

# BRE Global Assessment Report

**An assessment of the fire performance of a ventilated façade system with Kingspan Kooltherm K15 insulation and Alpollic A2 panels (4mm thick) against the criteria of BR 135, Third Edition when evaluated in accordance with BS 9414:2019**

**Prepared for:** Kingspan Insulation Limited

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## 1 Introduction

A fire test in accordance with 8414-2:2015+A1:2017 has been carried out on a ventilated façade system with Kingspan Kooltherm K15 insulation and Alpolic A2 panels (4mm thick). This assessment report considers the fire performance of this system where the facings on the Kingspan Kooltherm K15 insulation incorporate an alternative adhesive.

## 2 Scope

This assessment report considers the fire performance of a ventilated façade system with Kingspan Kooltherm K15 insulation and Alpolic A2 panels (4mm thick) against the criteria of BR 135, Third Edition. The evaluation has been carried out in accordance with BS 9414:2019.

## 3 Supporting data

### 3.1 BRE Global test report no. P109938-1000 Issue: 2

#### 3.1.1 General

A fire test in accordance with BS 8414-2:2015+A1:2017 was carried out on an external wall system incorporating Kingspan Kooltherm K15 insulation with rainscreen cladding comprising Alpolic A2 panels (4mm thick). The test was carried out on 05 February 2018.

#### 3.1.2 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 90° angle to and at one side of the main test wall. The main wall includes the combustion chamber.

#### 3.1.3 Description of the system

##### 3.1.3.1 Summary

Generic cladding type	Rain screen
Relevant test method	BS 8414-2:2015+A1:2017
Substrate	Structural steel frame
Insulation	Kingspan Kooltherm K15 (100mm thick)



Cavity depth	50mm
Vertical cavity barriers	Siderise Lamatherm RV-90/30 stone wool cavity barrier (75mm thick x 160mm deep)
Horizontal cavity barriers	Siderise Lamatherm RH25G-90/30 stone wool cavity barrier (75mm thick x 125mm deep)
External finish	4mm-thick Alpolic A2 ACM panels (Booth Muir BML400 rivet fixed)

Details of the tested system are shown in figures 2 to 4.

### 3.1.3.2 Description of product

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

Item	Description
1	Kingframe SFS (steel framing system) comprising galvanised, cold formed steel 'C' & 'U'-sections with 100 x 50mm studs.
2	12.5mm-thick plasterboard (double layer, fitted to internal face of partition).
3	12mm-thick Versapanel cement particle board.
4	Galvanised steel 'U'-shaped channels (170mm wide x 20mm deep x 2mm thick).
5	Aluminium 'L'-shaped brackets (85mm deep x 50mm wide x 120mm high x 5mm thick).
6	Galvanised steel folded skewers (320mm-long x 25mm wide).
7	Siderise Lamatherm RV-90/30 stone wool vertical cavity barriers (75mm thick x 160mm deep).
8	Galvanised steel folded skewers (350mm-long x 25mm wide).
9	Siderise Lamatherm RH25G-90/30 stone wool horizontal cavity barriers with intumescent strip (75mm thick x 125mm deep).
10	100mm-thick Kingspan Kooltherm K15 insulation.
11	Aluminium 'T'-shaped rails (120mm wide x 60mm deep x 2mm thick).
12	Aluminium 'L'-shaped rails (40mm wide x 60mm deep x 2mm thick).
13	Aluminium 'L'-shaped angles (175mm x 70mm x 5mm thick).



Item	Description
14	4mm-thick Alpolic A2 ACM panels (Booth Muir BML400 rivet fixed).

### 3.1.3.3 Installation sequence

A lightweight steel framework partition was constructed from 100mm×55mm 'C'-section Kingframe SFS studwork. The horizontal sections were fixed into the 'floor slabs' and the ground using 5.5×40mm self-drilling screws. The vertical sections were fixed to the horizontal sections at 465-600mm centres on the main wall and 265-600mm centres on the wing wall using 5.5 x 25mm self-drilling screws.

A double layer of 12.5mm-thick plasterboard was fitted with long edge horizontal to the internal face of the partition using 3.5 x 38mm drywall screws at 265-600mm horizontal and 390mm vertical centres. Versaseal-FS Euroform Grey sealant was applied between adjacent boards.

A single layer of 12mm-thick cement board was fixed with long edge vertical to the external face of the partition using 3.5 x 38mm drywall screws at 265-600mm horizontal and 390mm vertical centres. Versaseal-FS Euroform Grey sealant was applied between adjacent boards.

'U'-shaped channels (170mm wide x 20mm deep x 2mm thick) were fitted horizontally to the external face of the cement board at 420-960mm vertical centres. The channels were fixed using 5.5 x 45mm self-drilling screws at 600mm horizontal and 145mm vertical centres.

'L'-shaped brackets (85mm deep x 50mm wide x 120mm high x 5mm thick) were fixed to the 'U'-shaped channels at 485mm horizontal centres using two 5.5 x 45mm self-drilling screws per bracket.

Galvanised steel folded skewers (320mm-long x 25mm wide) were fixed to the cement board at nominal 600mm vertical centres in three columns located either side of the combustion chamber opening (approximately 280mm and 2280mm from the main-wing wall junction) and one at the outside edge of the wing wall (approximately 1150mm from the main-wing wall junction).

Siderise Lamatherm RV-90/30 stone wool vertical cavity barriers (75mm thick x 160mm deep) were pressed onto the skewers in columns. On the wing wall each vertical column was interrupted by the horizontal cavity barriers.

Galvanised steel folded skewers (350mm-long x 25mm wide) were fixed to the cement board at 300-450mm horizontal centres in four rows located: 0mm, 2400mm, 4800mm and 6600mm above the top of the combustion chamber.

Siderise Lamatherm RH25G-90/30 stone wool horizontal cavity barriers with intumescent strip (75mm thick x 125mm deep) were pressed onto the skewers in rows. A cut was made along the length of the skewers local to the tip and the ends were folded to opposite sides to secure the intumescent cavity barriers in place. On the main wall each horizontal row was interrupted by the vertical cavity barriers which extended the full height.

100mm-thick Kingspan Kooltherm K15 insulation was fitted to the cement board using 6.1 x 125mm screws with 70mm insulation retaining discs and 5.5 x 150mm screws with 70mm insulation retaining discs alternating at 600mm horizontal and 770mm vertical centres. The discs were sealed with silver tape.

120mm-wide x 60mm-deep x 2mm-thick 'T'-shaped rails were fixed to the 'L'-brackets in columns located: at the outer edges of the combustion chamber and in line with the vertical centreline of the combustion chamber on the main wall (from the top of the combustion chamber up to the full height of the cladding



system) and at the main-wing wall junction on the wing wall. The rails were fixed using 5.5 x 55mm self-drilling screws.

40mm-wide x 60mm-deep x 2mm-thick 'L'-shaped rails were fixed to the remaining 'L' brackets using 5.5 x 55mm self-drilling screws.

B1 foam was used to seal the gaps around the 'L'-brackets in the Kingspan Kooltherm insulation and silver tape was applied over the B1 foam.

4mm-thick Alpolic A2 ACM panels were fitted to the rails using 4.8 x 16mm Booth Muir BML400 rivets at 640mm horizontal, 320mm vertical centres on the wing wall and 110-460mm horizontal, 380mm vertical centres on the main wall.

The panels at the outer edge of the main wall returned around the edges where they were fixed using a single column of rivets at 380mm vertical centers.

There was a gap of 20mm between adjacent ACM panels.

175mm x 70mm x 5mm 'L'-shaped angles were fitted to the combustion chamber surround to form a window pod using 5.5 x 55mm at 480mm vertical centres for the angles fixed to the sides of the combustion chamber opening and 580mm horizontal centers for the angle fixed to the top of the combustion chamber opening.

The cladding system measured:

Requirement	Actual measurement
≥6000mm above the top of the combustion chamber	7145mm
≥2400mm width across the main wall	2600mm
≥1200mm width across the wing wall	1350mm
260mm (±100mm) wing wall-combustion chamber opening	220mm
2000mm x 2000mm (±100mm) combustion chamber opening	2000mm wide x 1940mm high

### 3.2 BRE classification report no. P109938-1001 Issue: 1

This report presents the classification of an external wall system incorporating Kingspan Kooltherm K15 insulation with rainscreen cladding comprising Alpolic A2 panels (4mm thick). 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.

The system, as tested, satisfied the criteria as follows:



Test method & test number	Parameter	No. of tests	Results	
			Fire spread test result time, $t_s$ (min)	Compliance with parameters in Annex B BR135:2013
BS 8414-2:2015+A1:2017/ P109938-1000 Issue: 2	External fire spread	1	>15 minutes	Compliant
	Internal fire spread cavity		>15 minutes	Compliant
	System burn through		>15 minutes	Compliant

The system described in this classification report was deemed to meet the performance criteria set in Annex B of BR 135:2013.

### 3.3 Warringtonfire test report no. 414280

A test in accordance with EN ISO 1716:2018 was carried out on a sample of “Low Smoke Adhesive”, comprising synthetic rubber, to determine its heat of combustion on 21 May 2019.

For the product tested, the following results relating to the gross calorific potential were obtained.

Gross calorific value per unit mass (MJ/kg)	Gross calorific value per unit area (MJ/m <sup>2</sup> )
24.1034	0.6990

### 3.4 Warringtonfire test report no. 414281

A test in accordance with EN ISO 1716:2018 was carried out on a sample of “FR Adhesive”, comprising synthetic rubber, to determine its heat of combustion on 21 May 2019.

For the product tested, the following results relating to the gross calorific potential were obtained.

Gross calorific value per unit mass (MJ/kg)	Gross calorific value per unit area (MJ/m <sup>2</sup> )
13.4048	0.3887

## 4 Description of the proposed systems

The proposed external wall system has the same construction as that tested. The only difference is that facings on the Kingspan Kooltherm K15 insulation incorporates an alternative adhesive.





## 5 Assessment

### 5.1 Applicable rule from BS 9414:2019

Parameter 1: INSULATION LAYER(S)

Tested component/product	Variation proposed	Sub-groups	Option for change	Additional evidence required (of tested and alternative/modified products)	For rule, see clause reference
Facing layer (if applicable), including any adhesive	Alternative facing layer and/or adhesive	All insulation products	Permissible – see note to rule	Reaction-to-fire test data	5.4.10



## 5.2 Applicable clause from BS 9414:2019 (Clause 5.4.10)

The test result shall be deemed to be valid if the tested facing is replaced with an alternative facing (including the adhesive) with a gross heat of combustion in MJ/m<sup>2</sup> equal to or less than the tested product.

*NOTE If the membrane is used for the purpose of protecting the insulation from the effects of fire, either as a separate membrane or encapsulation of the insulation product, it is not permitted to remove it or replace it with an alternative product.*

## 5.3 Evaluation

### 5.3.1 General

In this instance, the membrane is not considered to be for the purpose of protecting the insulation from the effects of the fire, so it is permitted to replace it with an alternative product.

### 5.3.2 Adhesive

The gross heat of combustion for the “Low Smoke Adhesive”, which was used in BRE Global report no. P109938-1000 Issue: 2, was found to be 0.6990MJ/m<sup>2</sup> (see Warringtonfire report no. 414280) and that for the alternative “FR Adhesive” was found to be 0.3887MJ/m<sup>2</sup> (see Warringtonfire report no. 414281). The latter is therefore considered a suitable alternative.

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## 6 Conclusion

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Therefore, it is our opinion that the ventilated façade system with Kingspan Kooltherm K15 insulation and Alpolic A2 panels (4mm thick), where the facings on the Kingspan Kooltherm K15 insulation incorporate an alternative adhesive, as described in section 4, will satisfy the criteria of BR 135, Third Edition, if tested to BS 8414-2:2015+A1:2017.

This evaluation has been carried out in accordance with BS 9414:2019.



## 7 Figures

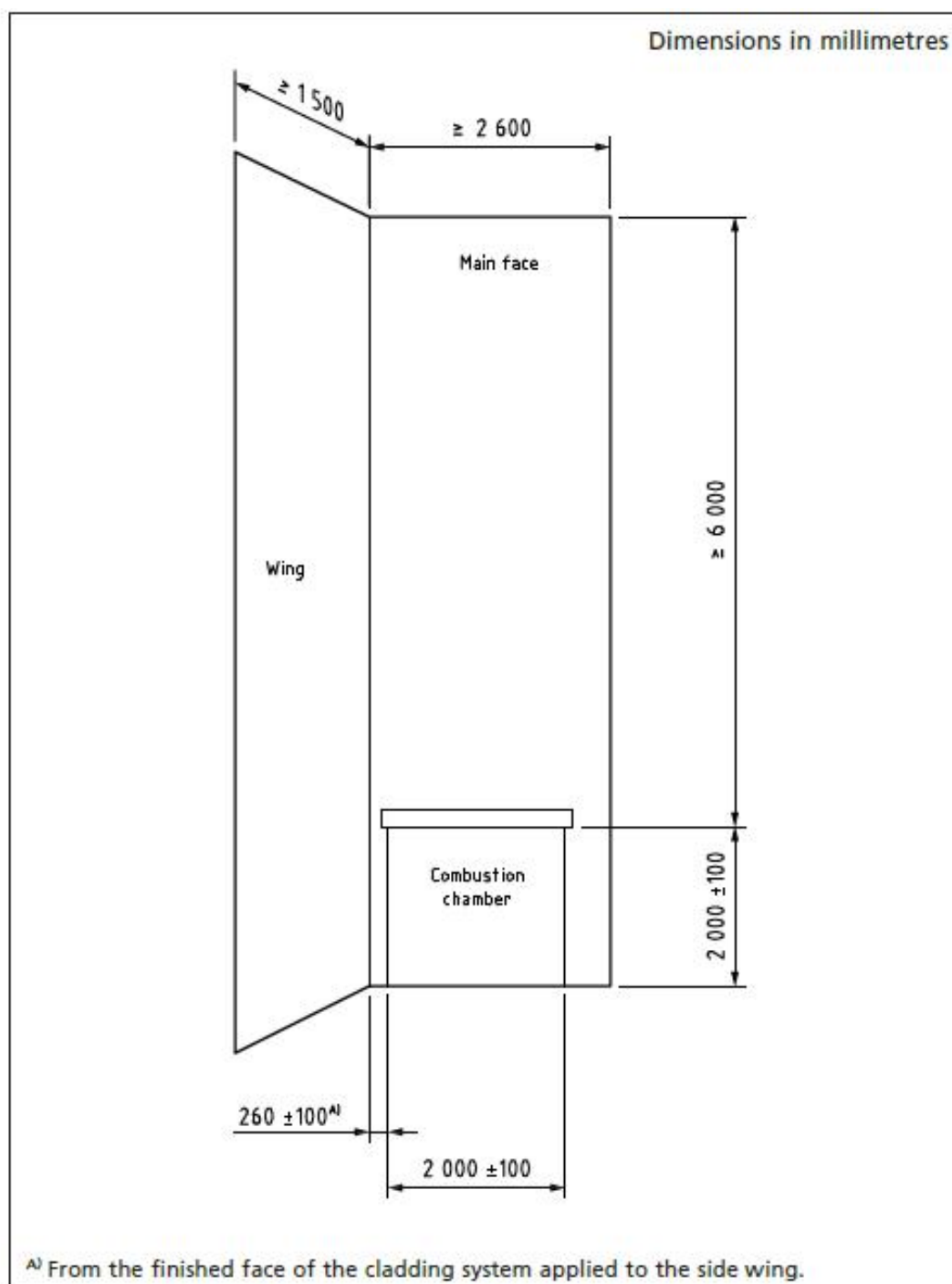


Figure 1. Test apparatus dimensions as specified by test Standard<sup>[1]</sup>.

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

Figure 2 ACM panel dimensions

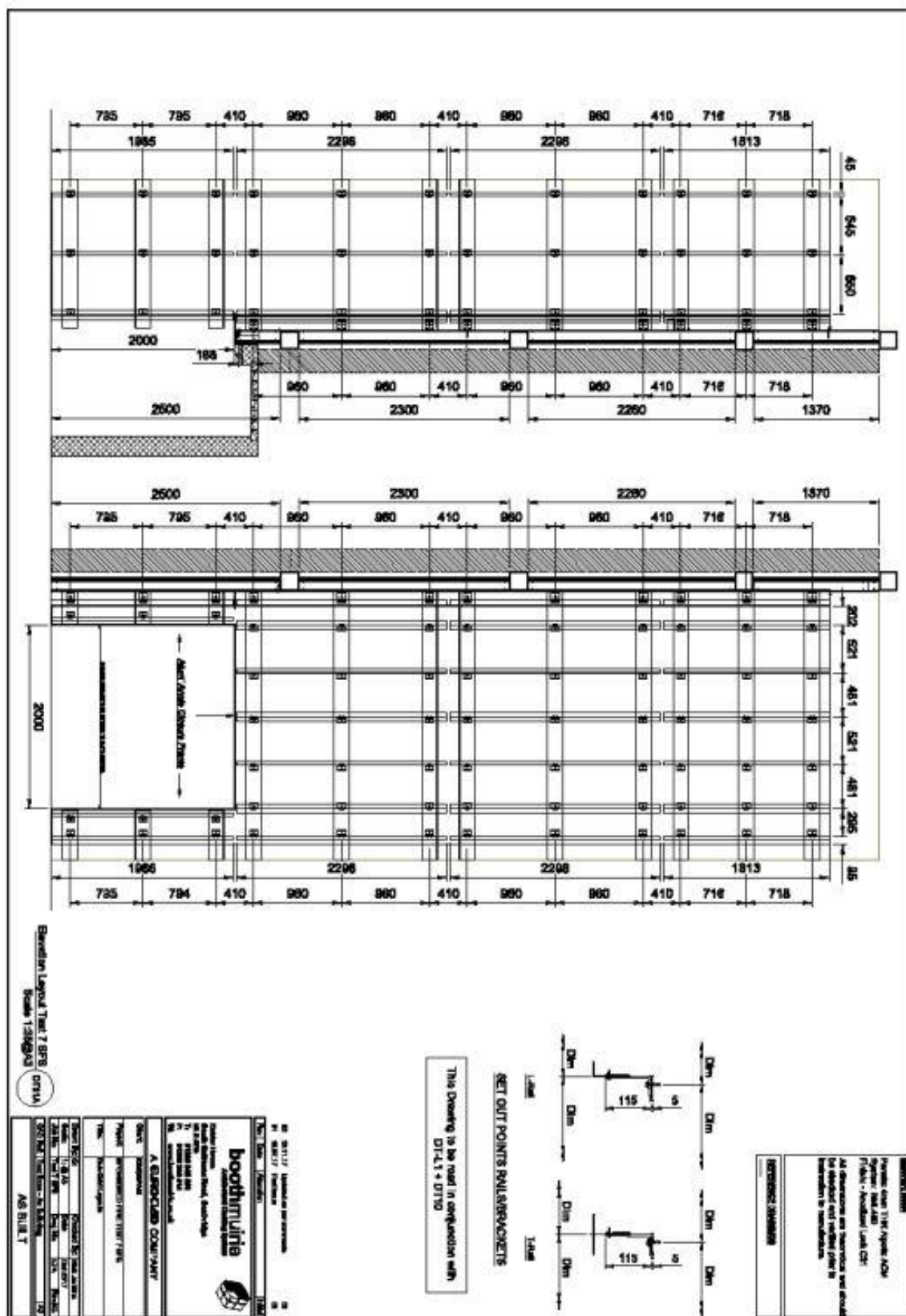


Figure 3 Rail and 'L'-shaped bracket locations

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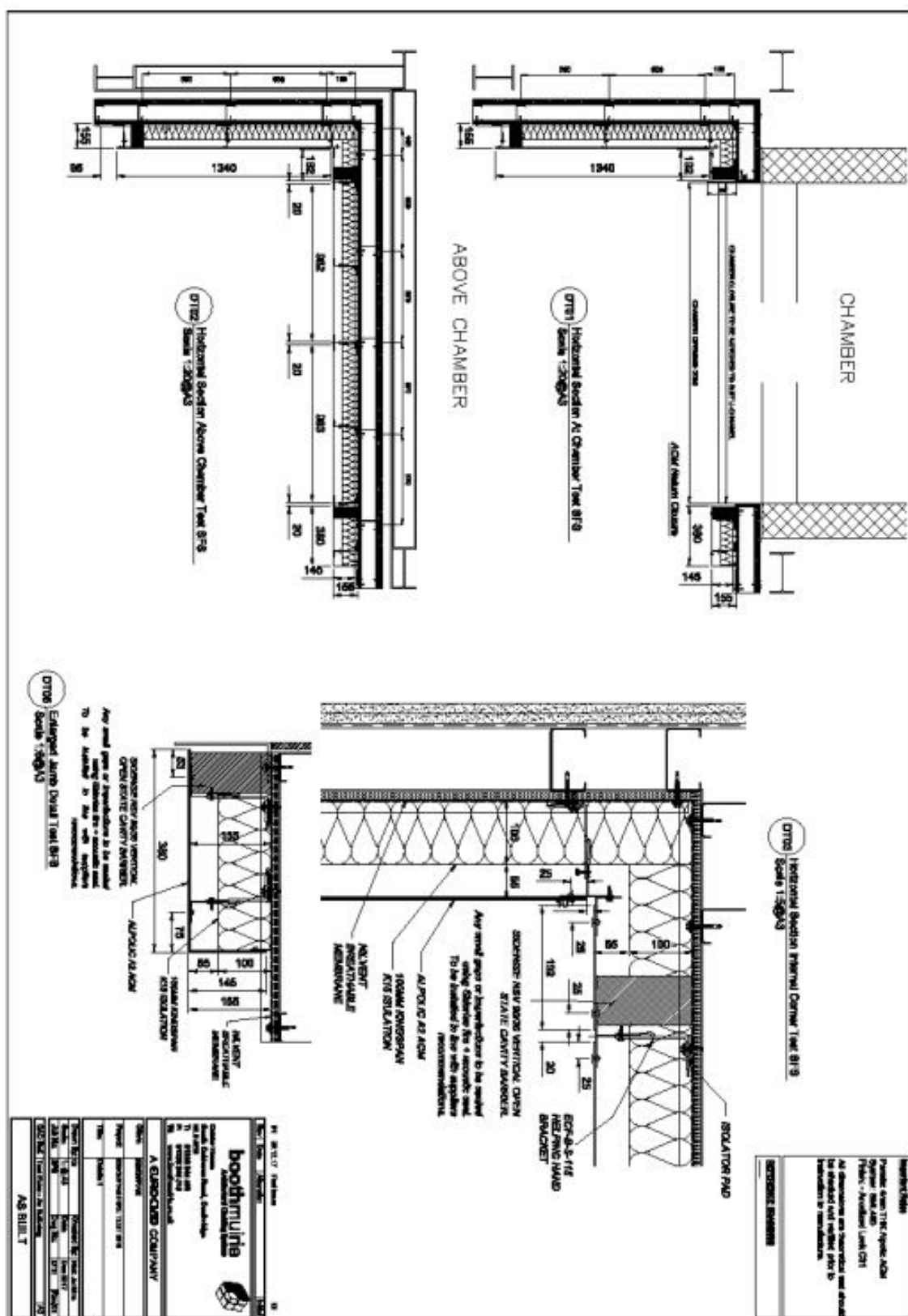


Figure 4 Cross-section views of cladding system





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## 8 Validity of the assessment

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### 8.1 Declaration by applicant

We the undersigned confirm that we have read and complied with the obligations placed on us by the PFPF Guide to Undertaking Assessments in Lieu of Fire Tests.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which this assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information, we agree to cease using the assessment and ask BRE Global to withdraw the assessment.

Signed:

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For and on behalf of:

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### 8.2 BRE Global declaration

This assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to BRE Global the assessment will be unconditionally withdrawn and the applicant will be notified in writing. Similarly, the assessment is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence over an expressed opinion. The assessment is valid for a period of five years after which it should be returned for review to consider any additional data which has become available or any changes in the fire test procedures. Any changes in the specification of the product will invalidate this assessment.

This assessment has been carried out in accordance with Fire Test Study Group Resolution No. 82. It relates to the fire performance of the product and does not cover aspects of quality, durability, maintenance nor service requirements. This assessment relates only to the specimen(s) assessed and does not by itself imply that the product is approved under any Loss Prevention Certification Board approval or certification scheme or any other endorsements, approval or certification scheme.

Next review date: 30 September 2025