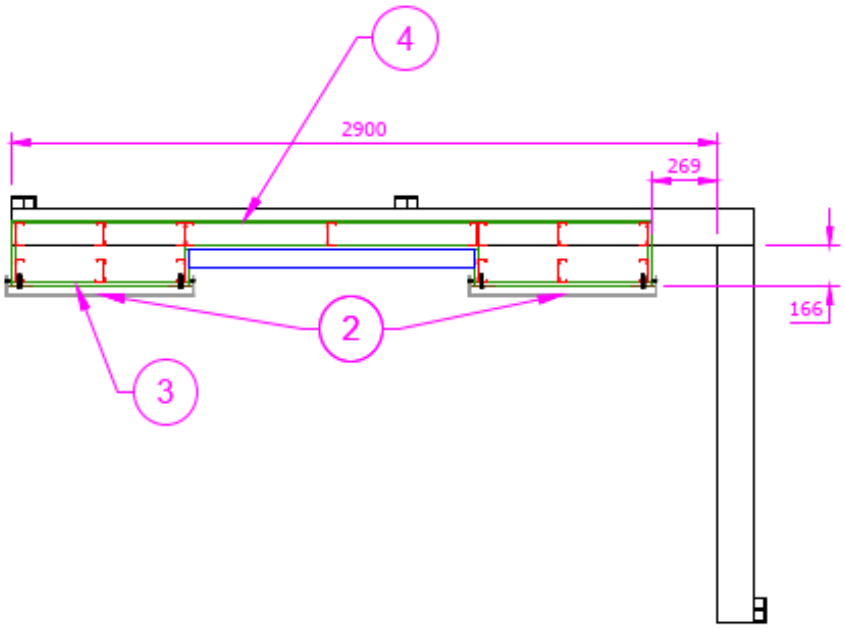


Figure 2 Cross section A-A

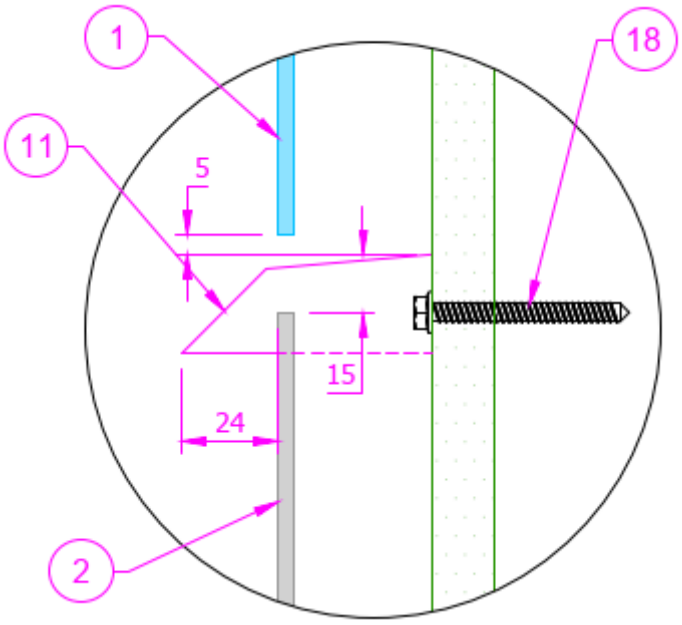


Figure 3 Cross section B-B

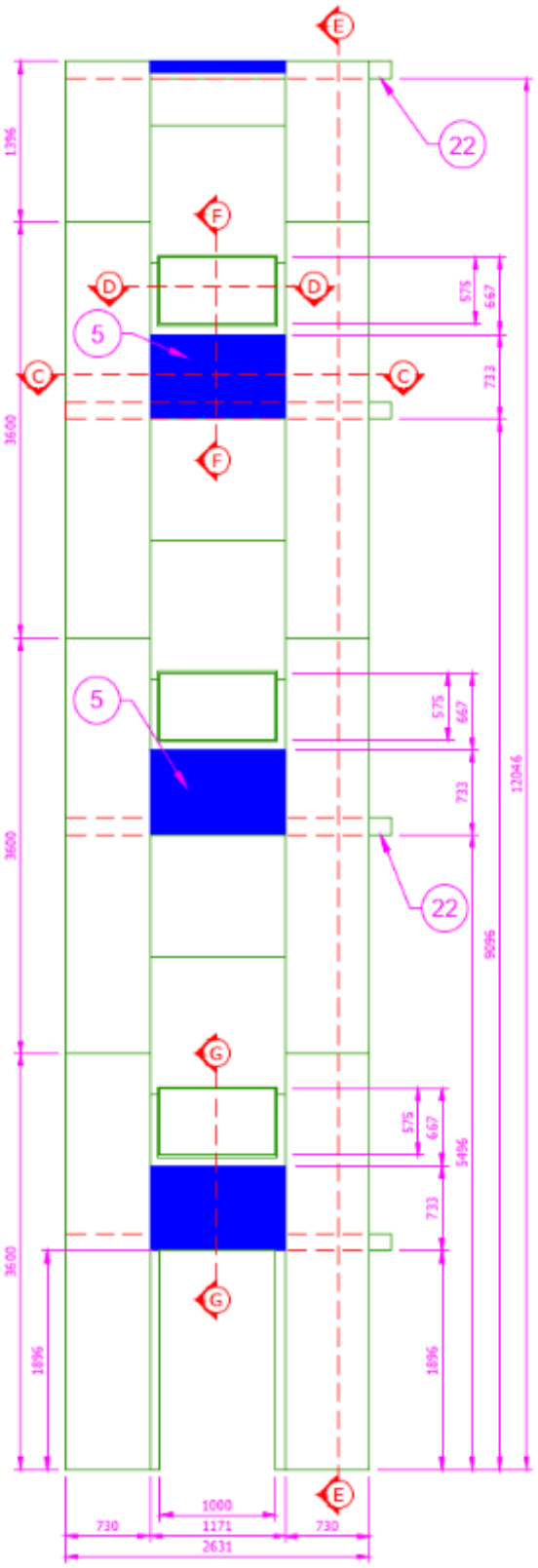


Figure 4 Plasterboard section – plasterboard wall detail

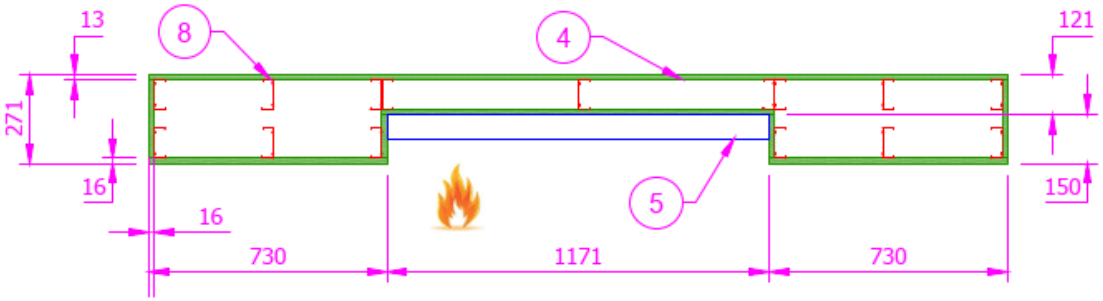


Figure 5 Cross section C-C

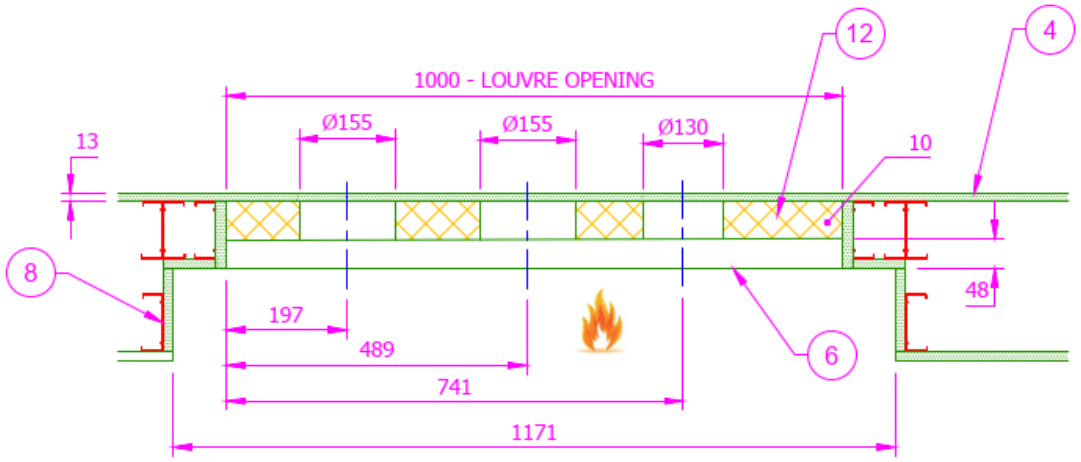


Figure 6 Cross section D-D

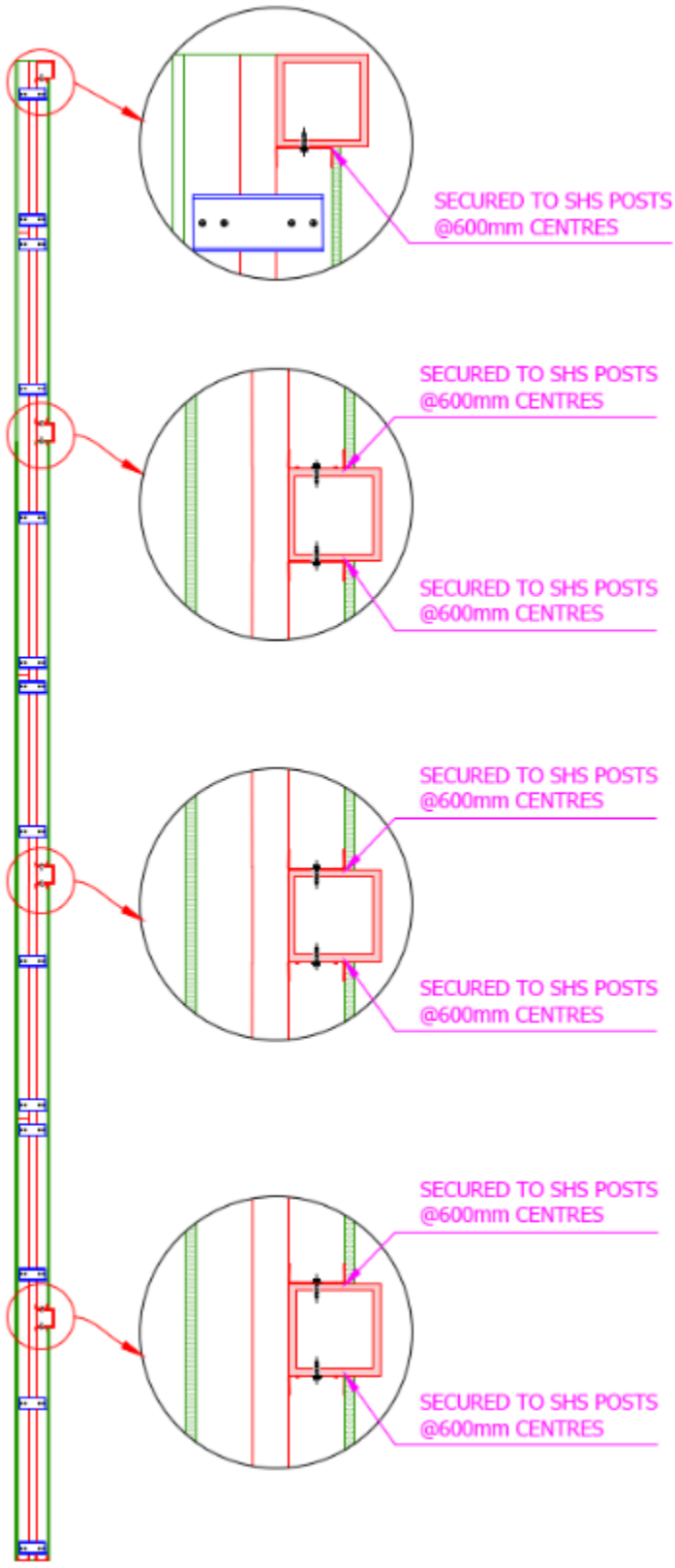


Figure 7 Cross section E-E

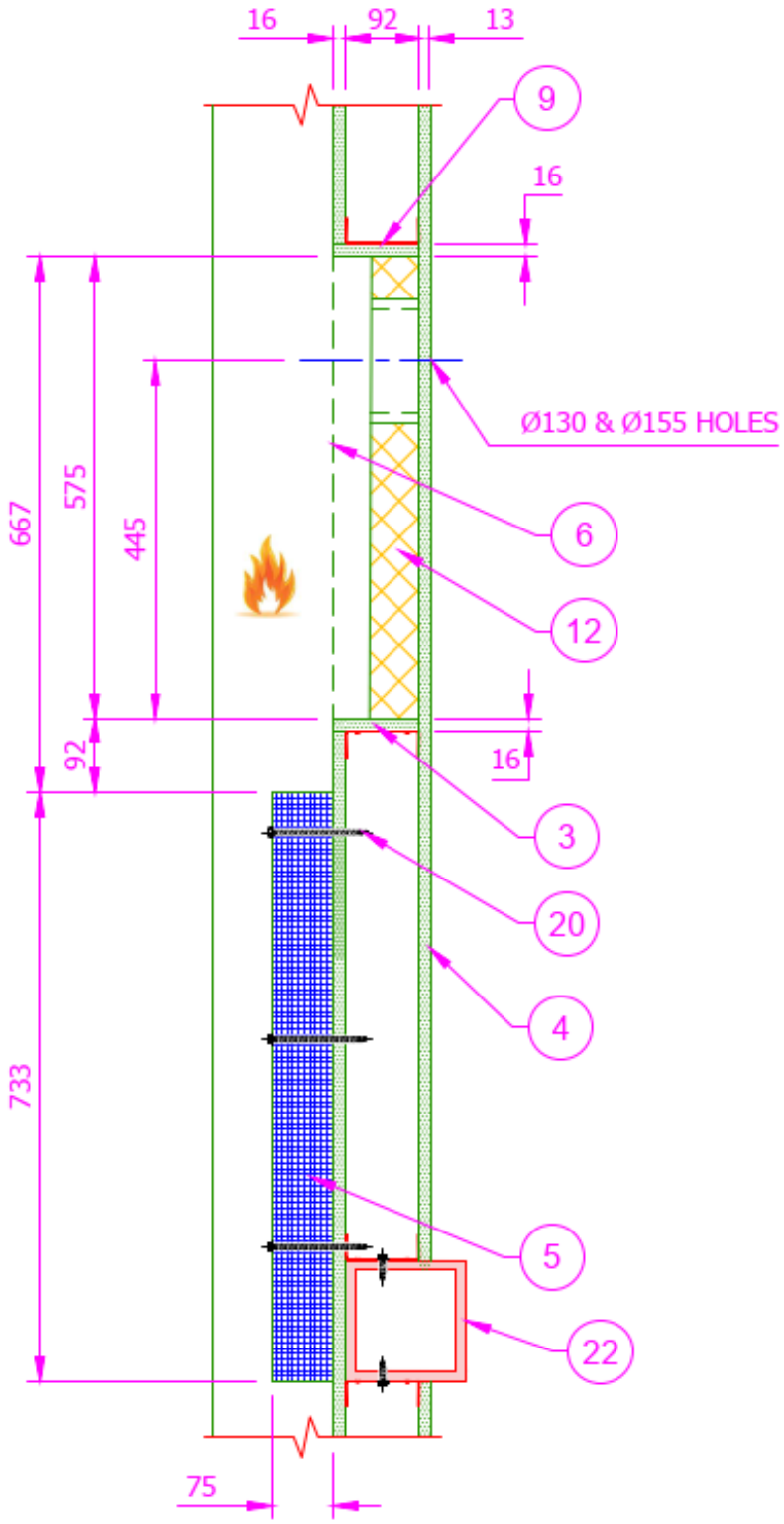


Figure 8 Cross section F-F

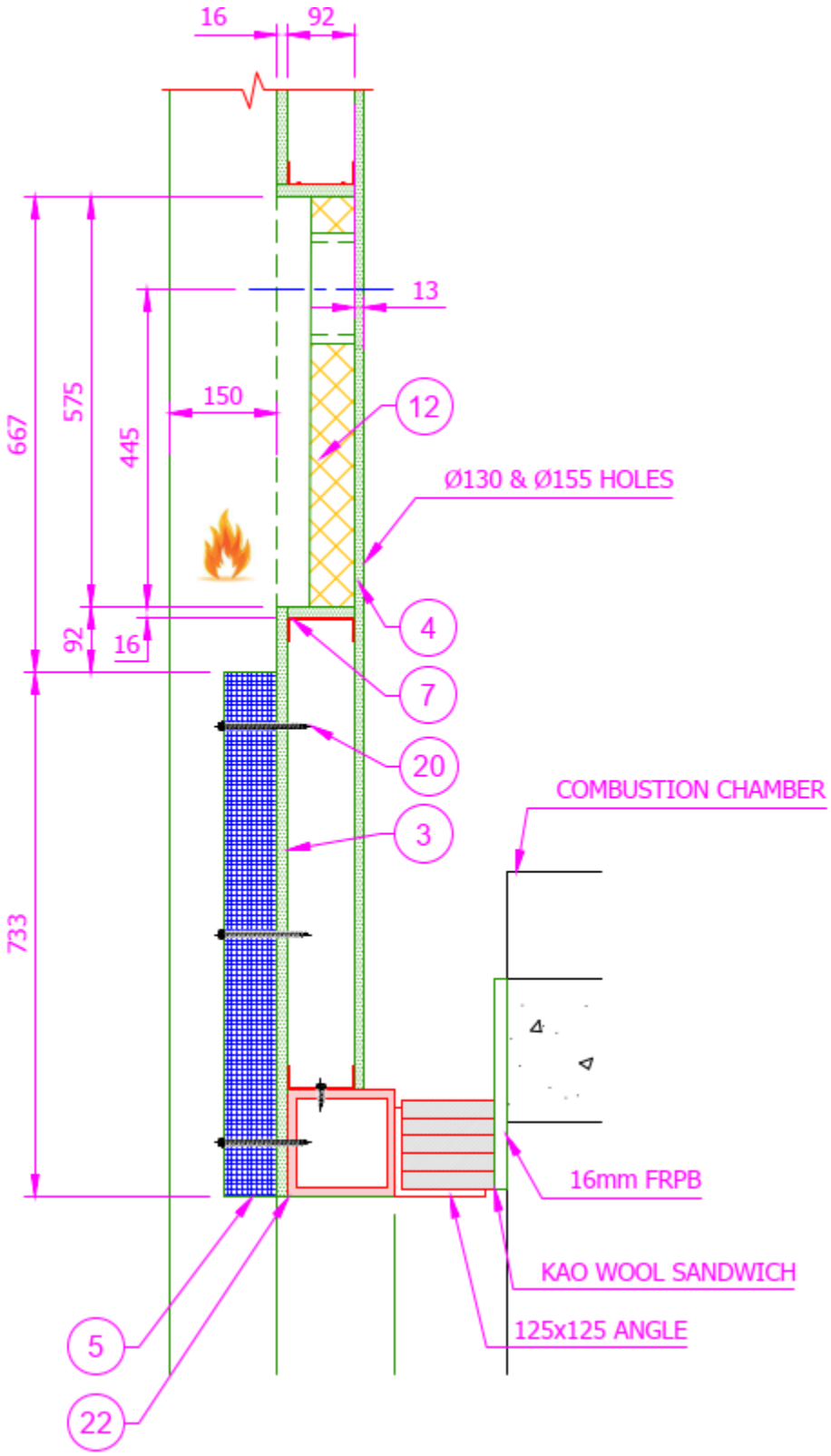


Figure 9 Cross section G-G

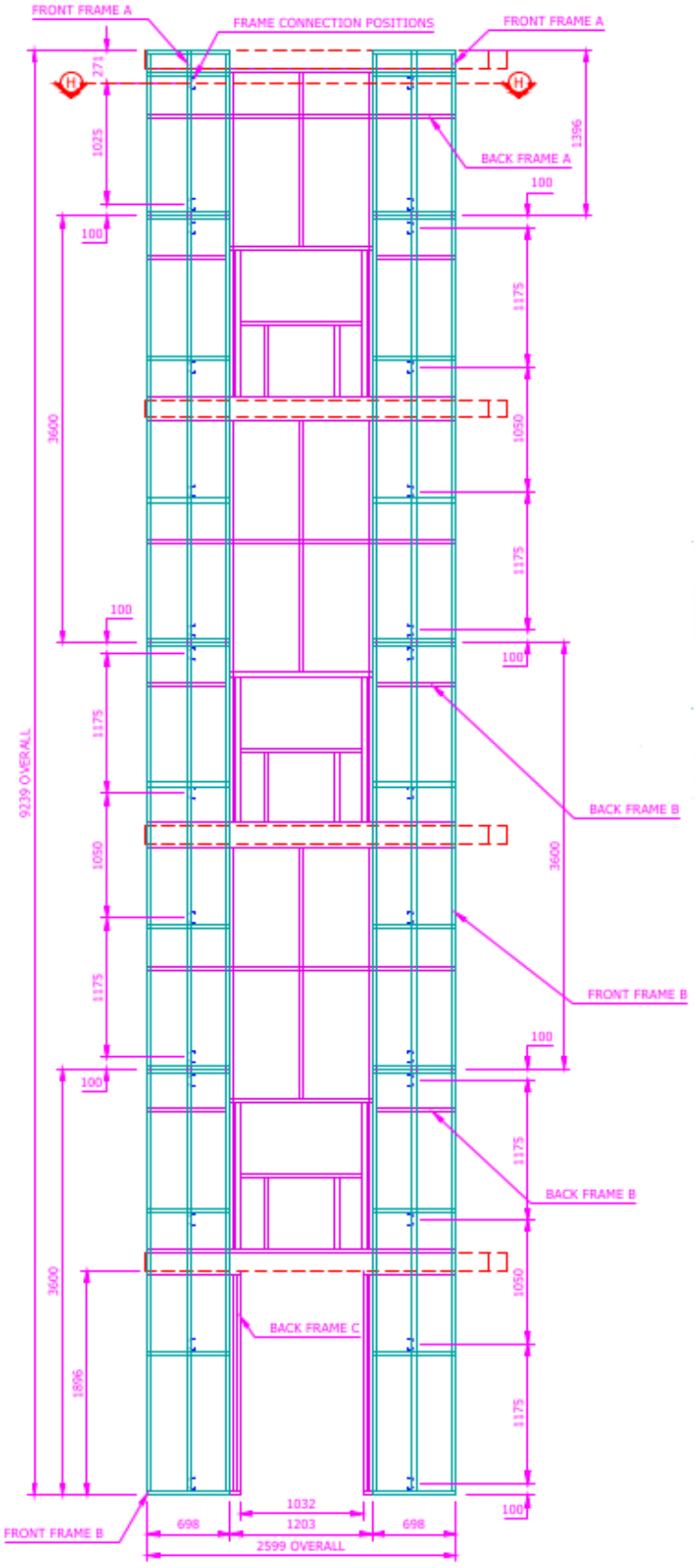
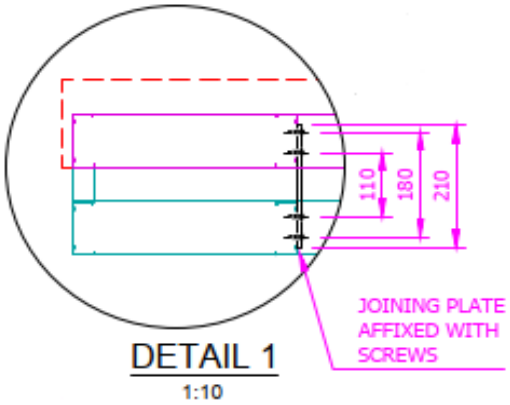


Figure 10 Front framing exposed view



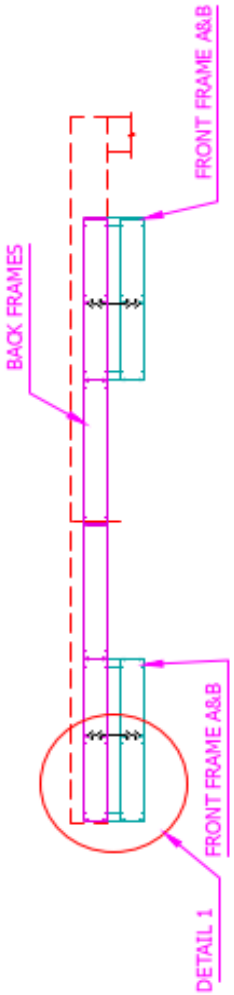


Figure 11 Cross section H-H

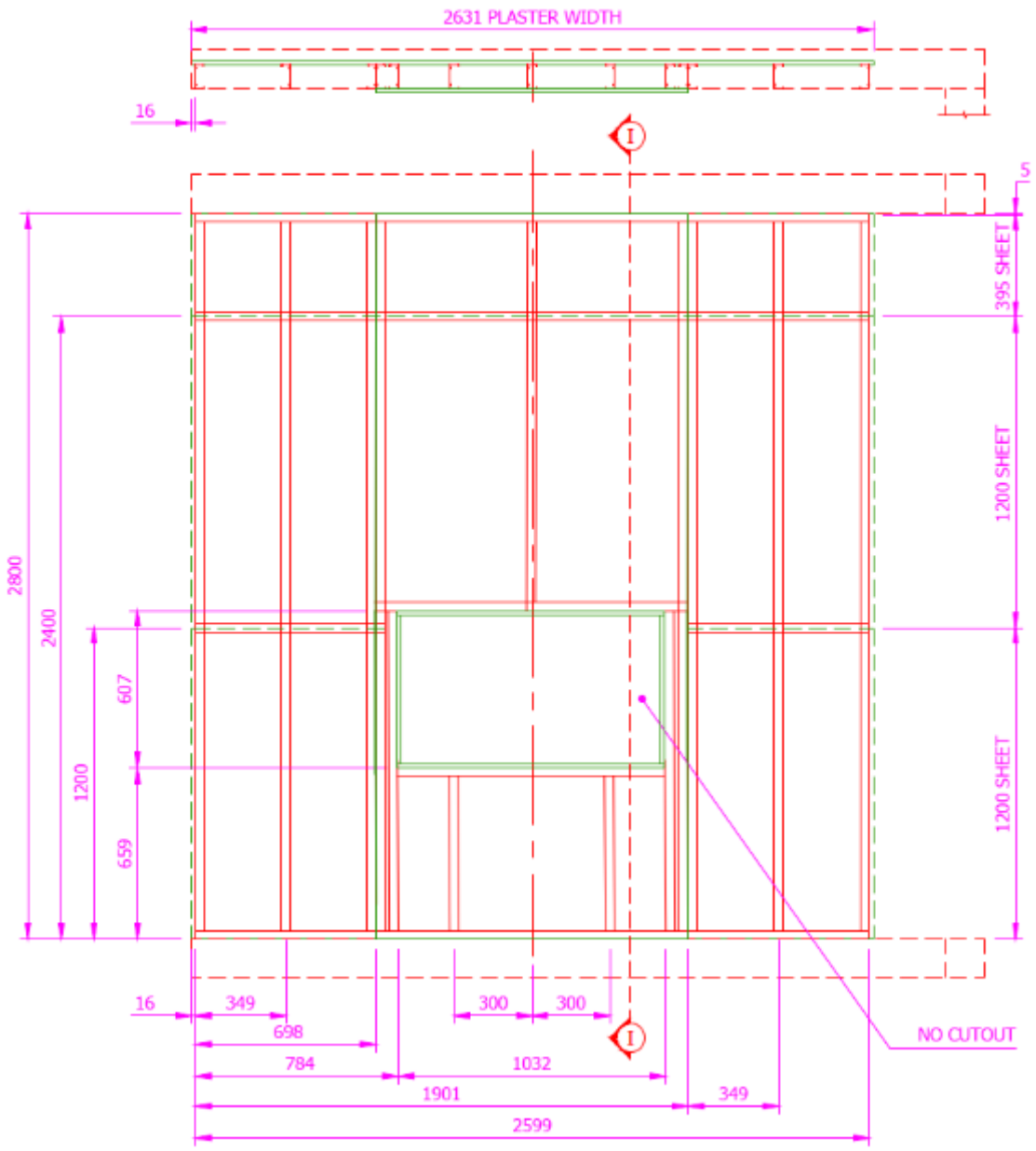


Figure 12 Front view – top steel framing detail

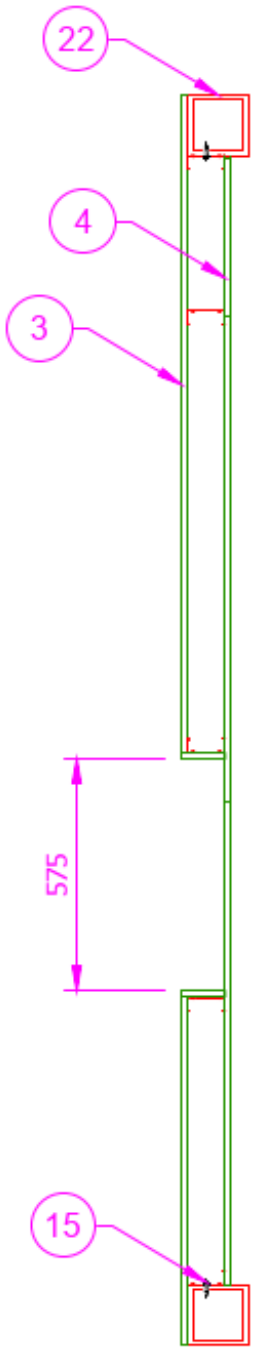


Figure 13 Cross section I-I

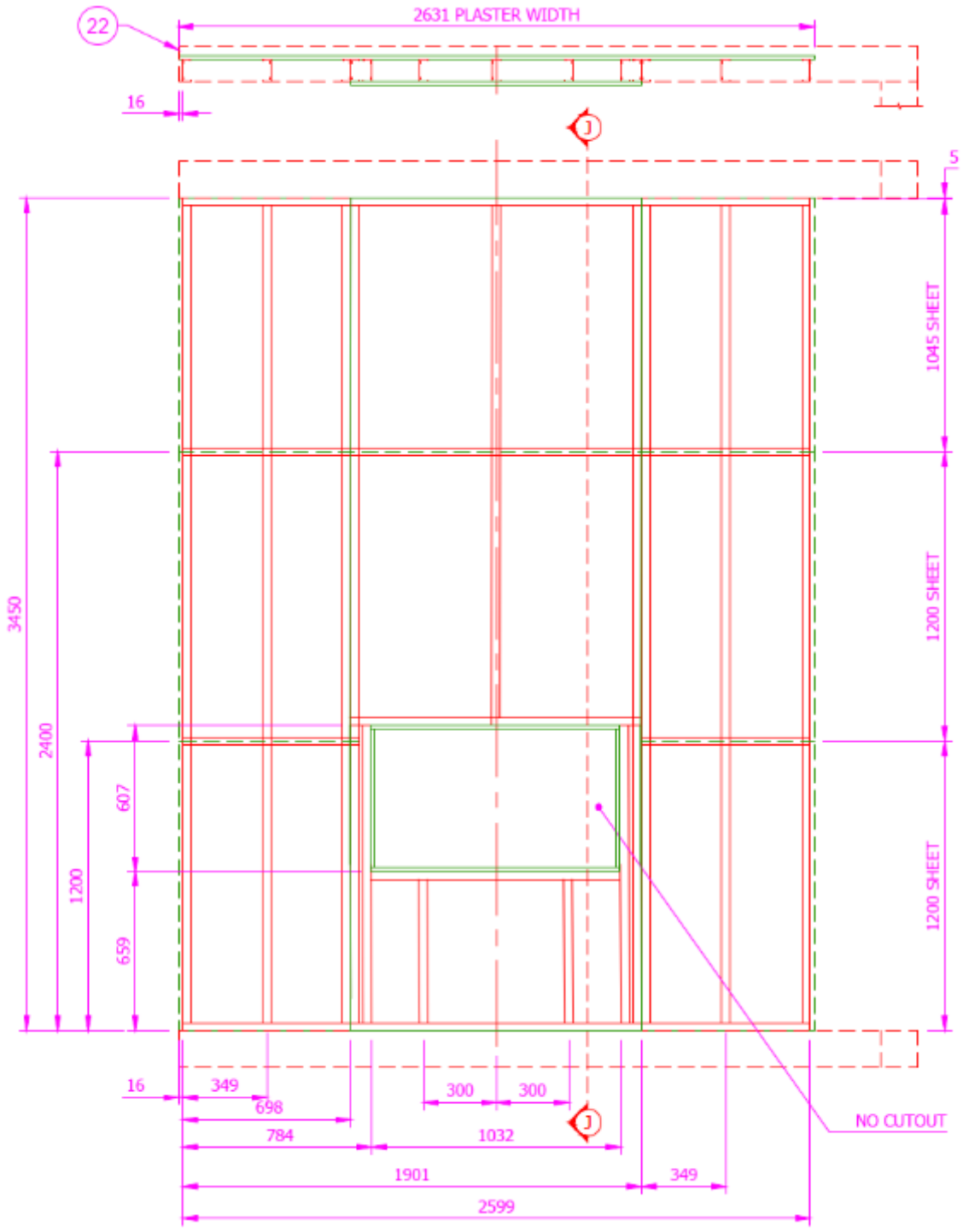


Figure 14 Front view – middle steel framing detail

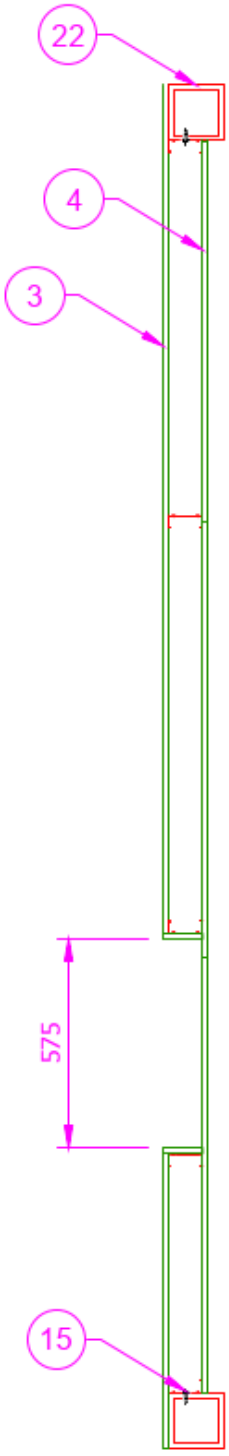


Figure 15 Cross section J-J

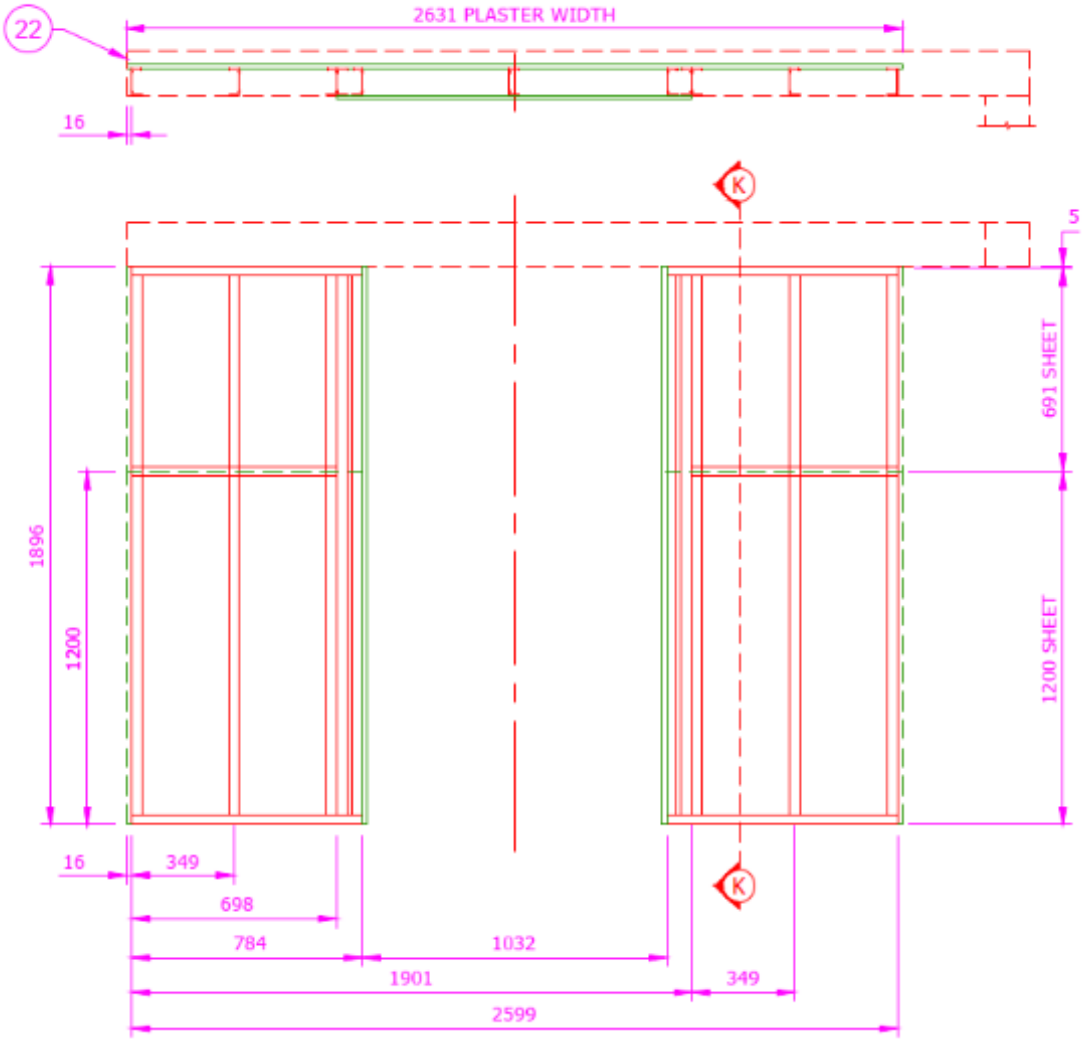


Figure 16 Front view – bottom steel framing detail

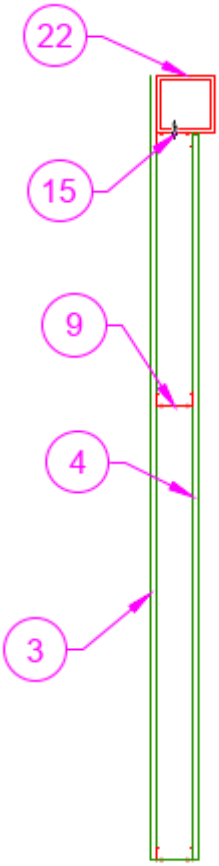


Figure 17 Cross section K-K

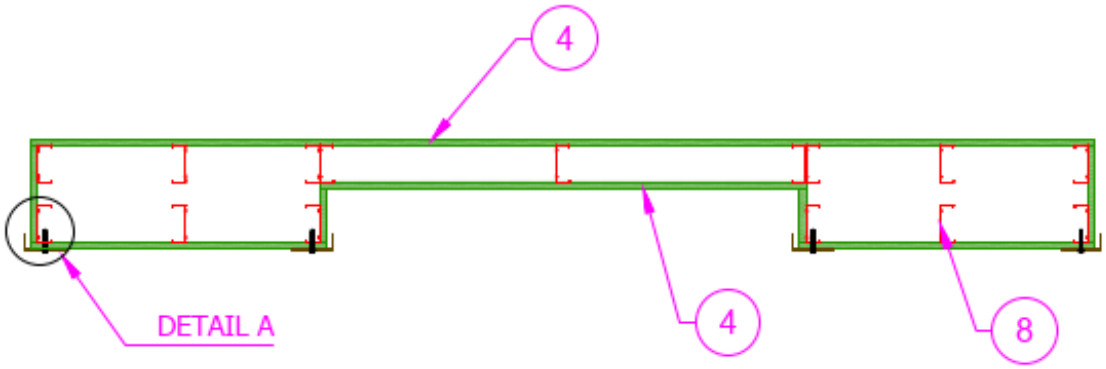


Figure 18 Cross section L-L

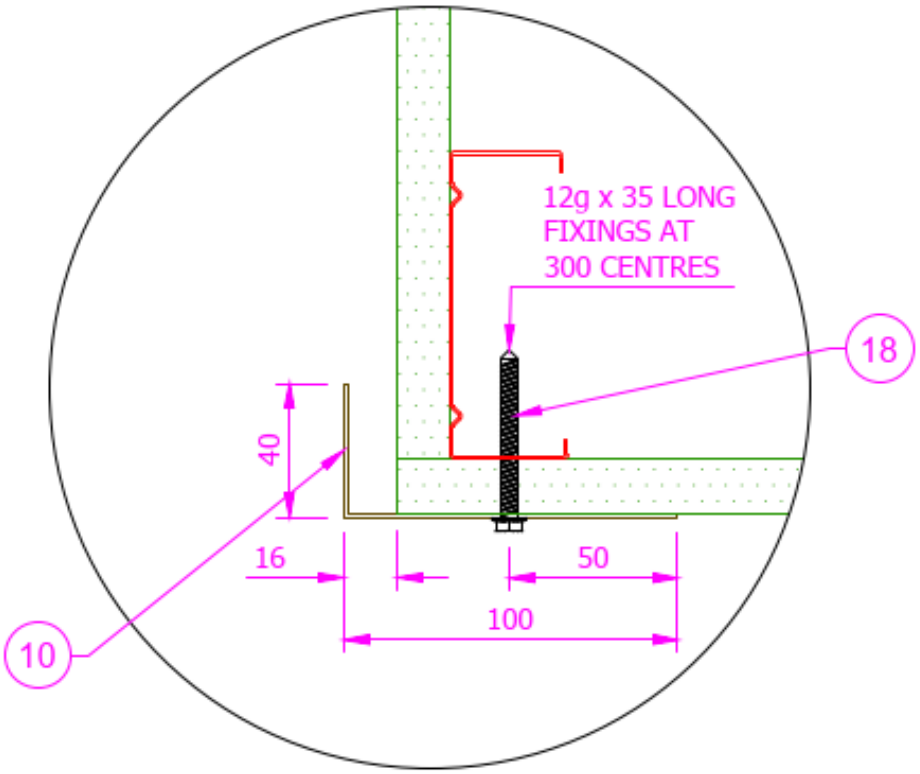


Figure 19 Detail A – Angle profile

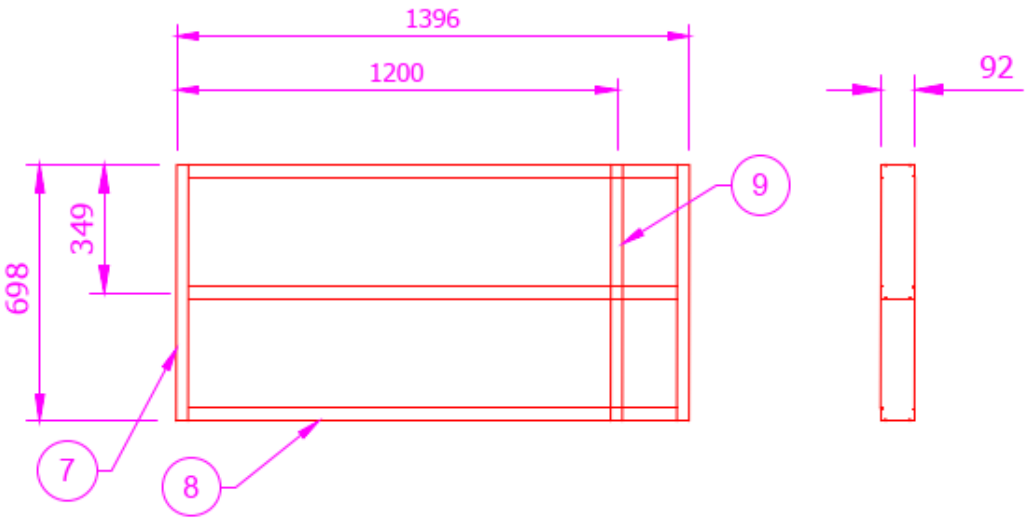


Figure 20 Steel framing details - front frame A

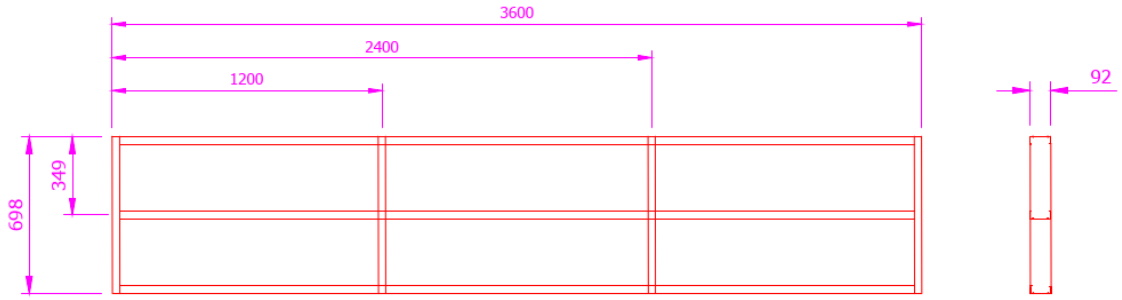


Figure 21 Steel framing details - front frame B

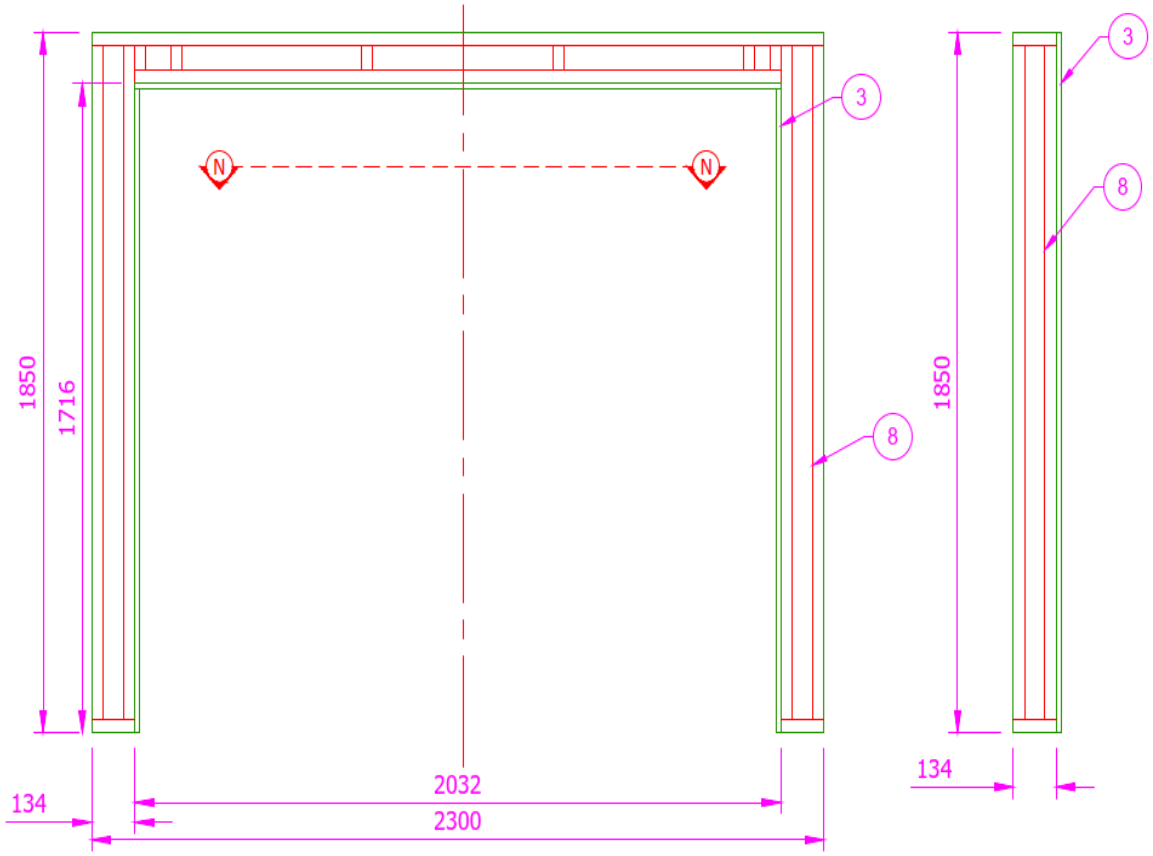


Figure 22 Spacer wall/legs

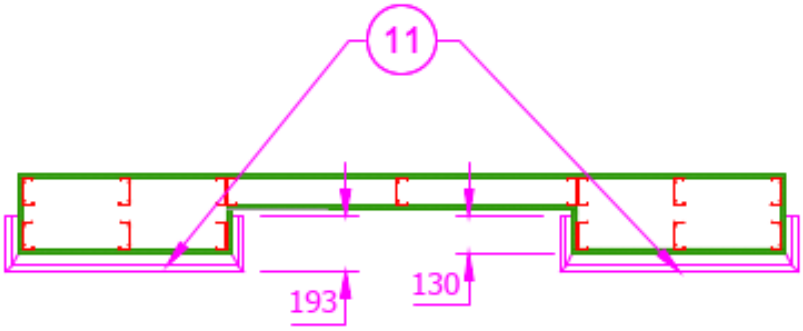


Figure 23 Cross section M-M

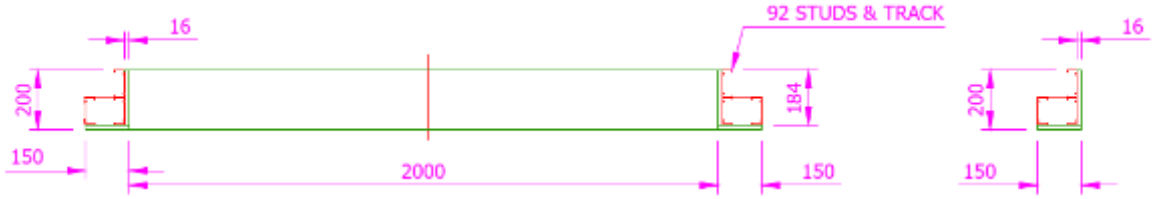


Figure 24 Cross section N-N

Appendix B Test observations

5.4 Visual observation

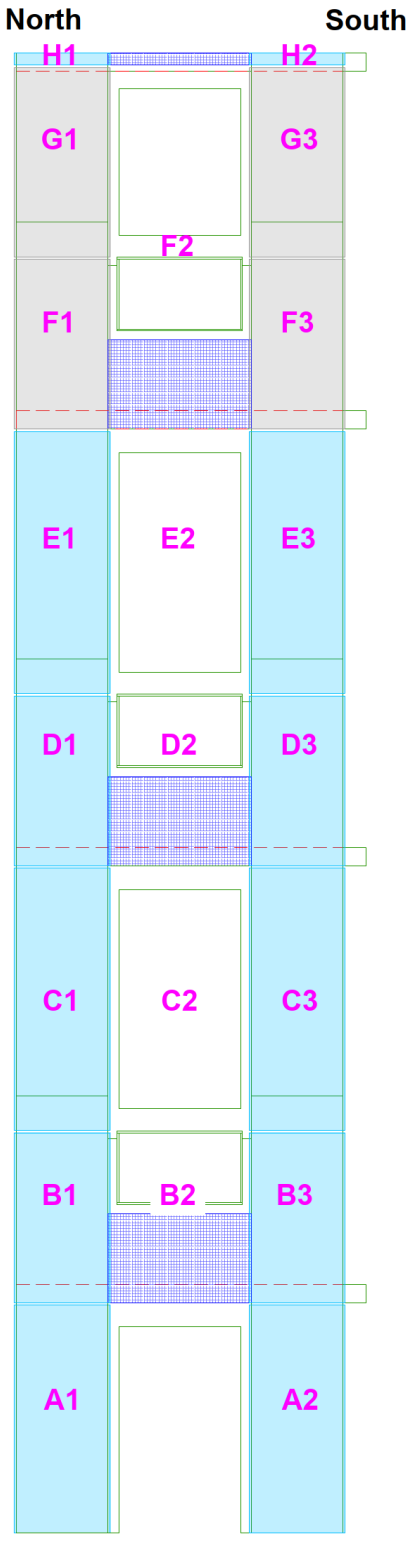


Figure 25 Observation designation

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

Table 9 Test observations

Time		Observation
Min	Sec	
0	00	The reaction to fire test was started.
2	58	The flames from the chamber started to escape from the front opening.
4	51	B2 discoloured from the centre.
5	30	A1 and B1 panel edges on the crib side deformed slightly.
7	30	C1 panel edge close to the crib deformed slightly.
8	16	C2 started discoloring at the from the bottom edge.
8	25	The wire net above the crib started melting.
8	30	The bottom edge of the D1 started to deform.
8	57	The A2 and B3 panel edges on the crib side have deformed.
9	33	Visible flaming on the top side corner of the A1 closer to the crib.
10	02	Top edge of the A2 closer to the crib started flaming.
10	14	There was visible flaming on the bottom right edge of the B3.
10	50	The flaming on the A1 and A2 start spreading downwards on crib side edges.
11	29	B1 vertical edge close to the crib was all flaming.
12	15	Bottom edge of the B3 close to crib was flaming.
12	43	Bottom right edge of the C1 started flaming.
13	00	A1, A2, B1, B3 and C1 panels on the crib side were all discoloured.
13	17	The smoke emission from the panels F1 and F3.
13	29	The smoke and flame between the C1 and D1.
14	15	C1 vertical edge on the crib side was all flaming.
14	27	The south vertical edge of the D1 was flaming.
14	30	Bottom left edge of the C3 was flaming.
14	35	Molten debris started dripping on the floor from the A1 and A2.
14	49	Intermittent flaming between F1 and G1.
15	00	There was significant flaming on the A1, A2, B1, B2 and C1.
15	34	Instantaneous flaming between F3 and G2.
15	56	Molten debris continued falling from the panels A1, A2, B1, B2 and C1.
16	22	Instantaneous flaming between E3 and F3.
17	00	The panels A1 and B1 slightly detached from the left edges closer to the crib.
17	47	Flaming between the D3 and E3 gap behind the panels.
17	58	There were visible holes in A2 and B3 panels due to fire damage.
18	27	C1 panel partially detached on the south side.
18	37	Molten aluminium was dripping from A1, A2, B1, B3, C1 and C3.
19	11	Flaming on the south edges of E1, F1 and north edge of E3.
19	28	The flame was coming out from the top of the D1.

Time		Observation
Min	Sec	
19	50	The E3 north edge was on fire.
20	00	Most of the side edges closer to the crib were melted on A1 to C3.
20	05	F1 south edge was on fire.
21	16	Large piece of melted aluminium detached from B1 and fell on the floor.
22	16	The most of the D1 and E1 was burnt.
22	23	Flaming observed on the whole front face of the E1.
23	26	The bottom side of the F1 panel melted.
24	06	Almost all the A1 and A2 panels were combusted and melted.
25	00	Some flaming was on the A2, B3 and C3 south edges.
25	52	E3 was flaming from the bottom edge.
29	24	Flames behind the panels F3 and G2.
29	25	A melted piece detached from C3 and fell on the floor.
30	00	The crib was extinguished.
32	34	There was visible flaming behind the panel E3 and F3.
33	59	The melted aluminium continued dripping from D3.
36	51	Flaming observed on the north side and behind E3.
41	20	High flames at the bottom of D3 and E3.
42	23	Instantaneous flaming from the joint of F3 and G3.
44	46	There was visible flaming at the top edge of F3.
47	09	Flaming visible behind the E3.
51	28	Visible flaming behind and on top of the F3.
59	14	Flaming died completely on the F3.
60	00	The test was ended.

5.5 Post-test observations

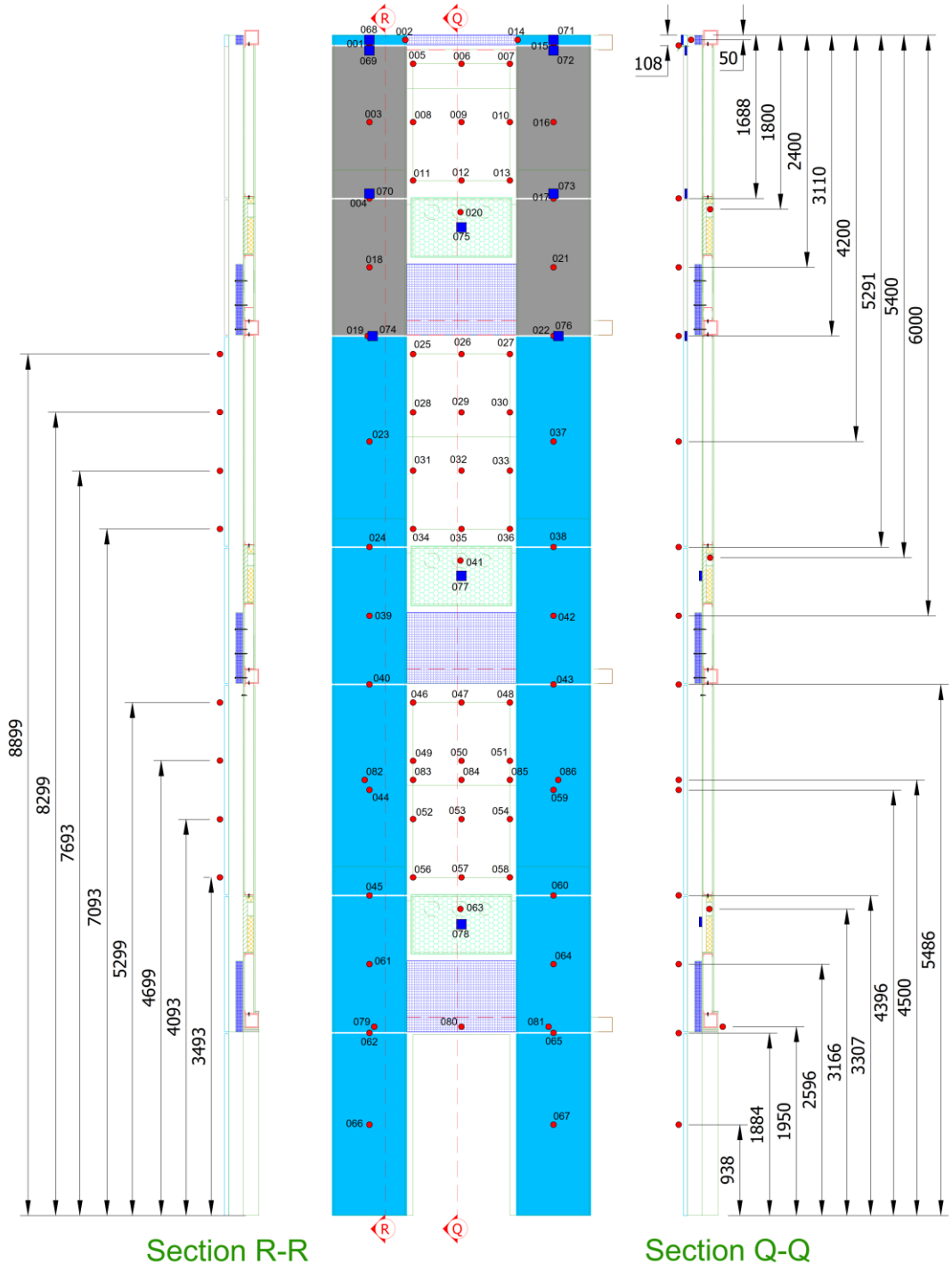
External wall system

The damaged area of the cladding system is described as follows:

- Approximately 1.49 m^2 of the aluminium panels had significant heat degradation.
- Approximately 9.52 m^2 of the ACP had its core combusted, melted and/or fallen away and the skin had melted and/or fallen away completely.
- Approximately 4.24 m^2 of the ACP had partially melted and/or combusted core and the skin deformed.
- The first and second floor aluminium wiring mesh had fully melted off, while the third floor aluminium wire mesh had deformed during the test.
- The glazing perimeter sealant for the first floor was fully consumed, while the sealant for the second and third floors was partially consumed.
- Approximately 19 m^2 of the plasterboard and [redacted] face had flame damage.
- The ACP panels at the top only bent from the bottom edges due to heat.

See Figure 58 and Figure 59 for more details.

Appendix C Test data



Note:

- Red dots show MIMS (50 mm extended from the face) thermocouple locations.
- Blue squares show plate thermometer (on the face) locations.

Figure 26 Thermocouple locations – exposed face

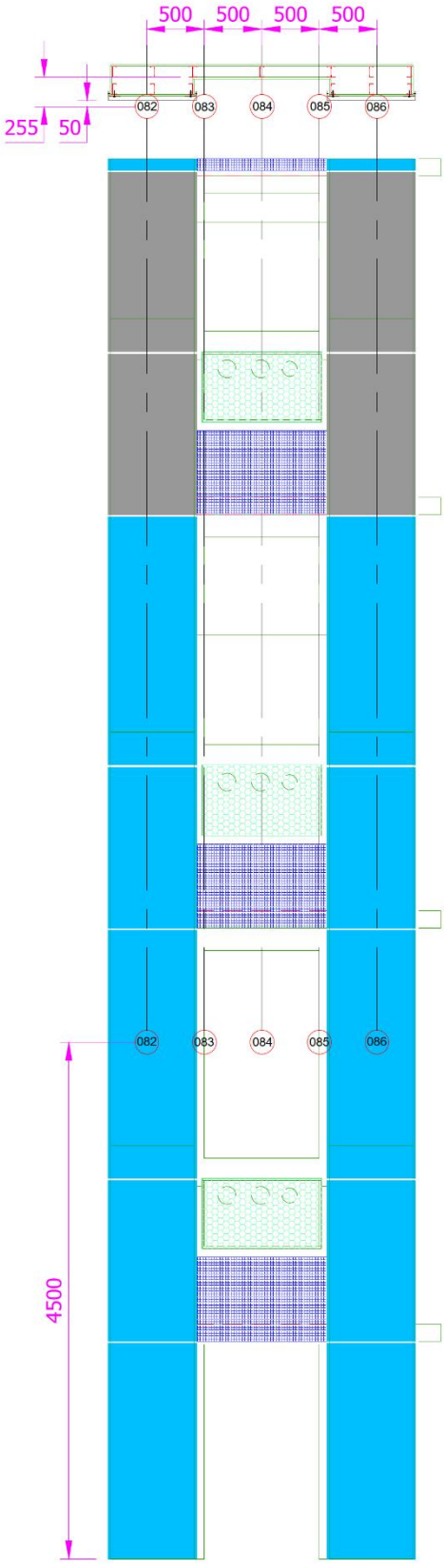


Figure 27 Thermocouple locations – BS8414-2

C.1 Specimen temperatures

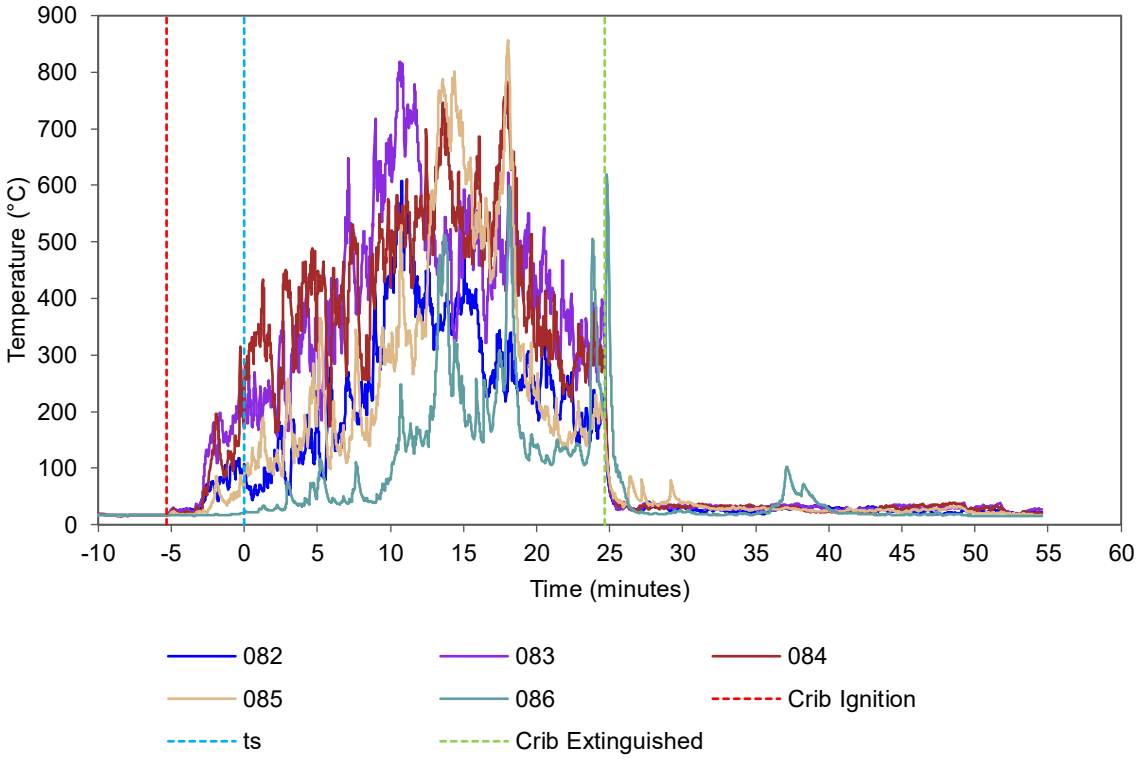


Figure 28 Level 1, external – temperature vs time

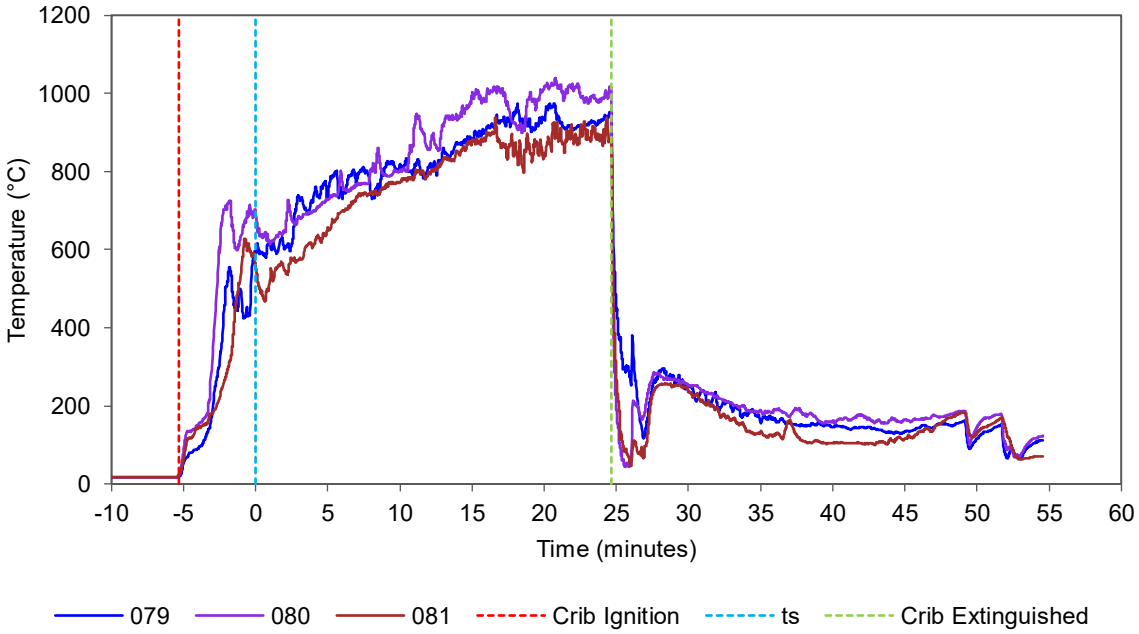


Figure 29 Combustion chamber, lintel – temperature vs time

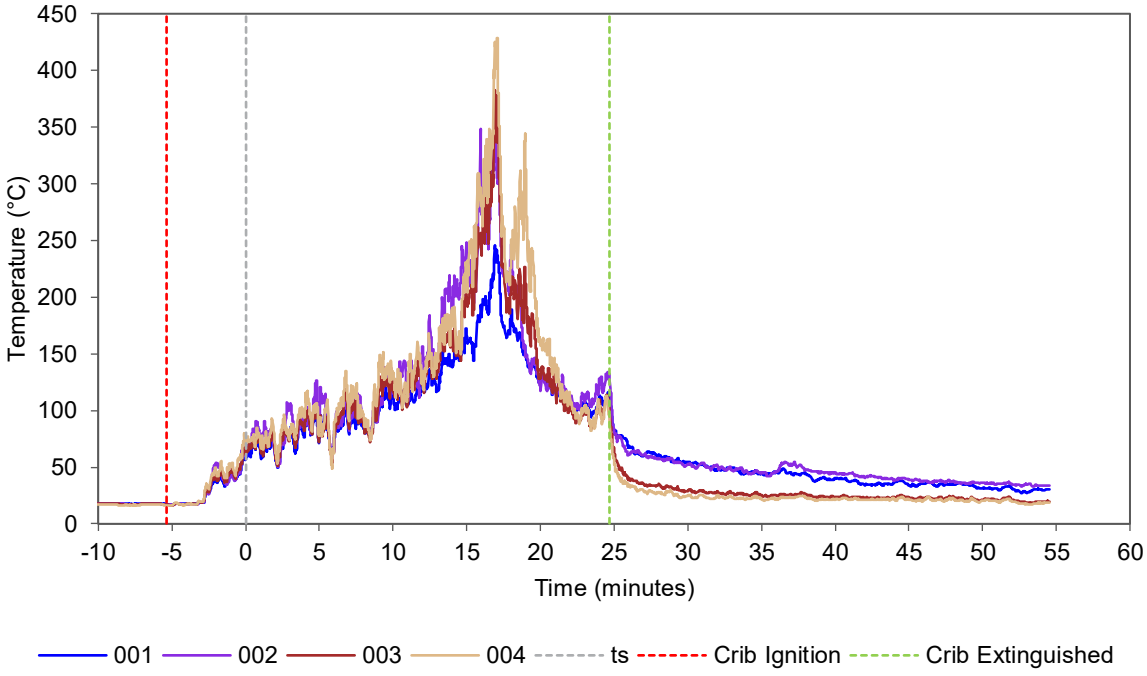


Figure 30 Level 3 ACP and aluminium (left side) thermocouples – temperature vs time

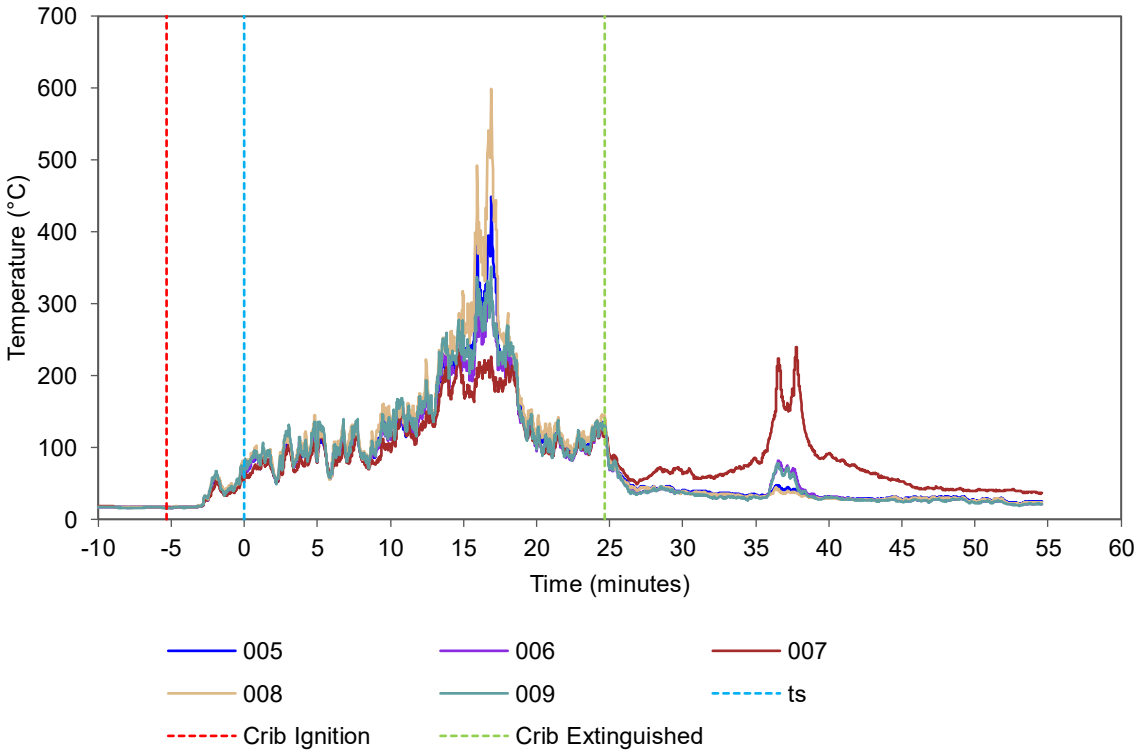


Figure 31 Level 3 glazing thermocouples – temperature vs time

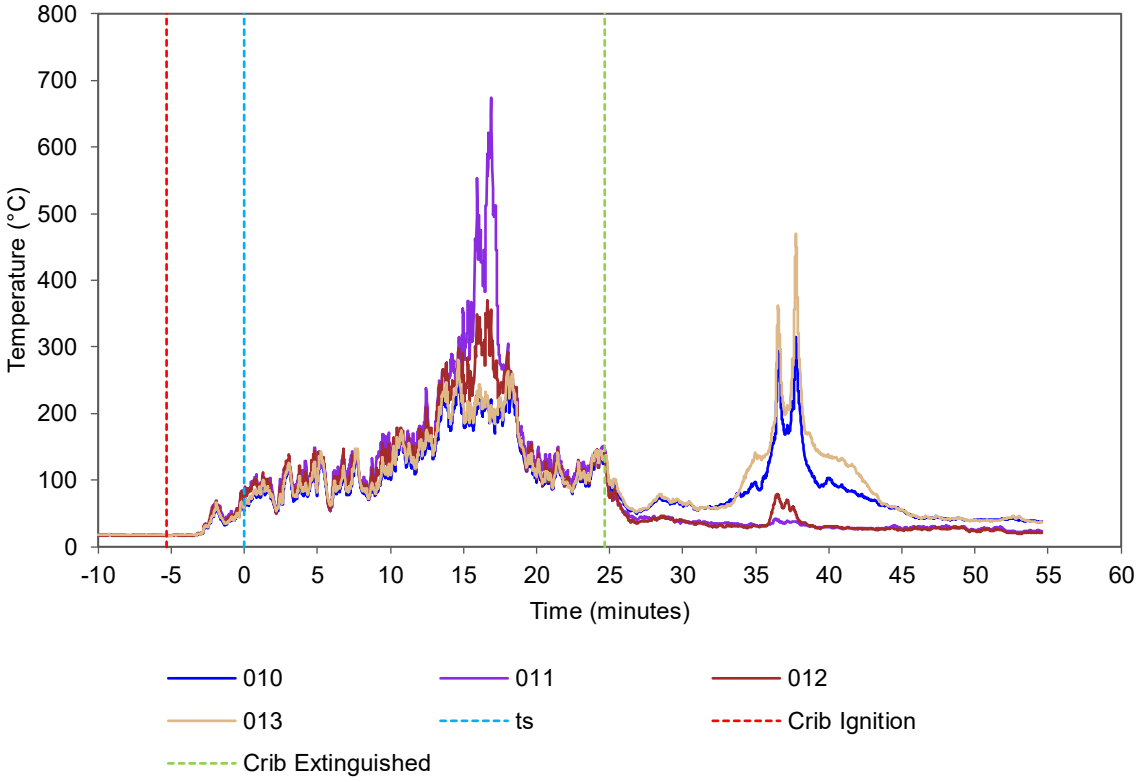


Figure 32 Level 3 thermocouples – temperature vs time

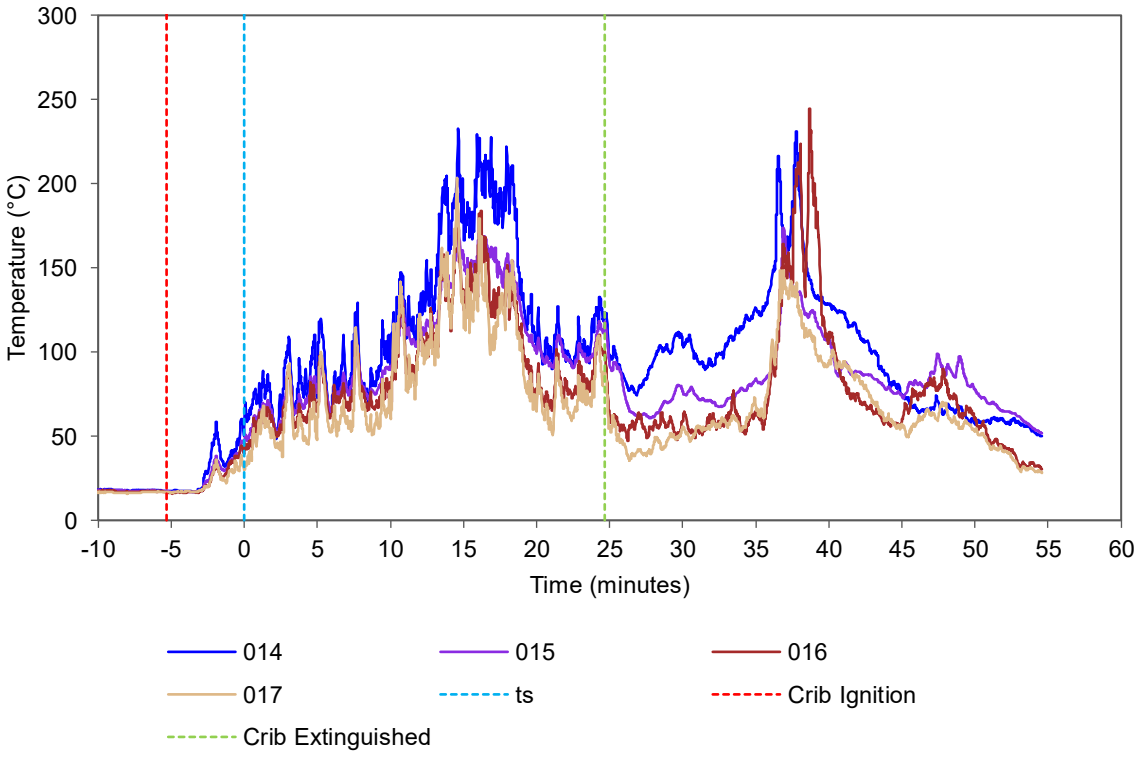


Figure 33 Level 3 ACP and aluminium (right side) thermocouples – temperature vs time

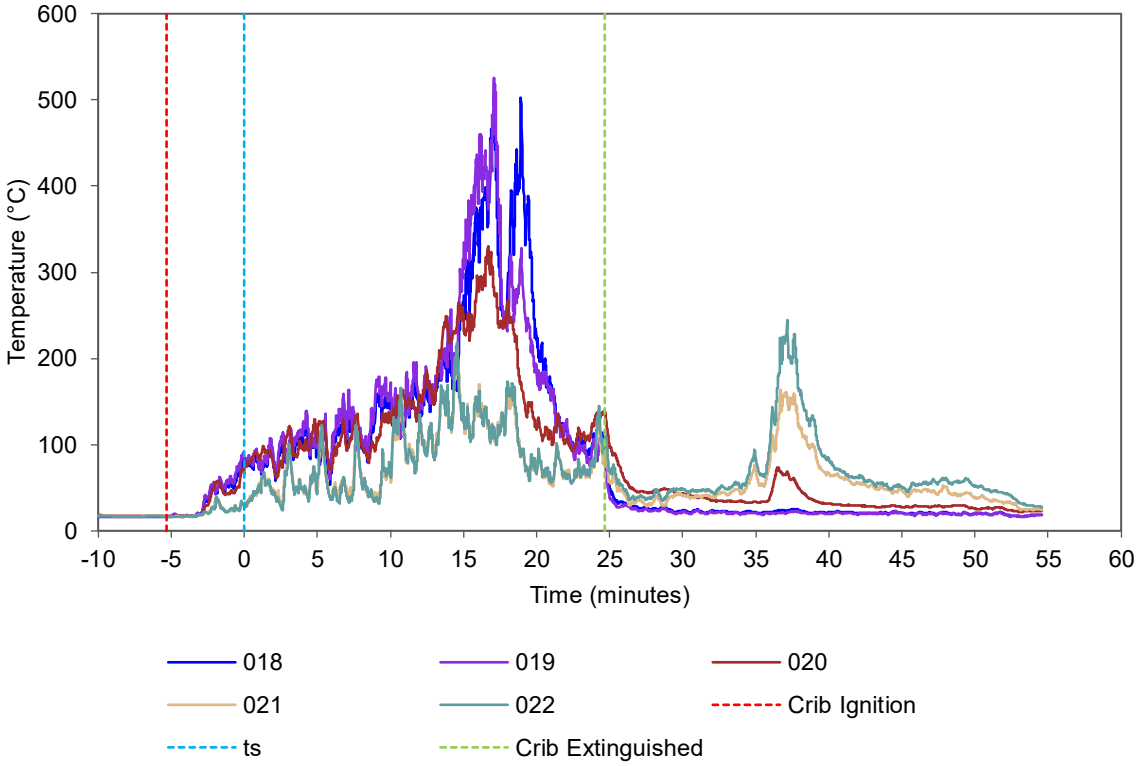


Figure 34 Level 3 aluminium and fly screen thermometers – temperature vs time

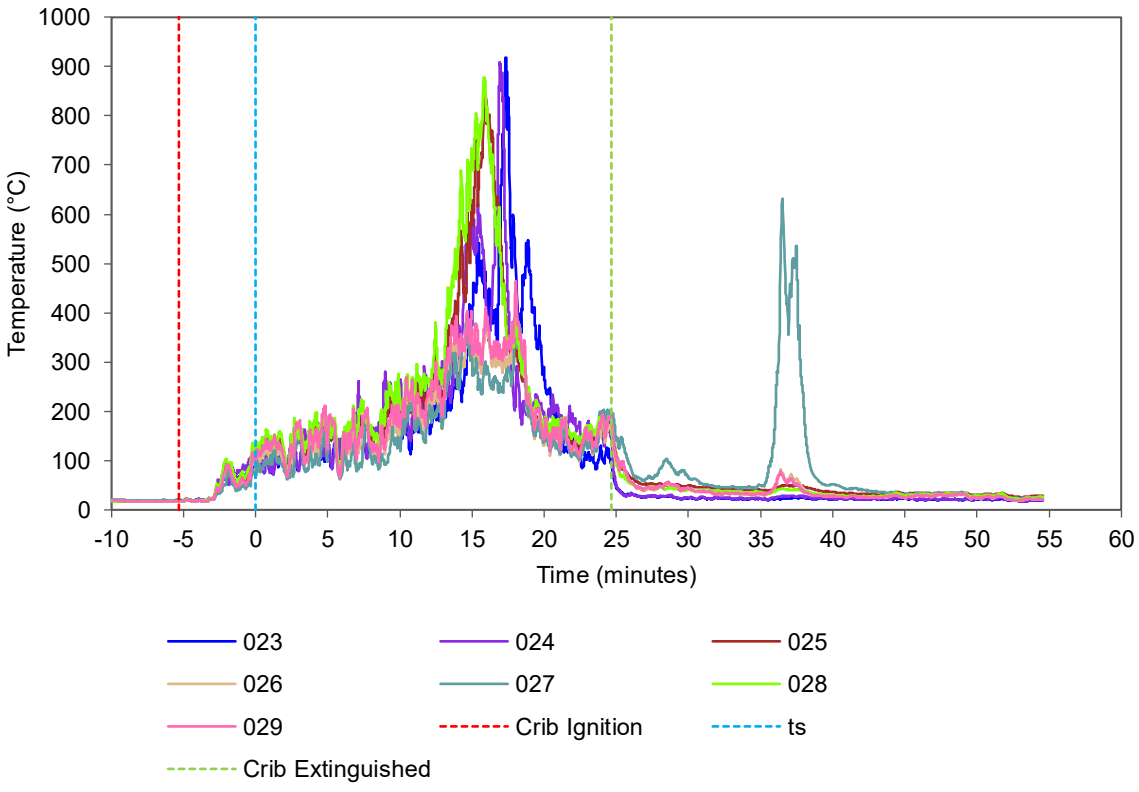


Figure 35 Level 2 ACP (right side) and glazing thermocouples – temperature vs time

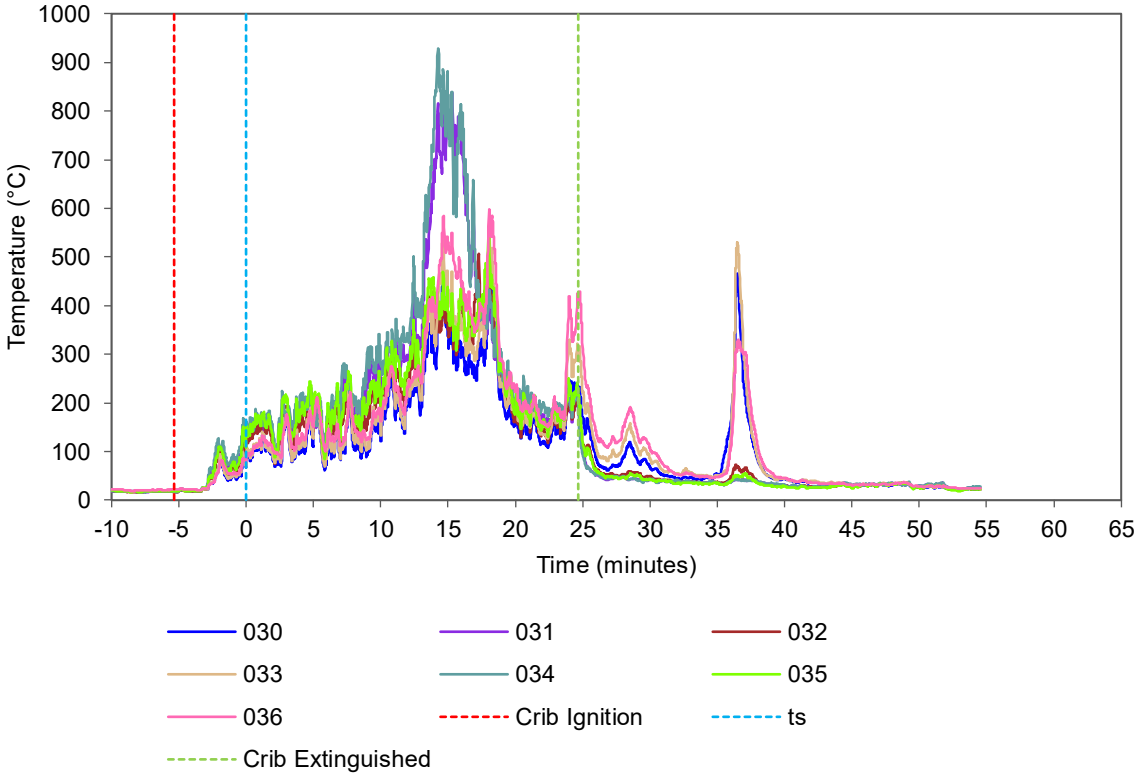


Figure 36 Level 2 glazing thermocouples – temperature vs time

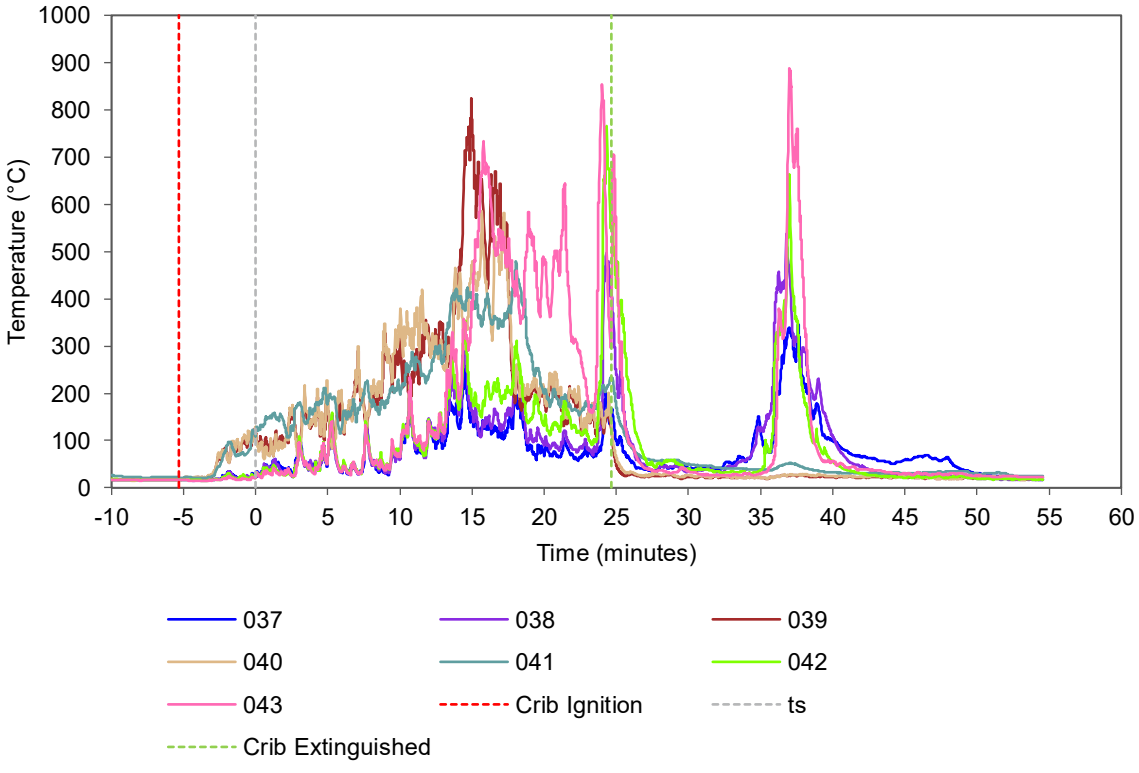


Figure 37 Level 2 ACP and fly screen thermocouples – temperature vs time

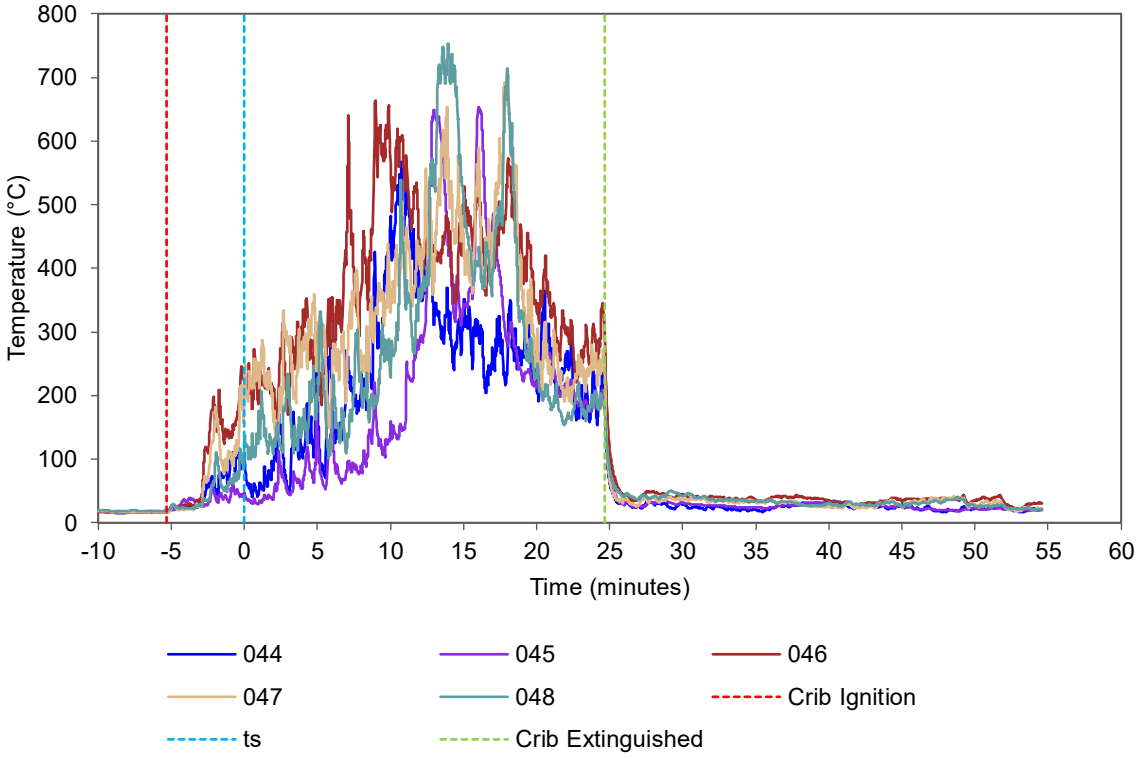


Figure 38 Level 1 left ACP and glazing thermocouples – temperature vs time

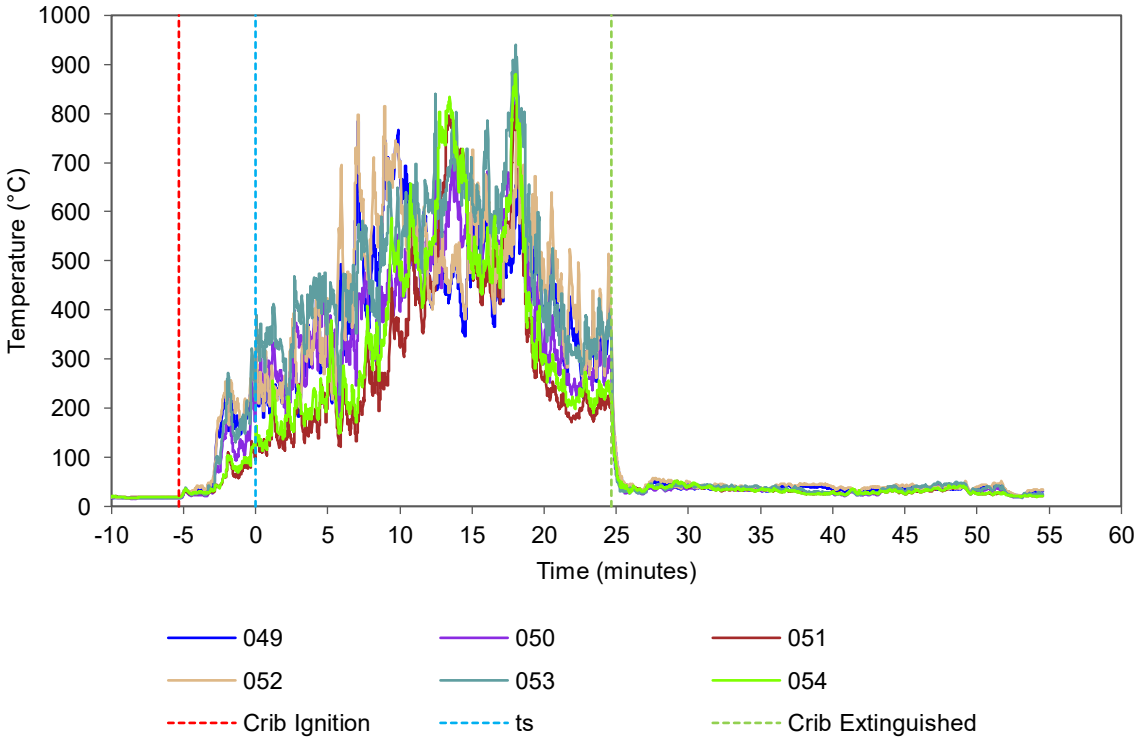


Figure 39 Level 1 glazing thermocouples – temperature vs time

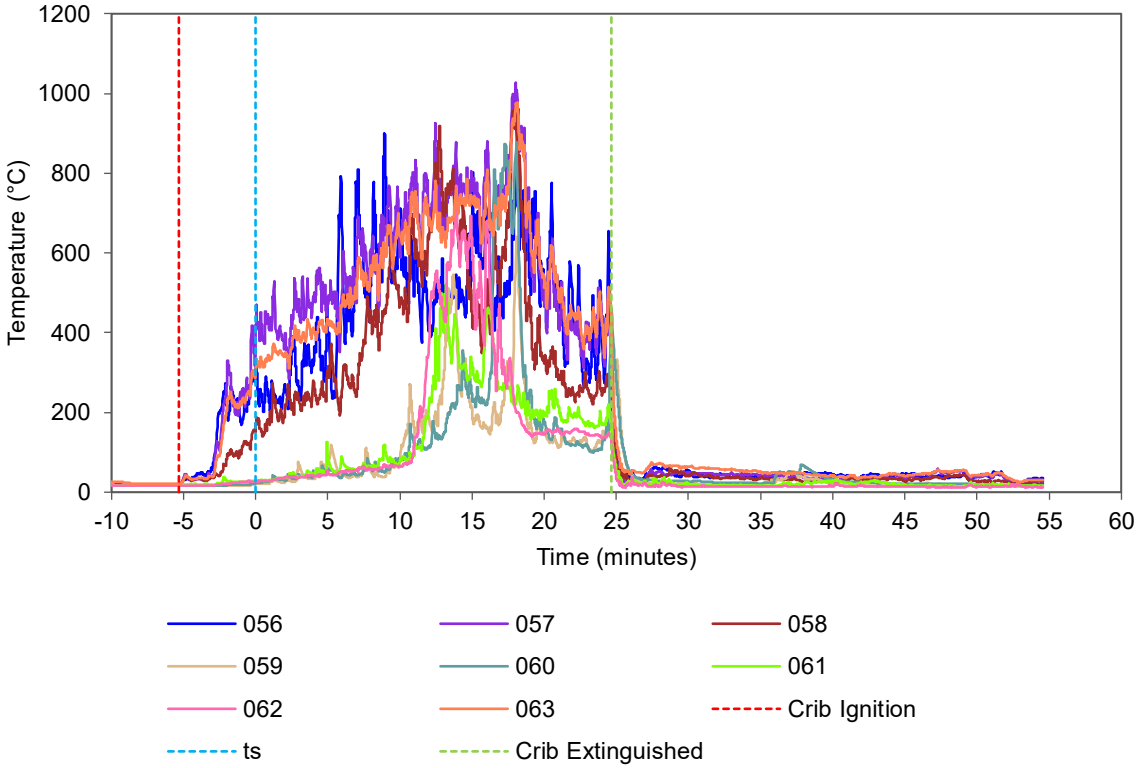


Figure 40 Level 1 glazing and ACP and fly screen thermocouples – temperature vs time

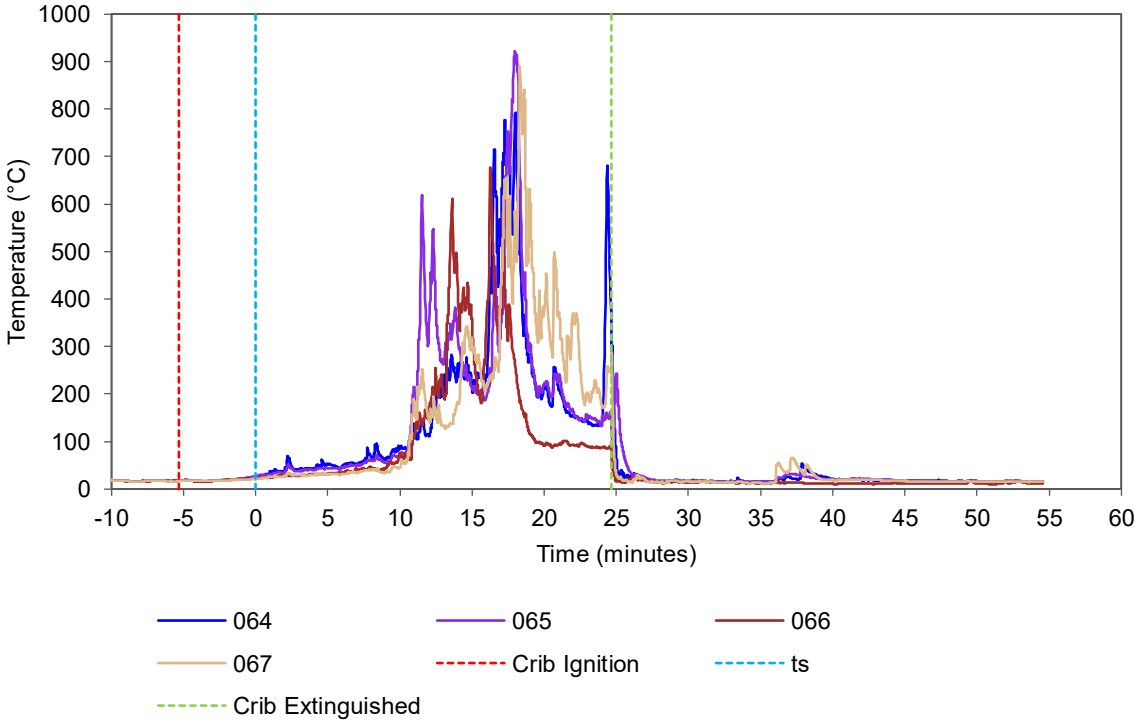


Figure 41 Bottom ACP thermocouples – temperature vs time

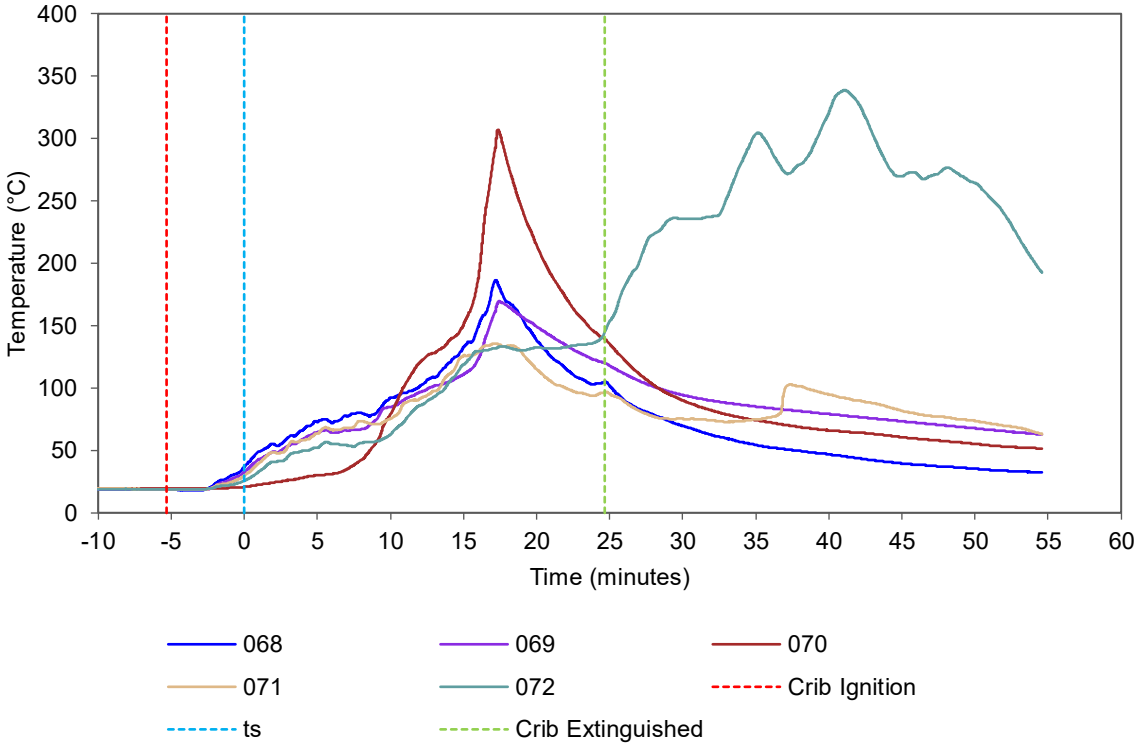


Figure 42 Level 3 plate (cavity and front) thermocouples – temperature vs time

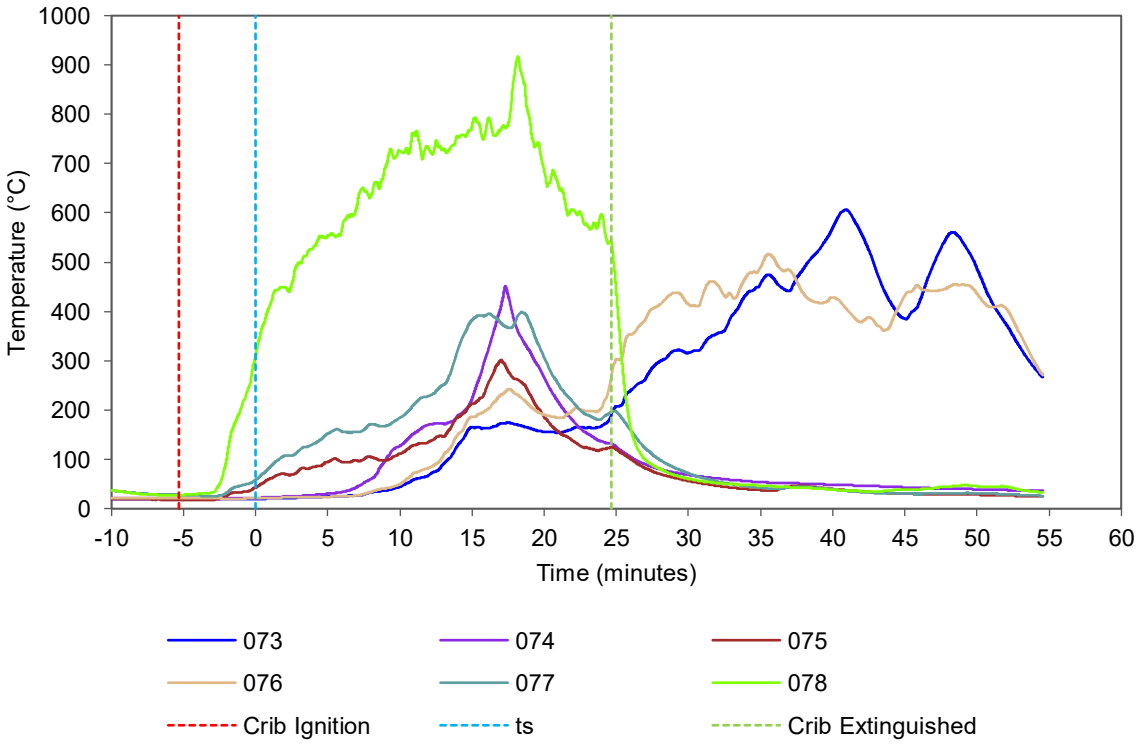


Figure 43 Level 3 and fly screens plate thermocouples – temperature vs time

Appendix D Photographs

Figure 44 The external cladding system before the start of the test – main wall

Figure 45 The external wall system during the test – 1 minute 30 seconds after crib ignition

Figure 46 The external wall system during the test – 6 minutes after crib ignition

Figure 47 The external wall system during the test – 10 minutes 30 seconds after crib ignition

Figure 48 The external wall system during the test – 15 minutes after crib ignition

Figure 49 The external wall system during the test – 20 minutes 5 seconds after crib ignition

Figure 50 The external wall system during the test – 24 minutes 55 seconds after crib ignition

Figure 51 The external wall system during the test – 29 minutes 55 seconds after crib ignition

Figure 52 The external wall system – 1 minutes 5 seconds after crib was extinguished

Figure 53 The external wall system – 2 minutes 30 seconds after crib was extinguished

Figure 54 **The external wall system – 7 minutes 51 seconds after crib was extinguished**

Figure 55 The external wall system – 12 minutes after crib was extinguished,

Figure 56 The external wall system – 15 minutes after crib was extinguished

Figure 57 The external wall system – 22 minutes and 12 seconds after crib was extinguished

Figure 58 The external wall system on the completion of the test

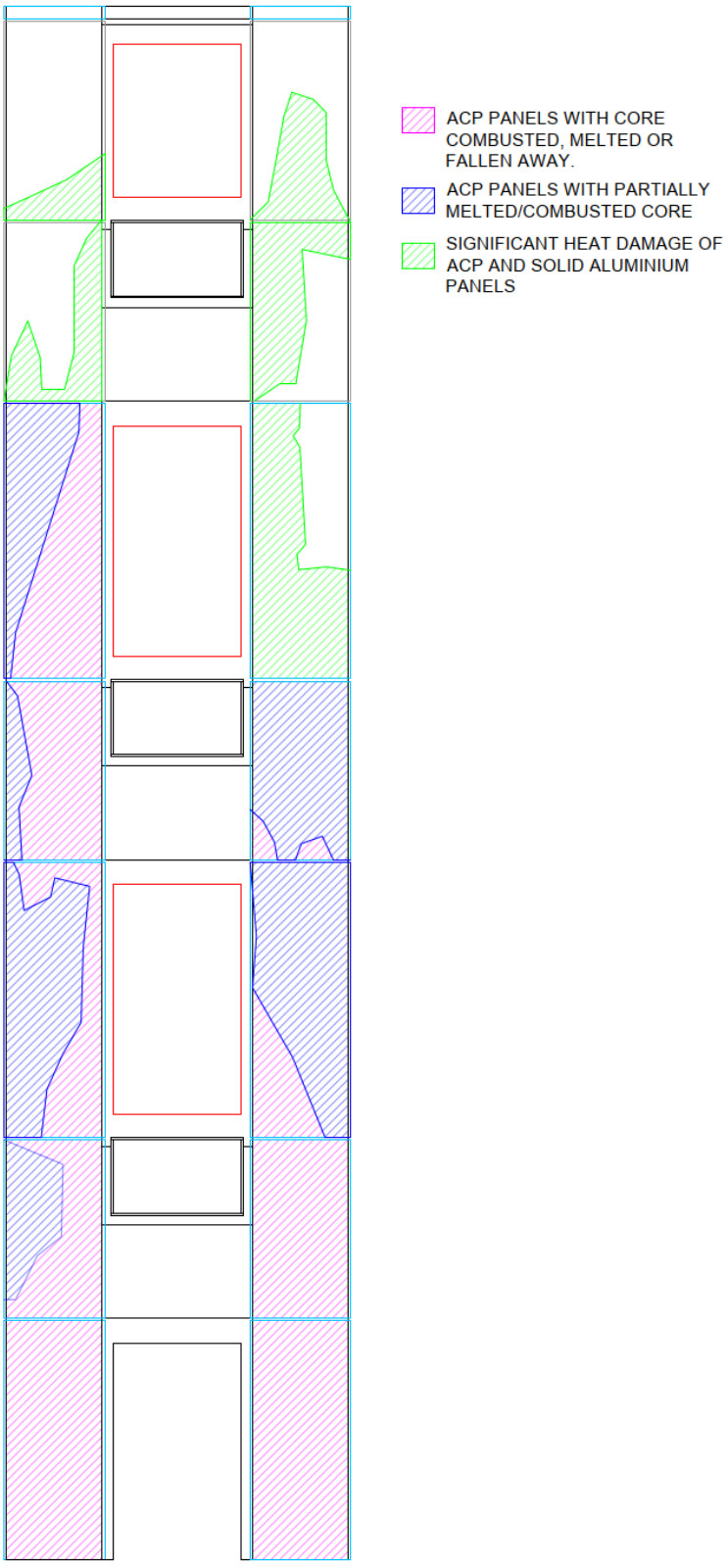


Figure 59 The post-test external wall system ACP damages – main wall

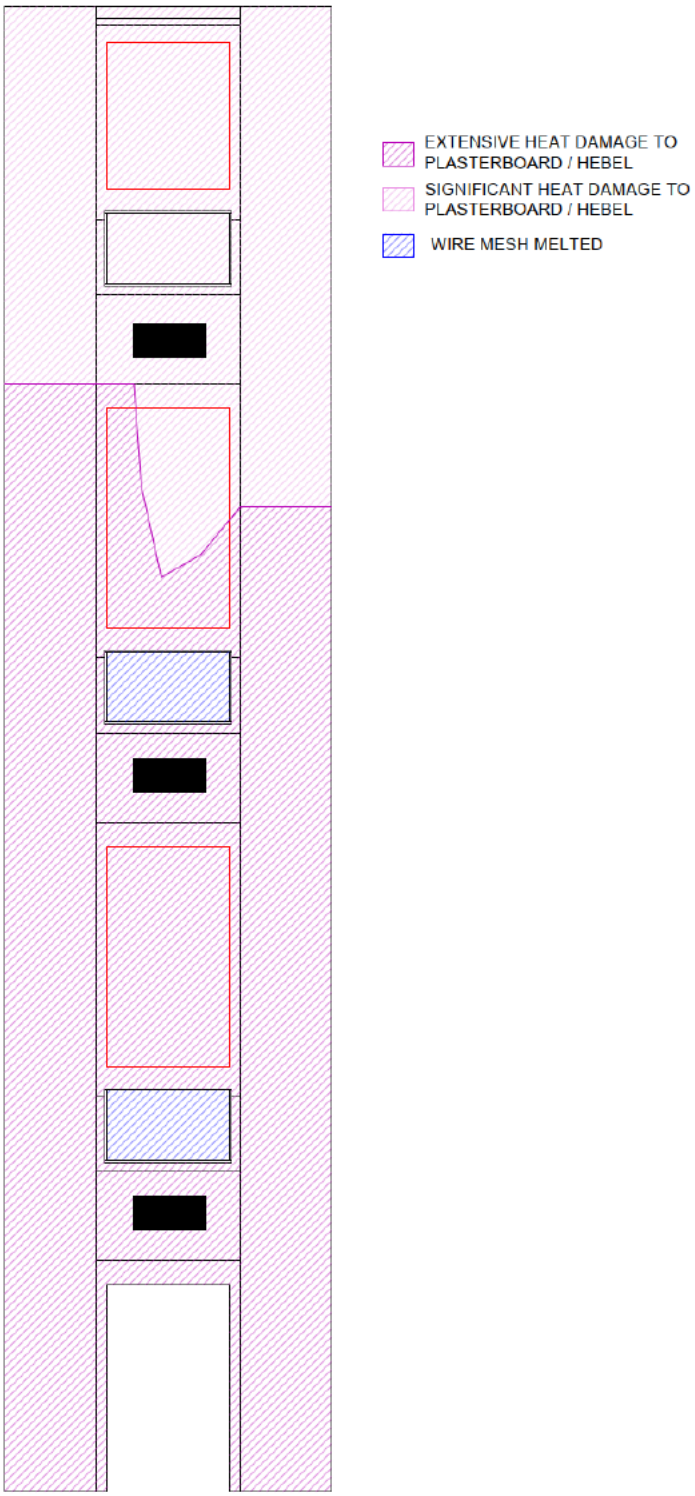


Figure 60 The post-test external wall system with ACP removed – main wall

Appendix E Chemical analysis results

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Test Report

Prepared by:

ANALYSIS OF CLADDING SAMPLES

For

Company: Warrington Fire
Contact: [redacted]
Date: 22 February 2024

Project No: 24021

Prepared by: [redacted]
Approved by: [redacted]

COMMERCIAL-IN-CONFIDENCE

UNSW SYDNEY

Analysis of Cladding Samples

1. SAMPLES

One envelope containing three ACP cores was received for analysis. The samples were identified as follows:

CCL sample coding	Client sample coding
24021-1	#1 - 100%
24021-2	#2 - 100%
24021-3	#3 - 45% Non FR

CCL has been asked to identify the polymer and the filler (s) in the samples by FT/IR, quantitate and identify the mineral filler in the samples and classify them in accordance with the ICA cladding scheme.

2. METHODOLOGY AND RESULTS

The aluminium metals were removed from the ACPs cladding polymer, and the flat surface of the polymer sample was abraded to remove any surface adhesive. The surface of the sample was analysed directly by FTIR. The FT-IR spectra are presented in Figures 1-3.

The core of the samples was then ashed to determine their percentage mineral content (Table 1). If sufficient (>0.5 g) ash was found in the sample, it was analysed for elemental composition by X ray fluorescence spectroscopy. Results are presented in Table 2.

Table 1 Ash content of 24021-1-3

Sample coding	Ash content (w/w%)
24021-1	3.3
24021-2	3.0
24021-3	40.0

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3. CONCLUSIONS

The cladding sample #1 consisted of 3.3% inert material and approximately 96% polyethylene polymer.

The cladding sample #1 is classified as ICA category A.

The cladding sample #2 consisted of 3.0% inert material and approximately 97% polyethylene polymer.

The cladding sample #2 is classified as ICA category A.

The cladding sample #3 consisted of 33.7% calcium carbonate, 5.6% magnesium hydroxide, 2.5% other inert material and approximately 58% polyethylene polymer.

The cladding sample #3 is classified as ICA category A.

The ICA Classification assigned is correct as per the September 2020 revision of the ICA Guidelines.

The reader is reminded that we can only analyse and classify the content of samples actually presented to us. We can offer no guarantee that this composition or classification is valid for cladding as a whole, because some types of cladding can be inhomogeneous, and a sample may not be representative of the cladding as a whole. Anyone using our results should consider these sampling issues and uncertainties before they generalise the results we present to anybody of cladding as a whole.

[redacted]

Senior Technical Officer

Chemical Consulting Laboratory

Mark Wainwright Analytical Centre, UNSW

22 February 2024

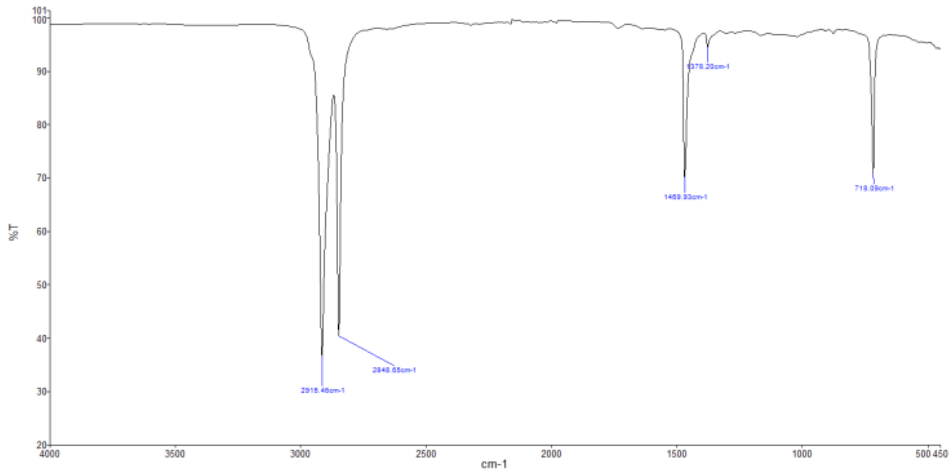

Figure 1. FT-IR spectrum of sample #1

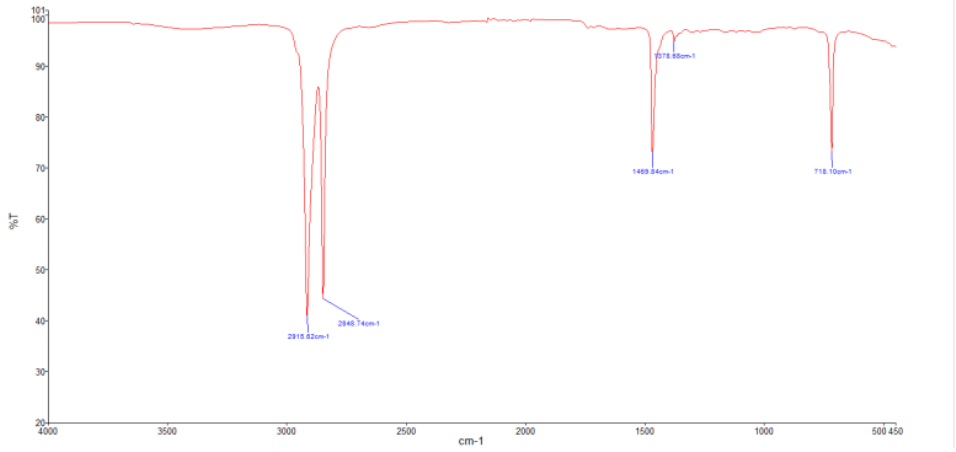

Figure 2. FT-IR spectrum of sample #2

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