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BRE Global Classification Report

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

Prepared for: Valcan Ltd

Date: 31st October 2018

Report Number: P111461-1001 Issue: 1

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CLASSIFICATION OF FIRE PERFORMANCE IN ACCORDANCE WITH BR 135:2013 Annex B

Sponsor: Valcan Ltd, Unit 7, Robins Drive, Castlefields Industrial Estate, Bridgwater, Somerset, TA6 4DL

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Product name: Ventilated façade system with Xtratherm phenolic insulation and Vitrabond A2 ACM

Classification report No.: P111461-1001

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This classification report consists of 18 pages and may only be used or reproduced in its entirety.

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.

2 Details of the Classified Product

2.1 Description of substrate

The product was installed on to wall number 1 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

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

Item	Description
1	Saint-Gobain Gyproc Fireline plasterboard (12.5mm-thick).
2	Galvanised steel 'U'-shaped head track (103mm-deep×40mm-high×1.3mm-thick).
3	Galvanised steel 'U'-shaped base track (104mm-deep×70mm-high×2mm-thick).
4	Galvanised steel 'C'-shaped studs (100mm-deep×50mm-wide×1.3mm-thick).
5	Rockwool RWA45 insulation (100mm-thick).
6	RCM Cemboard cement particle board (10mm-thick).
7	Aluminium tape.
8	Small aluminium 'L'-shaped brackets (123mm-deep×75mm-high×55mm-wide).
9	Large aluminium 'L'-shaped brackets (123mm-deep×150mm-high×55mm-wide).
10	Xtratherm Safe-R SR/PR phenolic insulation (100mm-thick).
11	Firetherm Spanatherm stone wool foil-faced vertical cavity barrier (150mm-deep×100mm-wide).

12	Metal skewers with 'S'-profiled base (165mm-deep×60mm-wide).
13	Firetherm Rainbar Plus stone wool horizontal cavity barrier with encapsulated intumescent (120mm-deep×60mm-high)
14	Siderise stone wool horizontal cavity barrier with intumescent strip (130mm-deep×75mm-high).
15	Coated Steel combustion chamber surround side flashing (100mm-deep×2000mm-high×3mm-thick).
16	Combustion chamber surround top flashing (155mm-deep×75mm-high×2010mm-wide×3mm-thick).
17	Stamisol UV Resistant façade vapour barrier.
18	Aluminium 'T'-shaped rails (125mm-wide×40mm-deep×2mm-thick).
19	Aluminium 'L'-shaped rails (60mm-deep×40mm-wide×2mm-thick).
20	Corner flashing (100mm-deep×100mm-wide×1.5mm-thick).
21	Vitrabond A2 ACM panels with dark grey metallic finish (4mm-thick).
22	Horizontal panel joint flashing (50mm-high×1mm-thick with 6mm triangular profile at mid-height).
23	Profiled aluminium capping (172mm-deep×100mm-high×2mm-thick).
24	Steel sheet (100mm-deep×2010mm-wide×3mm-thick).

2.2.1 Installation sequence

A lightweight steel framework partition was constructed from items 2-4 in *Table 1*, the partition protruded 16mm from the front face of the floor slabs.

Galvanised steel 'U'-shaped head track was fixed to the soffit of each floor slab using 5.5×38mm self-drilling screws at 400-500mm centres.

Galvanised steel 'U'-shaped base track was fixed to the top of each floor slab using 5.5×38mm self-drilling screws at 400-500mm centres and to the ground using 6.3×70mm self-drilling screws at 300-400mm centres.

Galvanised steel 'C'-shaped studs were fitted between the head and base tracks at 260-515mm horizontal centres on the main wall and 190-455mm horizontal centres on the wing wall. The studs were fixed to the horizontal tracks using 5.5×19mm self-drilling screws through the front and rear of the tracks.

A single layer of Saint-Gobain Gyproc Fireline plasterboard was fitted to the rear face of the partition using 3.5×32mm self-drilling screws at 500-600mm vertical centres and horizontal centres in line with the studs of the partition.

Rockwool RWA45 insulation was fitted within the partition and on the external face of the floor slabs.

A single layer of cement particle board oriented vertically was fixed to the external face of the partition using 4.8×45mm self-drilling screws at 340-600mm vertical centres and horizontal centres in line with the studs of the partition.

There was a gap of 4mm between adjacent cement particle boards. The gaps were sealed using Everbuild Fire Mate sealant. The joints were then covered with aluminium tape.

Two types of 'L'-shaped brackets (Items 7&8 in *Table 1*) were fitted to the cement particle board (every fourth row from the ground was made up of the larger brackets) using two 6.3×50mm self-drilling screws per bracket.

The 'L'-shaped brackets were fitted at 275-485mm horizontal and 455-625mm vertical centres.

Metal skewers with an 'S'-profiled base were fixed to the cement particle board using two EJOT JT3-3 6.3×50mm self-drilling screws with EPDM washers per skewer at 400mm vertical centres. The skewers were fixed in two full-height columns, located at the outer edges of the test specimen (2615mm and 1560mm from the main-wing wall junction), and two columns either side, and spanning the height, of the combustion chamber opening (54mm and 2362mm from the main-wing wall junction).

Firetherm Spanatherm stone wool vertical cavity barriers were pressed onto the skewers in columns and the foil-faced edges of the barriers were sealed with aluminium tape. The vertical cavity barriers (supplied as 170mm-deep) were shaved down by approximately 20mm prior to fitting ACM panels.

Metal skewers with 'S'-profiled base were fixed to the cement particle board using two EJOT 5.5×67mm self-drilling screws with EPDM washers per skewer at 350mm horizontal centres in five rows located: 0mm, 700mm, 3210mm, 5700mm and 6800mm above the top of the combustion chamber.

Siderise stone wool horizontal cavity barriers with intumescent strip were pressed onto the row of skewers immediately above the combustion chamber opening. Firetherm Rainbar Plus stone wool horizontal cavity barriers with intumescent strip were pressed onto the four rows of skewers spanning the full-width of the test specimen.

Xtratherm Safe-R SR/PR phenolic insulation boards were fixed to the cement board using 4.8×130mm self-drilling screws with a 40mm-diameter steel washer at mid-width and mid-height along the edges of

each board and a 63mm-diameter plastic insulation retaining disc at the corners and centre of each board.

Combustion chamber surround flashings were fixed to the partition using 5.5×38mm self-drilling screws at 320-600mm centres.

Stamisol UV Resistant façade vapour barrier was cut to fit between the cavity barriers with edges and junctions secured with aluminium tape and 4.8×130mm self-drilling screws with metal insulation retaining discs fitted to the corners of each section of vapour barrier.

The aluminium rails (Items 17&18 in *Table 1*) were fixed to the 'L-brackets in alternating order using and mixture of 4.8×19mm, 4.2×16mm and 5.5×38mm self-drilling screws.

Corner flashing was fitted along the full-height of the main-wing wall junction.

Vitrabond A2 ACM panels were fixed to the rails using rivets at 70-400mm horizontal centres and 150-450mm vertical centres. ACM panels were cut to size and fitted to a series of modified 'T'-shaped rails at the internal sides of the combustion chamber opening.

There was a gap of 10mm between adjacent ACM panels.

There was a nominal 45mm cavity (measured at 42-46mm) between the outer face of the insulation and inner face of the ACM panels.

Horizontal joint flashing was cut to length and fitted at the horizontal joints between adjacent panels so that the 6mm triangular profile protruded outwards, into panel gap.

Profiled aluminium capping sealed the opening at the top of the test specimen. It was fixed using 4.5×25mm self-drilling screws at 300-700mm centres to sections of aluminium 'L'-shaped rails installed horizontally along the front edge. The 'L'-shaped rails had been secured with the same rivet fixings used, at 70-400mm horizontal centres, to attach the ACM panels.

A steel sheet was fixed to the top of the combustion chamber surround towards the inner edge of the opening using 5.5×38mm self-drilling screws at 300 nominal centres in two staggered rows approximately 90mm apart. Everbuild Firemate sealant was applied to the inner edge of the steel plate.

A single layer of Saint-Gobain Gyproc Fireline plasterboard was fitted to the combustion chamber surround adjacent to the combustion chamber surround flashings.

2.3 Installation of specimen

All test materials were supplied and installed by the Test Sponsor. BRE Global were not involved in the sample selection process and therefore cannot comment upon the relationship between samples supplied for test and the product supplied to market.

3 Product Specification

Figure 1. Full-height photograph of cladding system prior to test.

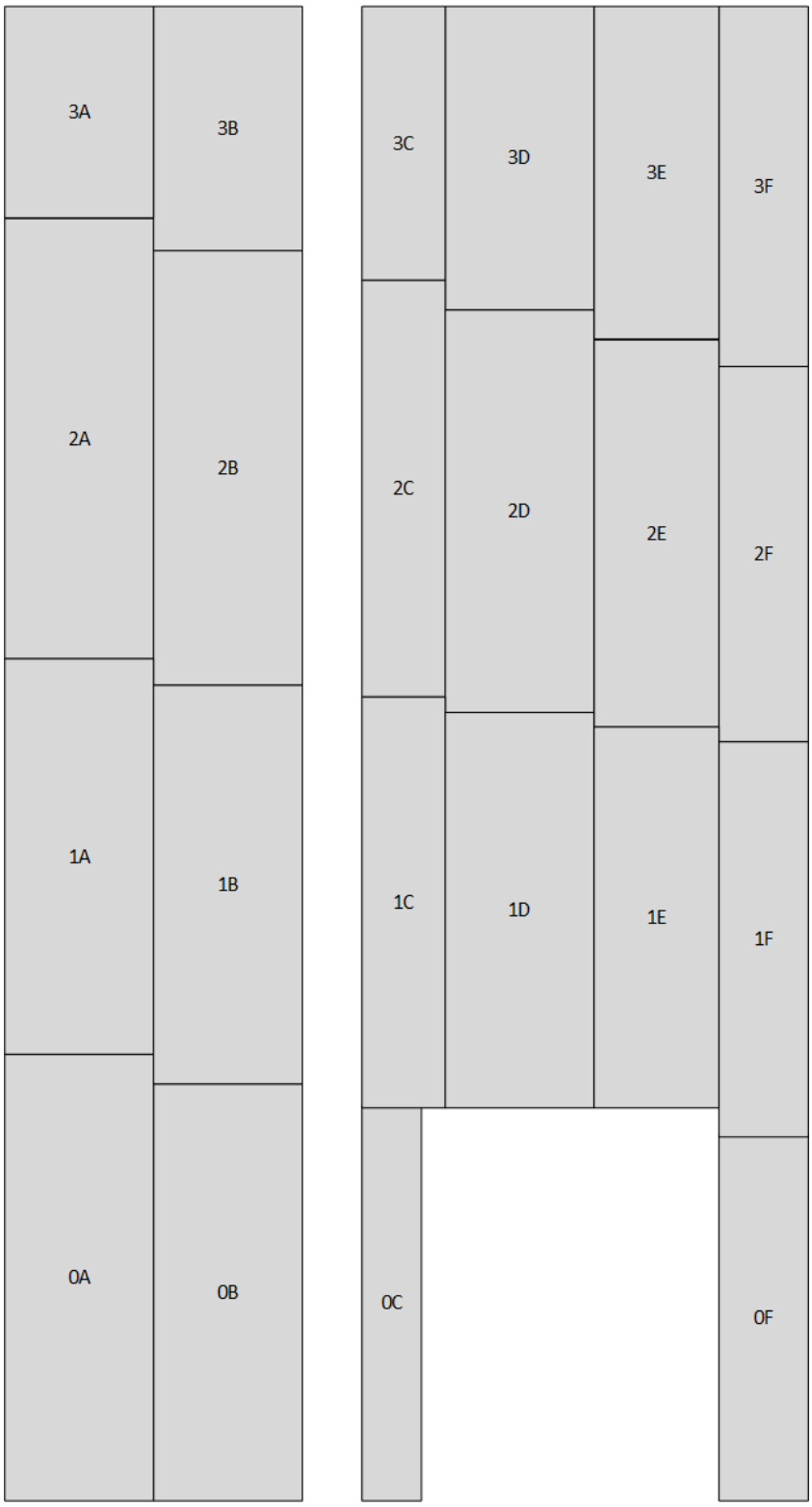

Figure 2. Layout of panels and numbering system used for reporting. Not to scale.

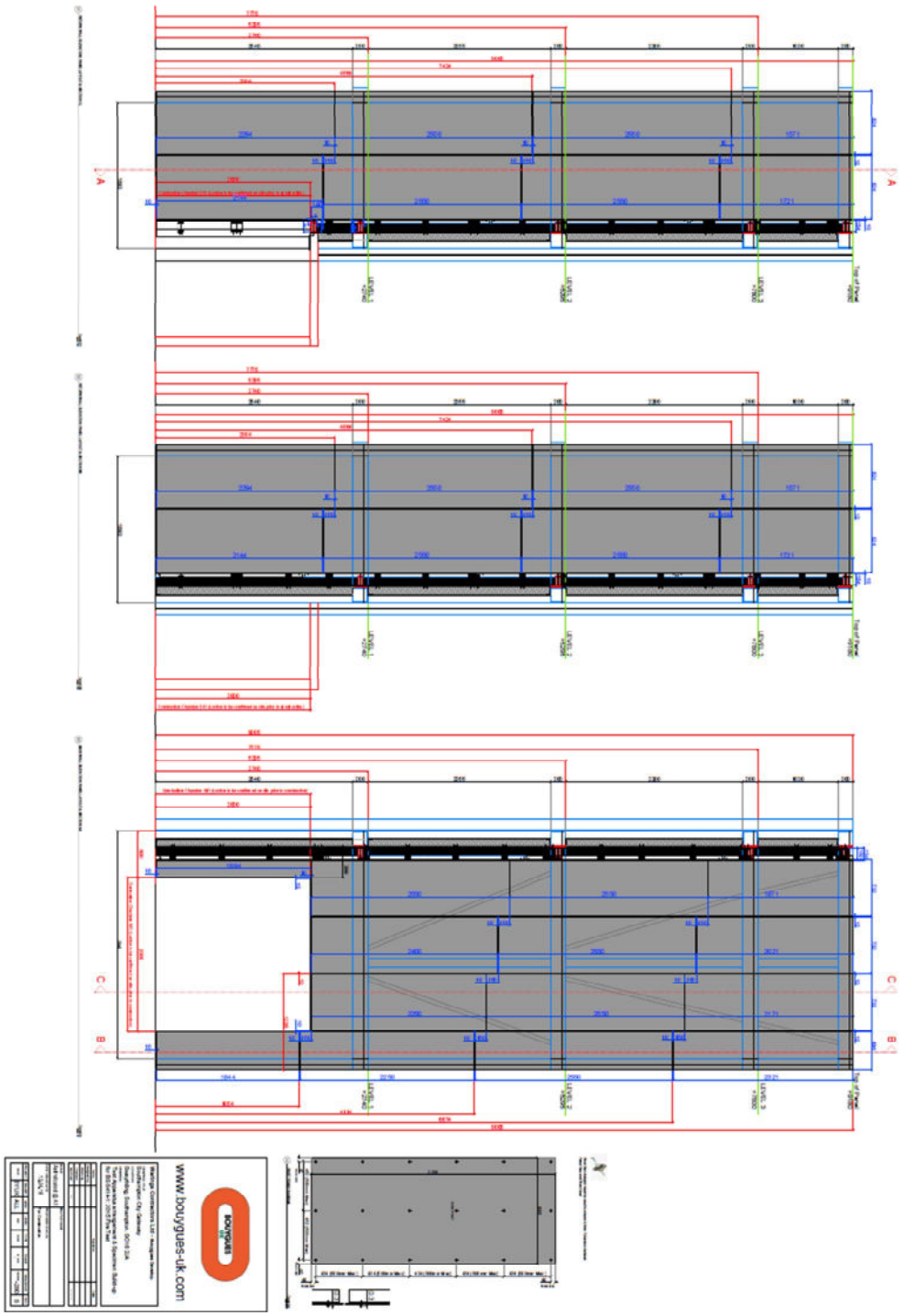

Figure 3. Panel layout (supplied by Test Sponsor).

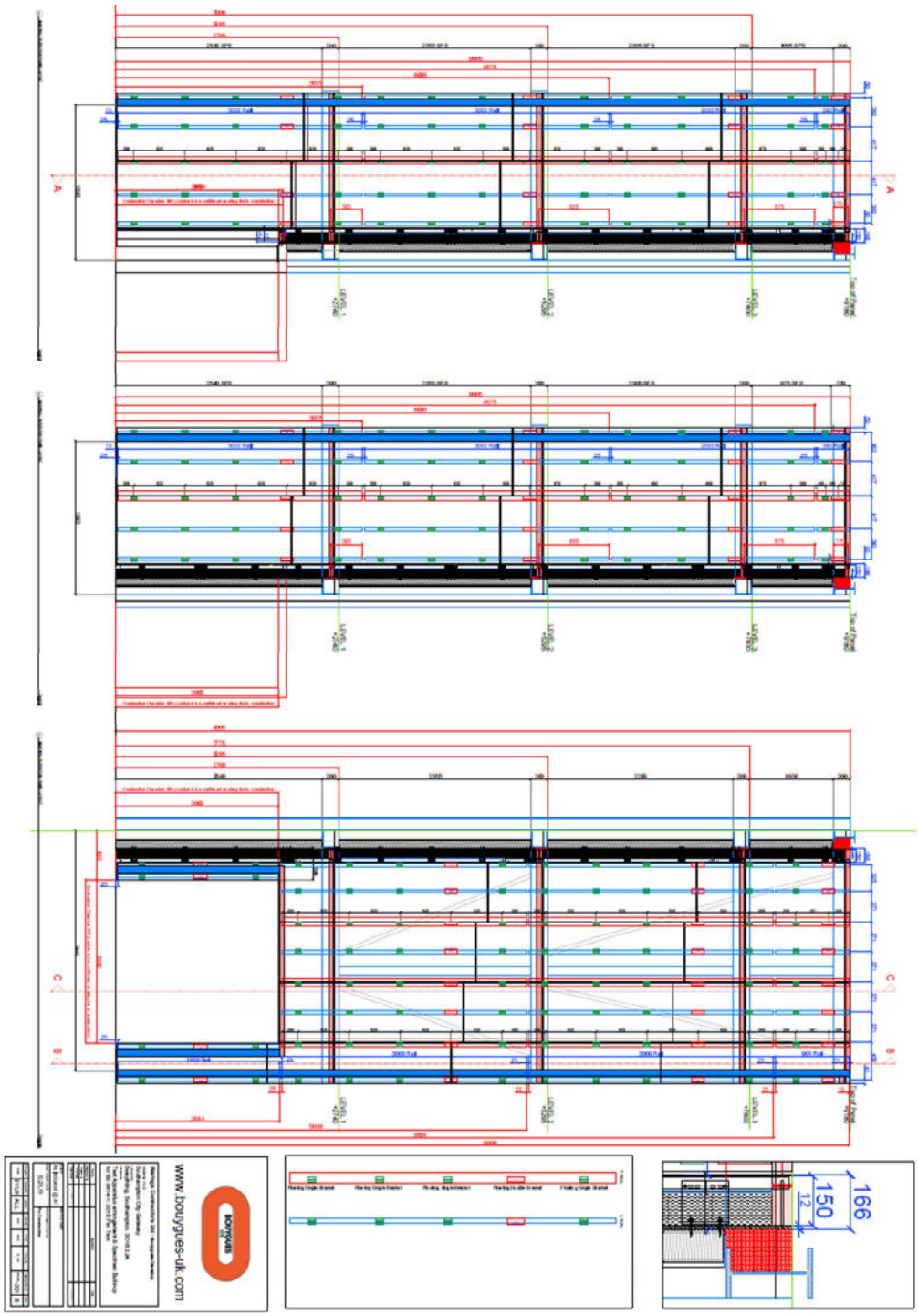

Figure 4. Rail and cavity barrier layout (supplied by Test Sponsor).

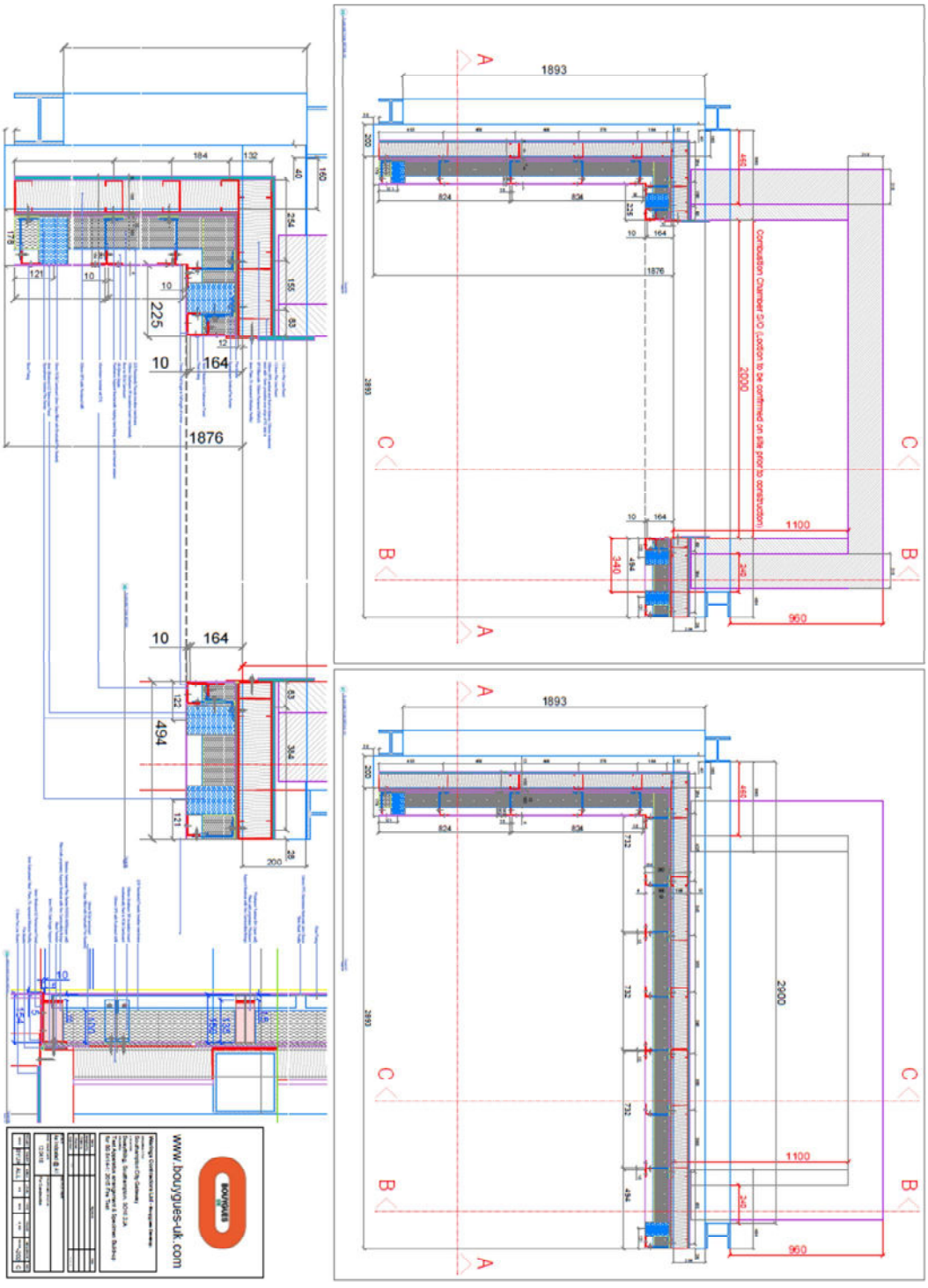

Figure 5. Cross-sections (supplied by Test Sponsor).

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	Valcan Ltd	P111461-1000	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		>15 minutes	Compliant
	System burn through		>15 minutes	Compliant

4.3 Mechanical performance

Flaming debris was observed from the cladding system from 8 minutes 30 seconds until 30 minutes 30 seconds. A small pile of flaming debris formed at the base of the cladding system at 12 minutes 40 seconds as a result.

Sections of panel detached and other non-flaming debris started at 12 minutes 40 seconds and continued until 45 minutes 30 seconds.

After the crib was extinguished, flaming continued from beneath the ACM panels, on both the main and wing wall, until test termination (60 minutes 0 seconds).

4.4 System damage

4.4.1 ACM panels

With reference to *Figure 2,* the damage observed to the ACM panels was as follows:

From 0-6500mm above the top of the combustion chamber on the main wall there was an area of panel consumption and detachment tapering up from 1990mm-wide at the base to 500mm-wide at the top.

From approximately 1000-6000mm above the top of the combustion chamber on the wing wall there was an area of panel consumption/detachment 500mm-wide. The panels remained attached until doused with water at test termination at which point there was significant detachment in this area. Panel 1B remained attached up to 1m-high, above this the panel had detached from the fixings and folded away from the wall.

There were areas of distortion and discolouration on the panels that remained in place.

4.4.2 Aluminium ‘L’ and ‘T’-shaped rails

The aluminium rails on the main wall were consumed from 0-6500mm directly above the top of the combustion chamber within a width of approximately 2000mm.

The aluminium rails on the wing wall were consumed from approximately 600-6000mm above the top of the combustion chamber within a width of 1600mm.

The rail that remained in place were distorted with localised areas of discolouration.

4.4.3 Phenolic insulation

Insulation on the main wall was charred from the top of the combustion chamber to the top of the cladding system across the full-width of the main wall. The front foil face of the insulation remained intact with discolouration in some areas above the fourth row horizontal cavity barrier. The sheathing board beneath the insulation was exposed from 0-3000mm above the top of the combustion chamber approximately 800mm-wide.

Insulation on the wing wall was charred from the ground to a height of approximately 6000mm above the top of the combustion chamber across the full width of the wing wall. The rear foil face of the insulation, and in some places the sheathing board beneath, was exposed from 700-3000mm above the top of the combustion chamber approximately 1600mm-wide.

Insulation where the external foil face remained intact was discoloured and charred beneath.

Some of the damage to the insulation may have been increased following post-test firefighting actions.

4.4.4 Horizontal (intumescent) cavity barriers

There was evidence of intumescent expansion across the full-width of all horizontal cavity barriers with partial detachment of intumescent strip.

The second and third horizontal cavity barriers were partially detached on the main wall (possibly as a result of post-test firefighting actions).

4.4.5 Vertical (compression) cavity barriers

All vertical cavity barriers remained intact and in place with localised areas of discolouration. The vertical cavity barrier located at the outer edge of the wing wall was partially detached from 2500-3000mm above the top of the combustion chamber (possibly as a result of post-test firefighting actions).

4.4.6 'L'-shaped brackets

All 'L'-shaped brackets had discolouration with partial consumption of brackets within flame damage zone on the main and wing wall.

4.4.7 Cement particle board

The cement particle board had localised areas of discolouration across the full-height of the cladding system.

4.4.8 Stone wool insulation

There were localised areas of discolouration across the full-height of the cladding system.

4.4.9 Lightweight steel framework partition

There were localised areas of discolouration across the full-height of the cladding system.

4.4.10 Plasterboard

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 Section 2 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.

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons, it is recommended that the relevance of test and classification reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test or classification to ensure that they are consistent with current practices, and if required may endorse the report.

Report Ends