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BRE Global Classification Report

Classification of fire performance in accordance with BR 135: 2013 Annex B

Prepared for: SBS Cladding

Report Number: P119916-1001 Issue: 2

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1 Introduction

This report presents the classification of the system detailed in section 2. The classification is carried out in accordance with the procedures given in BR 135 – 'Fire performance of external thermal insulation for walls of multi-storey buildings', Third edition, Annex B 2013. This classification should be read in conjunction with this document and the associated test reports referenced in section 4.

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This report supersedes the original BRE Global Ltd test report P119916-1001 issue 1 dated 14/03/2022 which is now withdrawn with effect from the date of this Issue 2 report.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 the Classified Product

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 2.1, 2.2 and 2.3 were dimensionally/visually verified and recorded during installation by BRE Global and take precedence over the Test Sponsor supplied drawings (section 3).

The Test Sponsor has been asked to review the test report (P119916-1000) and takes responsibility for any discrepancies and inaccuracies in the supplied drawings (section 3).

2.1 Description of substrate

The product was installed on to wall number 3 of the BRE Global cladding 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.

2.2 Description of product

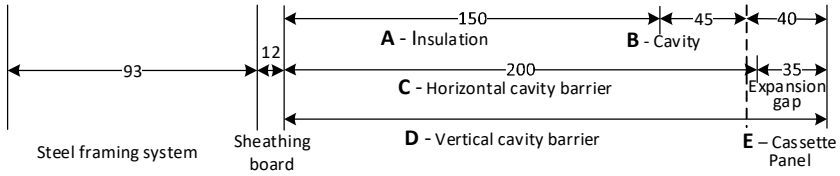

Figure 1. Basic system cross section (not drawn to scale, dimensions given in mm).

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** (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’

Table 1. List of component parts used in the construction of the 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)
13	Profiled aluminium 'T'-shaped rail (100mm-wide×80mm-wide×4.5mm-thick×Ø20mm head)
14	Aluminium joint block (215mm-high×58mm-deep×28mm-wide×4mm-thick)
15	Aluminium dead load clip (50mm-high×58mm-deep×28mm-wide×4mm-thick)
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) 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'

2.3 Installation sequence

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.

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.

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).

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).

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.

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.

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.

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.

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.

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).

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

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.

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.

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.

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.

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.

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.

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 Product Specification

Figure 2. Completed installation prior to test.

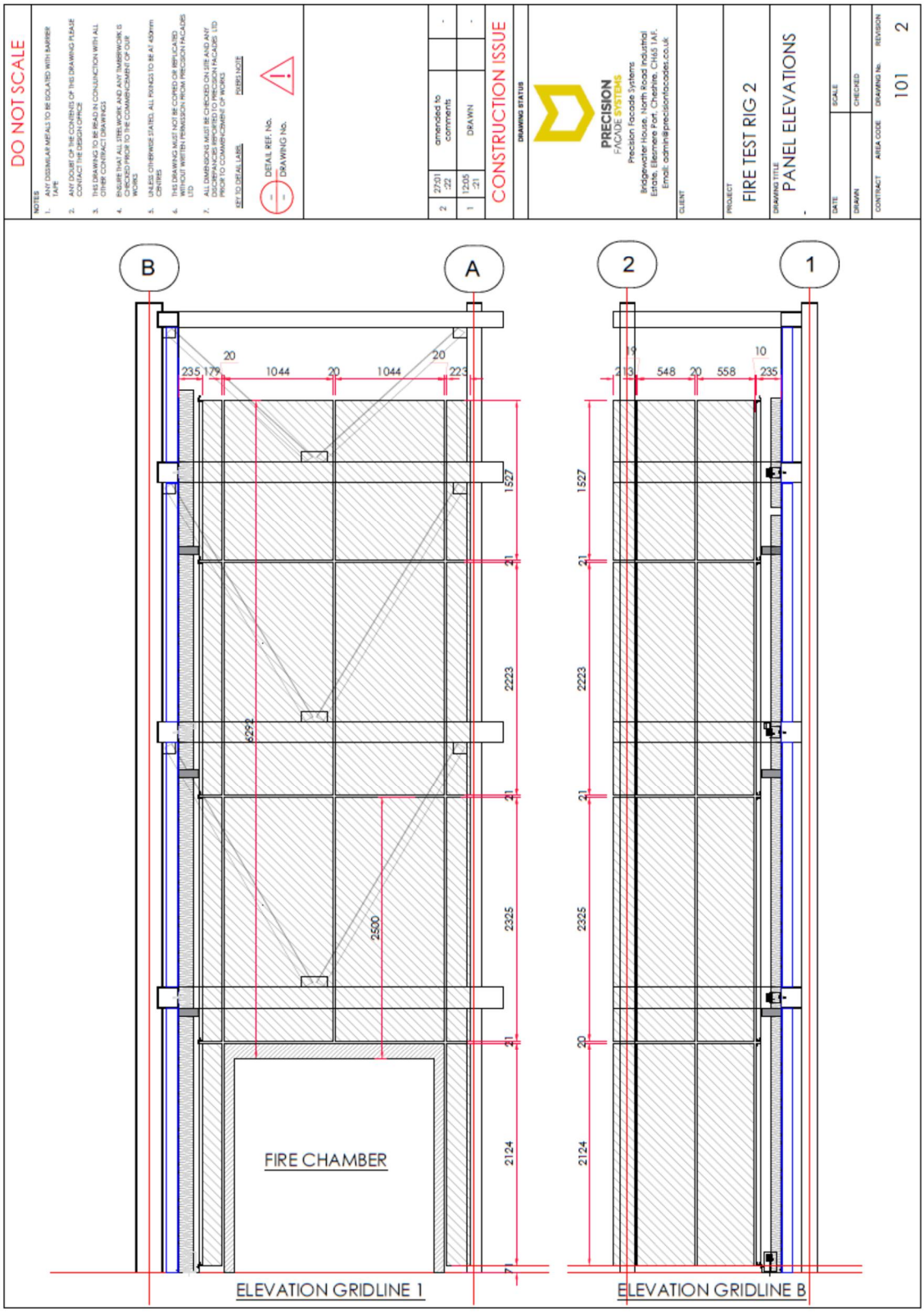

Figure 3. Panel layout (supplied by Test Sponsor).

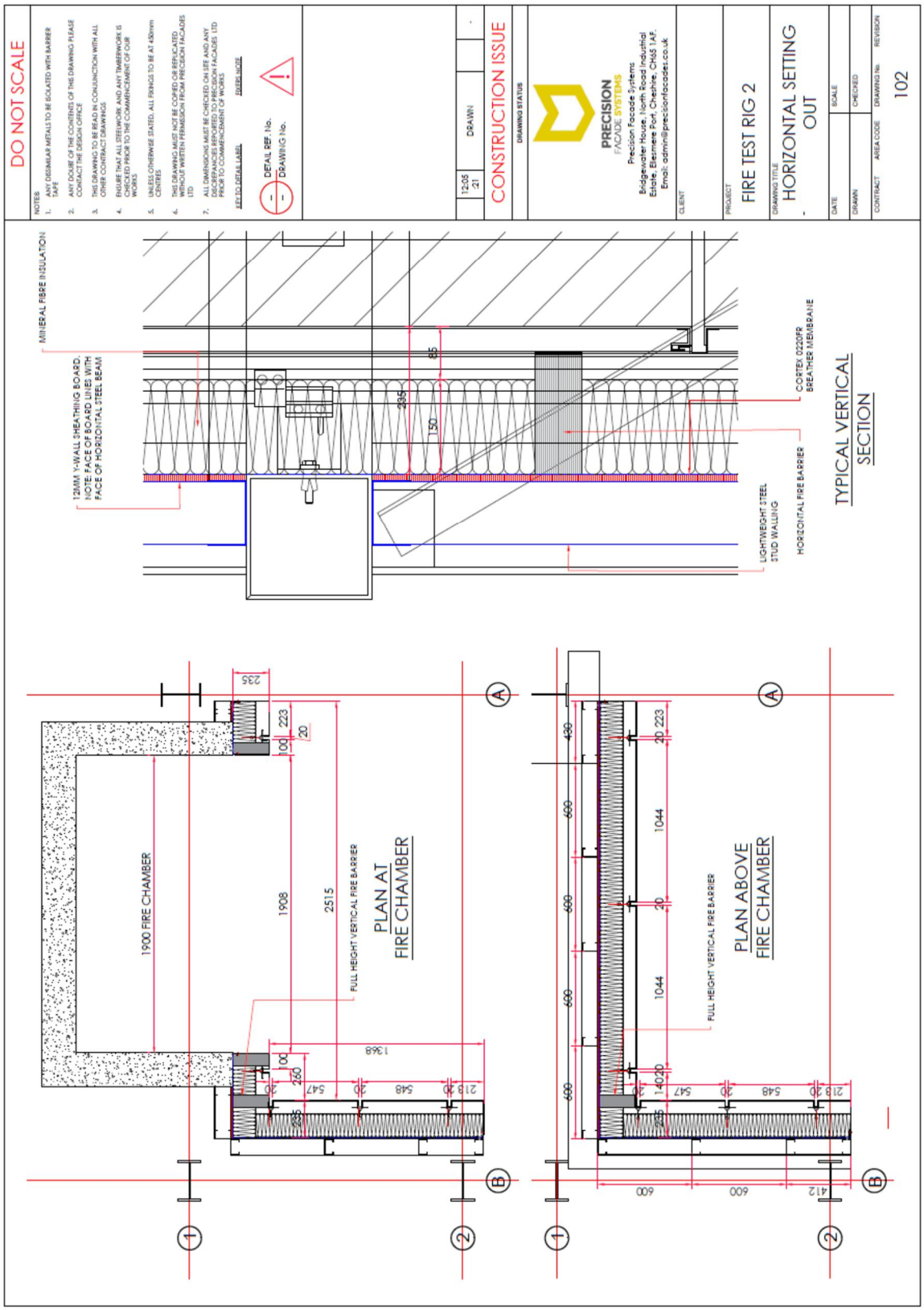

Figure 4. System cross-section (supplied by Test Sponsor).

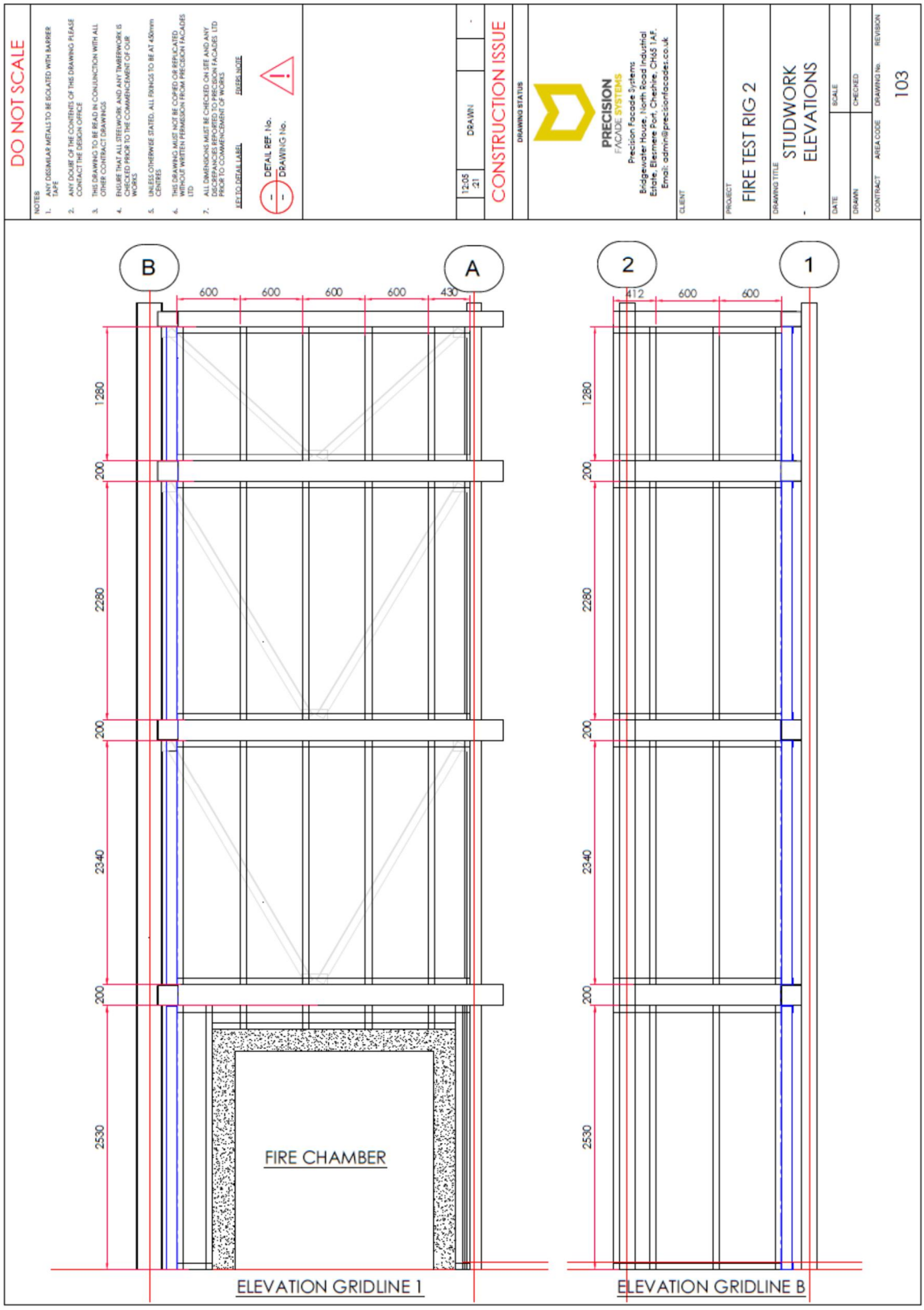

Figure 5. Steel Framing System (supplied by Test Sponsor).

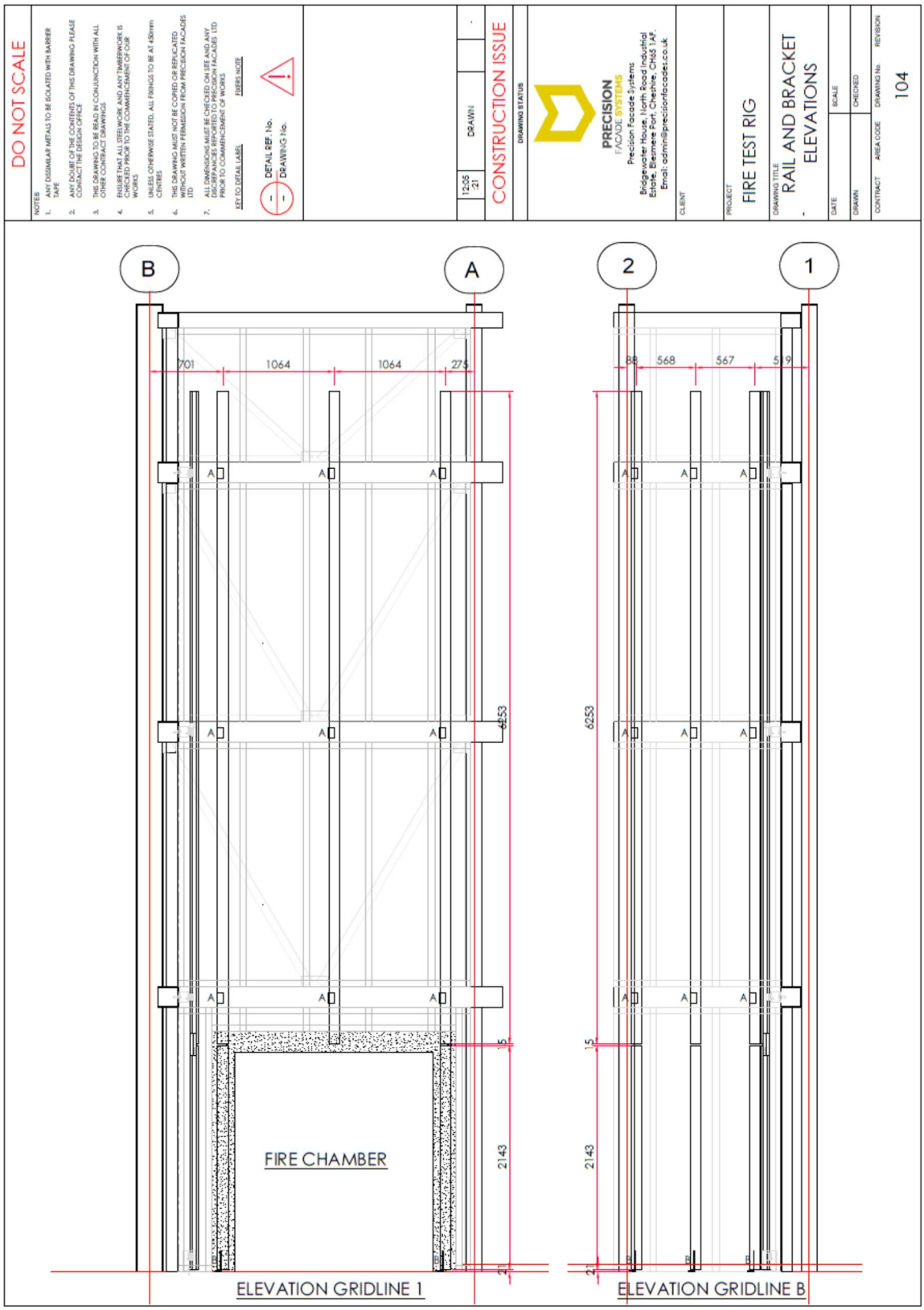

Figure 6. Rail and bracket layout (supplied by Test Sponsor).

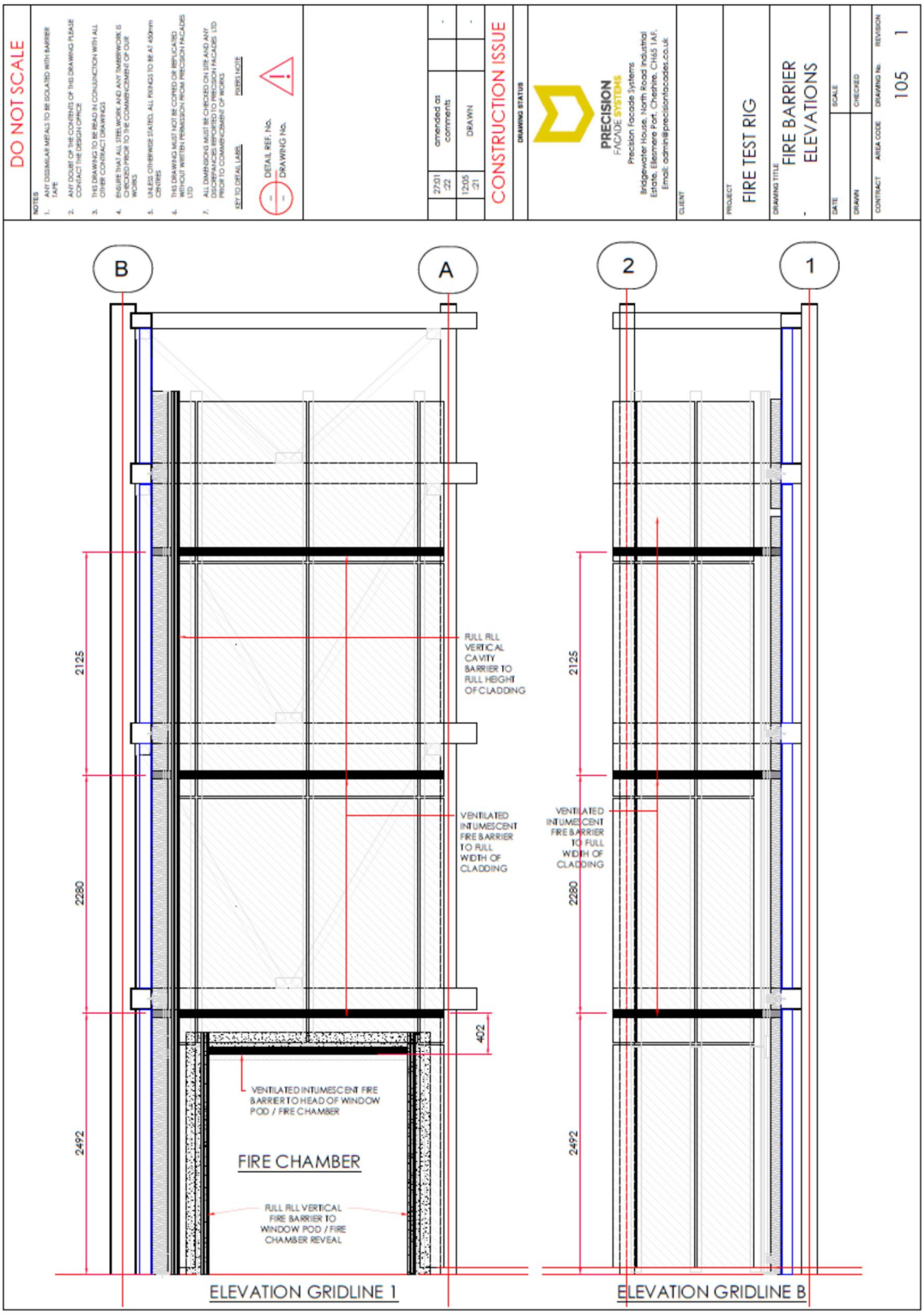

Figure 7. Horizontal and vertical cavity barrier layout (supplied by Test Sponsor).

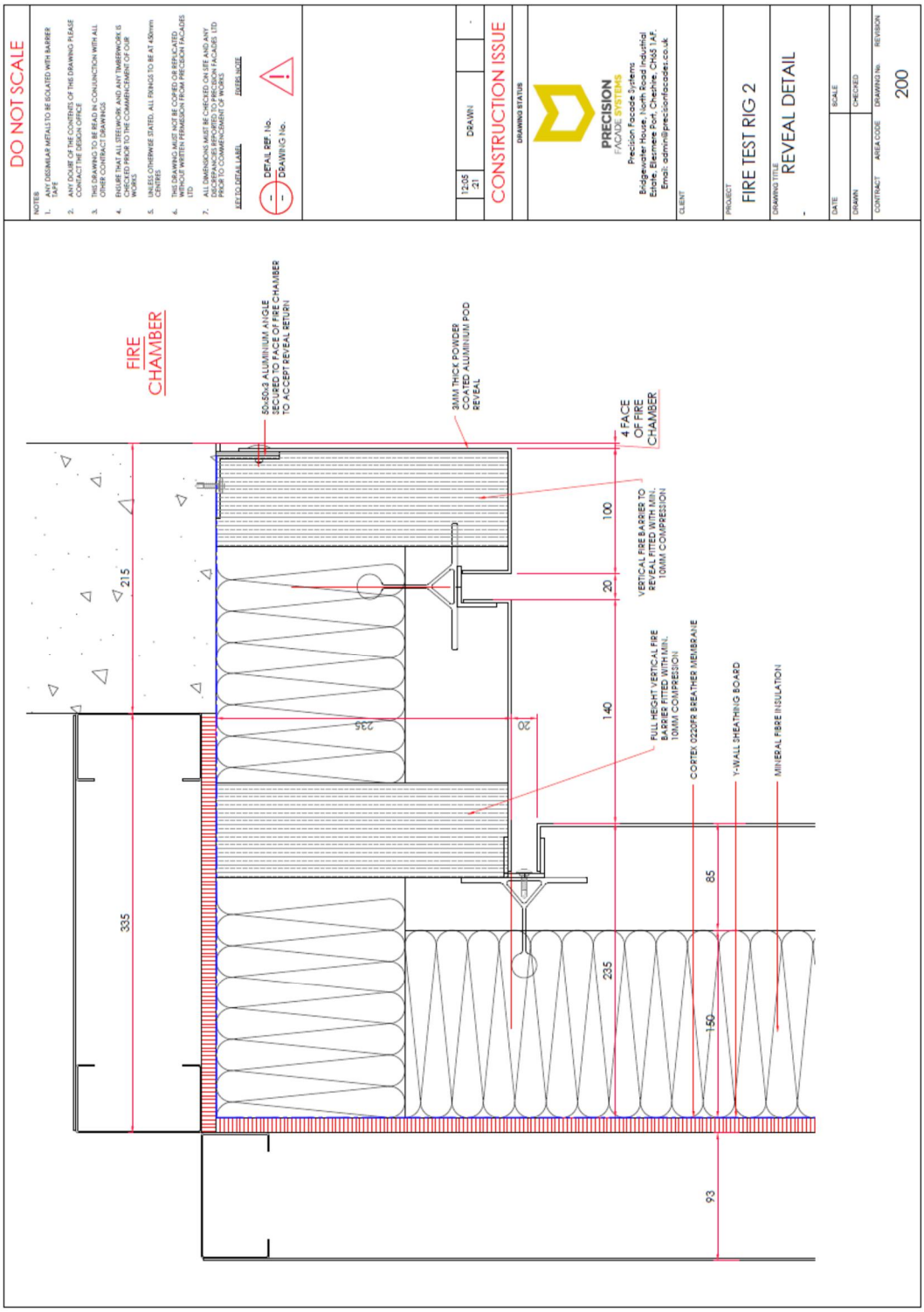

Figure 8. Main-wing wall junction detail (supplied by Test Sponsor).

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’.

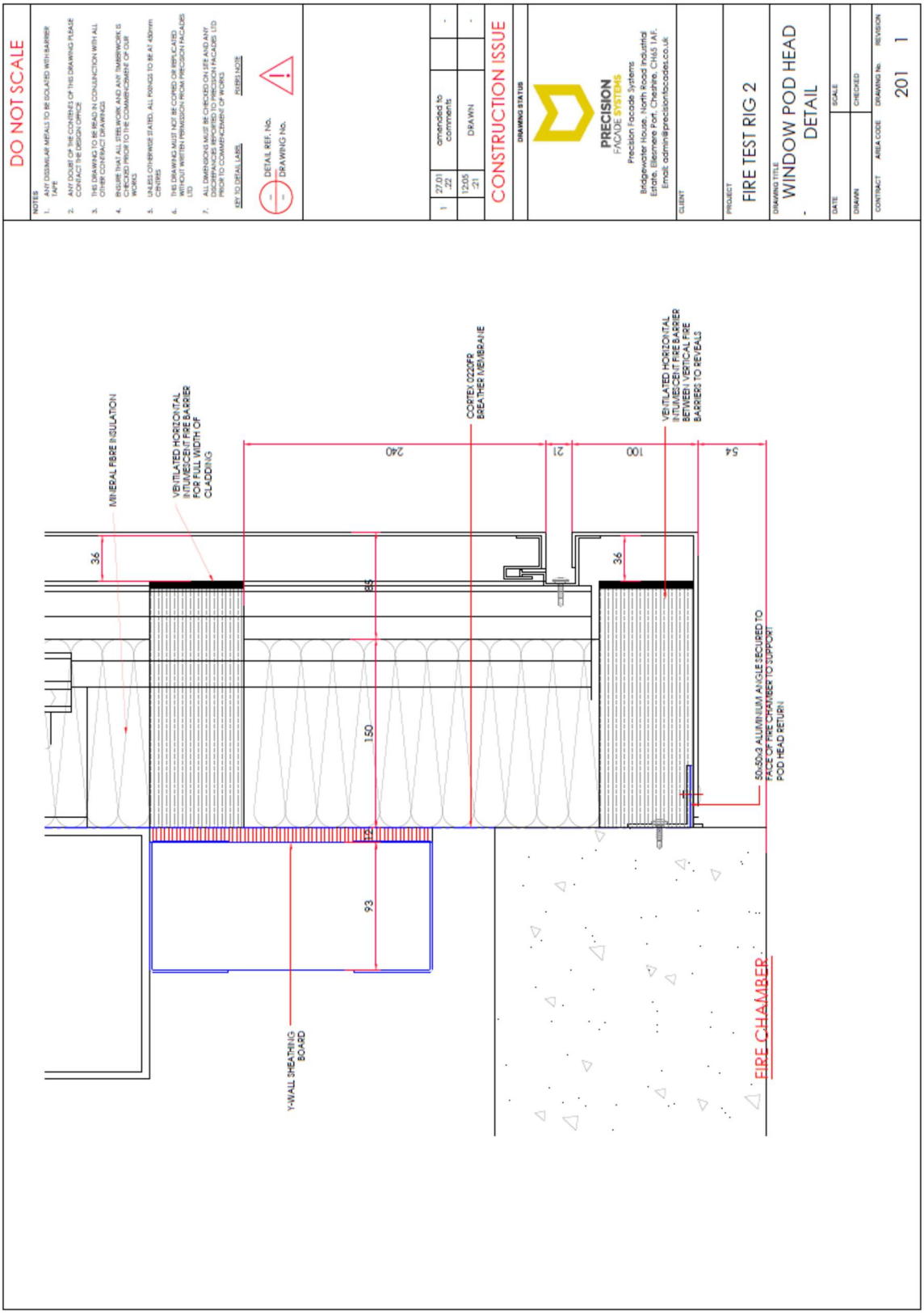

Figure 9. Combustion chamber head detail (supplied by Test Sponsor).

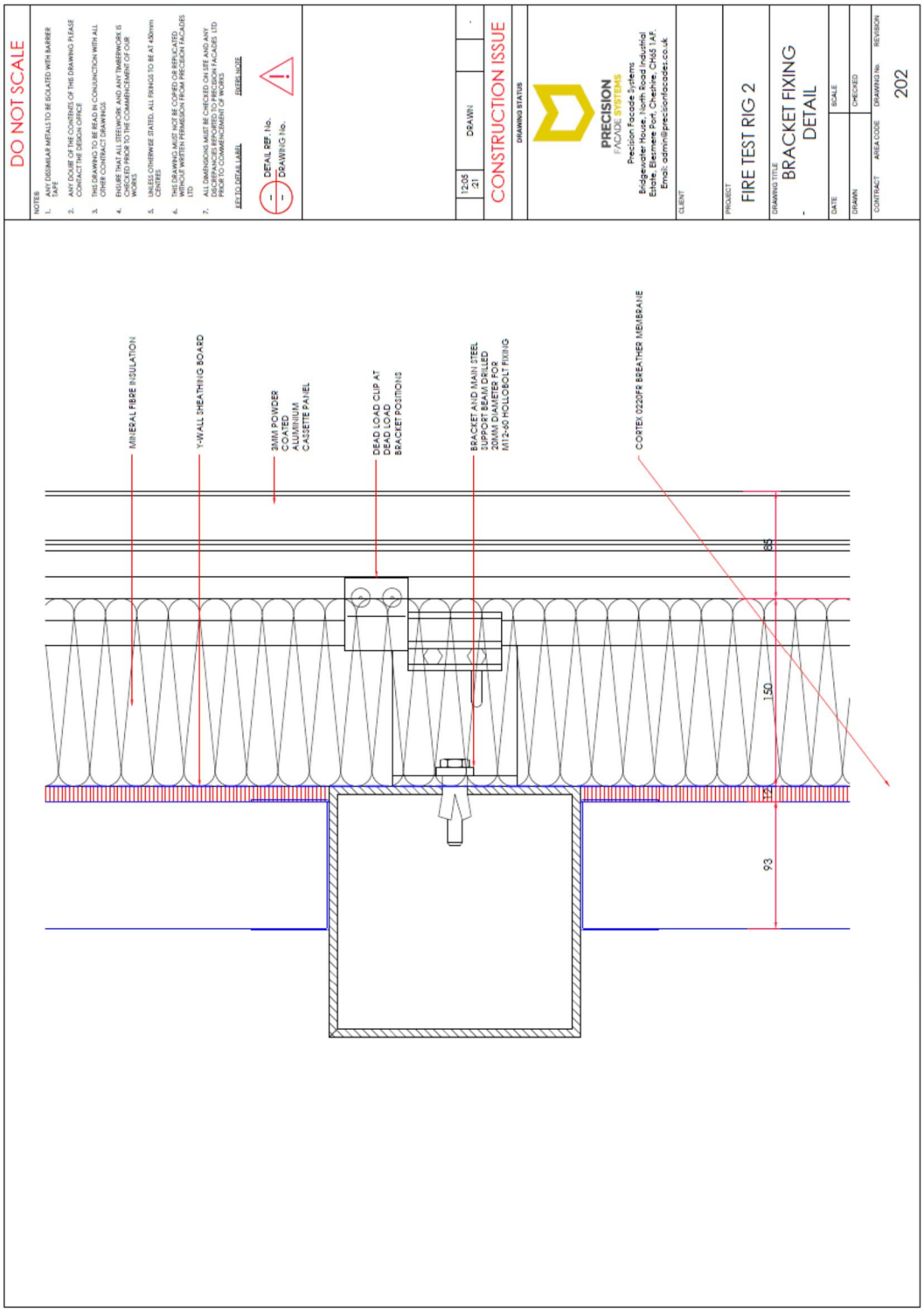

Figure 10. System cross-section (supplied by Test Sponsor).

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’.

4 Supporting Evidence

4.1 Test reports

Name of Laboratory	Name of sponsor	Test reports/extended application report Nos.	Test method / extended application rules & date
BRE Global, BRE	SBS Cladding	P119916-1000 Issue: 2	BS 8414-2:2015 + A1:2017

4.2 Test results

Test method	**Parameter**	**No. tests**	**Results**	
			Fire spread test result time, t_s (min)	**Compliance with parameters in Annex B BR135:2013**
BS 8414-2:2015 + A1:2017	External fire spread	1	>15 minutes	Compliant
	Internal fire spread (Panel cavity)		>15 minutes	Compliant
	Internal fire spread (Cavity)		>15 minutes	Compliant
	Internal fire spread (Insulation)		>15 minutes	Compliant
	Internal fire spread (Sheathing board)		>15 minutes	Compliant
	Internal fire spread (Steel framing system)		>15 minutes	Compliant
	System burn through		>15 minutes	Compliant

4.3 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.

4.4 System damage

4.4.1 Panels

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.

4.4.2 Insulation

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.

4.4.3 Horizontal and vertical cavity barriers

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.

4.4.4 Aluminium rails and angles

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.

4.4.5 Aluminium brackets and breather membrane

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.

4.4.6 Sheathing board and EPDM membrane

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

The rear of the sheathing board had no visible damage.

4.4.7 Steel Framing System (SFS)

Remained intact with no visible damage.

5 Classification and Field of Application

5.1 Reference of classification

This classification has been carried out in accordance with Annex B of BR 135 – 'Fire performance of external thermal insulation for walls of multi-storey buildings.' Third Edition 2013.

5.2 Classification

The system described in this classification report has been tested and met the performance criteria set in Annex B of BR 135:2013.

5.3 Field of application

This classification is valid only for the system as installed and detailed in Sections 2 and 3 of this classification report and the associated details found in the related test reports, referenced in Section 4.

6 Limitations

This classification document does not represent type approval or certification of the product.

The classification applies only to the system as tested and detailed in the classification report. The classification report can only cover the details of the system as tested. It cannot state what is not covered. When specifying or checking a system it is important to check that the classification documents cover the end-use application.

Report Ends