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BRE Global Test Report

BS 8414-2:2015 + A1:2017 Test on 3mm-thick aluminium cassette panels with 150mm-thick Rockwool Rainscreen Duo Slab insulation

Prepared for: SBS Cladding

Report Number: P119916-1000 Issue: 2

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1 Introduction

The test method, BS8414-2:2015 + A1:2017[1] describes a method of assessing the behaviour of non-loadbearing external cladding systems, rainscreen over cladding systems and external wall insulation systems when applied to the face of a building and exposed to an external fire under controlled conditions. The fire exposure is representative of an external fire source or a fully developed (post-flashover) fire in a room, venting through an opening such as a window aperture that exposes the cladding to the effects of external flames.

All materials and products used in the test were supplied and installed by the Test Sponsor. BRE Global was not involved in the sample selection process and therefore cannot comment upon the relationship between samples supplied for test and the samples supplied to market. Results apply to the sample as received and installed.

The validity of the results is conditional on the accuracy of the data. All measurements quoted in this report are nominal unless stated otherwise.

This report supersedes the original BRE Global Ltd test report P119916-1000 issue 1 dated 14/03/2022 which is now withdrawn with effect from the date of this Issue 2 report. The test specimen detailed within this report has not been re-tested.

In Issue 2, ‘Luxe Clad A1 PVDF coil coated aluminium sheet’ has been added at the request of the Test Sponsor. It was not possible for BRE to verify this detail at the time of test or retrospectively. This change has been made following a statement from the Test Sponsor and panel manufacturer, email dated 22/01/2024, that this was the product delivered and installed for test.

The Test sponsor company name and address has also been updated from Precision Façade Systems to SBS Cladding.

2 Details of Test Apparatus

The product was installed on to wall number 3 of the BRE Global test facility. This apparatus is representative of a structural steel framed building and consists of a structural steel test frame with a vertical main test wall and a vertical return wall at a 90º angle to and at one side of the main test wall - see *Figure 42*. The main wall includes the combustion chamber.

3 Description of the System

Product names, system drawings and other detailed construction data were supplied by the Test Sponsor and were not independently verified by BRE Global. The validity of the test results is conditional on the accuracy of the system details, the component specification and the installation of the system components.

The details in sections 3.1, 3.2 and 3.2.1 were dimensionally/visually verified and recorded during installation by BRE Global and take precedence over the Test Sponsor supplied drawings (section 3.2.2).

The Test Sponsor has been asked to review the test report and takes responsibility for any discrepancies and inaccuracies in the supplied drawings (section 3.2.2).

3.1 Summary

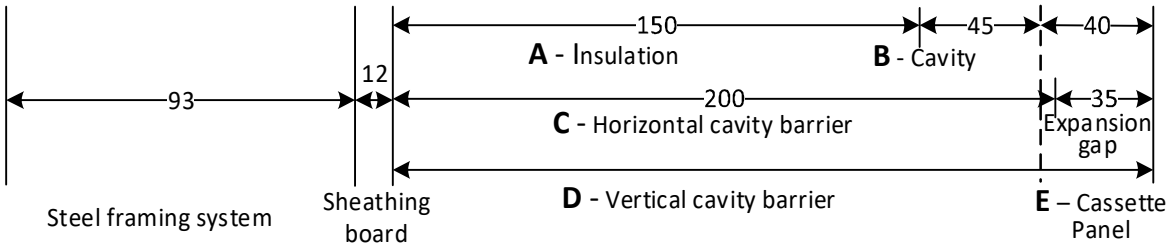

Figure 1. Basic system cross section (not drawn to scale, dimensions given in mm).

Generic cladding type	Aluminium cassette panel rainscreen on a steel framing system
Insulation (A)*	Rockwool Rainscreen Duo Slab (1200mm×600mm×150mm-thick)
Cavity (B)*	45mm (to rails) 85mm (including panel profile)
Horizontal (ventilated) cavity barriers (C)*	FSi Silverliner OSCB 2 75/50 open state intumescent cavity barrier with pig tail screws (200mm-deep×75mm-high, 50mm max air gap specified) FSi Silverliner OSCB X intumescent strip (75mm-high×105mm-wide×2mm-thick, double layer)
Vertical (full fill) cavity barriers (D)*	FSi Paraflam foil faced cavity barrier (240mm-deep×75mm-wide)
External finish (E)*	Aluminium cassette panel** with white finish (3mm-thick×40mm-deep profile)

*with reference to Figure 1

**stated by the Test Sponsor to be ‘Luxe Clad A1 PVDF coil coated aluminium sheet’

3.2 Description of product

Table 1. List of component parts used in the tested system.

Item	Description
1	Metsec slotted 'U'-shaped steel head track (93mm-deep×68mm-high×1.2mm-thick)
2	Metsec 'U'-shaped steel base track (93mm-deep×68mm-high×1.2mm-thick)
3	Metsec vertical 'C'-shaped steel stud (90mm-deep×50mm-wide×1.2mm-thick)
4	RCM Y-WALL calcium silicate sheathing board (2400mm×1200mm×12mm-thick)
5	Cortex 0560FR Flame-retardant self-adhesive membrane (49mm×20m roll)
6	Cortex 0500FR Flame-retardant membrane (350mm×20m roll)
7	Cortex 0771FR paste adhesive
8	Cortex 0220FR breather membrane (1500mm×50m roll)
9	Cortex Double-Sided Tape (50mm×100m roll)
10	Cortex UV Façade Tape (75mm ×25m roll)
11	Aluminium 'L'-shaped brackets: A. 150mm-deep×60mm-wide×100mm-high×6mm-thick B. 200mm-deep×60mm-wide×100mm-high×6mm-thick
12	Profiled aluminium link block (75mm-high×47mm-deep×24mm-wide×5-10mm-thick) – see Fig 10
13	Profiled aluminium 'T'-shaped rail (100mm-wide×80mm-wide×4.5mm-thick×Ø20mm head) – see Fig 11
14	Aluminium joint block (215mm-high×58mm-deep×28mm-wide×4mm-thick) – see Fig 12
15	Aluminium dead load clip (50mm-high×58mm-deep×28mm-wide×4mm-thick) – see Fig 13
16	Aluminium 'L'-shaped angle (50mm-wide×50mm-deep×3mm-thick)
17	FSi stainless steel split-end brackets (390mm×25mm-wide×1mm-thick)
18	FSi Silverliner OSCB open state intumescent cavity barrier with pig tail screws (200mm-deep×75mm-high with 50mm intumescent expansion)
19	FSi stainless steel brackets (390mm×25mm-wide×1.5mm-thick – cut to 325mm-deep)
20	FSi Paraflam foil faced cavity barrier (240mm-deep×75mm-wide)
21	Rockwool Rainscreen Duo Slab (1200mm×600mm×150mm-thick)
22	FSi Silverliner OSCB X Intumescent strip (75mm-high×105mm-wide×2mm-thick)
23	Combustion chamber opening flashing: A. Aluminium cassette panel* with white finish (100mm-wide×215mm-deep internal side×45mm-deep on wall side×3mm-thick) see Fig 25 B. Aluminium 'L'-shaped angle* with white finish (50mm-deep×12mm-wide×3mm-thick)
24	Aluminium cassette panel* with white finish (3mm-thick×40mm-deep profile)

*stated by the Test Sponsor to be 'Luxe Clad A1 PVDF coil coated aluminium sheet'

3.2.1 Installation sequence

Figure 2. Installation of steel framing system (SFS).

Figure 3. Head track (left), base track (middle) and vertical stud (right).

Figure 4. SFS location on the square hollow section (SHS).

200mm×200mm×6mm Square Hollow Section (SHS) steel beams were fitted as part of the BRE test rig at 2530mm, 5070mm and 7550mm from ground to underside of section. At the top of the apparatus was a 150mm×150mm×6mm steel angle, 9030mm from ground. These were the primary attachment points of the cladding system to the test rig.

Head tracks (Item 1) were fixed to the underside of the SHS at every level (20mm behind the front face of the SHS) and to the steel angle at the top of the system, with 5mm×37mm self-drilling screws with EPDM washers. Fixings at nominal 600mm horizontal centres.

Base tracks (Item 2) were fixed to the ground and topside of the SHS at every level in line with the head tracks, with DEWALT DWT1400150 SP 6.3mm×45mm screws (to ground) and 5mm×37mm self-drilling screws with EPDM washers (to SHS). Fixings at nominal 600mm horizontal centres.

Vertical studs (Item 3) were fixed between the head and base tracks, with TIMCO 5.5mm×25mm self-drilling screws, four fixings per stud located: front/back at top (through movement slot) and front/back at base. The stud centres were at 600mm with the spacing at main and wing wall outer edges reduced to 430mm and 412mm respectively. An additional stud was installed at ground level, adjacent to the combustion chamber wall, 195mm from the main-wing wall junction.

Figure 5. Installation of sheathing board.

Sheathing boards (Item 4) were fixed to the vertical studs (Item 3) as horizontal boards, with Evolution TSTF4.8-45-3 (4.8×45mm) self-drilling screws at 300mm vertical centres.

Figure 6. Installation of EPDM membrane.

Self-adhesive EPDM membrane (Item 5) was applied to vertical and horizontal sheathing board joints and at the main-wing wall junction.

A 350mm-high section of fire-retardant EPDM membrane (Item 6) was applied to the sheathing board-SHS joints and combustion chamber-sheathing board joints. The membrane was fixed in place with Cortex paste adhesive (Item 7).

Figure 7. Installation of the breather membrane.

Breather membrane (Item 8) was fixed to the system in horizontal rows, with approx. 200mm overlap per section. The rear side of the membrane was secured with Cortex double-sided tape (Item 9) vertically and horizontally as each section was applied. The joints on the front face were sealed with Cortex UV Façade Tape (Item 10).

Figure 8. Installation of brackets and profiled ‘T’-shaped rails.

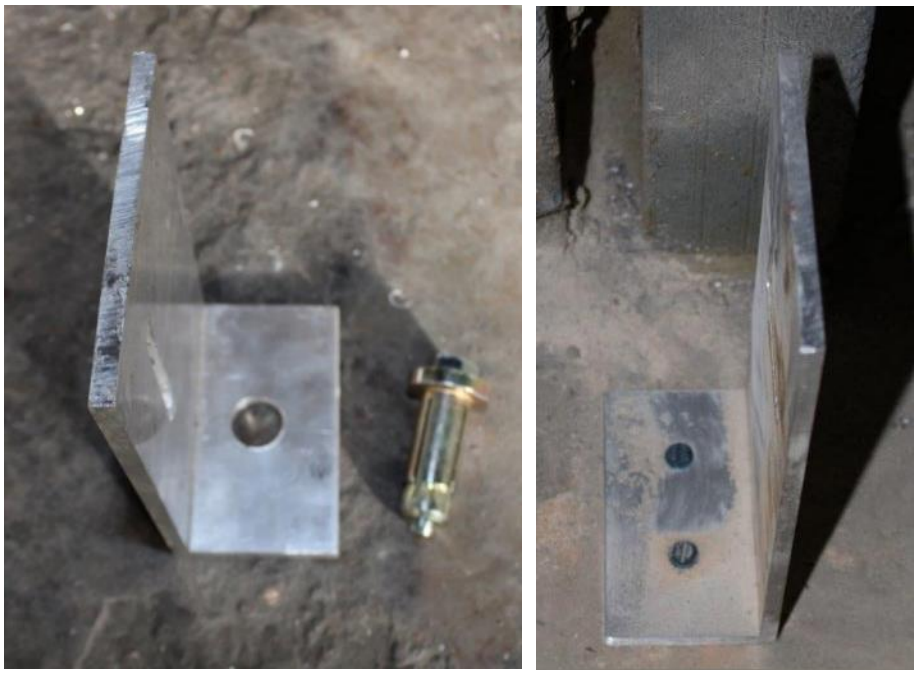

Figure 9. Aluminium ‘L’-shaped brackets (Item 11A - left, Item 11B - right).

Figure 10. Profiled aluminium link blocks (Item 12).

Aluminium brackets (Item 11A) were fixed to the SHS beams located at 2530mm, 5070mm and 7550mm from ground to underside of section, with one Lindapter M12 Hollo-Bolt per bracket. Aluminium brackets (Item 11B) were fixed at the base of the system to the ground in line with the brackets fixed to the SHS beams, with two DEWALT DWT1400150 6.3mm×45mm screws per bracket. Horizontal bracket centres were 1064mm on the main wall and 568mm on the wing wall.

Two aluminium link blocks (Item 12) were fixed back-to-back, 110mm from the sheathing board to the brackets with 2 × DIN933 A2 M8×60mm bolts, M8×25(×1.5) A2 penny washer, DIN 125-A A2 flat washer and DIN985 A2 M8 nut with nylon insert.

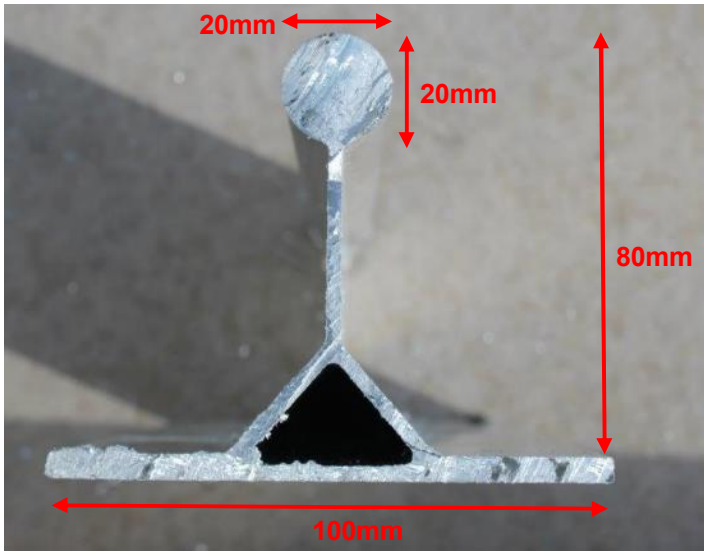

Figure 11. Profiled 'T'-shaped rail (Item 13).

Aluminium rails (Item 13) were slotted into the link blocks (Item 12) and secured by tightening link block fixings together. Two sections of rail spanned the full height: one from ground to 2144mm high, second section continued from first section to top of system with a 15-20mm gap at the junction.

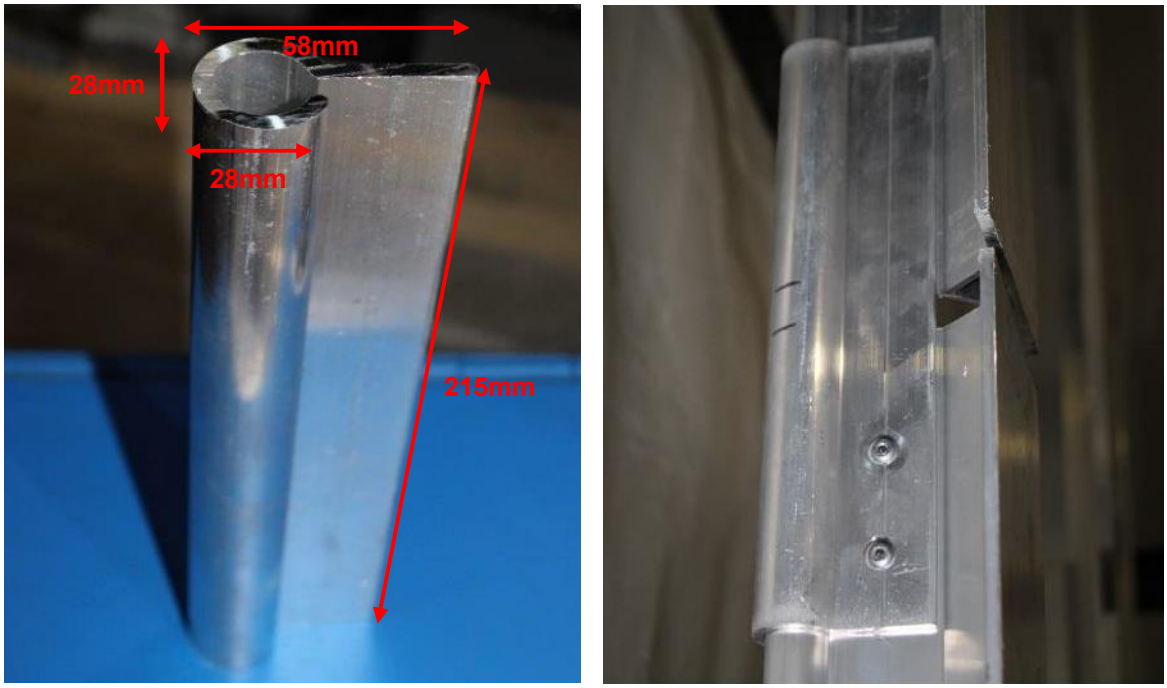

Figure 12. Aluminium joint block (Item 14).

A section of joint block (Item 14) was used to join both sections of rail length together. It slotted over the rail along the back edge (closest to sheathing board) and was fixed through the web of the rails with EasyFix 4.8mm×14mm steel rivets: two at the lower rail section.

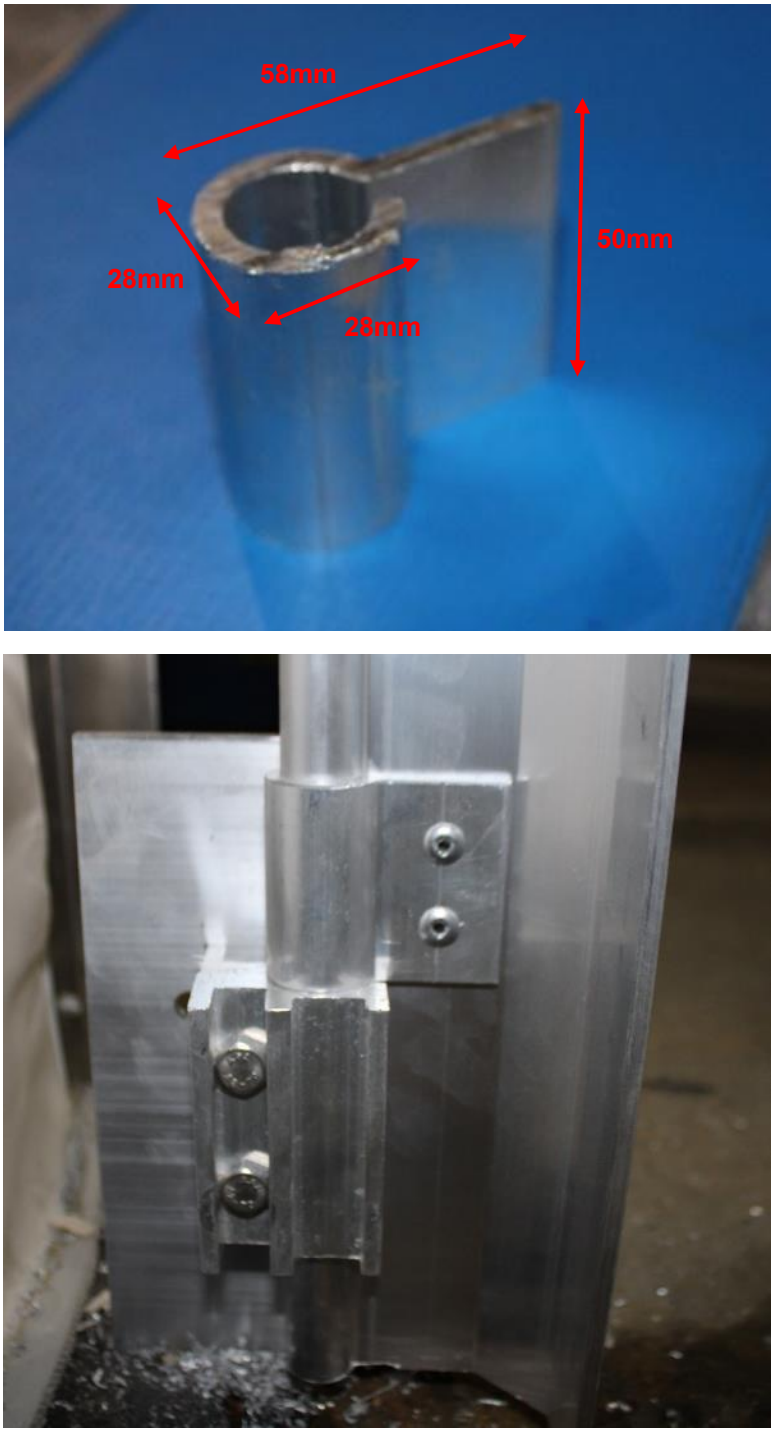

Figure 13. Aluminium dead load clip (Item 15).

Dead load clips (Item 15) were fixed to the web of the rails just above the link blocks (Item 12) at both locations (ground level and at 1st SHS) to secure rails in place. The dead load clips were fixed with two EasyFix 4.8mm×14mm steel rivets per clip.

Figure 14. Aluminium ‘L’-shaped angle.

Aluminium angle (Item 16) was fixed at the outer edges of the main and wing walls and around the combustion surround at the vertical (15mm offset) and horizontal (50mm offset) edges. The angles were fixed with DEWALT DWT1400150 6.3mm×45mm screws at nominal 550mm centres.

Figure 15. Installation of horizontal & vertical cavity barriers.

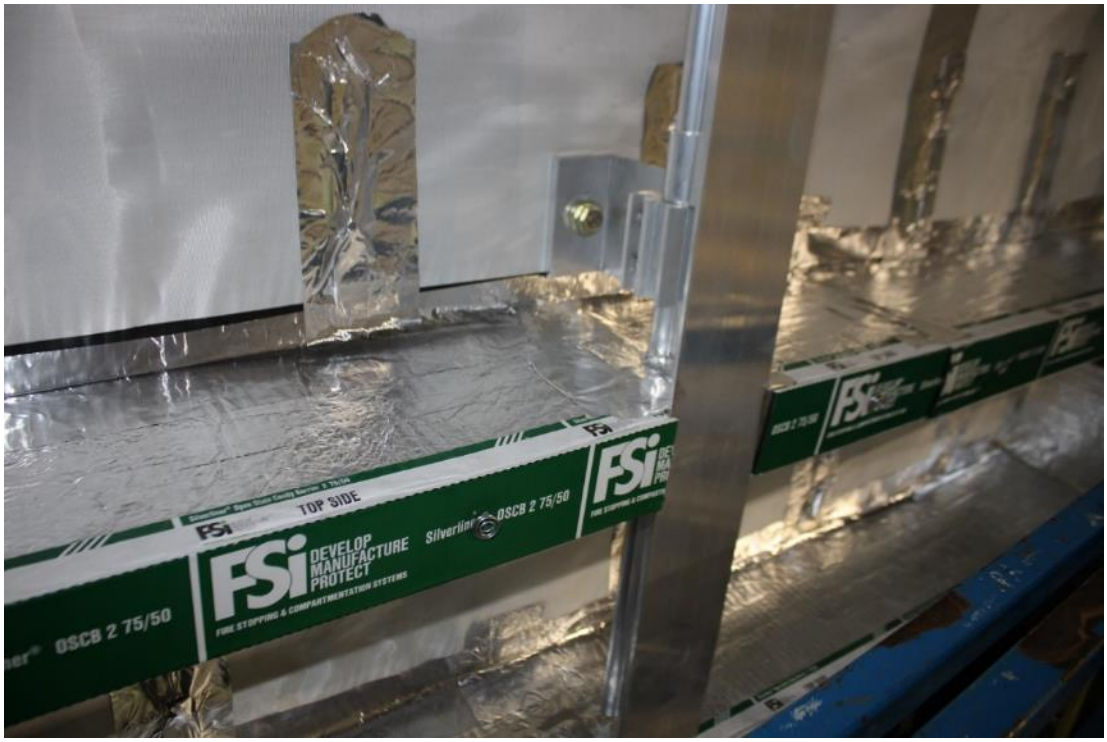

Figure 16. Barrier cut outs at rail and barrier joints.

Figure 17. Horizontal and vertical barrier joint.

Figure 18. Vertical cavity barrier joint.

Horizontal cavity barriers

Steel split-end brackets (Item 17) were folded to 165mm-deep and fixed in three continuous rows located at: 2490mm, 4770mm and 6895mm from ground. Another row was located in line with the combustion chamber opening, 2127mm from ground. The brackets were fixed at 250mm horizontal centres with DEWALT DWT1400150 6.3mm×45mm screws to the combustion chamber blockwork and Evolution TSBW5.5-38-3 (5.5mm×38mm) screws (with EPDM washer) to the sheathing board, two fixings per brackets.

Horizontal cavity barriers (Item 18) were pressed onto the split-end brackets in rows and notched around the 'T'-shaped rails, with a section of the intumescent strip removed in line with the width of the 'T'-shaped rails. Aluminium tape was applied to: barrier-barrier joints (top and bottom face), sheathing board-barrier joints and barrier-'T'-shaped rail joints.

Vertical cavity barriers

Steel brackets (Item 19) were folded to 170mm-deep and fixed in one continuous column located at: 230mm from the wing wall breather membrane face. Two other columns were located either side of the combustion chamber at: 470mm and 2455mm from the wing wall sheathing board to a height of 2400mm. The brackets were fixed at 250mm vertical centres with DEWALT DWT1400150 6.3mm×45mm screws to the combustion chamber blockwork and Evolution TSBW5.5-38-3 (5.5mm×38mm) screws with EPDM washers to the sheathing board, two fixings per brackets.

Vertical cavity barriers (Item 20) were pressed onto the brackets in columns. Aluminium tape was applied: to barrier-sheathing board joints, at vertical barrier-horizontal barrier joints (top and bottom face of horizontal barrier) and vertical barrier-barrier joints (front and side face).

Figure 19. Installation of tape to profiled ‘T’-rail face.

Cortex UV Façade Tape (Item 10) was applied to the face of the ‘T’-shaped rails vertically from ground to full height of system.

Figure 20. Installation of the insulation & and intumescent strip.

Figure 21. Plastic disc.

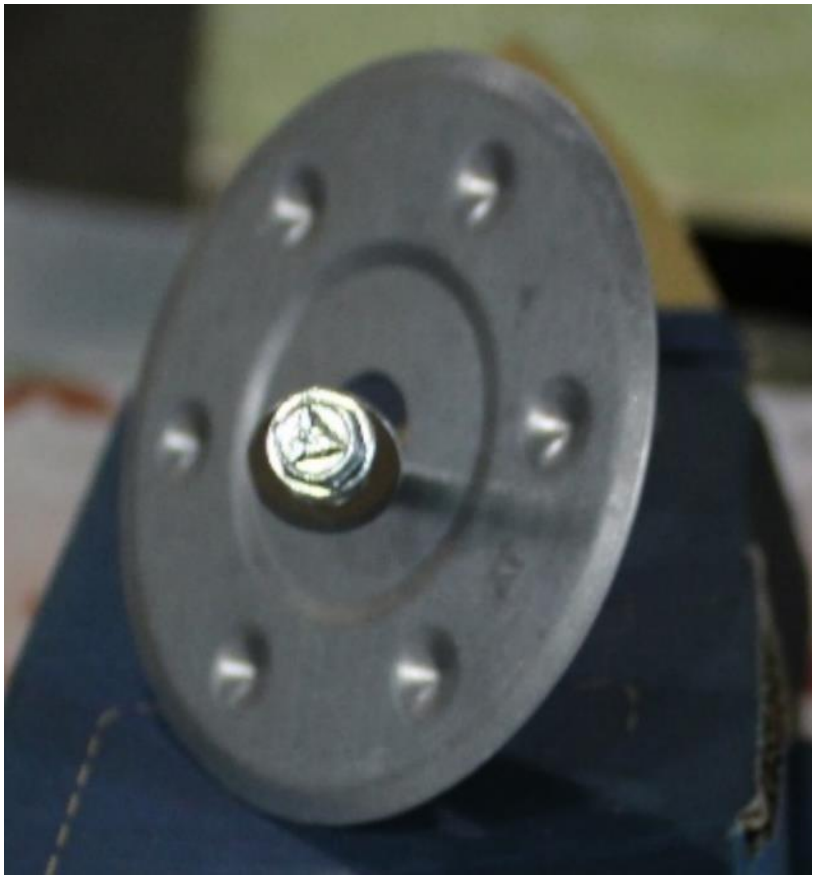

Figure 22. Metal disc.

Figure 23. Close up of insulation fixing detail.

Insulation slabs (Item 21) were fixed (long edge vertical) with staggered horizontal joints. The insulation was fixed with screws and insulation washers:

- Rawplug OCS-55/63170 6.3mm×170mm screws with Rawlplug MKC-85 (Ø85mm) metal washer (at the centre of the slab), or
- Rawplug R-WX-48T180 4.8mm×180mm screws with Koelner Ø90mm plastic (outer) washer and Rawlplug R-KC (Ø60mm) plastic (inner) washer (between adjoining slabs at mid-width).

There was an 45mm cavity from the front face of the insulation to the front face of the ‘T’-rail.

Figure 24. Intumescent strip applied to face of rail.

Intumescent strip (Item 22) was fixed to the ‘T’-shaped rails at the horizontal barrier heights, where a section of intumescent had been removed. The intumescent strip was double lapped and fixed with two Evolution TSBW5.5-38-3 (5.5mm×38mm) screws, nominal 85mm apart.

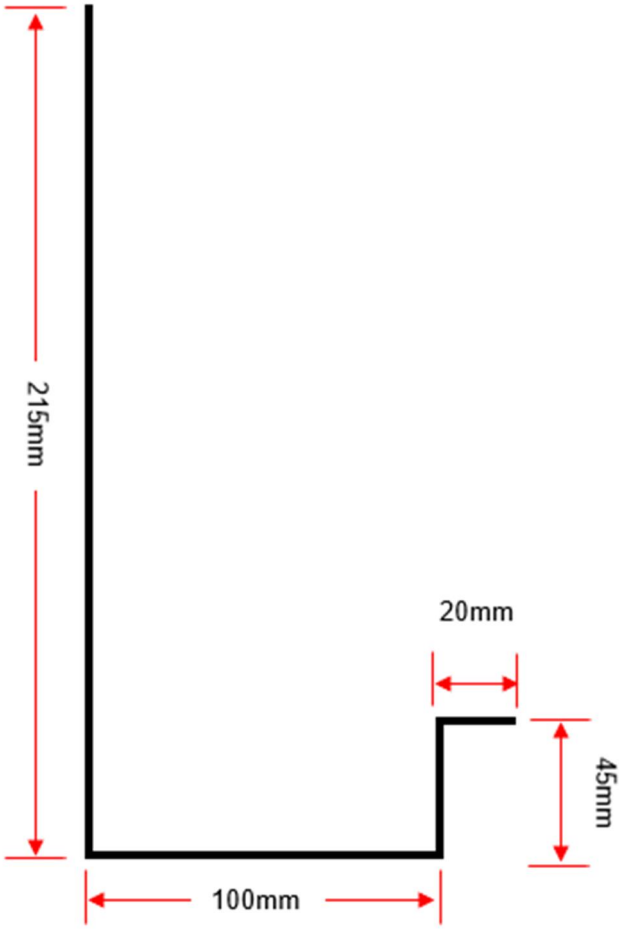

Figure 25. combustion chamber flashing (Item 23A) dimensions (not drawn to scale).

Figure 26. Combustion chamber flashing and ‘L’-shaped angle.

The combustion chamber surround flashing (Item 23A and Item 23B) was fixed to the aluminium angle (Item 16) surrounding the perimeter of the combustion chamber opening, with Mainline SSAL/501214AS/RA_9010 5.0×12×14mm AlMg5/stainless steel rivets at nominal 300mm centres. The front face of Item 23A was fixed to the ‘T’-shaped rails front face with the same rivets at nominal 500mm centres.

The combustion chamber flashing was not installed flush to the combustion chamber front lintel. There was a 50mm vertical gap 2050mm-2100mm above ground.

Figure 27.Top of panel profile.

Figure 28. Base of panel profile

The cassette panels (Item 24) had a 40mm-deep profile with a 45mm-high lip at the top of each panel and a profile at the base of each panel to allow panels to be slotted into position.

Figure 29. Rear of panel profile.

Figure 30. Panel brackets.

Figure 31. Panel fixings.

All panels had fixing location brackets prefabricated at 450mm vertical centres. The fixing brackets of the panels were fixed to the ‘T-shaped rails with two Evolution TSBW5.5-38-3 (5.5mm×38mm) screws per bracket.

Figure 32. Edge of walls side panel profile.

The panels in line with the outside edge of the main and wing walls had a 230mm panel return to close the sides of the system off. The panel returns at outside edge of main and wing wall were fixed to the side of the system with Mainline SSAL/501214AS/RA_9010 5.0×12×14mm AlMg5/stainless steel rivets at nominal 400mm vertical centres.

Figure 33. Completed installation prior to test.

The bottom edge of the first row of panels was located approximately 70mm above the ground. Panel gaps were measured to be 20mm vertical and horizontal gaps. Between the combustion chamber flashing and panels, the gaps were approximately 28mm.

There was an 85mm cavity (including 40mm panel profile) from the front face of the insulation to the rear face of the panel. There was a 45mm cavity from the front face of the horizontal cavity barrier to the rear face of the panel.

3.2.2 System drawings

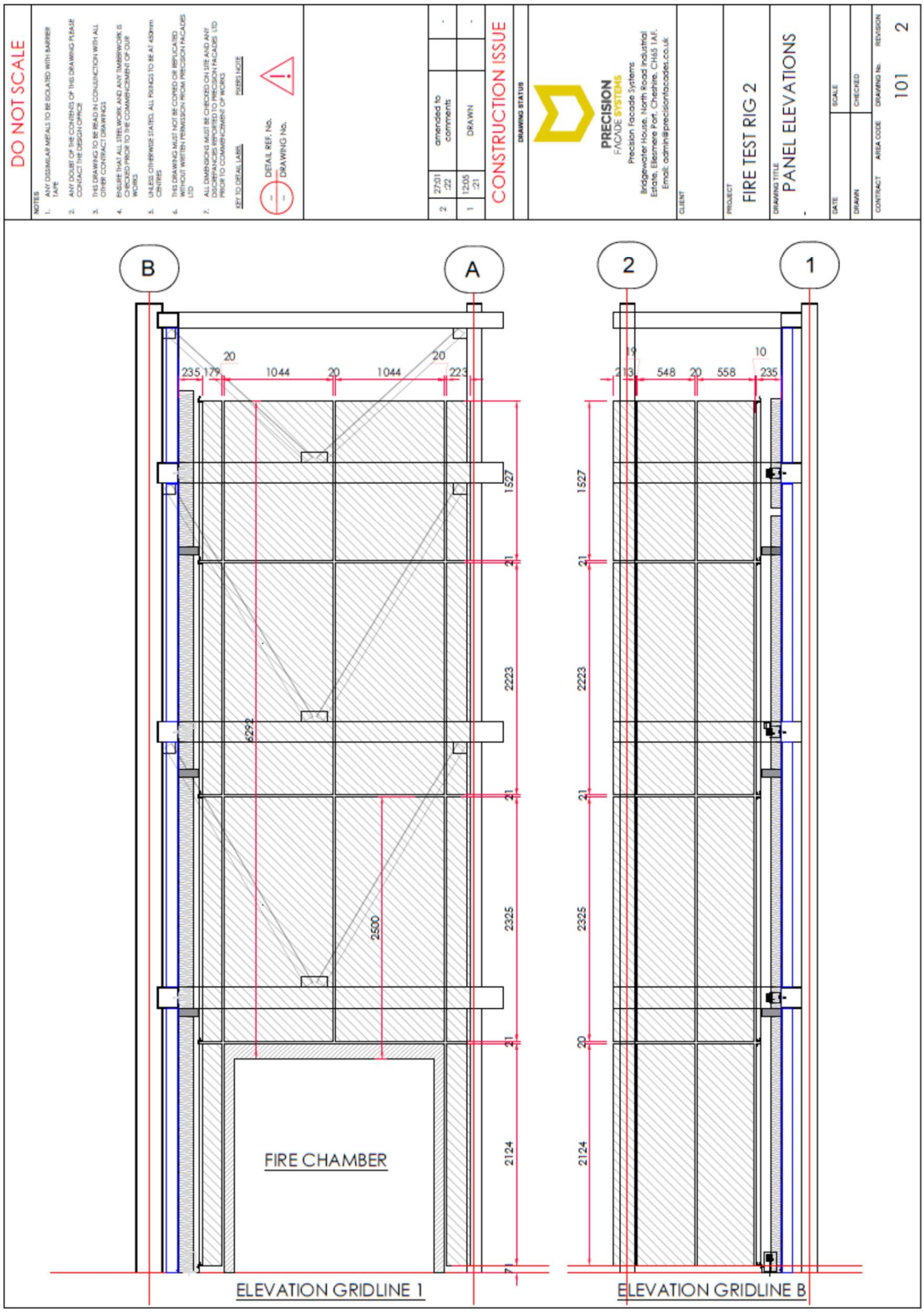

Figure 34. Panel layout (supplied by Test Sponsor).

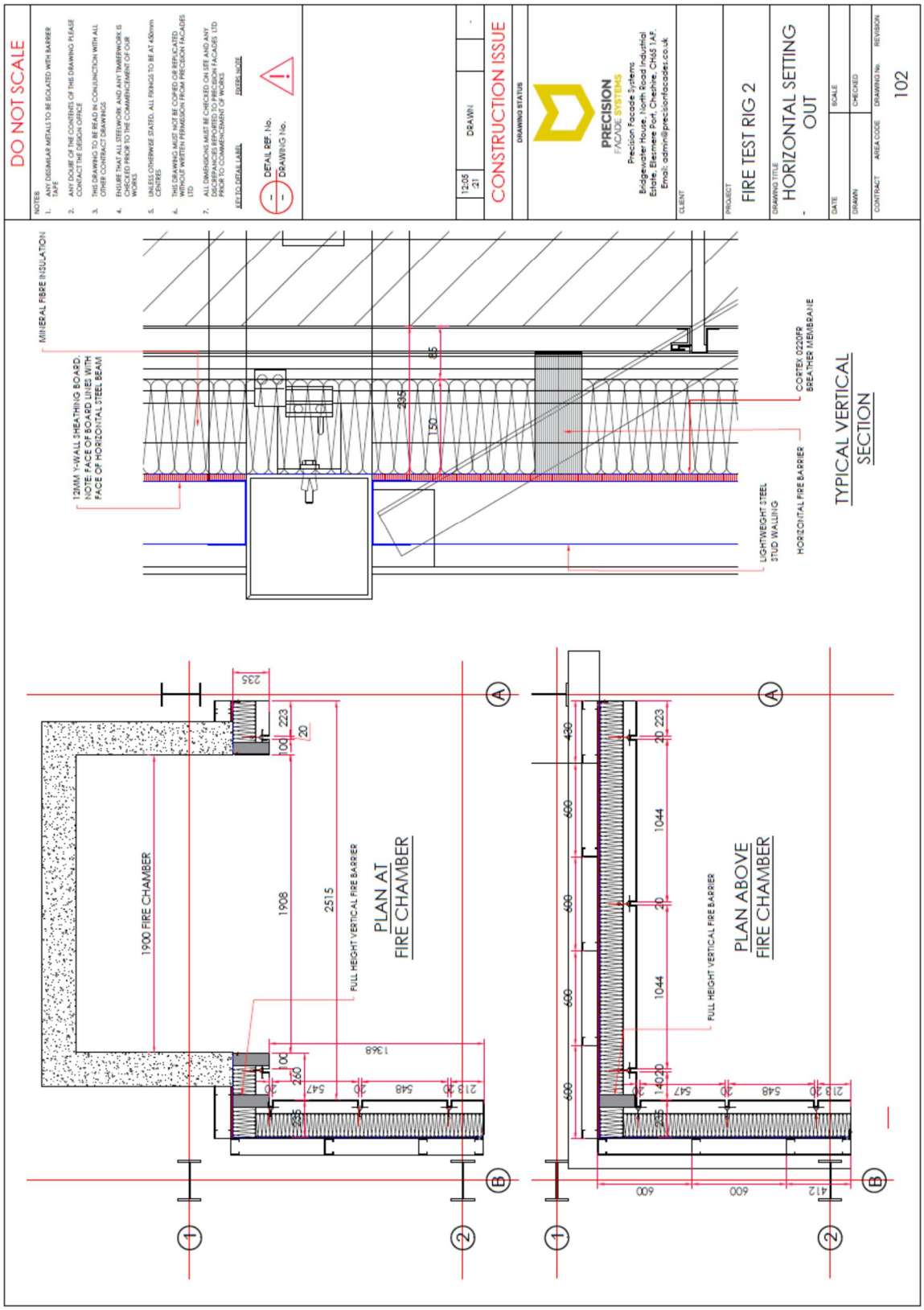

Figure 35. System cross-section (supplied by Test Sponsor).

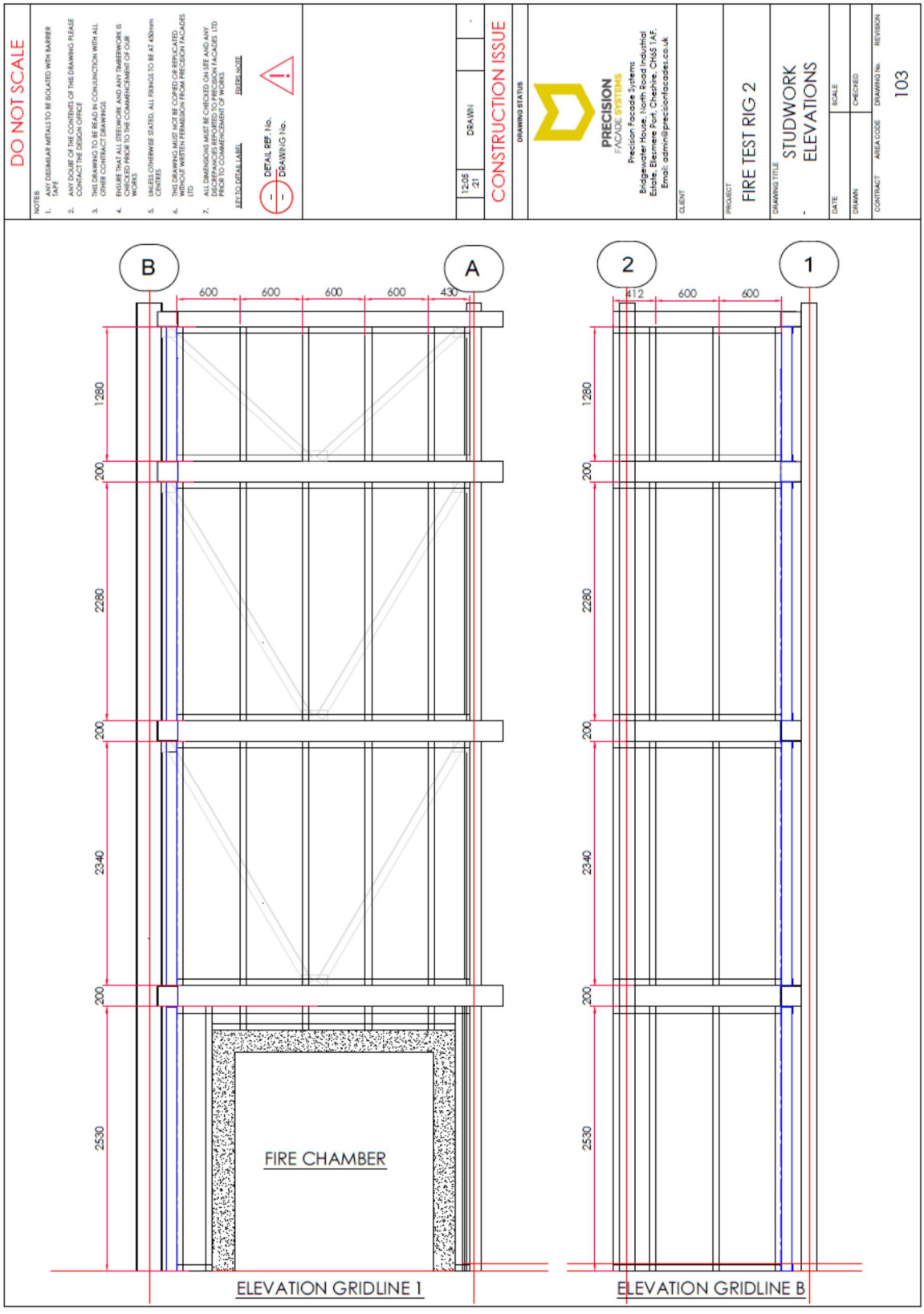

Figure 36. Steel Framing System (supplied by Test Sponsor).

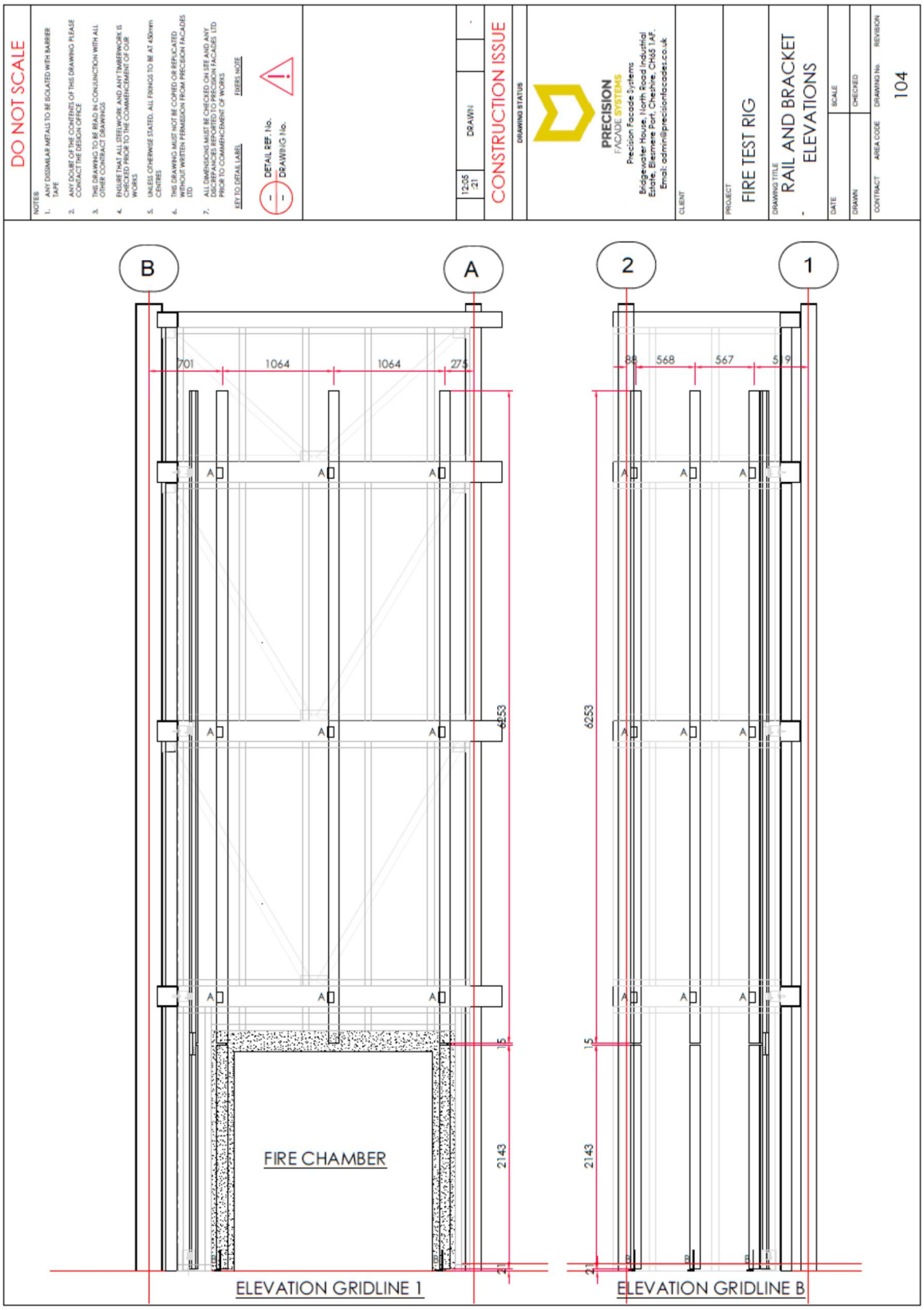

Figure 37. Rail and bracket layout (supplied by Test Sponsor).

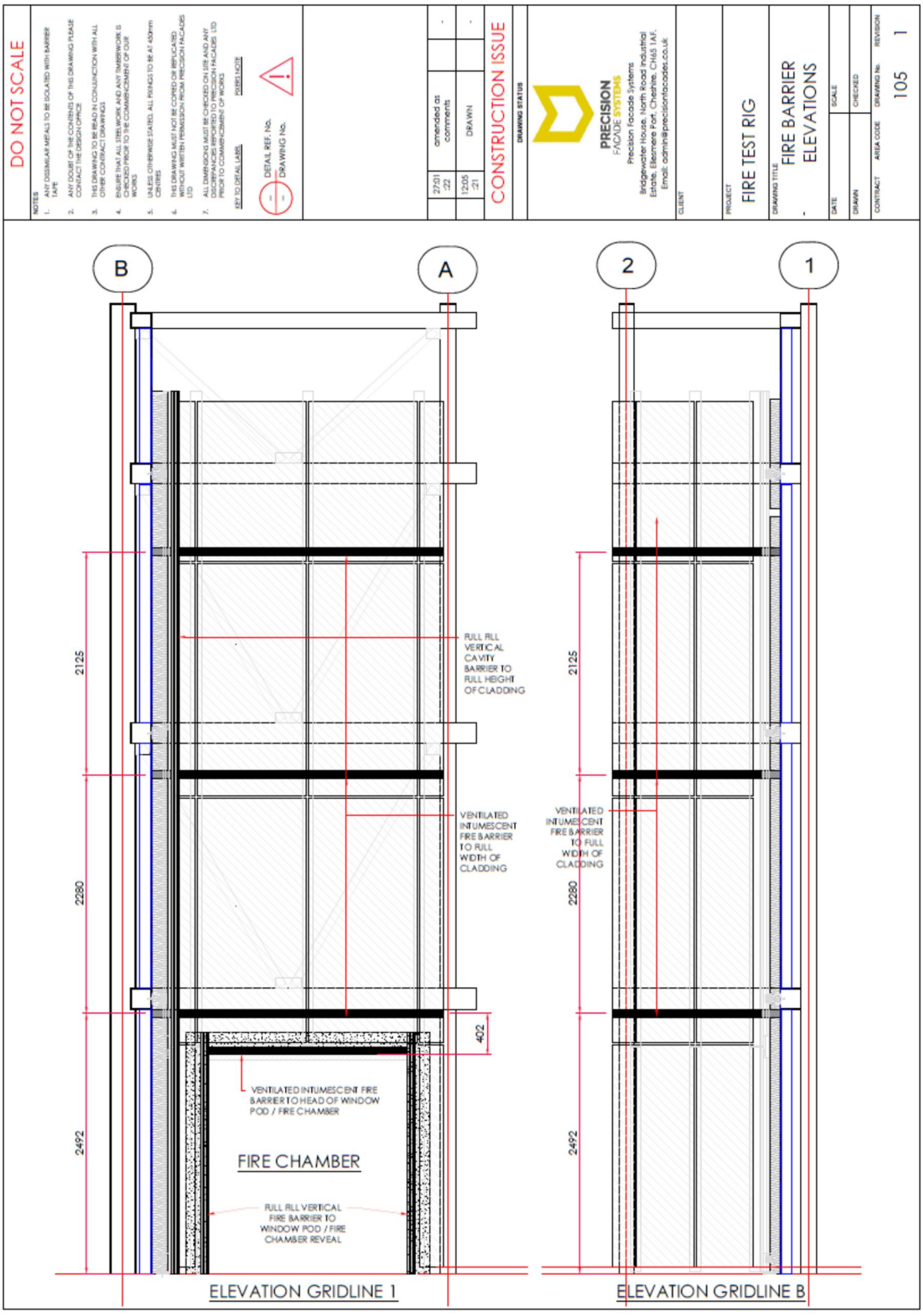

Figure 38. Horizontal and vertical cavity barrier layout (supplied by Test Sponsor).

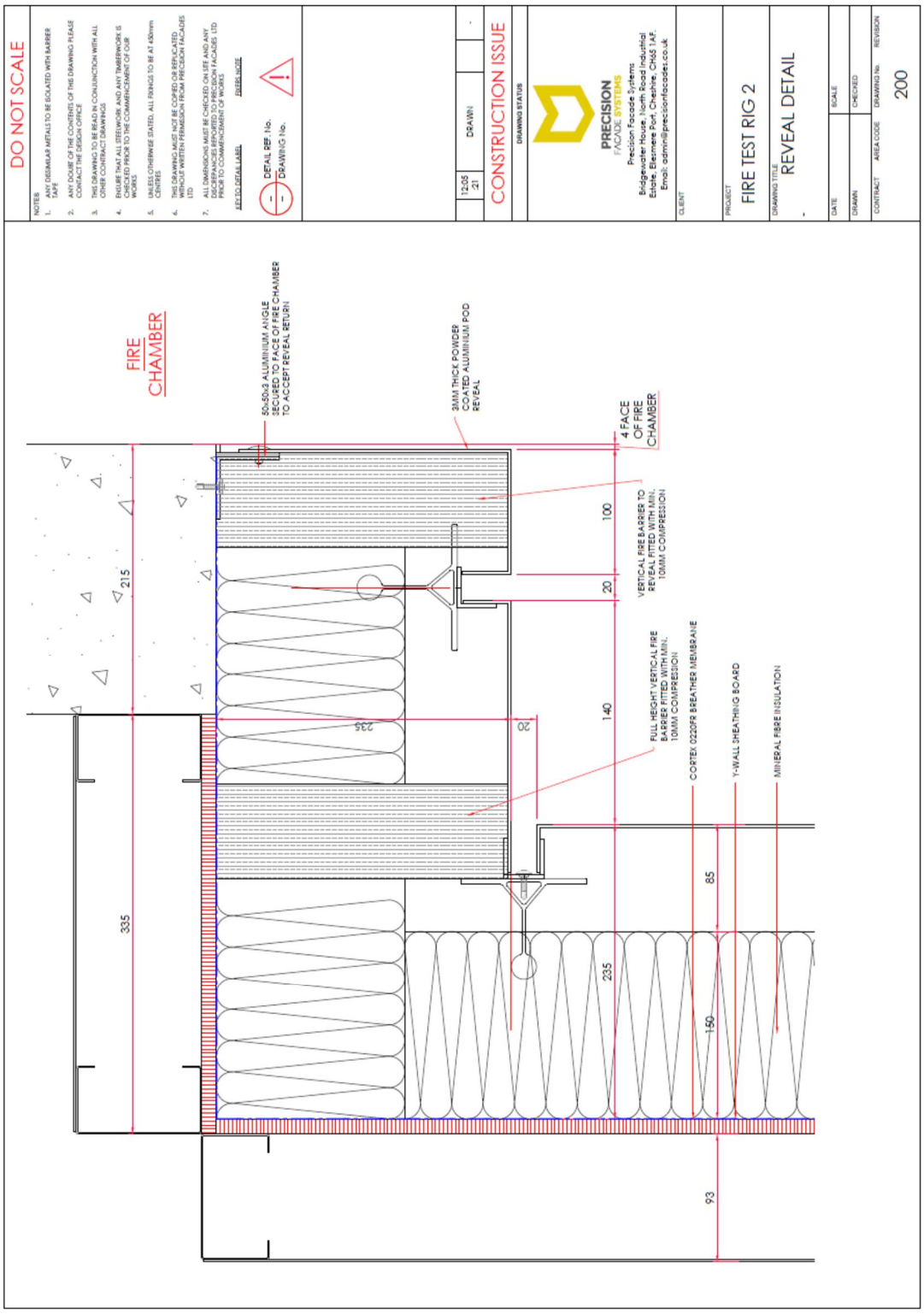

Figure 39. Main-wing wall junction detail (supplied by Test Sponsor).

Note: Reference to the detail in the drawing shown as “3mm thick powder coated aluminium ..”, the Test Sponsor has subsequently stated that the tested panel was ‘Luxe Clad A1 PVDF coil coated aluminium sheet’.

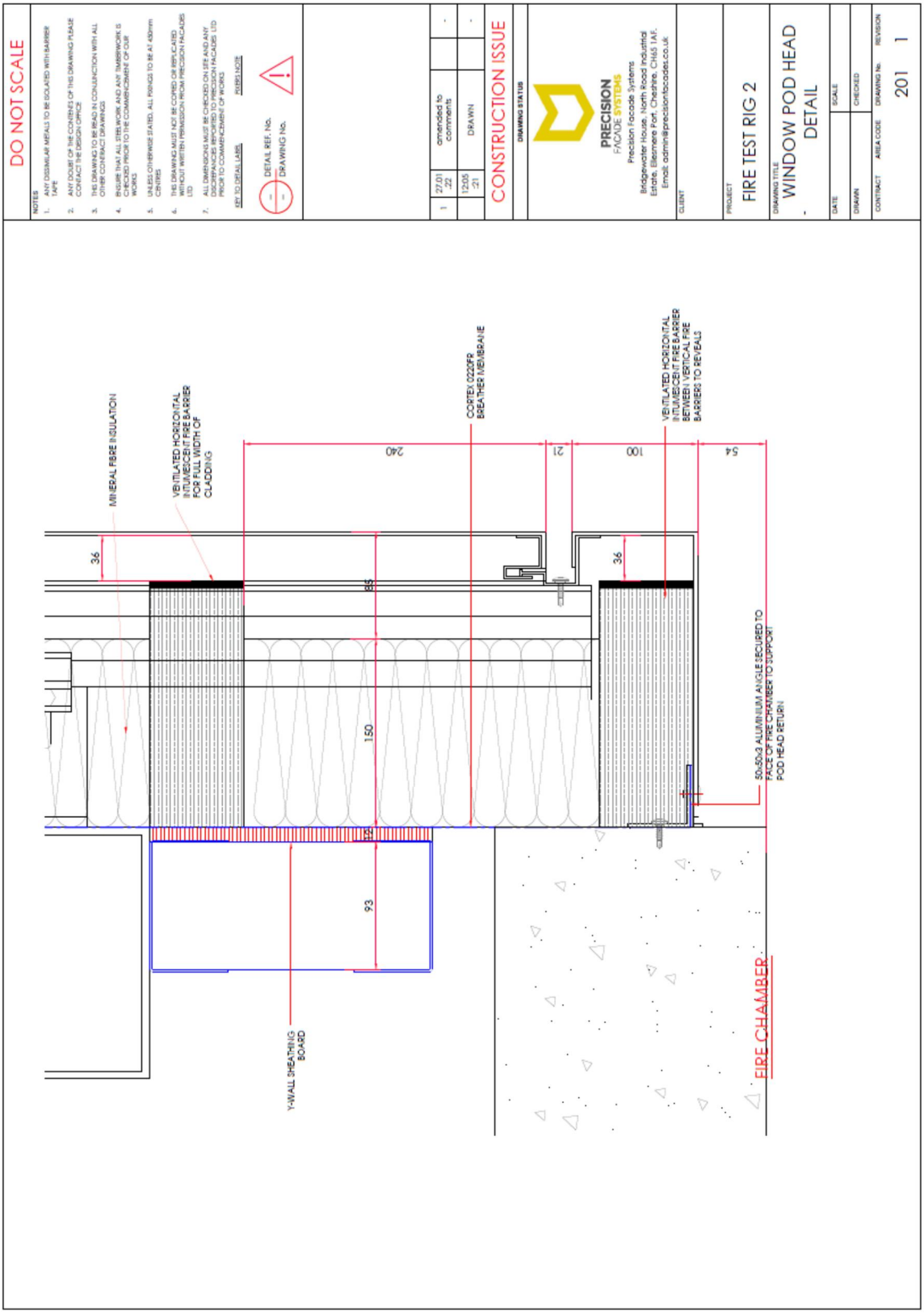

Figure 40. Combustion chamber head detail (supplied by Test Sponsor).

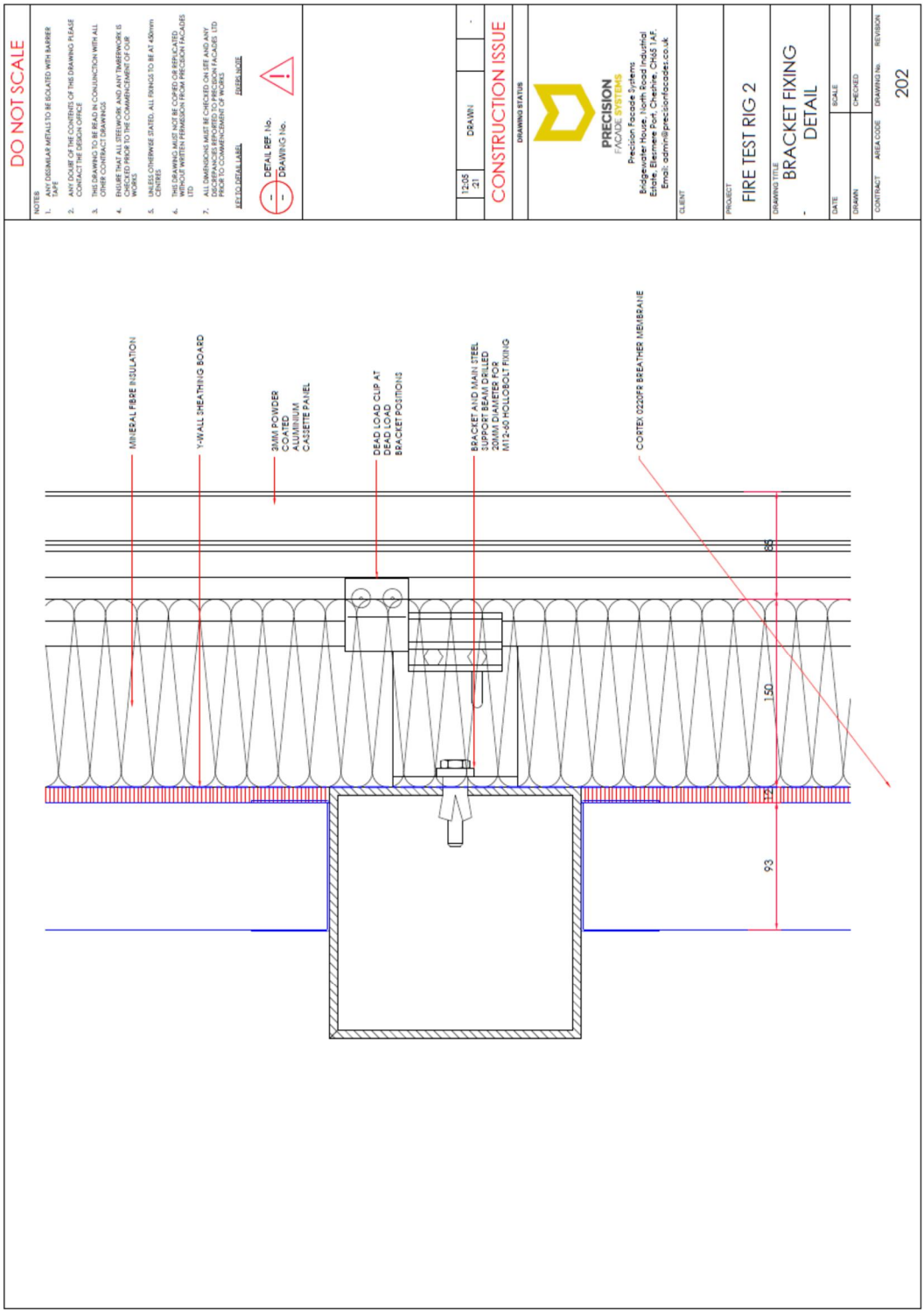

Figure 41. System cross-section (supplied by Test Sponsor).

Note: Reference to the detail in the drawing shown as “3mm thick powder coated aluminium ..”, the Test Sponsor has subsequently stated that the tested panel was ‘Luxe Clad A1 PVDF coil coated aluminium sheet’.

3.3 Critical dimensions

3.3.1 Test Standard requirements

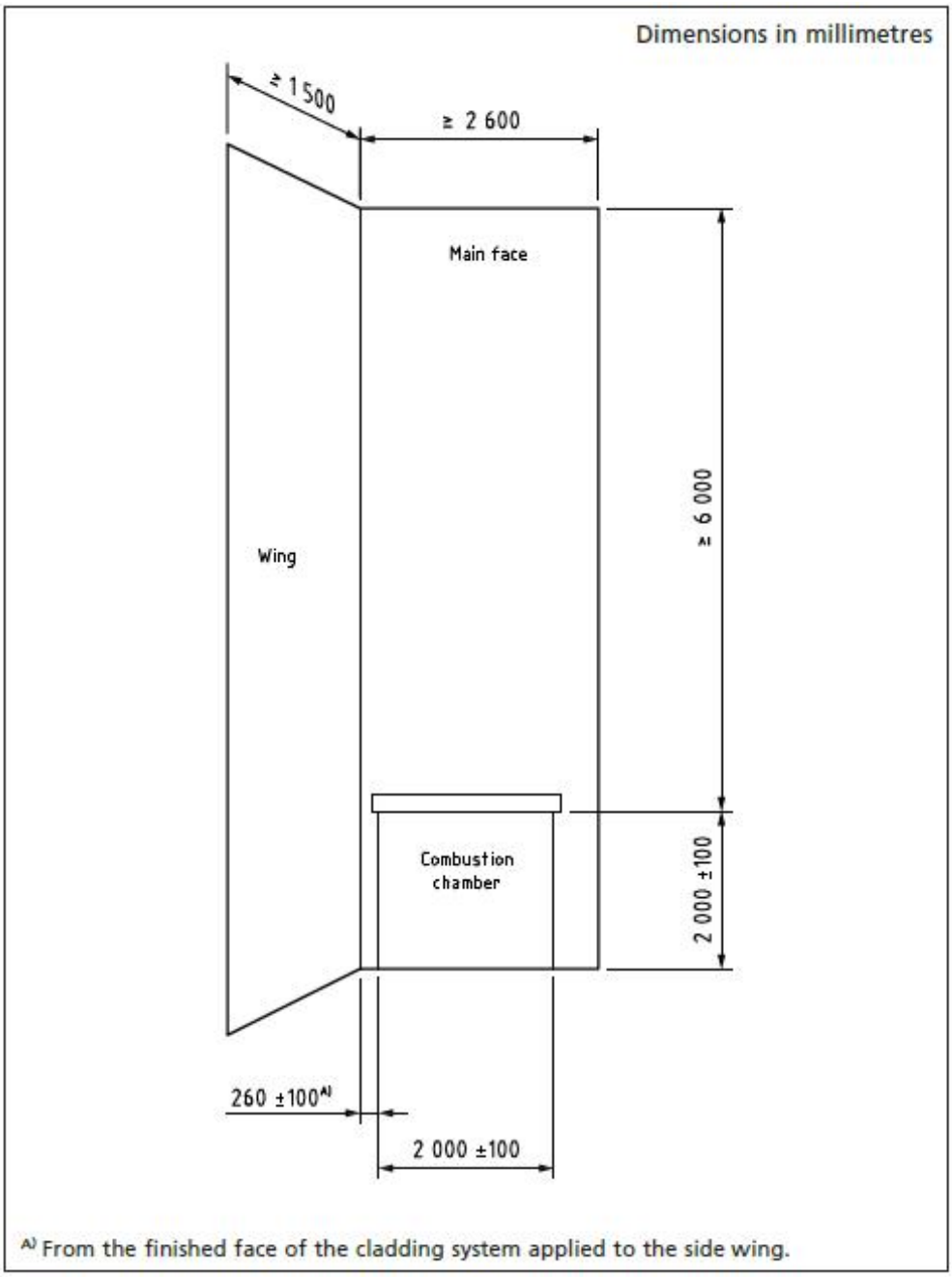

Figure 42. Test apparatus dimensions as specified by test Standard[1].

Note: The test apparatus may be constructed left - or right-handed.

3.3.2 Measured dimensions of cladding system

BS 8414-2 requirement	Actual measurement	Criteria achieved?
≥6000mm above the top of the combustion chamber	6240mm	✓
≥2400mm width across the main wall	2515mm	✓
≥1200mm width across the wing wall	1370mm	✓
260mm (±100mm) wing wall-combustion chamber opening	260mm	✓
2000mm×2000mm (±100mm) combustion chamber opening	1910mm-wide×2050mm-high*	✓
Horizontal joint (if present) placed 2400 (±100mm) above combustion chamber opening.	2445mm	✓
Vertical joint (if present) located on centre line of combustion chamber (±100mm).	On centre line	✓

*Note: The tested system was not installed flush to the combustion chamber opening. There was a 50mm vertical gap 2050mm-2100mm above ground – see Figure 26

4 Test Information

4.1 Test details

Project Number	P119916-1000
Sponsor	SBS Cladding
Type	BS 8414-2:2015+A1:2017
Date of test	23/06/2021
T_s (°c)	18
t_s (s)	110
t_s (min)	01:50
Burn through	No
Early termination	No

Ambient temperature: 18 °C

Wind speed: <0.1m/s (test undertaken indoors).

Frequency of measurement: Data records were taken at ten second intervals.

4.2 Deviations from Test Standard

No deviations recorded.

4.3 Temperature data

Figures 44-50 provide the temperature profiles recorded during the test. *Figure 33* shows the system before the test.

Thermocouple set	Whole test	t_s + 15mins
Max Level 1: External	860°C (1003 @ ts+ 04:50)	-
Max Level 2: External	450°C (1021 @ ts+ 04:50)	450°C (1021 @ ts+ 04:50)
Max Level 2: Panel cavity	335°C (1039 @ ts+ 07:10)	335°C (1039 @ ts+ 07:10)
Max Level 2: Cavity	325°C (1017 @ ts+ 07:10)	325°C (1017 @ ts+ 07:10)
Max Level 2: Insulation	41°C (1018 @ ts+ 42:10)	29°C (1018 @ ts+ 15:00)
Max Level 2: Sheathing board	34°C (1025 @ ts+ 58:10)	21°C (2019 @ ts+ 14:50)
Max Level 2: Steel Framing System	26°C (2020 @ ts+ 28:40)	23°C (2020 @ ts+ 14:40)

4.4 Thermocouple location and panel layout

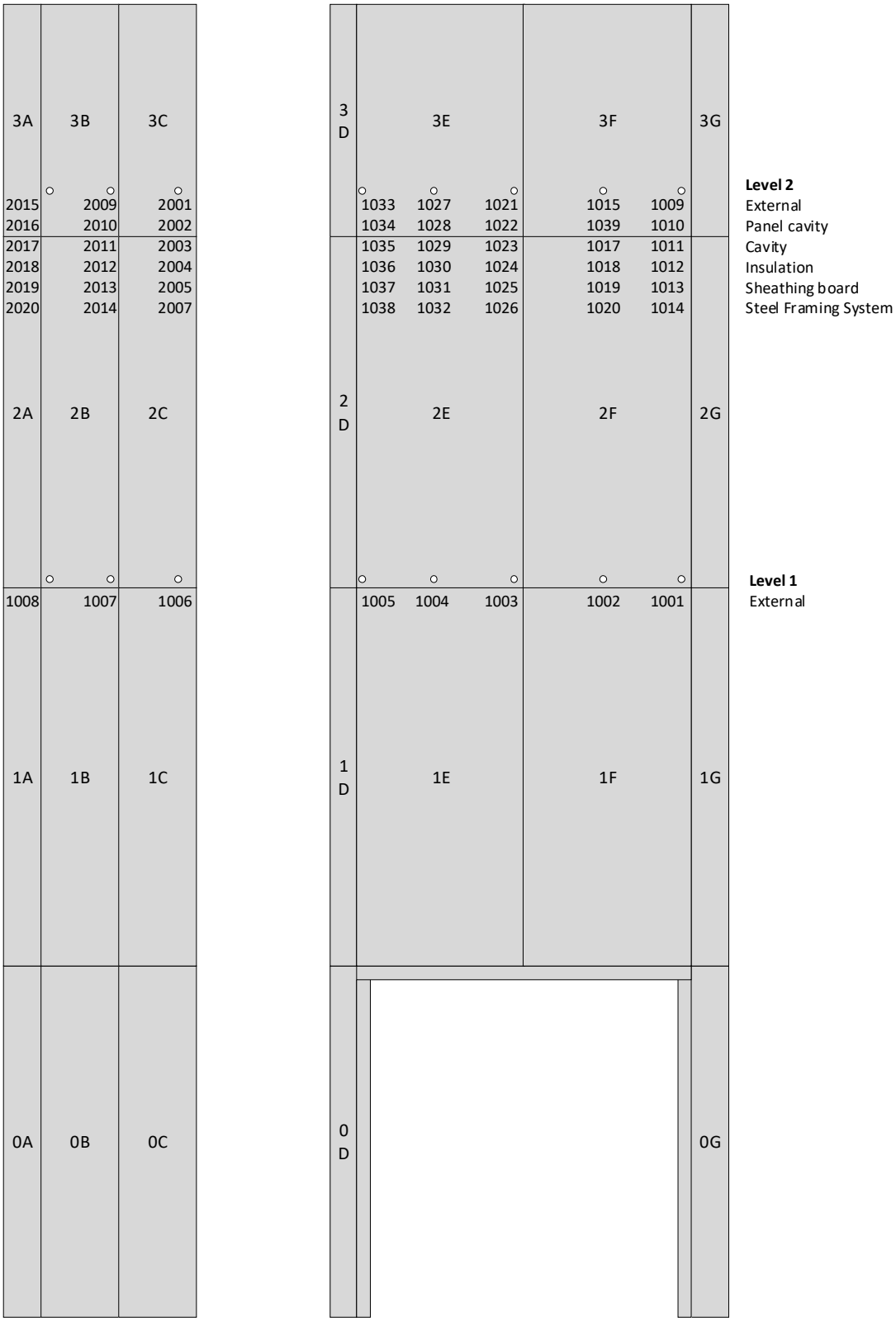

Figure 43. Layout of panels, TC positions and numbering system used for reporting. Not to scale.

4.5 Visual observations

Table 2. Visual Observations – Refer to *Figure 43* for system schematic. Height measurements are approximate and given relative to a zero at the top of the combustion chamber. Unless otherwise specified, observations refer to the centre line above the combustion chamber on the main wall.

Time* (mm:ss)	t_s (mm:ss)	Description
00:00		Ignition of crib
01:20		Flame tips to cladding system.
01:50	00:00	Start time (t_s) criteria achieved: External temperature 2.5m above the top of the combustion chamber in excess of 218˚C (=200˚C+T_s).
02:40	00:50	Flame tips to level 1 thermocouples.
04:00	02:10	Flame tips to level 2 thermocouples.
06:40	04:50	Flame tips to top of system.
07:25	05:35	Melting to panel 1E.
07:45	05:55	Falling debris.
08:10	06:20	Further melting to panel 1E.
08:25	06:35	Melting to panel 1F.
08:45	06:55	Falling debris.
09:30	07:40	Falling debris.
10:00	08:10	Flaming debris.
10:50	09:00	Falling debris.
11:40	09:50	Melting to base of panel 2E.
12:15	10:25	Falling debris.
12:30	10:40	Flaming debris.
13:40	11:50	Flaming debris.
15:15	13:25	Flaming debris.
18:20	16:30	Flame tips to level 2 thermocouples.
25:20	23:30	Falling debris.
30:00	28:10	Crib extinguished.
32:45	30:55	Flame flickering at panel 2F and 2G vertical joint.
37:00	35:10	All flaming/flickering ceased.
60:00	58:10	Test complete.

*Time from point of ignition.

4.6 Mechanical performance

Time references given from point of ignition in the format mm:ss.

Observation	Details*
Ongoing system combustion following extinguishing of the ignition source	32:45-37:00
System collapse	Not observed.
Spalling	Not observed.
Delamination	07:25-11:40
Flaming debris	10:00-15:15
Pool fire	Not observed.

*with reference to *Table 2*.

4.7 Temperature profiles

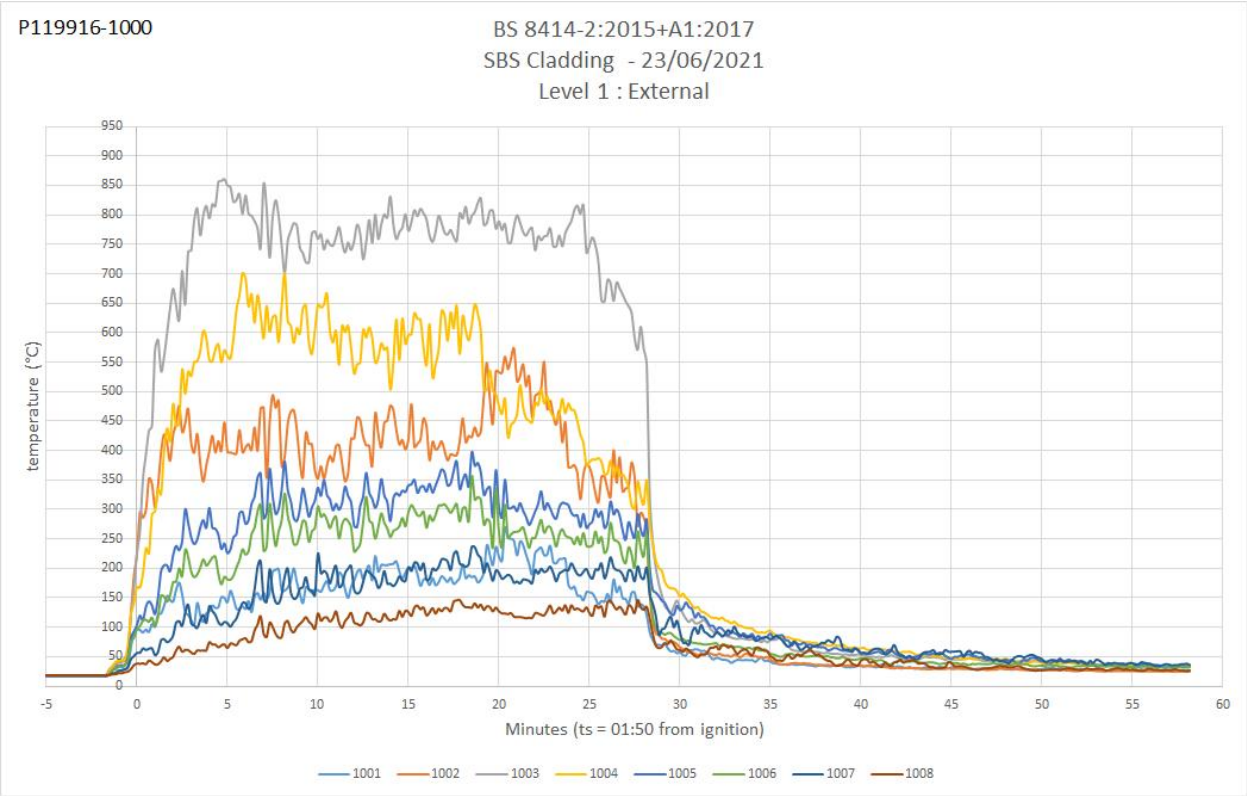

Figure 44. Level 1 external thermocouples.

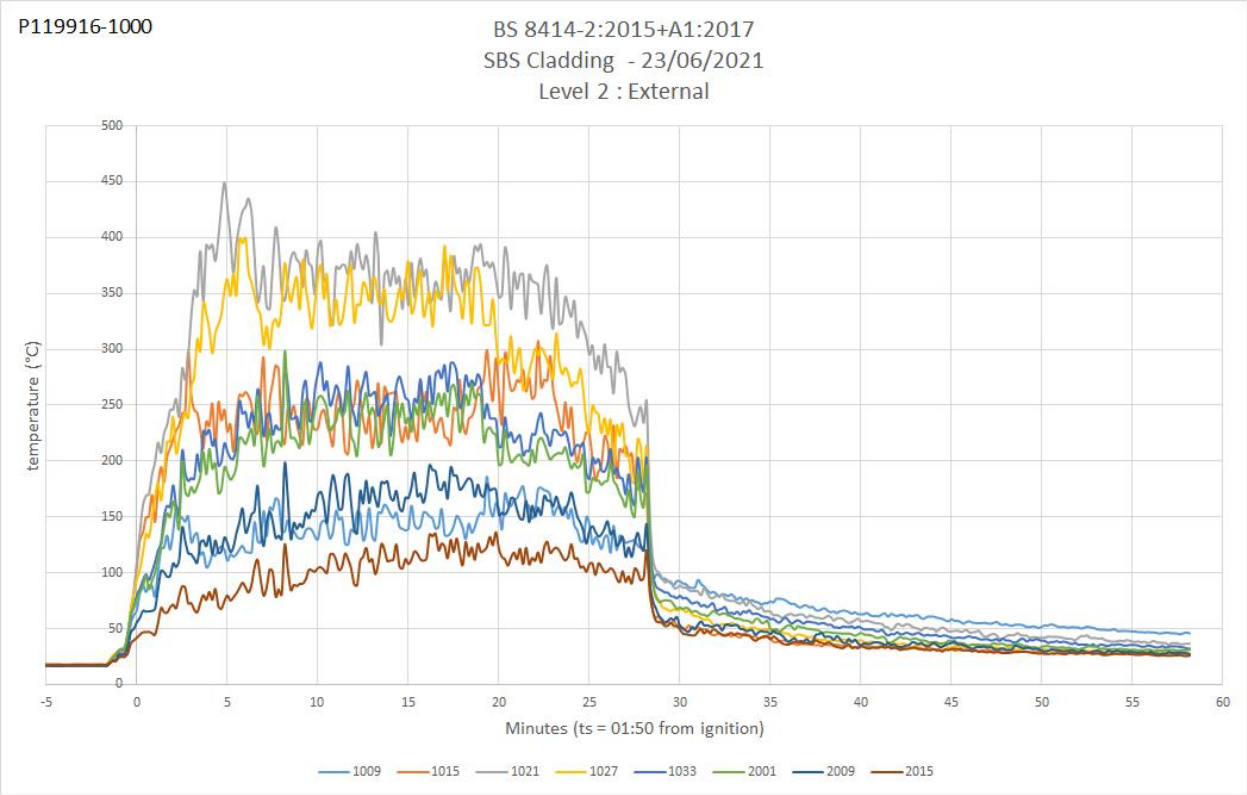

Figure 45. Level 2 external thermocouples.

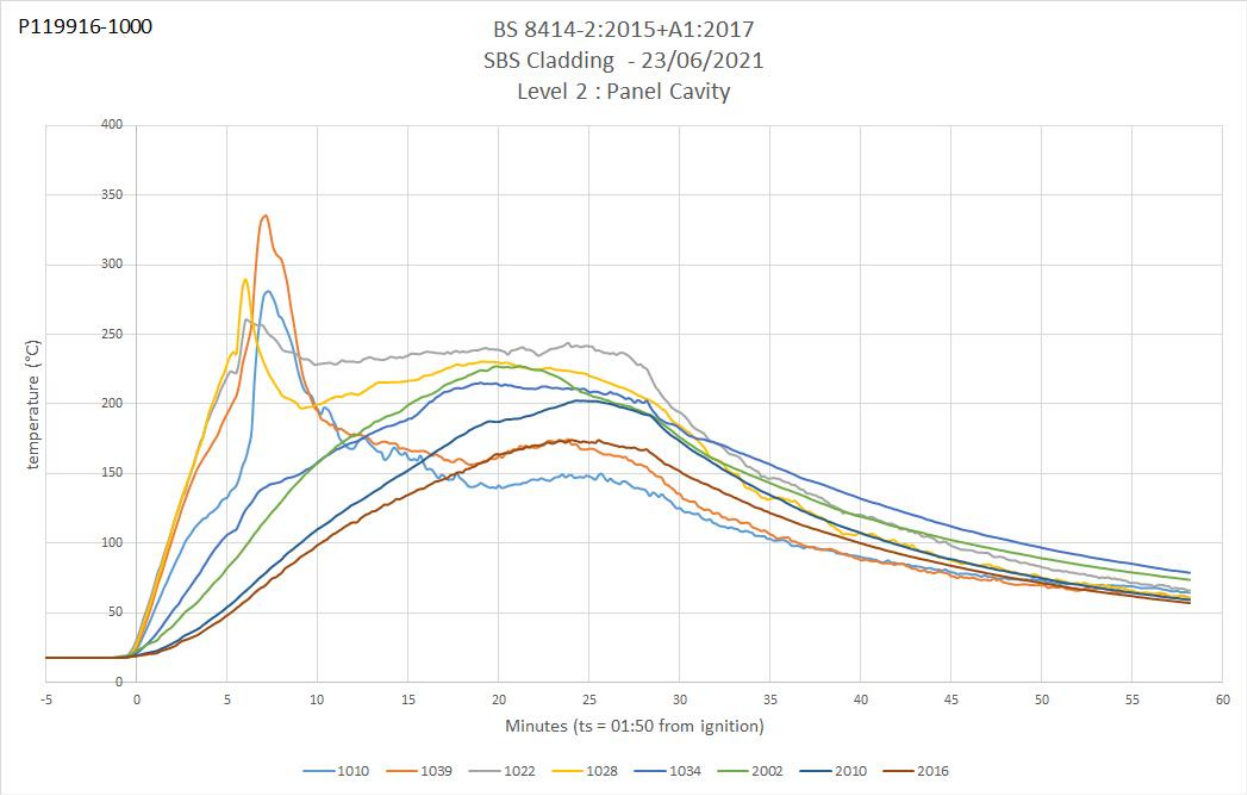

Figure 46. Level 2 panel cavity thermocouples.

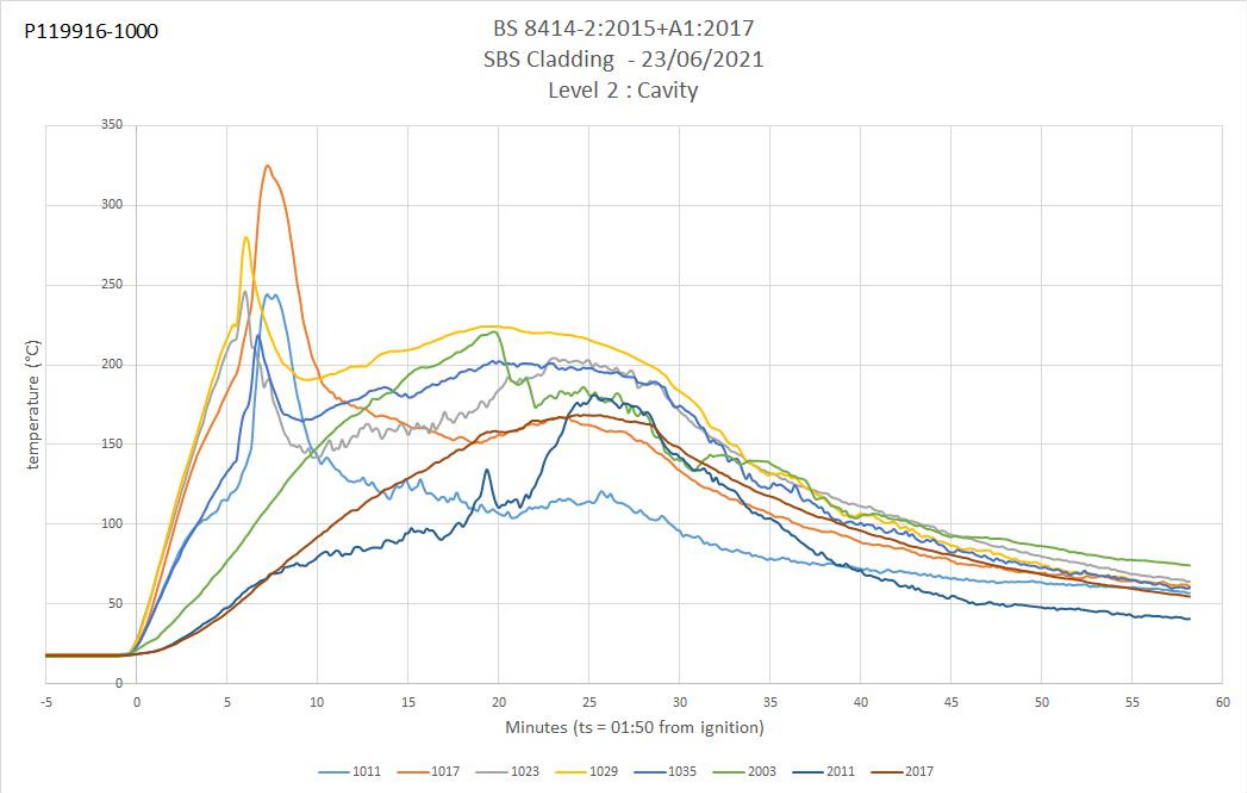

Figure 47. Level 2 cavity thermocouples.

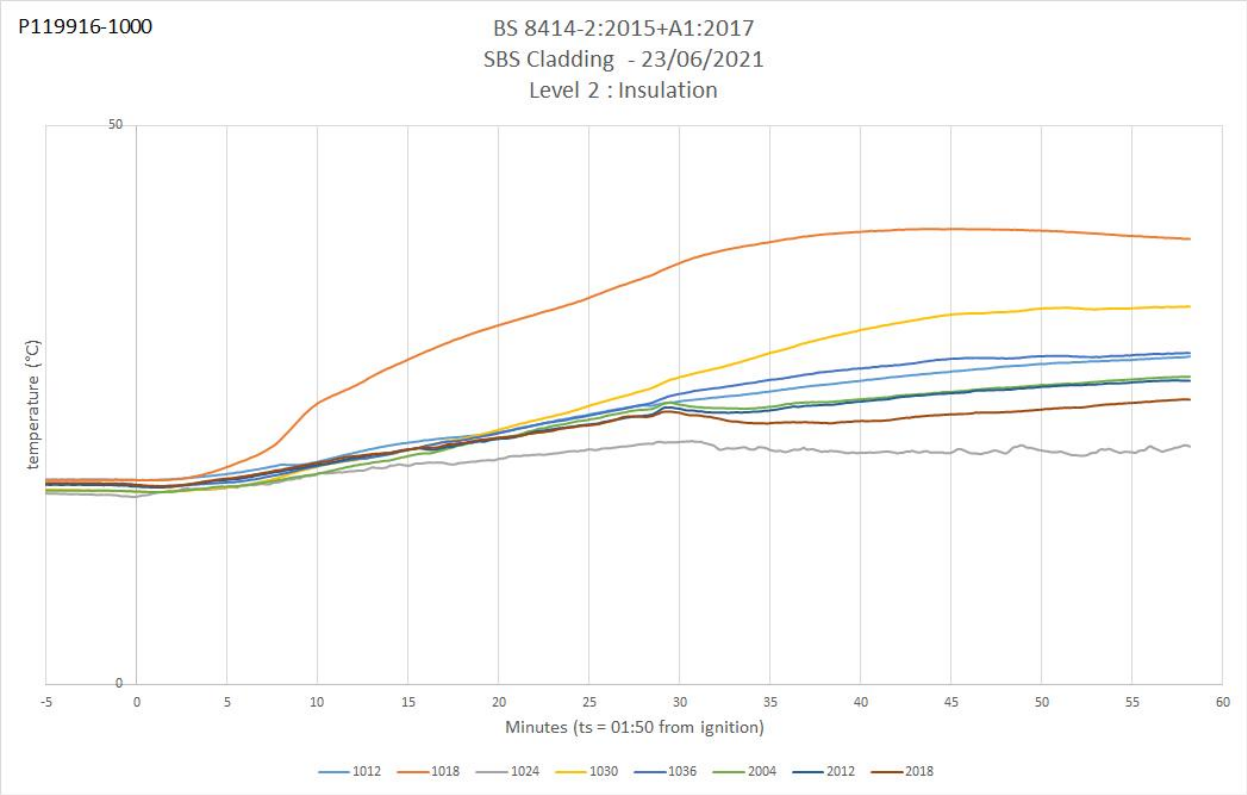

Figure 48. Level 2 insulation thermocouples.

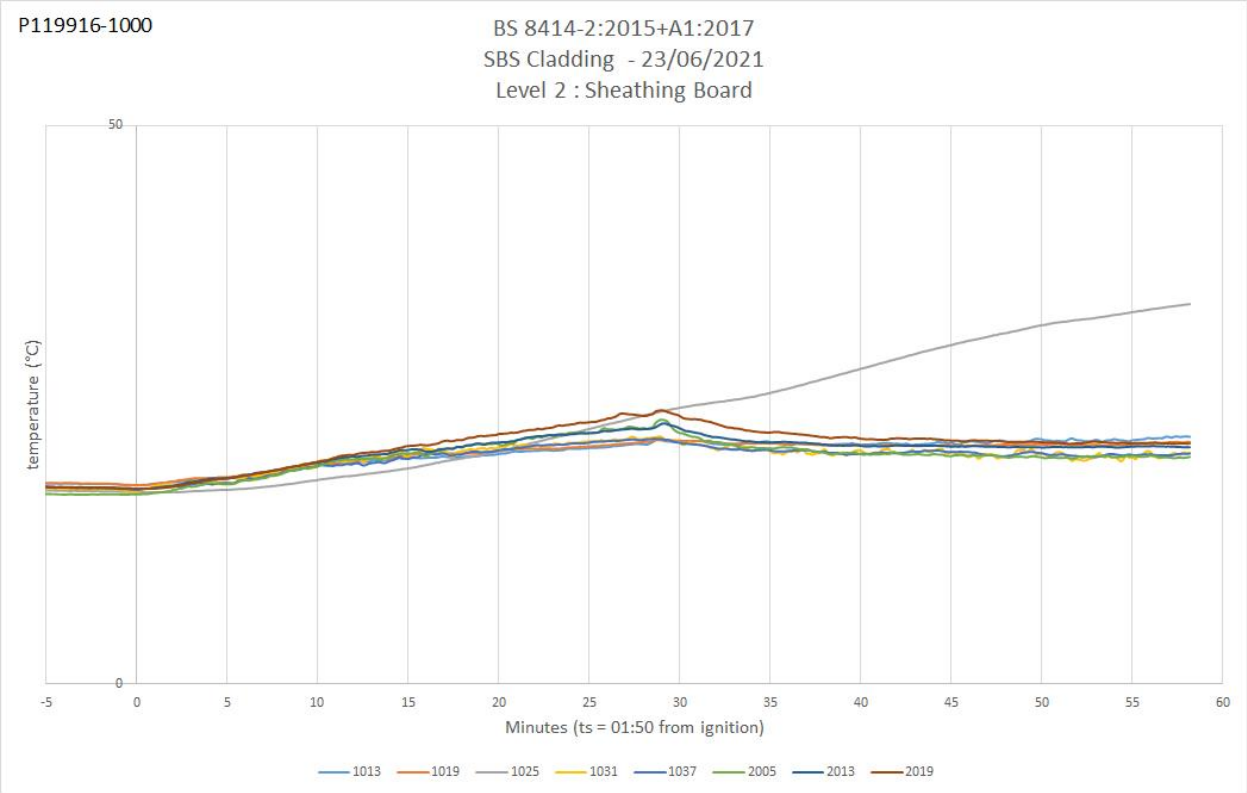

Figure 49. Level 2 sheathing board thermocouples.

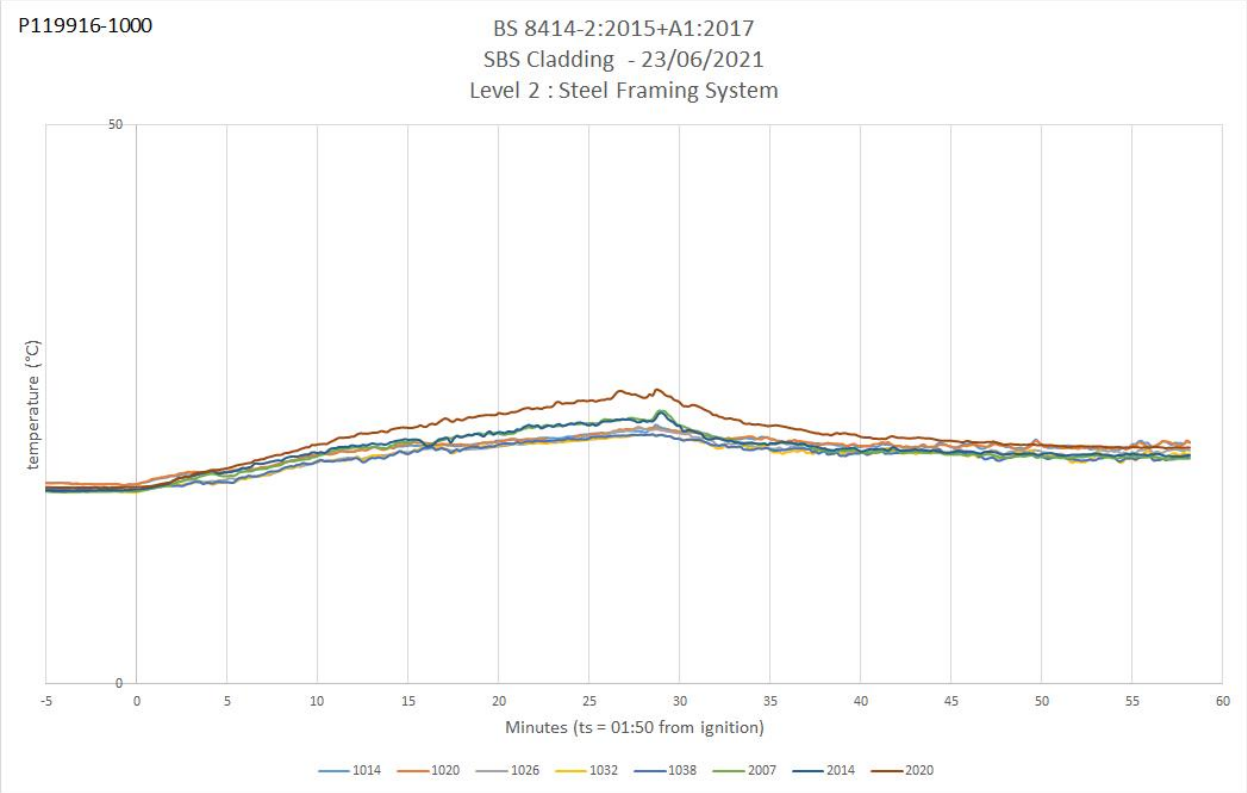

Figure 50. Level 2 steel framing system thermocouples.

5 System Damage

5.1 Panels

Figure 51. Full-height photograph at test end.

Figure 52. Combustion chamber surround.

On the main wall, the panels were melted in an area of approximately 2600mm-high×1360mm-wide (max) tapering to 500mm-wide (approx. 3.6m^2), directly above the combustion chamber opening. All main wall panels were distorted up to the base of panels 3E & 3F and discoloured to top of system.

On the wing wall, the panels were distorted up to the base of panels 2B & 2C and discoloured to mid-height of panel 2C.

The combustion chamber flashing was melted to approx. 1360mm-wide along the top edge, with a melted patch at the top of each vertical edge.

5.2 Insulation

Figure 53. Full-height photograph following removal of panels.

On the main wall, the insulation remained in place and was discoloured up to 5300mm from above the combustion chamber opening.

On the wing wall, the insulation had discoloured patches between 2500mm-5000mm from ground.

5.3 Horizontal and vertical cavity barriers

Figure 54. Full-height photograph following removal of insulation.

Figure 55. Cavity barriers at combustion chamber height.

Figure 56. 1st full width row of horizontal cavity barriers (approx. 400mm above chamber).

Figure 57. 2nd full width row of horizontal cavity barriers (approx. 2700mm above chamber)

Figure 58. 3rd full width row of horizontal cavity barriers (approx. 4800mm above chamber).

All horizontal cavity barriers remained in place. On the main wall, the horizontal cavity barrier directly above the combustion chamber opening, the intumescent strip had detached to full width. The horizontal cavity barrier located at 2490mm from ground, the intumescent strip had detached to approx. 1000mm-wide, the remaining intumescent strip had activated in line with the combustion chamber opening. The horizontal cavity barriers located at 4770mm and 6895mm from ground, the intumescent strip had activated to full width of the wall.

On the wing wall, all horizontal barriers had signs of activation to maximum 1000mm-wide.

The vertical cavity barriers remained intact and in place but were discoloured to up to 3000mm above combustion chamber opening.

5.4 Aluminium rails and angles

Figure 59. Full-height photograph of the aluminium rails.

Figure 60. Aluminium rails (from 3m to 5.5m above the combustion chamber opening).

Damage to the ‘T’-shaped rails on the main wall (numbered from left to right) was as follows:

1. Distorted at 1300mm above combustion chamber opening and discoloured to full height.
2. Melted up to 2500mm above combustion chamber opening. Discoloured to full height.
3. Discoloured to full height.

Damage to the ‘T’-shaped rails on the wing wall (numbered from right to left) was as follows:

1. Discoloured from combustion chamber opening to full height.
2. Discoloured from combustion chamber opening to 2500mm
3. No visible damage.

The aluminium angles located at the top edge of the combustion chamber surround had melted to full width and the vertical edges distorted and discoloured to full height.

The aluminium angle located at the outside edge of the main/wing wall remained intact with no visible damage.

5.5 Aluminium brackets and breather membrane

Figure 61. Full-height photograph of the breather membrane and aluminium brackets.

Figure 62. Close up photograph of breather membrane and brackets.

On the main wall, the brackets located at ground level had no visible damage. The brackets at all other levels had signs of discolouration to the tip.

On the wing wall, the brackets remained intact with no visible damage.

The breather membrane was discoloured at the combustion chamber surround and there were discoloured patches in line with the combustion chamber centre line up to 2500mm.

5.6 Sheathing board and EPDM membrane

Figure 63. Full-height photograph of the sheathing board & EDPM membrane.

The EPDM membrane and sheathing board remained intact with no visible damage.

Figure 64. Sheathing board at rear of system at level 1.

Figure 65. Sheathing board at rear of system at level 2.

The rear of the sheathing board had no visible damage.

5.7 Steel Framing System (SFS)

Figure 66. Full-height photograph of the Steel Framing System (SFS).

Remained intact with no visible damage.

6 Conclusion

BS8414-2:2015 + A1:2017 [1] does not contain acceptance criteria and therefore this test report does not indicate a pass or fail of the product.

7 Limitations

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

8 Reference

1. BS 8414-2:2015 + A1:2017, 'Fire performance of external cladding systems – Part 2: Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame', British Standards Institution, London, 2017.

Report Ends