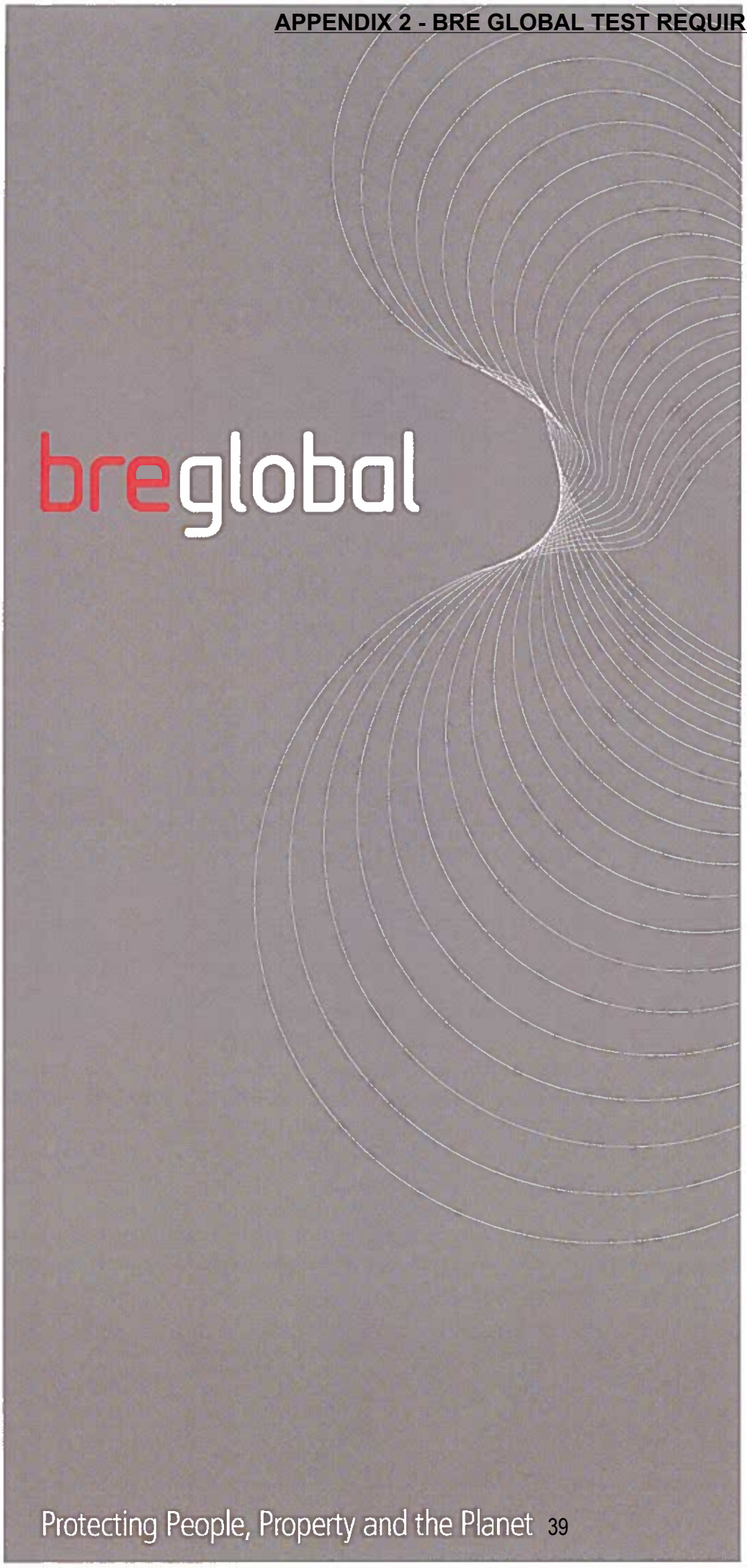

BS 8414-1:2002 test on a Piperhill Construction External Rainscreen system with Vinylit Cladding

Prepared for:
Piperhill Construction Ltd,
Unit 7, Annagh Business Centre,
3 Tandragee Road,
Portadown,
BT62 3BQ

13 November 2013
Test report number 287918
Issue 2

UKAS TESTING
0578

Prepared on behalf of BRE Global by

Name Phil Clark

Position Senior Consultant

Signature

Authorised on behalf of BRE Global by

Name S Howard

Position Business Group Manager, Passive Fire

Date 13 November 2013

Signature

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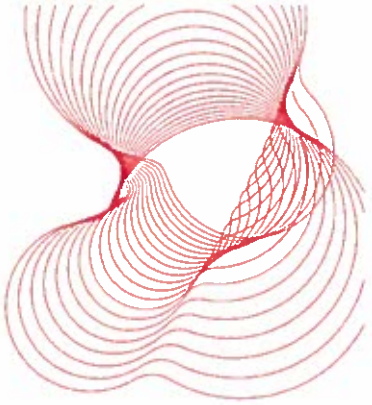
E enquiries@breglobal.com
www.breglobal.com

BRE Global is not UKAS accredited to make opinions and interpretation. Any opinions and interpretations included as part of this report are clearly marked as such.

UKAS TESTING
0578

Contents



Introduction

The test method, BS8414 Part 1:2002[1] describes a method of assessing the behaviour of non-load bearing external cladding systems, rain screen overcladding 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.

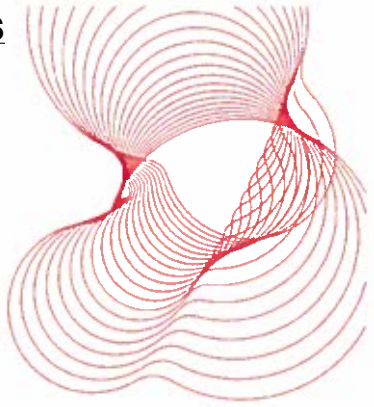
The specification and interpretation of fire test methods is the subject of on-going development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

All measurements quoted in this report are nominal unless stated otherwise.

This report issue (Issue 2) supersedes all previous issues of report number 287918. This has been published with an editorial correction to section 4.3 and clarification to the wording of section 4.2.3.

1 Details of tests carried out

Name of Laboratory:	BRE Global Ltd.
Laboratory Address:	Bucknalls Lane, Garston, Watford, Hertfordshire. WD25 9XX
Telephone No.:	01923 664000
Fax No.:	01923 664910
Test reference:	287918
Date of test:	8th August 2013
Sponsor:	Piperhill Construction Ltd.
Sponsor address:	Unit 7, Annagh Business Centre, 3 Tandragee Road, Portadown, BT62 3BQ.
Sponsors Reference No:	PhC 315
Method:	The test was carried out in accordance with BS8414-1:2002
Deviations:	None



2 System Description.

2.1 Description of substrate

The test specimen was installed onto face 1 of the BRE Global External Cladding Test Facility. This is a multi-faced test facility constructed from steel, with a concrete block wall, installed between concrete (floor) beams

2.2 Description of product

Figure 1 shows the system during construction. The system prior to test is shown in Figure 4. Full details of the system specification and installation details have been provided by the client and are summarised in the following section and.

The system, as built comprised of:

- Rockwool RW3 insulation slabs
- Rockwool SP Firestop cavity barriers (Vertically installed)
- Galvanised steel flashing/fire breaks (Horizontally installed)
- Plastic cladding rails
- Vinylit cladding panels

2.3 Installation of cladding system

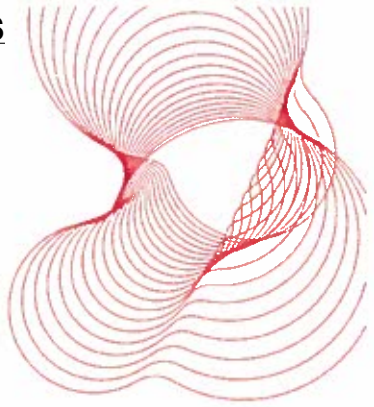
2.3.2 Insulation layer

The insulation layer was 50mm thick Rockwool RW3 insulation slabs, nominally 600 x 1200mm, these were fixed to the substrate with plastic insulation anchors at a rate of 3.3 /m^2. The insulation layer during construction can be seen in Figure 2.

2.3.3 Fire breaks

The vertical fire breaks consisted of a rockwool SP60 Firestop slab of 75mm x 650mm x 1000mm, mechanically fixed on Rockwool SP/L fixing brackets, vertically on the main wall only, nominally 2.4m from the internal corner and 150mm from the outside vertical edge line of the combustion chamber. However, the barrier was perforated by the plastic cladding rails in a number of places throughout the full height of the installation; this can be seen in Figure 1 and Figure 2.

The horizontal fire breaks consisted of continuous galvanised steel flashing 140 x 65mm 'Z' channels screw fixed, at nominally 300mm centres, directly to the block wall immediately above the combustion chamber lintel and subsequent height spacing intervals of approximately 2.4m.



2.3.4 External finish

The external finish was fixed to the wall using 2mm galvanised steel cladding brackets which were fixed back to the wall using 6mm x 130mm wood screws. The Vinylit plastic cladding rails, 40mm x 20mm were fixed to the cladding brackets using 8M hex head fixing bolts. The base of the system had a 1.2mm thick galvanised steel flashing to form the bottom closer for the system, with a Vinylit 50.02.11 bottom vent fixed 5mm above the steel flashing. The Vinylit Vinytherm Stonechip façade cladding panels, colour 'Tirol', were vertically fixed to the cladding rails with 30mm stainless steel pan head screws. This is shown in Figure 3.

2.4 Installation of Specimen

All test materials were supplied and installed by the sponsor. BRE 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.

2.5 Conditioning of the Specimen

The system did not require any conditioning. The system was installed and the test undertaken indoors.

Installation was completed on 24th July 2013.

3 Test Conditions

Test Date: 8th August 2013

Ambient Temperature: 21.9°C

Wind speed: < 0.1 m/s, test undertaken indoors

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

Thermocouple locations: Level 1 – External

Level 2 – External

Level 2 – Mid-point of cavity

Level 2 – Mid-point of insulation

Figure 6 shows the locations and identification numbers of the thermocouples for the test specimen and also the face references used to describe the system.

4 Test results

4.1 Temperature Profiles

Table 1 Test temperatures

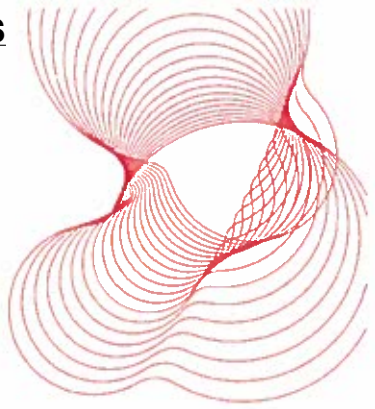


Figure 7 to Figure 10 show the temperature profiles recorded during the test.

Parameter	Result
T_s, Start Temperature	22.0°C
t_s, Start time	3:00 mins : secs after ignition of the crib
Peak temperature/time at Level 2, 50mm external	568.0°C at 13:45 mins : secs after t_s
Peak temperature/time at Level 2, cavity	507.2°C at 13:45 mins : secs after t_s
Peak temperature/time at Level 2, Insulation	432.2°C at 15:55 mins : secs after ts

4.2 Visual Observations

Table 1. Visual Observations.

Time (mins:secs)	Description
-5:00	Logger start
0:00	Ignition
2:16	Flames out of hearth.
3:16	Flames to 1m cladding wall main face
4:06	Flames to 1.5m cladding wall main face
4:20	Hole in system at 1m cladding wall main face
5:17	Flames at 3 m wall main face. Cladding material fallen to floor.
6:47	Hole in system to 3.5 m
8:30	Cladding system has fallen away to 6 m on cladding wall main face.
9:00	System fallen away on wing wall to three-quarter width between 1 and 2.5m
10:15	System away main face to 6 m
14:00	System falling away from wing face to height to 5 m. Flaming droplets 10 seconds plus. Rail burning at 0 m from five minutes plus.
17:48	Debris fire on the floor
20:00	Material still falling away main face and wing face.
21:00	Flames to 3 m cladding wall main face
21:00	Debris fire at base of wing wall with heavy smoke
23:00	Flames to 3.5 m with dark smoke, crib starts to collapse
25:00	Flames to 4.5m on main face
25:00	MW insulation away at 0 m on cladding wall main face
27:00	MW insulation away at 2 m on cladding wall main face

Time (mins:secs)	Description
28:00	Debris fire at base continues to burn with a low flame, area approx. 2 x 3m.
30:00	Crib extinguished

4.3 Post test damage report

4.2.1 External Facing

A schematic illustration of the damage to the system is shown in Figure 12. A photograph showing the condition of the Vinylit layer after the test is shown in Figure 11.

4.2.2 Insulation Layer

A photograph showing the condition of the insulation after the test is shown in Figure 13 with a schematic illustration in Figure 14.

4.2.3 Collapse

The system exhibited significant melting and delamination of the external Vinylit VinyTherm rainscreen cladding from a large percentage of the main and wing walls during the test, the resulting debris on the floor of the test facility was flaming as detailed in the visual observations (see 4.2).

4.4 BR 135[2] Classification

Refer to Classification Report number 285809.

5 References

1. BS 8414-1: 2002 – Fire performance of external cladding systems. Part 1: Test method for non-loadbearing external cladding systems applied to the face of the building. BSI, London. 2002.

2. BR 135 – 'Fire performance of external thermal insulation for walls of multi-storey buildings.' Third Edition, Annex B 2013 – IHS BRE Press, Garston, Watford. 2013.

6 Figures

Figure 1. Photograph of the system during construction – Insulation, Cladding rails, horizontal and vertical fire breaks

Figure 2. Photograph of the system during construction – insulation layer and vertical fire break with plastic cladding rail penetration.

Figure 3. Photograph of the system during construction – insulation layer, bottom rail and Vinylit bottom vent fixing detail.

Figure 4. Photograph of system prior to test.

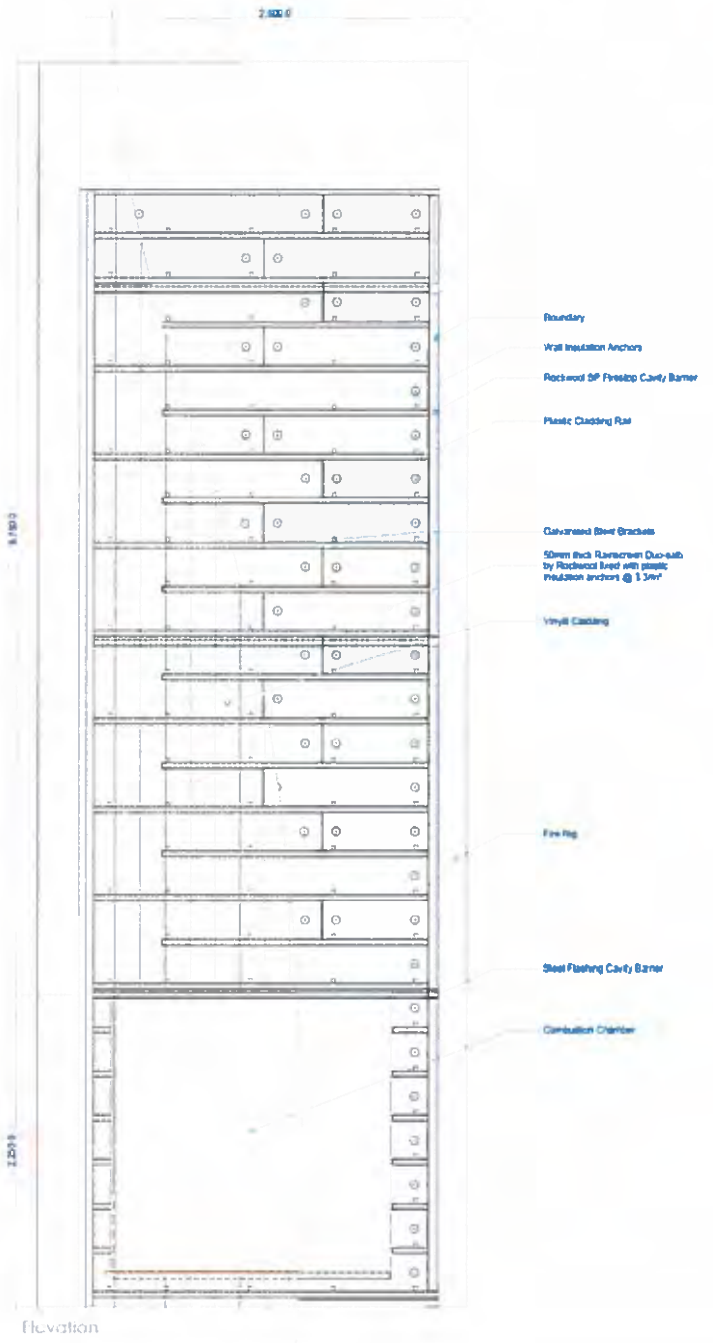


Figure 5a. Construction of the System– detail drawing supplied by client.

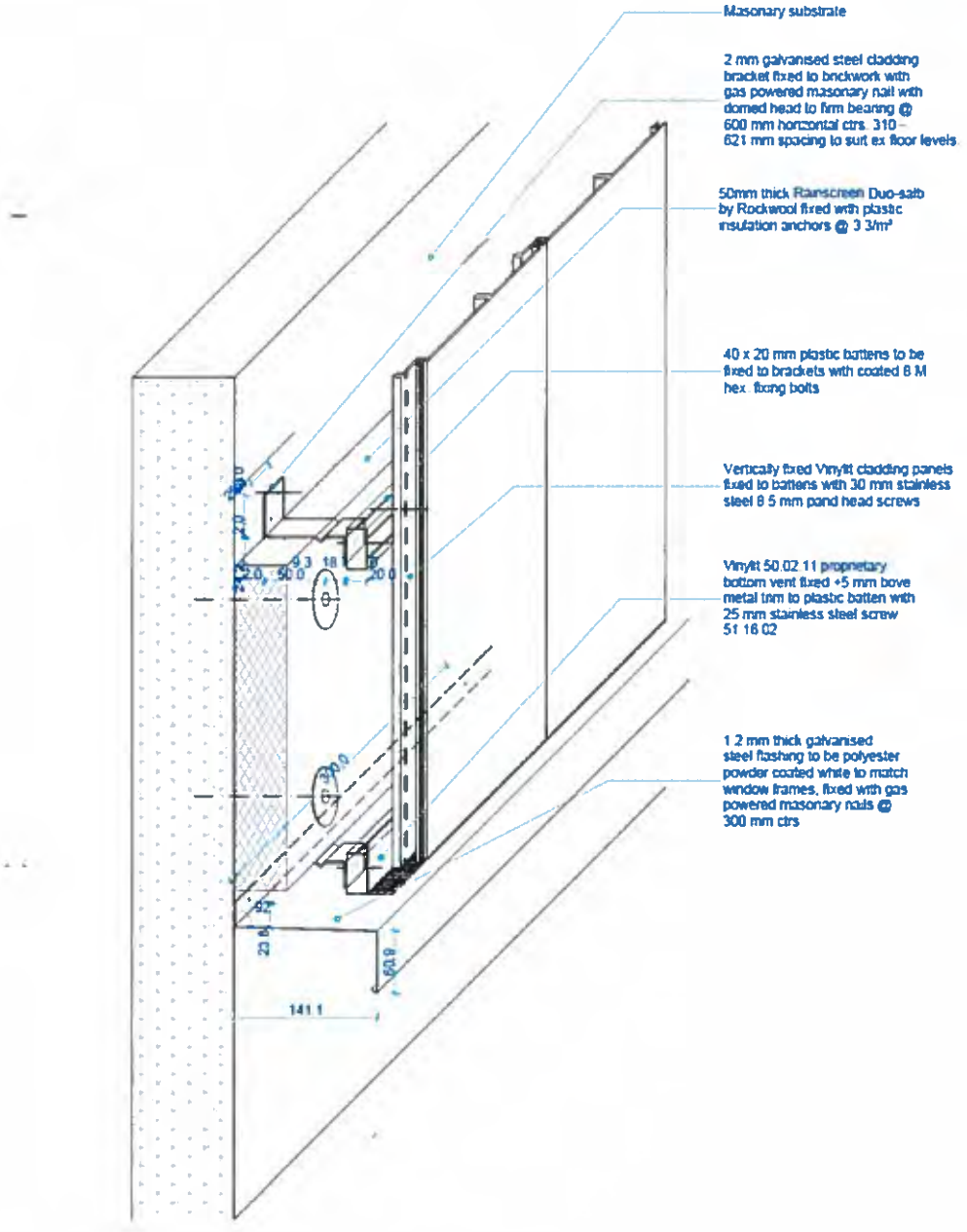


Figure 5b. Construction of the System– detail drawing supplied by client.

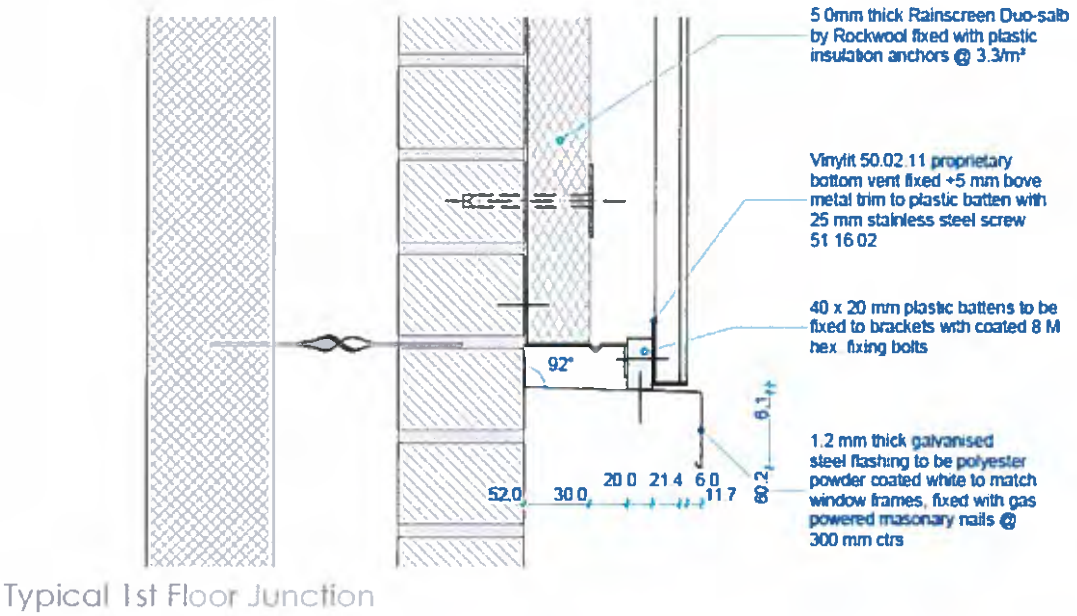
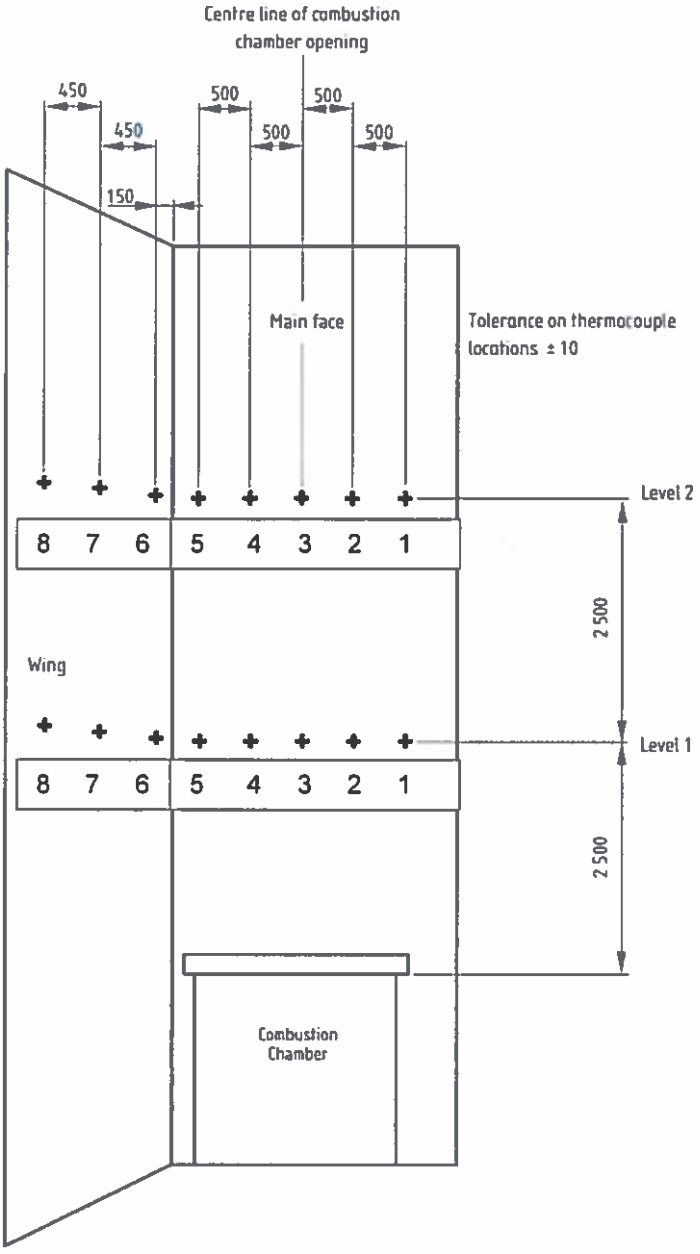


Figure 5c. Construction of the System– detail drawing supplied by client.



Level 1	External only
Level 2	External
Level 2	Cavity
Level 2	Mid depth of stud cavity

Figure 6. Location and identification numbers of thermocouples used (schematic only).

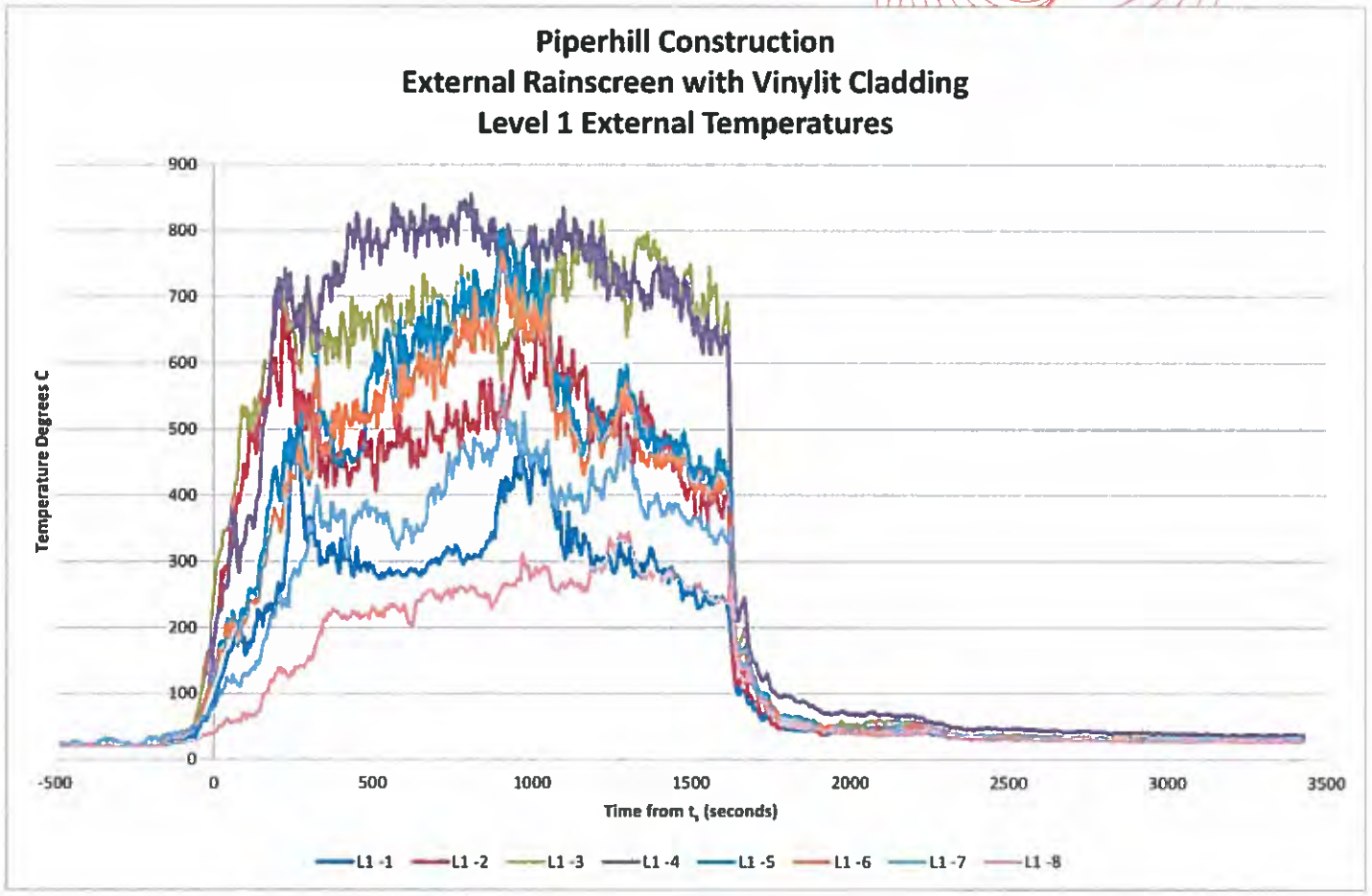


Figure 7. Graph of external temperatures for level 1 from t_s.

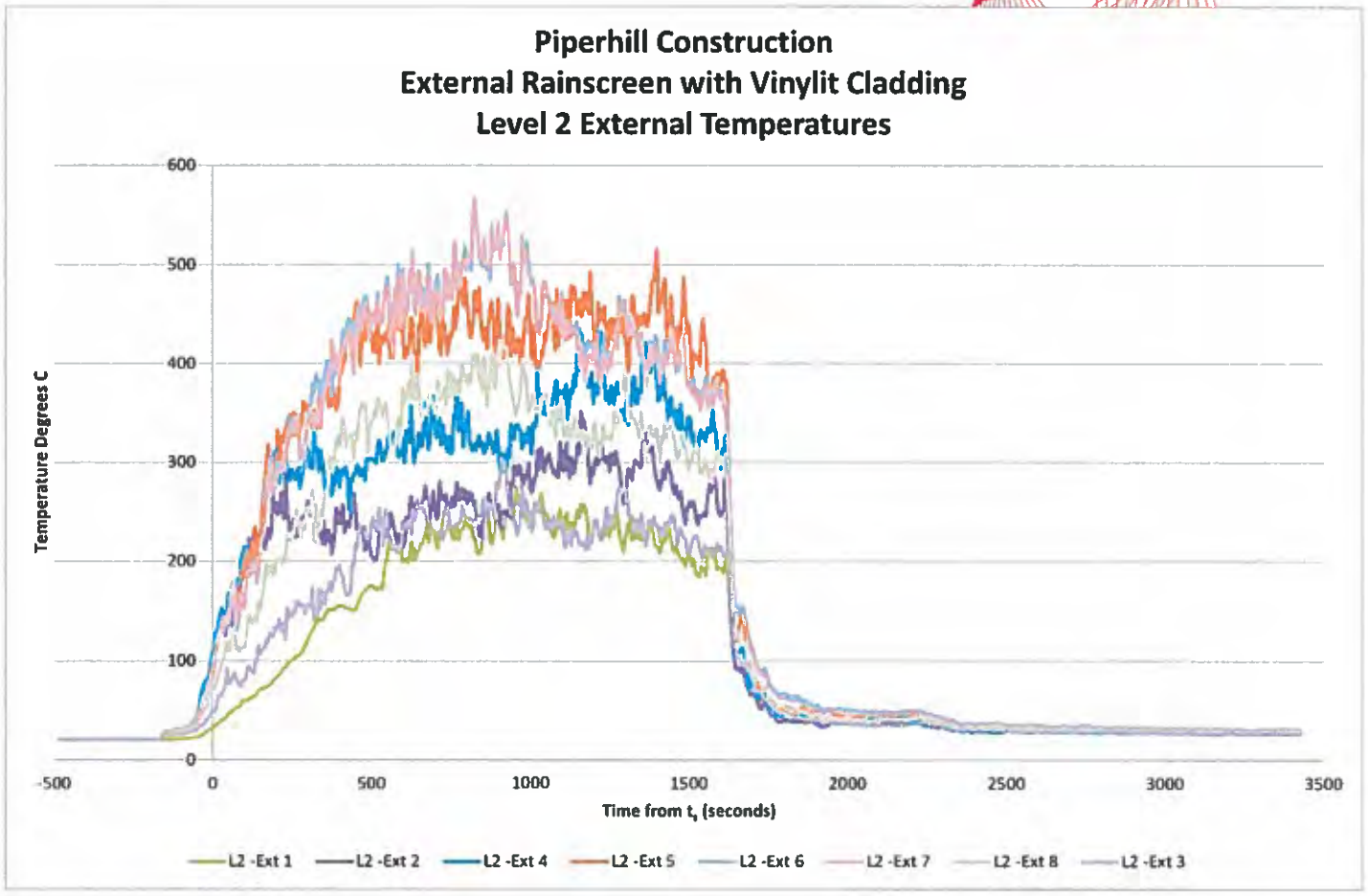


Figure 8. Graph of external temperatures for level 2 from t_s.

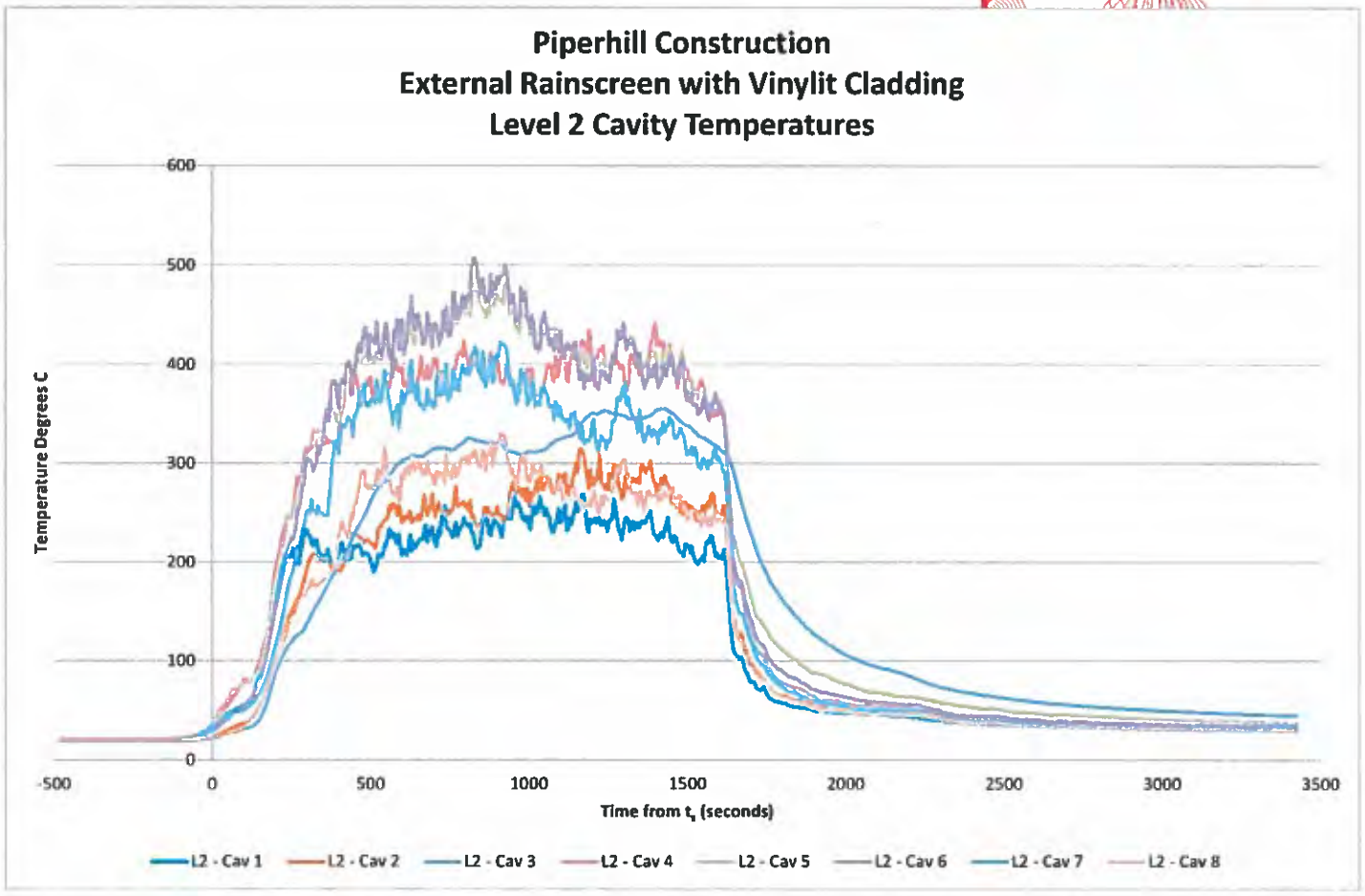


Figure 9. Graph of cavity temperatures for level 2 from t_s

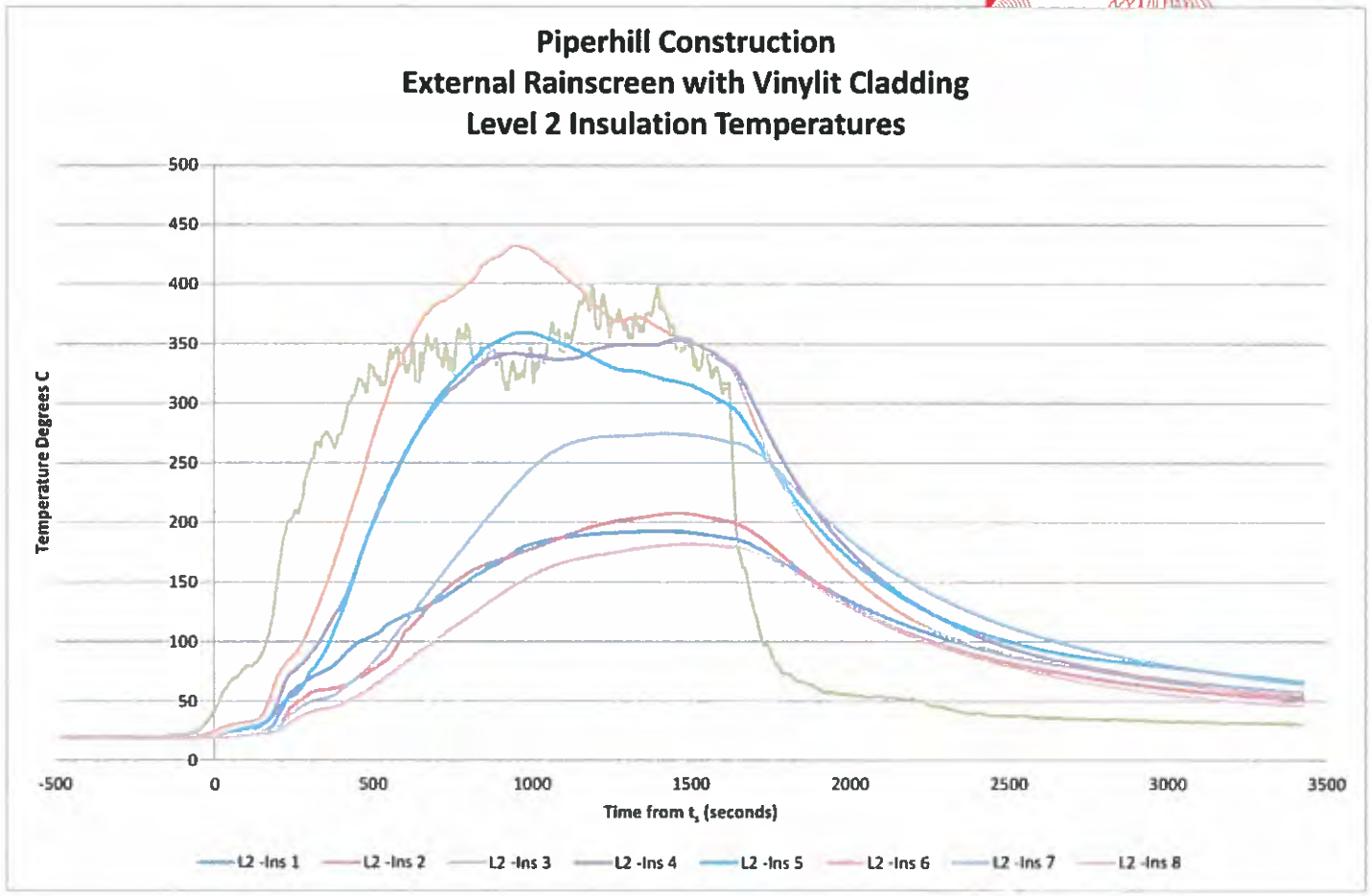


Figure 10. Graph of insulation board temperatures for level 2 from t_s

Figure 11. Photograph of system post-test.

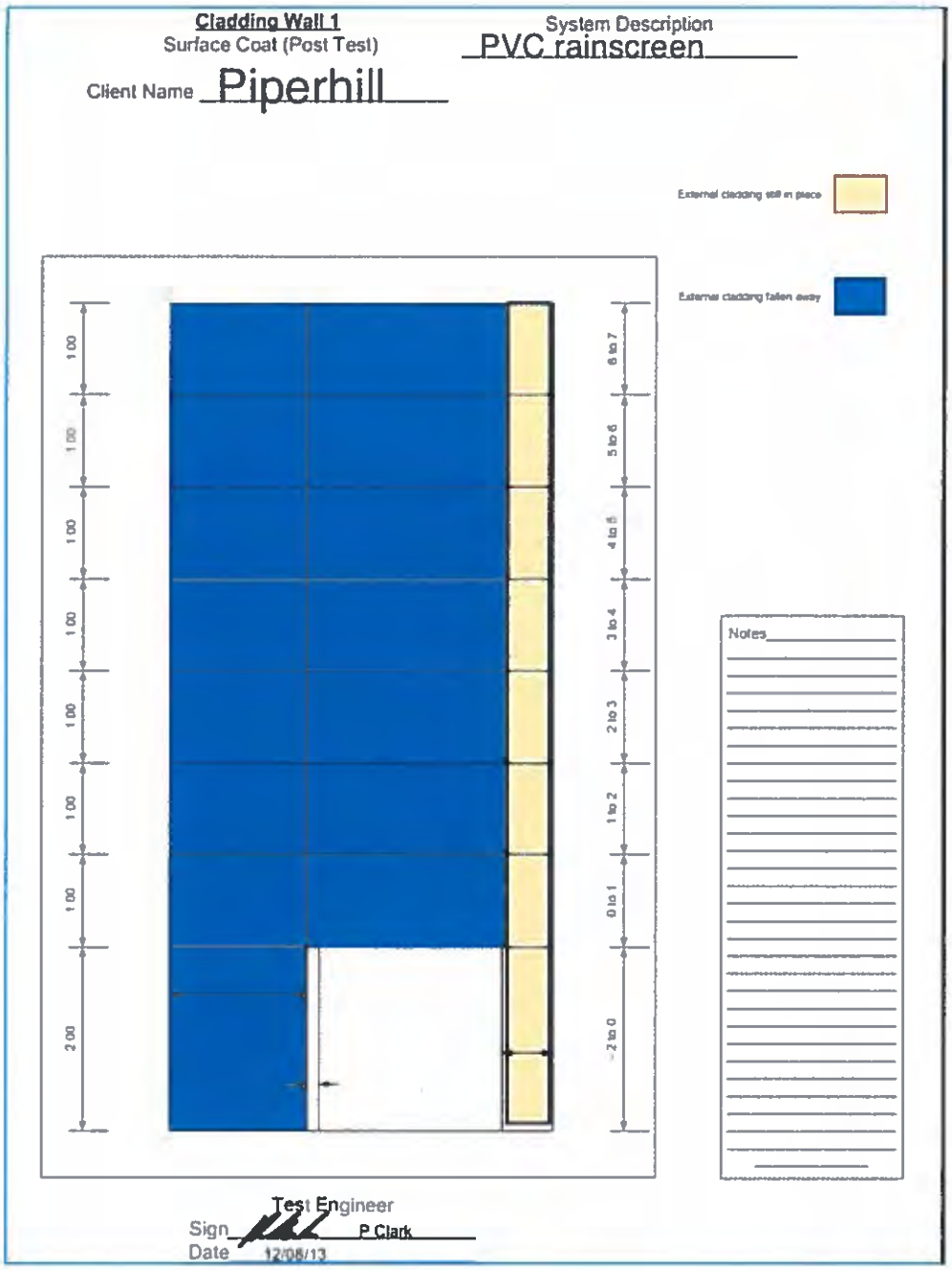


Figure 12. Schematic of system surface coat post-test.

Figure 13. Photograph of insulation post test.

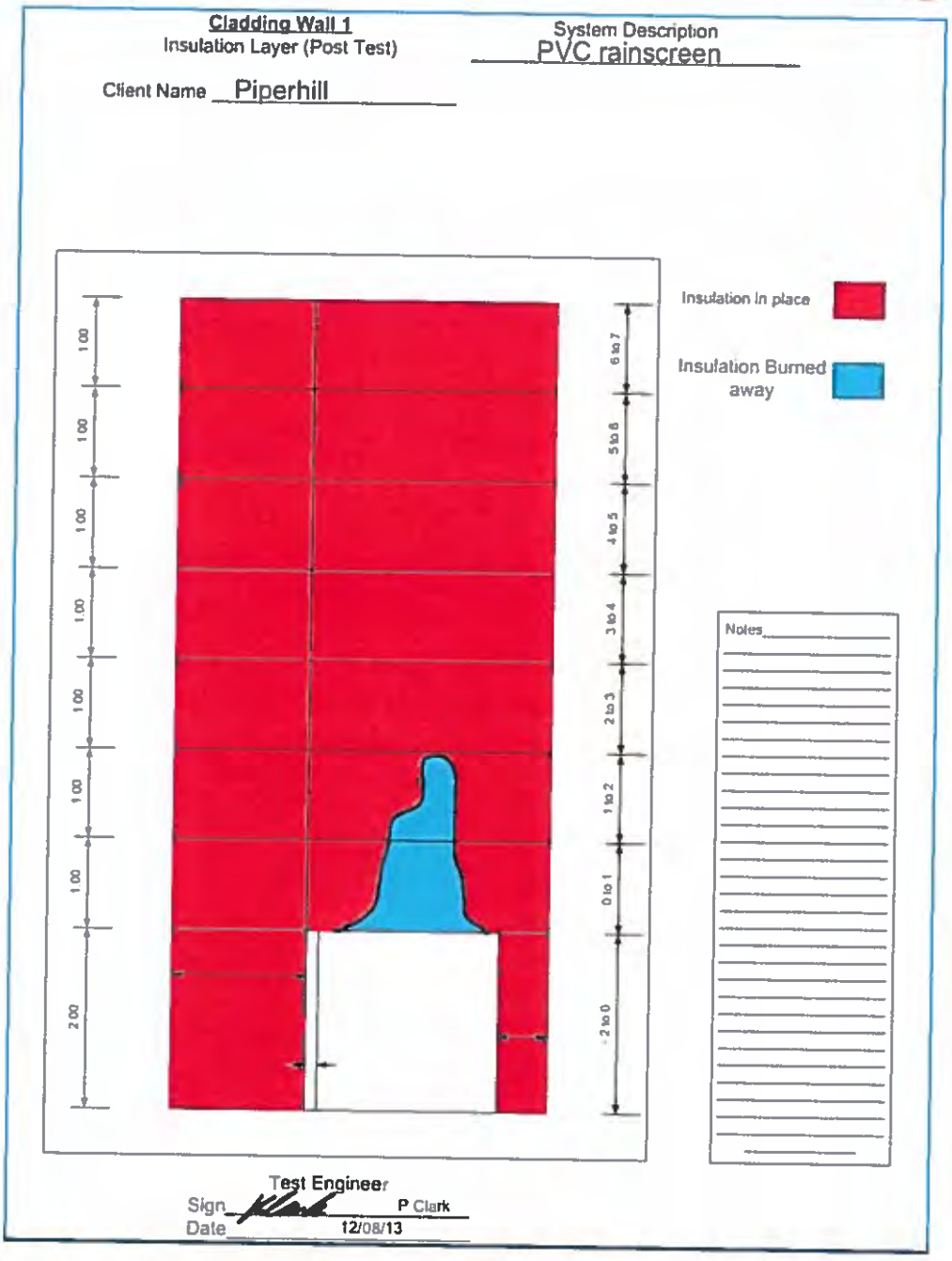


Figure 14. Schematic of system insulation layer post test.

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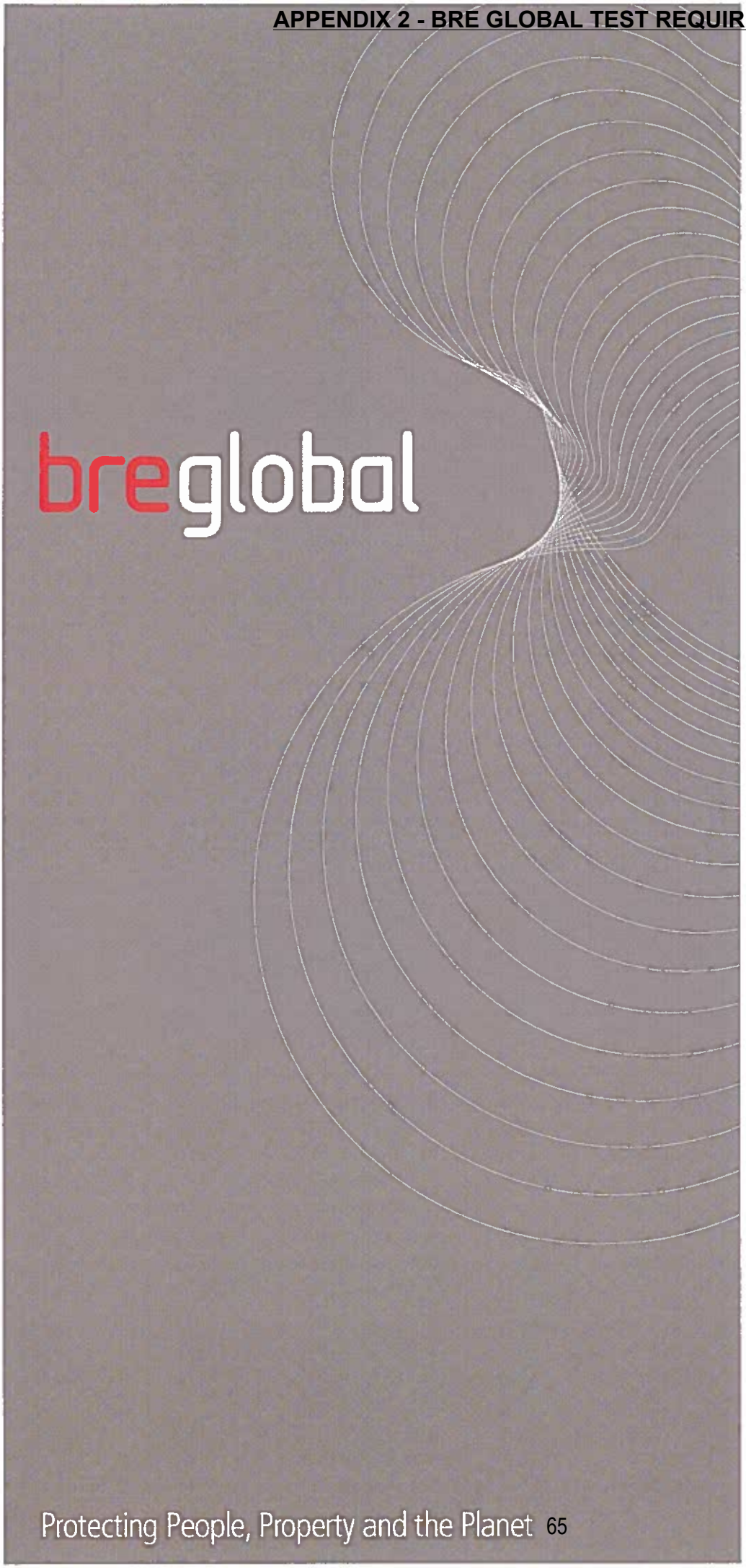
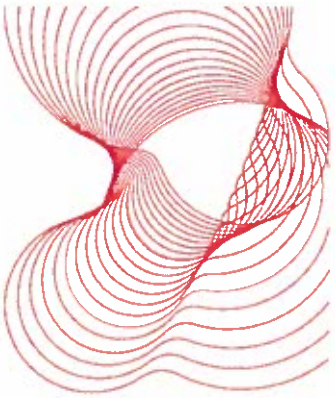


Piperhill Construction External Rainscreen system with Vinylit Cladding - Classification of fire performance in accordance with BR 135: 2013 Annex A

Prepared for:
Piperhill Construction Ltd,
Unit 7, Annagh Business Centre,
3 Tandragee Road,
Portadown,
BT62 3BQ

13th November 2013
Classification report: 285809
Issue number 2



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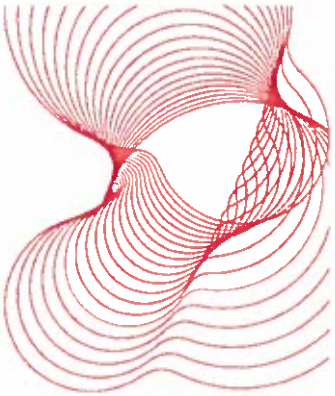


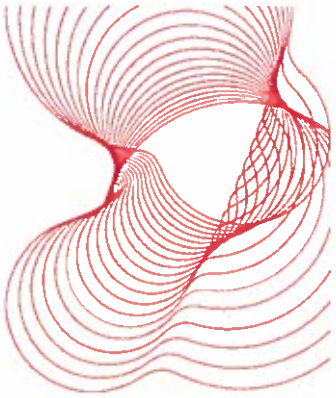
breglobal

CLASSIFICATION OF FIRE PERFORMANCE

IN ACCORDANCE WITH BR 135:2013 ANNEX A

Sponsor:	Piperhill Construction Ltd, Unit 7, Annagh Business Centre, 3 Tandragee Road, Portadown, BT62 3BQ
Prepared by:	BRE Global Ltd, BRE, Bucknalls Lane, Garston, Watford, WD25 9XX, England
Product name:	Piperhill Construction External Rainscreen system with Vinylit Cladding
Classification report No.:	285809
Issue number:	2
Date of issue:	13th November 2013

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



1 Introduction

This report presents the classification of the system detailed in section 2.1. 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 A 2013. This classification should be read in conjunction with this document and the associated test reports referenced in section 3.

This classification report issue (Issue 2) supersedes all previous issues of report number 285809. This has been published with an editorial correction to section 4.3 and clarification to the wording of section 4.2.3.

2 Details of classified product

2.1 General

The product is described as a Piperhill Construction External Rainscreen system with Vinylit Cladding and is applied to a masonry substrate.

2.2 Description of product

The system comprises of the following elements, see Figures 1 to 3:

- Rockwool RW3 insulation slabs
- Rockwool SP Firestop cavity barriers (Vertically installed)
- Galvanised steel flashing/fire breaks (Horizontally installed)
- Plastic cladding rails
- Vinylit cladding panels

2.2.1 Installation of cladding System.

2.2.1.1 Insulation layer

The insulation layer was 50mm thick Rockwool RW3 insulation slabs, nominally 600 x 1200mm, these were fixed to the substrate with plastic insulation anchors at a rate of 3.3 /m2.

2.2.1.2 Fire barriers

The vertical fire breaks consisted of a rockwool SP60 Firestop slab of 75mm x 650mm x 1000mm, mechanically fixed on Rockwool SP/L fixing brackets, vertically on the main wall only, nominally 2.4m from the internal corner and 150mm from the outside vertical edge line of the combustion chamber. However, the barrier was perforated by the plastic cladding rails in a number of places throughout the full height of the installation; this can be seen in Figure 1.

The horizontal fire breaks consisted of continuous galvanised steel flashing 140 x 65mm 'Z' channels screw fixed, at nominally 300mm centres, directly to the block wall immediately above the combustion chamber lintel and subsequent height spacing intervals of approximately 2.4m.

2.2.1.3 External finish

The external finish was fixed to the wall using 2mm galvanised steel cladding brackets which were fixed back to the wall using 6mm x 130mm wood screws. The Vinylit plastic cladding rails, 40mm x 20mm were fixed to the cladding brackets using 8M hex head fixing bolts. The base of the system had a 1.2mm thick galvanised steel flashing to form the bottom closer for the system, with a Vinylit 50.02.11 bottom vent fixed 5mm above the steel flashing. The Vinylit Vinytherm Stonechip façade cladding panels, colour 'Tirol', were vertically fixed to the cladding rails with 30mm stainless steel pan head screws.

Figure 1. Photograph of the system during construction – Insulation, Cladding rails, horizontal and vertical fire breaks

Figure 2. Photograph of system prior to test.

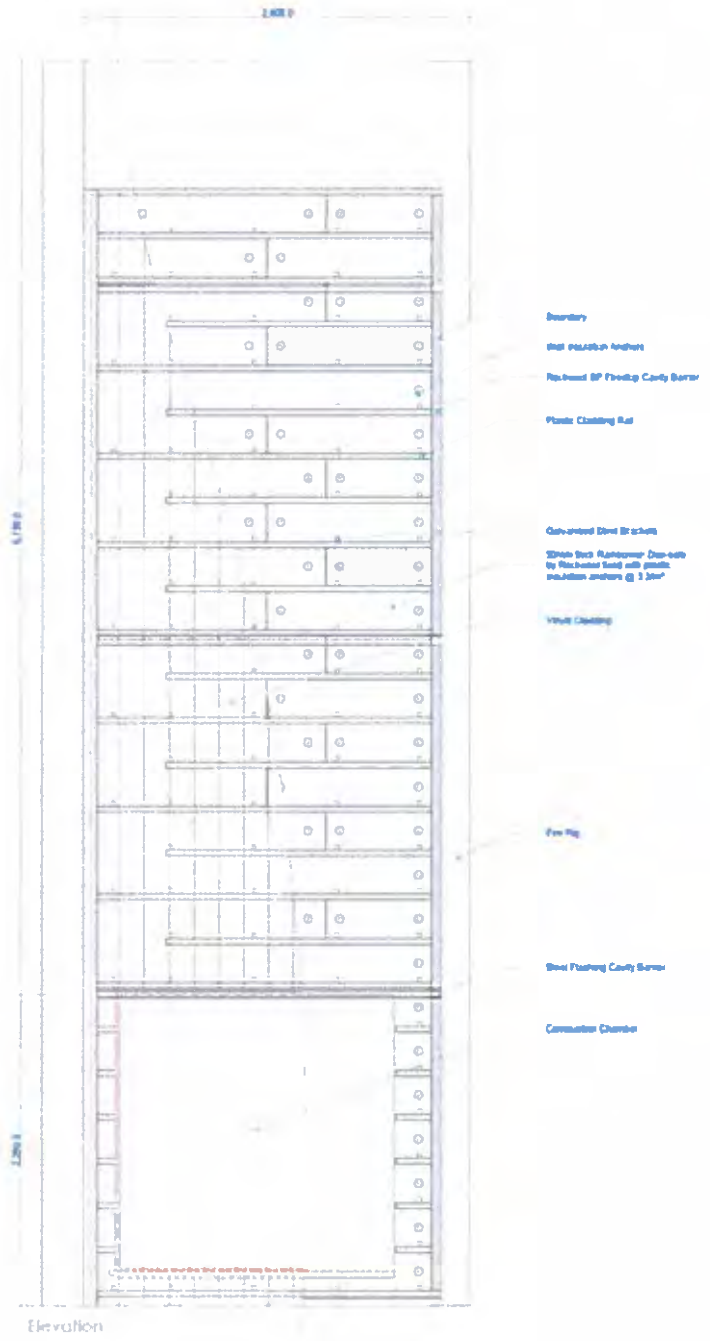


Figure 3a. Construction of the System– detail drawing supplied by client.

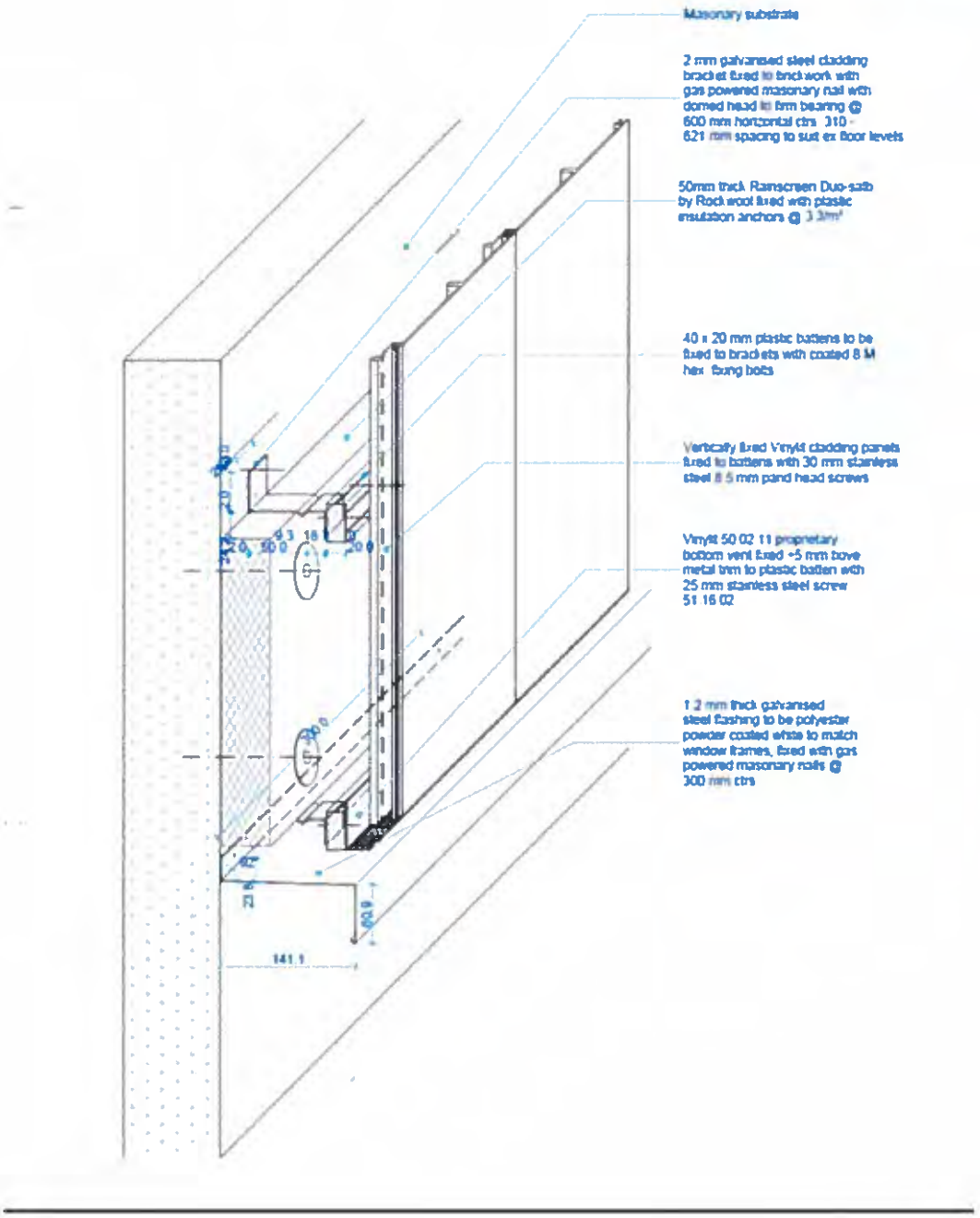
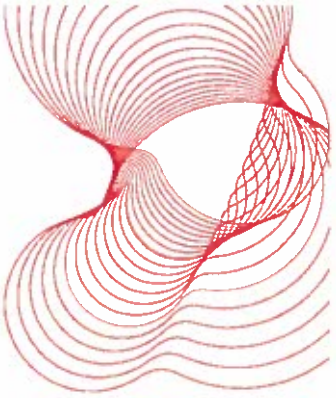


Figure 3b. Construction of the System– detail drawing supplied by client.



3 Test reports in support of classification

3.1 Test report

Name of Laboratory	Name of sponsor	Test reports/extended application report Nos.	Test method / extended application rules & date
BRE Global, BRE	Piperhill Construction Ltd	287918 Issue 2 13th November 2013	BS 8414-1: 2002

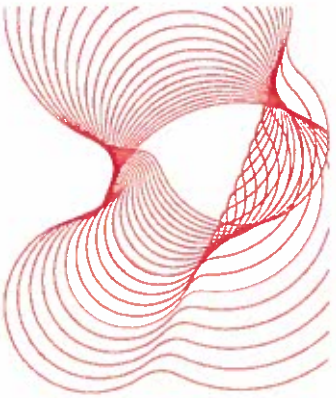
3.2 Test results

Test method & test number	Parameter	No. tests	Results	
			Fire spread test result time, t_s (min)	Compliance with parameters in BR 135: 2013 Annex A.
BS 8414-1 : 2002	External fire spread	1	>15 minutes	Compliant
	Internal fire spread Insulation layer		>15 minutes	Compliant
	Internal fire spread Cavity		>15 minutes	Compliant

3.3 Observations

Mechanical Performance

The system exhibited significant melting and delamination of the external Vinylit VinyTherm rainscreen cladding from a large percentage of the main and wing walls during the test, the resulting debris on the floor of the test facility was flaming.



4 Classification and field of application

4.1 Reference of classification

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

4.2 Classification

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

4.3 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 3.

5. References

1. BR 135 – 'Fire performance of external thermal insulation for walls of multi-storey buildings.' Third Edition, Annex B 2013 – IHS BRE Press, Garston, Watford. 2013.

2. BS 8414-1:2002, 'Fire Performance of External Cladding Systems – Part 1: Test method for non-load bearing external cladding systems applied to the face of the building', British Standards Institute, Chiswick, 2002.

5 Limitations

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

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.

SIGNED

.....

T Baker
Laboratory Manager
For and on behalf of BRE Global Ltd

APPROVED

.....

S J Howard
Business Group Manger, Passive Fire
For and on behalf of BRE Global Ltd

Date: 13th November 2013

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E enquiries@brecertification.co.uk
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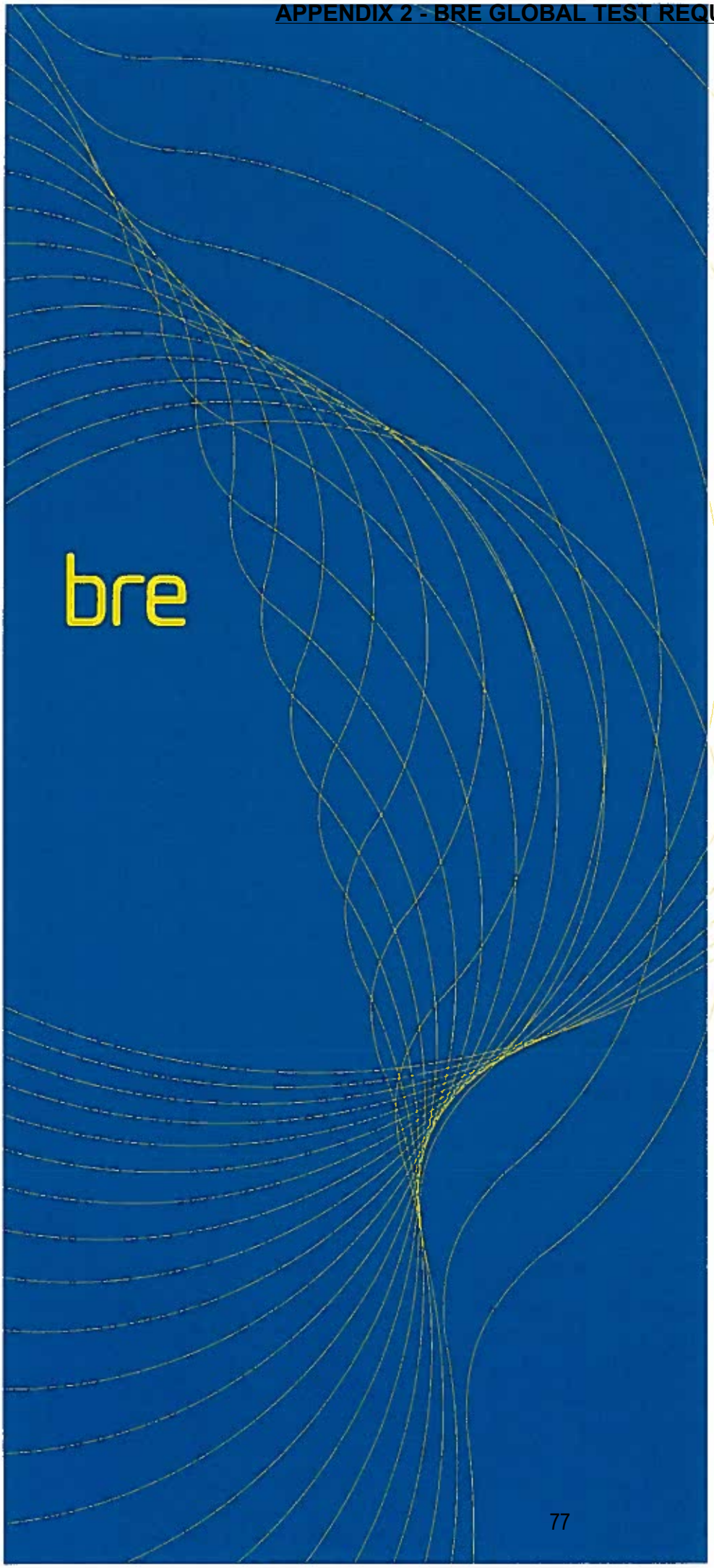

Weathertightness test of overcladding and window assembly

Prepared for:
Mr Brian Burns
Piperhill Construction Ltd

19 December 2013

Client report number 287817

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS

1 Weathertightness test of overcladding and window assembly

Prepared by

Name Dr Rupert Pool

Position Principal Consultant

Signature

Approved on behalf of BRE

Name Mr Sandy Mackay

Position Principal Consultant

Date 19 December 2013

Signature

BRE
Garston
WD25 9XX
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E enquiries@bre.co.uk
www.bre.co.uk

2 Weathertightness test of overcladding and window assembly

Contents

3 Weathertightness test of overcladding and window assembly

1 Introduction

1.1 Piperhill Construction Ltd commissioned BRE to carry out weathertightness testing of an insulated rainscreen overcladding and window combination that is proposed for installation at Cuchulainn House in Belfast, Northern Ireland.

1.2 Cuchulainn House comprises a concrete frame with cavity wall brick infill panels between floor beams.

1.3 Piperhill was concerned to test the watertightness at the interface(s) where the window, rainscreen and backing wall components came together.

2 Description of test specimen

2.1 The test specimen comprised a 4 m x 4 m backing wall of brick and block masonry, with a cavity between the leaves. The outer (brick) face of the backing was clad with insulation and a PVC panel rainscreen.

2.2 The overall arrangement of the test specimen is shown in Figures 1 to 9, which was constructed in BRE's laboratory.

2.3 A window assembly comprising a PVCu window and an alloy pod was installed in the window opening.

2.4 The window was approximately 1400 mm wide and 1200 high and comprised a single fixed light glazed with a 4-16-4 insulated glazing unit, Figure 10. The cill rail of the window frame contained three drainage slots. The dimensions of each drainage slot were approximately 25 mm x 7 mm, Figure 11.

2.5 Five inspection holes were formed in the 'inner' blockwork leaf of the test specimen, Figure 9. These holes had two functions:

- To reduce resistance to air flow across the inner leaf in order that the air pressure differential during testing occurred primarily across the 'outer' brickwork leafs and seal of the outer leaf to the window assembly;
- To enable inspection of the cavity between the brickwork leaf and the blockwork leaf and of the components associated with the cavity and the installation of the window assembly.

5 Weathertightness test of overcladding and window assembly

3 Test procedure

3.1 General

3.1.1 The following sequence of test procedures was carried out:

1. Water penetration resistance – static.
2. Wind resistance – serviceability
3. Water penetration resistance – static
4. Wind resistance – safety

3.1.2 The design wind pressure was 1460 Pa.

3.2 Water penetration resistance testing

3.2.1 The water penetration resistance test was based on the procedures in BS EN 12155 and the CWCT publication "'standard test methods for building envelopes'.

3.2.2 The maximum test pressure applied during the watertightness testing was 600 Pa.

3.2.3 Water was applied to the face of the test specimen at a rate of 3.4 l min^{-1} m^{-2}.

3.2.4 The serviceability wind resistance test was based on the procedures in BS EN 12179 and the CWCT publication 'Standard test methods for building envelopes'.

6 Weathertightness test of overcladding and window assembly

4 Results from testing

4.1 Resistance to water penetration.

4.1.1 The specimen was subjected to three bedding-in pulses of 750 Pa.

4.1.2 Results from water penetration testing are shown in Table 1.

Pressure / Pa	Time / mins	Observations
0	15	No water ingress observed
50	5	No water ingress observed
100	5	No water ingress observed
150	5	No water ingress observed
200	5	No water ingress observed
300	5	No water ingress observed
450	5	No water ingress observed
600	5	No water ingress observed

Table 1 Results from water penetration resistance testing

4.2 Wind loading (serviceability)

4.2.1 The specimen was subjected to the wind loading regime that is shown in Table 2.

Pressure / pascals	Duration of loading pulse / seconds
+ 365	15
+ 730	15
+ 1,095	15
+ 1,460	15
- 365	15
- 730	15
- 1,095	15
- 1,460	15

Table 2 Resistance to wind load, loading profile.

7 Weathertightness test of overcladding and window assembly

4.3 Resistance to water penetration (confirmation of wind loading)

Pressure / Pa	Time / mins	Observations
0	15	No water ingress observed
50	5	No water ingress observed
100	5	No water ingress observed
150	5	No water ingress observed
200	5	No water ingress observed
300	5	No water ingress observed
450	5	Thin film of water along 30 mm of cill gasket in lower left side corner of window after 4 minutes at 450 Pa. The film of water did not increase in length after being observed. The film did not form a bead or run off the gasket onto or down the glazing bead.
600	5	The film of water that was observed after 4 minutes at 450 Pa remained present. Film did not increase in length after being observed. The film did not form a bead or bead or run off the gasket onto or down the glazing bead.

Table 3 Results from water penetration testing to confirm the wind resistance

5 Disassembly of the test specimen

5.1 The specimen was disassembled after the test programme had been completed.

5.2 The rainscreen was removed to reveal the insulation, Figure 12. A small region of the dpc cloaking flashing of the aluminium cover plate assembly adjacent to the lower right side corner, as seen from the weather side of the test specimen, was damp, as was the forward part of the cover plate and a small adjacent area of insulation, Figure 13. Otherwise, the insulation was dry.

5.3 Removal of the insulation showed that the damp region did not extend beyond the corner of the aluminium cover plate assembly by more than approximately 30 mm and that the brickwork outer leaf of the backing wall behind the insulation and adjacent to the aluminium cover plate assembly was dry, figure 14.

5.4 The upper surface of the galvanised steel flashing (Figure 15) that was installed above the head of the window was wet in places. Where the wetness coincided with debris that extended beyond the flashing upstand, adjacent to the brickwork exterior leaf, the water had soaked into the debris and also formed damp patches on the brickwork, Figure 16. In other locations where the debris was damp but did not extend above the flashing's upstand, the backing wall remained dry, Figure 17.

5.5 When the window assembly was removed its exterior perimeter was dry.

9 Weathertightness test of overcladding and window assembly

6 Conclusions

6.1 The interface between the window assembly and the backing wall was watertight at pressures up to and including 600 Pa before and after the application of the design wind load pressure of 1460 Pa.

6.2 The window was watertight at pressures up to and including 600 Pa. The film of water that appeared after 4 mins at a pressure of 450 Pa, during the second watertightness test to confirm the wind loading rating, was stable during the final minute of the 450 Pa pressure step and subsequently for five minutes at 600 Pa. It did not increase in extent or form droplets, or run down the glazing bead and does not constitute a failure of the serviceability wind loading resistance of the window up to a design wind pressure of pressure of 1460 Pa.

10 Weathertightness test of overcladding and window assembly

7 Figures

11 Weathertightness test of overcladding and window assembly

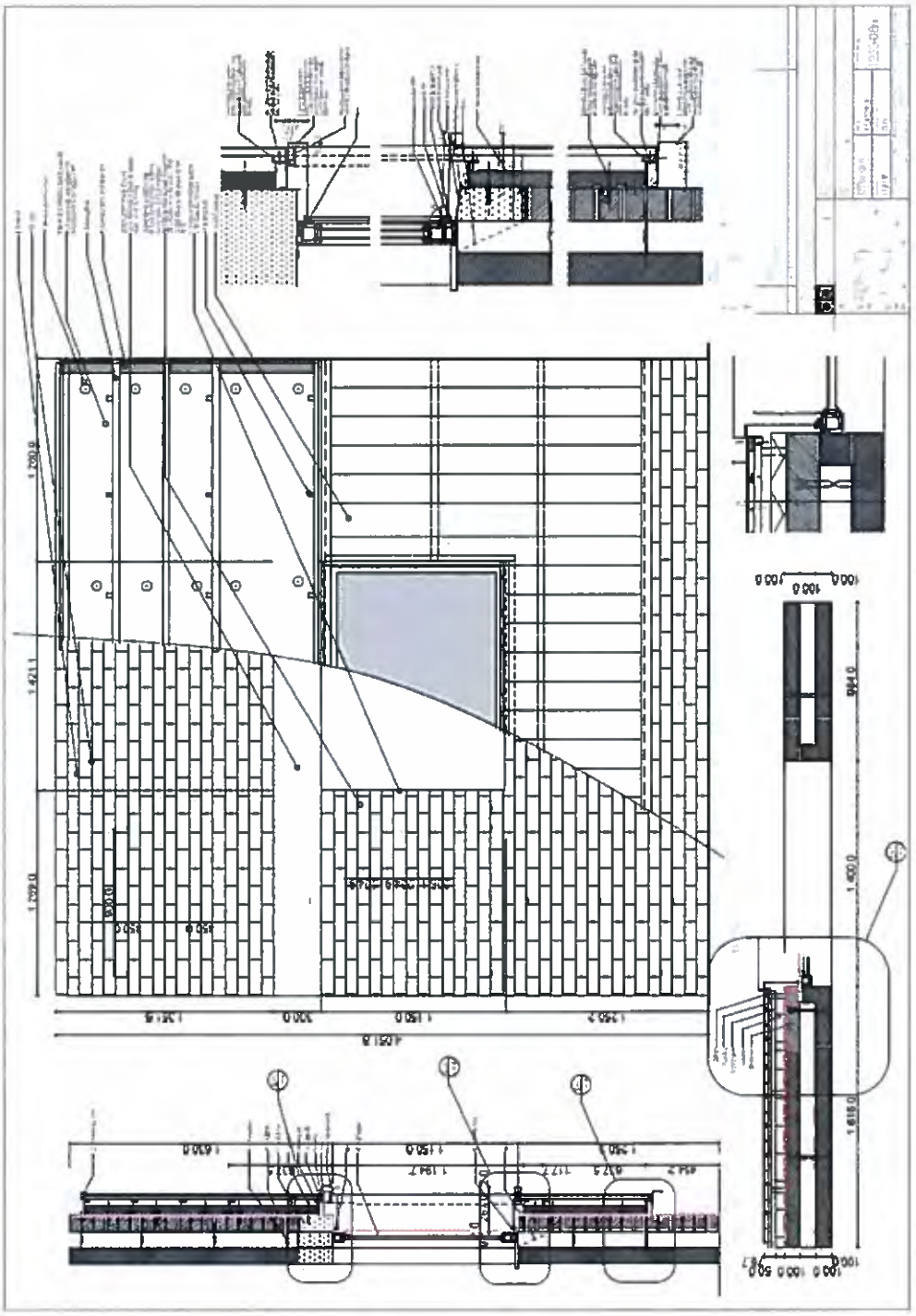


Figure 1 Drawing of test specimen (landscape format) for greater detail see following figures and da architects ltd drawing No 1223-08n

12 Weathertightness test of overcladding and window assembly

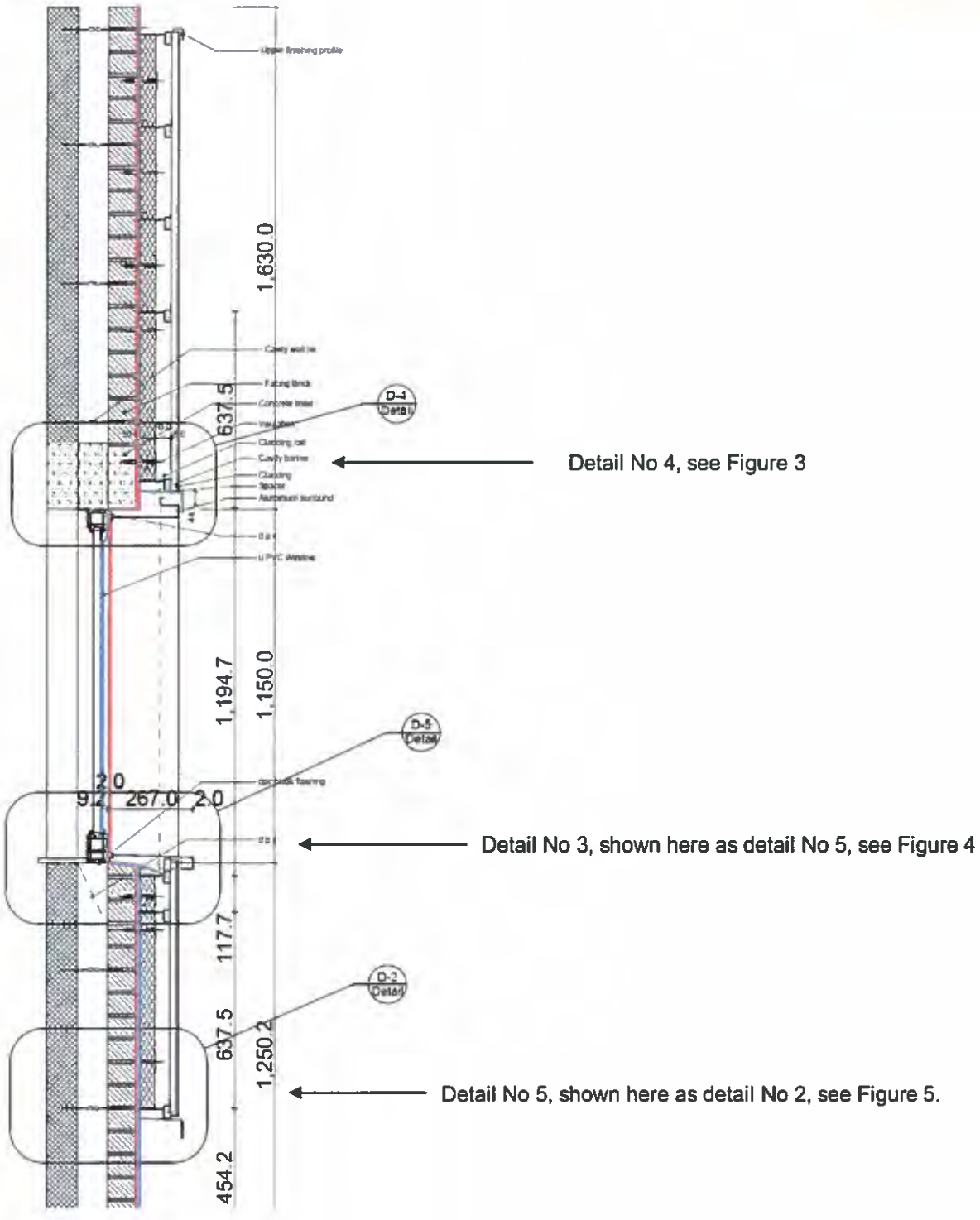


Figure 2 Vertical cross section through window, backing wall and cladding system.

13 Weathertightness test of overcladding and window assembly

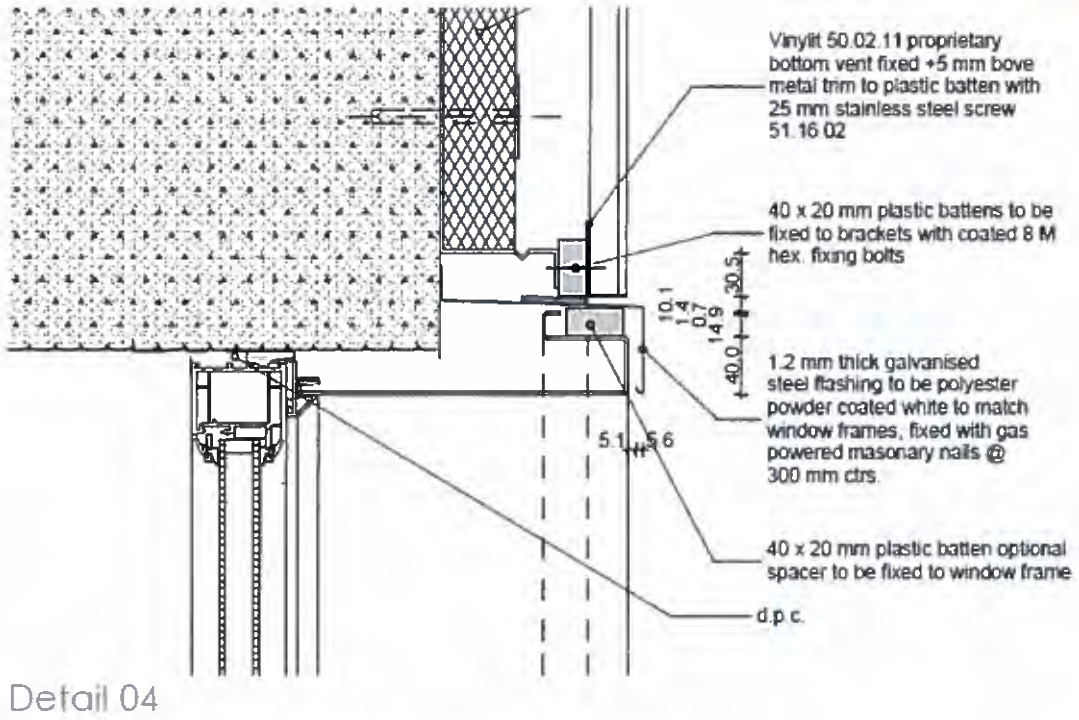


Figure 3 Detail No 4 from vertical cross section, window head.

14 Weathertightness test of overcladding and window assembly

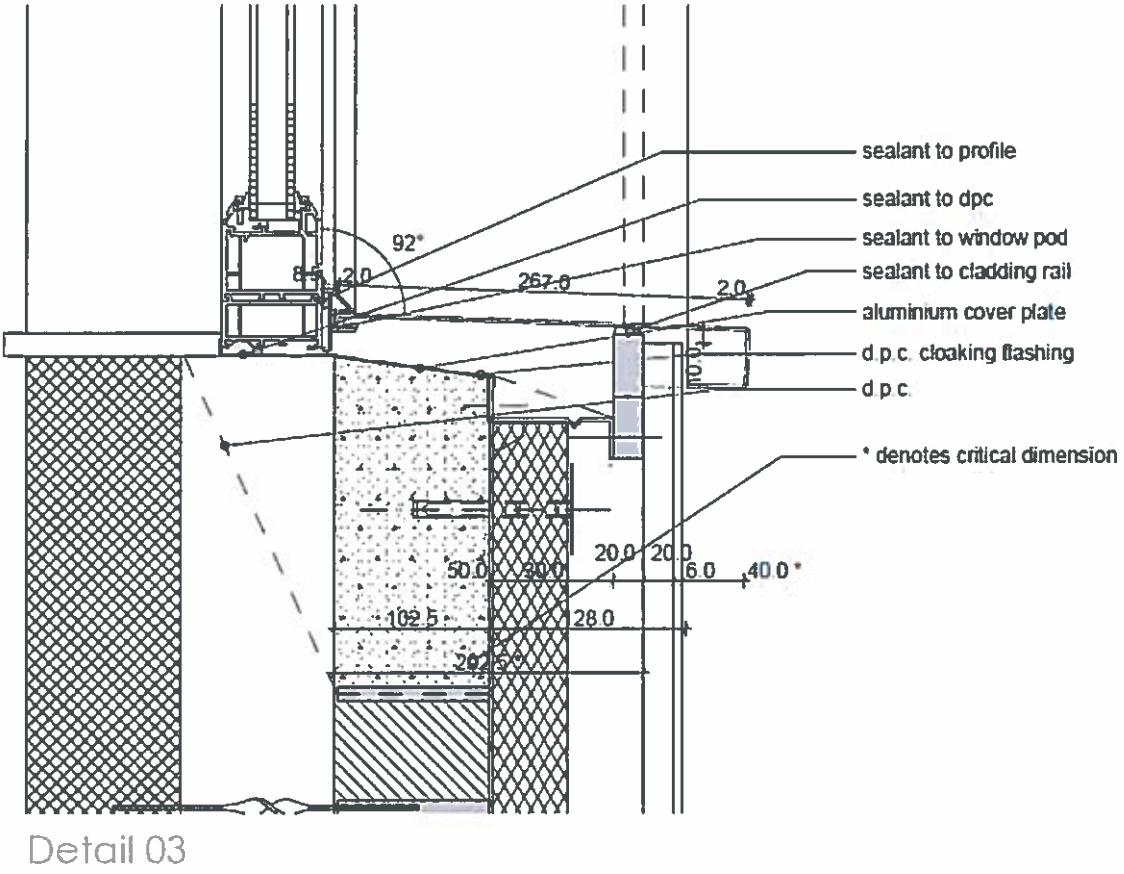


Figure 4 Detail No 3 from vertical cross section, window cill.

15 Weathertightness test of overcladding and window assembly

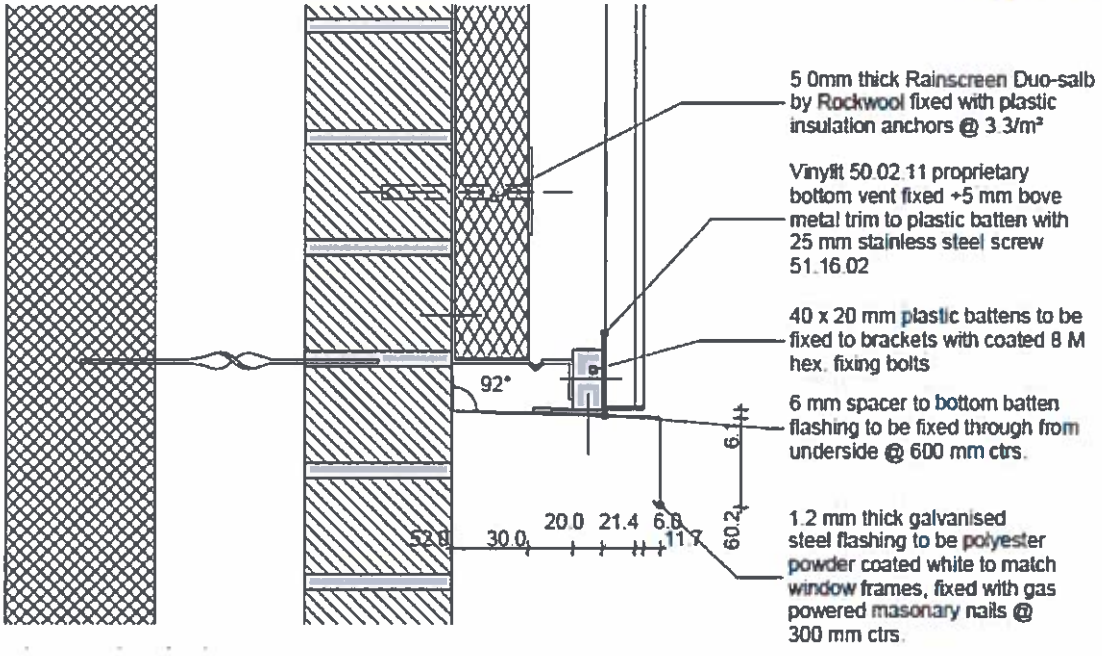
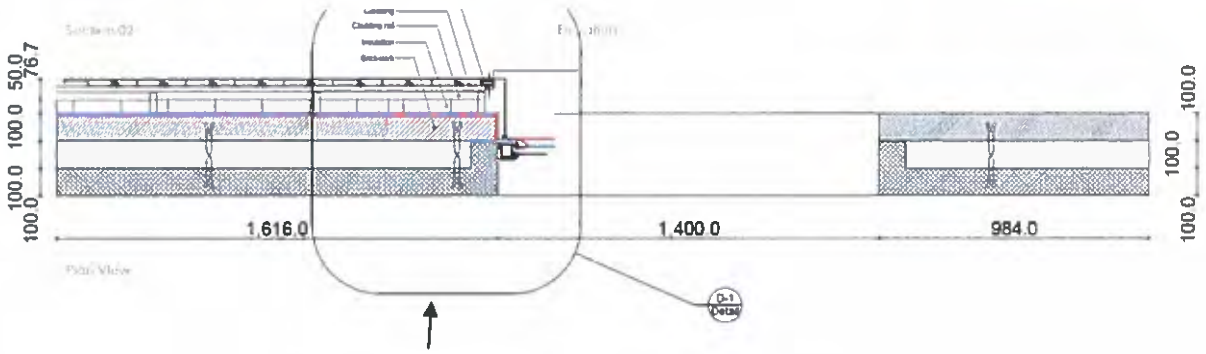


Figure 5 Detail No 5 from vertical cross section, lower edge of cladding system.

16 Weathertightness test of overcladding and window assembly



Detail No 2, shown here as detail No 1, see figure 7, below.

Figure 6 Horizontal cross section through window, backing wall and cladding system.

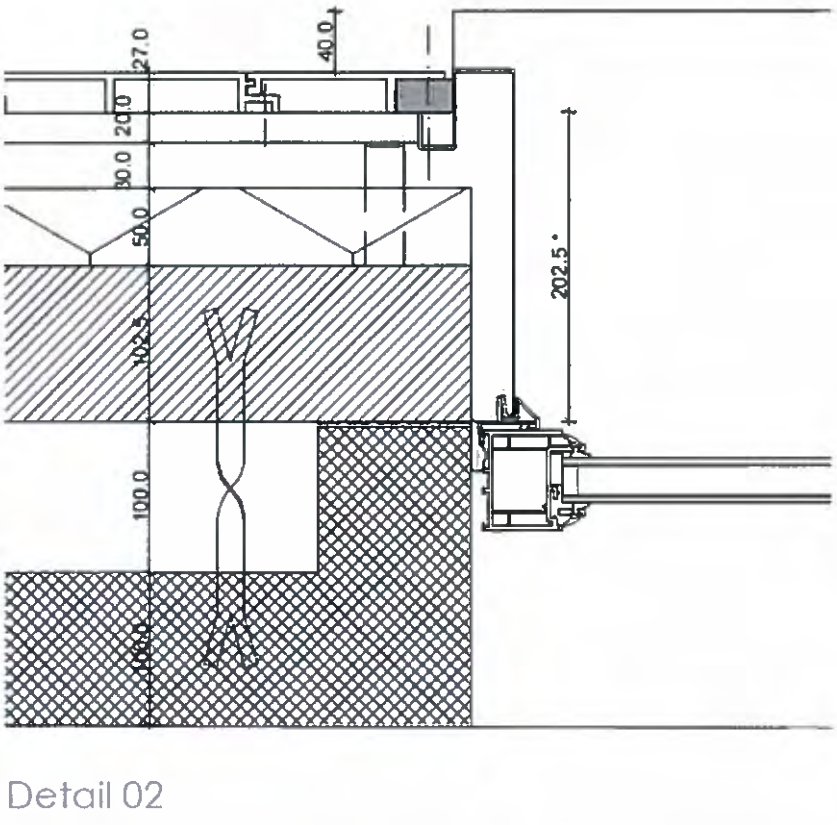


Figure 7 Detail No 2 from horizontal cross section, window jamb detail.

17 Weathertightness test of overcladding and window assembly

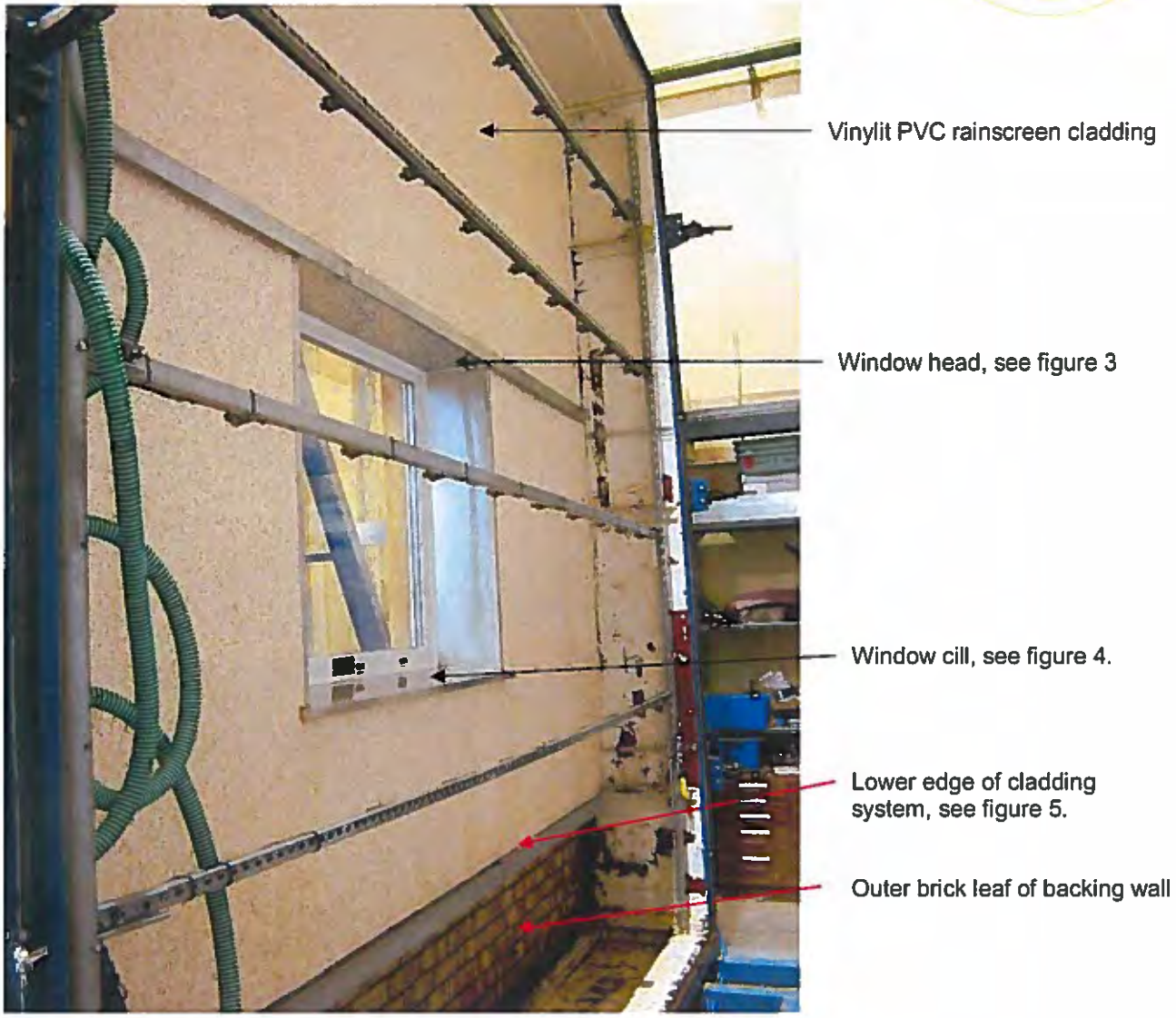


Figure 8 "Weather" face of test specimen installed in test chamber.

18 Weathertightness test of overcladding and window assembly

Figure 9 Specimen installed in test rig, showing interior face.

19 Weathertightness test of overcladding and window assembly

Figure 10 Window assembly installed in backing wall.

Figure 11 Drainage slot with cover cap removed.

20 Weathertightness test of overcladding and window assembly

Figure 12 Rainscreen panels partially removed showing the insulation.

21 Weathertightness test of overcladding and window assembly

Figure 13 Water on dpc cloak flashing.

Figure 14 Brickwork adjacent to window assembly was dry.

22 Weathertightness test of overcladding and window assembly

Figure 15 Galvanised steel flashing above the window.

Figure 16 Damp patch on backing wall from water transferred via debris on upper surface of flashing.

23 Weathertightness test of overcladding and window assembly

Figure 17 Partially damp debris on surface of flashing that has not transferred to the backing wall.

MFPA Leipzig GmbH
Testing, Inspection and Certification Authority for Construction Products and Construction Types
Leipzig Institute for Materials Research and Testing
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Dr.-Ing. Peter Nause
Work Group 3.1 - Fire Behaviour of Building Products
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-Certified translation from German-

Classification Report No. KB 3.1/12-421-1

17 December 2012
No. Copy 1

Client: Vinylit Fassaden GmbH
Gobietstrasse 10
D-34123 Kassel

Subject matter: This classification report defines the classification of the building product in accordance with the methods specified in DIN EN 13501-1.

Object: vinyTherm full-protection facade

Prepared by: Dr.-Ing. W. Jank

This classification report consists of 4 sheets.

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-11021-01-00

Test laboratory accredited by DAkkS GmbH according to DIN EN ISO/IEC 17025. The accreditation only applies to the test methods listed in the certificate (in this document marked with *) which can be seen on www.mfpa-leipzig.de

Notified testing laboratories, inspection bodies and certification bodies recognized according to the Construction Products Law (NB 800) and the State Building Code (SAC 02).

Gesellschaft für Materialforschung und Prüfungsanstalt für das Bauwesen Leipzig mbH (MFPA Leipzig GmbH)

Head Office: Hans-Weigel-Str. 2b – 04319 Leipzig/Germany
Managing Director: Prof. Dr.-Ing. Frank Dehn
Comm. Register: Local Court Leipzig HRB 17719
VAT-ID: DE 813200649
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Fax: +49 (0) 341 - 6582-135

1 Details of the classified building product

1.1 Description of the building product

According to the client, the building product to be classified is a façade profile of PVC hard foam with rock granulate applied at the outer side (exposed side).

Panel thickness:	approx. 6 mm
Panel width:	180 mm (exposed surface)
Mass with coating:	approx. 1.08 kg/m

2 Test reports and test results used as basis for classification

2.1 Test reports

Name of laboratory	Client	Number of test report	Test method
MFPA Leipzig GmbH	Vinylit Fassaden GmbH	PB III/B-07-108 23/04/2007	DIN EN 13823
MFPA Leipzig GmbH	Vinylit Fassaden GmbH	PB III/B-07-109 23/04/2007	EN ISO 11925-2 (30 s flaming time) Building Rule List 2006/2 issue, Annex 0.2.3

2.2 Test results of the facade profile of PVC hard foam with the designation vinyTherm full-protection facade

Test method	Parameter	Number of tests	Test results	
			Constant parameters (average value)	Requirement met (Y/N)
EN 13823	Figra $_{0.2\ MJ}$ Figra $_{0.4\ MJ}$ LFS < edge THR_{600s} [MJ]	3 3 3 3	80.7 80.7 7.47	Y
	Smogra [m²/s²] TSP_{600s} [m²]	3 3	107.8 667.7	(-)
	Burning dripping down/dropping down	3	(-)	No burning dripping down/dropping down
DIN EN ISO 11925-2 Area and edge flaming 30 s flaming	Fs < 150 mm	7	(-)	Y
	Burning dripping down/dropping down	7	(-)	No burning dripping down/dropping down
	Ignition of filter paper	7	(-)	No ignition

(-) not applicable

3 Classification and direct field of application

3.1 Reference

This classification was carried out in accordance with sections 10 and 12.1 of the norm DIN EN 13501-1:2002.

3.2 Classification

The building product is classified in terms of its fire behavior: B

Additional classification in terms of smoke development: s3

Additional classification in terms of burning dripping down/dropping down: d2

The format of classification of the fire behavior of the building product is:

Fire behavior		Smoke development			Burning dripping down/dropping down	
B	-	s	3	,	d	2

i.e. **B-s3, d2**

Classification of fire behavior: B-s3, d2

3.3 Field of application of building product

Classification is applicable to the following final conditions of application:

- The PVC hard foam façade profile is a homogenous building product which can be used for cladding facades.
- A distance of higher than and equal to 40 mm has to be kept to equal or other two-dimensional building materials.
- The PVC hard foam façade profile shall have the dimensions of 183 mm (exposed surface) and its surface shall be provided with rock granulate.
- The facade profile shall have a weight of approx. 1.08 kg/m related to the length.
- Classification is applicable only to the above mentioned construction (without paint-coat and without fastening at a substrate).
- Statements on the interaction between façade profile and a substrate are not object of this classification.

4 Restrictions

4.1 In connection with other building products, in particular insulation materials/substrates or bulk density ranges other than those given in section 3.3, the fire behavior may be affected such that the classification in section 3.2 is no longer applicable.
The fire behavior in connection with other building materials or substrates or other bulk density ranges or thickness ranges shall be verified separately.

4.2 This document shall not be deemed a type approval or product certification and shall not substitute a verification of applicability according to State building regulations, if any, as required under the provisions of the German building law (State building regulations).

4.3 This classification report shall be valid as long as the product composition and the product structure, respectively, the base materials or the production process and building regulations are not modified.

4.4 This classification report shall substitute the classification report KB III/B-07-027 of 25/04/2007.

The results of the tests exclusively refer to the described test objects but not to the main unit.

Leipzig, 17 December 2012

Dr.-Ing. Peter Nause	Dipl.-Phys. G. Brinkmann	Dr.-Ing. W. Jank
Head of Business Division	*Head of Testing Centre*	*Testing Engineer*

Having been publicly appointed and generally sworn in as a translator for English by the President of the Leipzig Regional Court, I hereby certify the above translation of the document submitted to me as an original in the German language to be correct and complete.

Leipzig, 23/01/2013

INTERNATIONAL FIRE CONSULTANTS LTD

COMMERCIAL IN CONFIDENCE

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IFC FIELD OF APPLICATION REPORT PAR/10811/01 REVISION A

Field of Application of StoTherm Vario, Mineral and Lamella Systems in Accordance with BRE 135 Annex A or B

Prepared on behalf of:

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Antura
Kingsland Business Park
Wade Road
Basingstoke
RG24 8EN

NOTE: This report should not be manipulated, abridged or otherwise presented without the written consent of International Fire Consultants Ltd

Ref: #11506

Issue Date – April 2012
Valid Until – April 2017

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS

ISSUE RECORD

Issue	Date	Recipient	Comments
Original	21/09/11	Sto Ltd	In electronic (pdf) format
Revision A	12/04/12	Sto Ltd	In electronic (pdf) format

AMENDMENT RECORD

Date	Paragraph	Amendment
12/04/12	Various	Inclusion of additional finishes and note regarding Sto SS Firebreak fixings

Revision	PAR/10811/01	Revision A				
Author	DC	PP				
Reviewer	PEJ	DC				

CONTENTS

1. INTRODUCTION

This report has been produced by International Fire Consultants Ltd (IFC) for our assessment of the Field of Application of the StoTherm Vario, Mineral and Lamella systems against the performance criteria of BRE 135 Annex A or B, if it were tested in accordance with BS 8414-1: 2002 or BS 8414-2: 2005, respectively. IFC have performed the evaluations/analysis, and preparation of this report, on the instruction of Sto Ltd.

Assemblies are rarely supplied in an identical form to that which was tested. The specification will invariably require the construction to be supplied with variations from that tested. The result of a fire test can apply to variations in configuration/construction, as long as they do not reduce the performance to one which is below that specified. The influence of those variations is covered by a judgement, sometimes made by the approving authority.

Where the approving authority does not feel technically able to make such judgements, or, does not wish to take responsibility for them, then a third party expert opinion is often sought. Such an opinion is often expressed in the form of an assessment of the performance, which may be supported by numerical/quantifiable methods or may be purely an expert judgement.

Where Building Regulations guidance requires that Fire Safety Information is given to the 'Responsible Person' [as defined under the Regulatory Reform (Fire Safety) Order 2005] for a building or project, an assessment, such as this, is used to provide essential information about the design, construction and performance of relevant assemblies, with controlled fire response.

The assessment is based upon the test methodology and performance criteria (detailed in Section 2) and upon the fire test evidence (detailed in Section 3). An analysis of the fire resistance performance of the elements of the cladding systems are presented in Section 4.

2. TEST METHODOLOGY AND PERFORMANCE CRITERIA

A summary of the test methodology is given in Section 2.1 and a summary of the performance criteria is given in Section 2.2.

2.1 Test Methodology

The test methodologies considered are as follows;

- BS 8414-1: 2002, *"Fire performance of external cladding systems – test method for non-loadbearing external cladding systems applied to the face of the building"*
- BS 8414-2: 2005, *"Fire performance of external cladding systems – test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame"*

The principle purpose of the test methodologies is to enable the overall fire behaviour performance of a non-loadbearing external cladding system, and its relevant components, to be assessed as a complete system as far as is practically possible. The fire spread away from the initial fire source and the rate of spread are monitored against performance criteria as discussed in Section 2.2. The external cladding systems is to be installed as close to typical end-use conditions as possible and in Part 2 variations in the steel frame design are permitted to match those used in practice.

The test frame consists of a vertical main/dominant face, into which the combustion chamber is located, and a vertical return wall, set at 90° to the dominant face. The test specimen extends a minimum of 6 metres above the combustion chamber opening on the main face and is at least 2.8 metres wide. The return wall is the same height as the main wall and is a minimum 1.5 metres wide. The distance between the surface of the cladding on the wing and the edge of the combustion chamber opening is 260mm. A schematic representation and the thermocouple position within the test facility are shown in **Figure PAR/10811/01A:01** in Appendix A.

The ignition source is either a specified wooden crib or gas burner. Two arrays of thermocouples are included within the system, at 2.5 and 5 metres above the top of the combustion chamber. Those at 5 metres above include thermocouples at mid-depth of each combustible layer greater than 10mm thick and in cavities. Full details are contained within BS 8414-1: 2002 and BS 8414-2: 2005.

2.2 Performance Criteria

The performance criteria of BRE 135 Annex A and B are given for the external cladding system when tested to BS 8414-1: 2002 and BS 8414-2: 2005, respectively. The primary concerns in setting the performance criteria are stated to be fire spread away from the initial fire source and the rate of fire spread. The aim is, if fire spread occurs, that the rate of spread or the tendency for collapse should not unduly hinder intervention by the emergency services. There are three criteria against which the system is evaluated and they are as follows;

i) External fire spread

Failure is deemed to occur if the temperature rises by more than 600°C above the start temperature measured by external thermocouples at the second level for more than 30 seconds within 15 minutes of the start of the test.

ii) Internal fire spread

Failure is deemed to occur if the temperature rises by more than 600°C above the start temperature measured by internal thermocouples at the second level for more than 30 seconds within 15 minutes of the start of the test.

iii) Mechanical performance

Failure is deemed to occur if the system burns through and a flame of duration in excess of 60 seconds is observed on the internal surface of the test specimen at, or above 0.5 metres above the combustion chamber within 15 minutes of the start of the test. The test observations should also include details of system burn through, collapse, spalling, delamination or flaming debris for consideration as part of the specifiers overall risk assessment.

3. TEST EVIDENCE

Applicable test evidence is available for StoTherm Vario, Mineral and Lamella systems and this has been used to form the basis of the technical evaluation. The applicable tests are summarised in Sections 3.1 to 3.7 below.

3.1 Test Reference UB III/B-07-001

This test was performed to BS 8414-1: 2002 at MFPA Leipzig, on 14 December 2006. The test specimen was a StoTherm Classic 80mm Sto-EPS board with reinforcing mesh including the following elements;

- Blockwork substrate
- 80mm Sto-EPS (expanded polystyrene) board
- StoLevell Uni thermal insulation adhesive
- Mineral intermediate coat including StoArmat Novo base coat and Sto-Glass fibre reinforcement mesh
- Reinforcing mortar including StoArmat Classic base coat and Sto-Glass fibre reinforcement mesh
- Stolit K3 plaster finish coat

The results of the test are summarised below;

Thermocouple Position	Maximum Temperature
External at Second Level (50mm in Front of Plaster)	318°C
External at Second Level (100mm in Front of Plaster)	339°C
Mid-point of Insulation at Second Level	99°C
Quarter Through the Insulation at Second Level	99°C

The system did not collapse during the test.

3.2 Test Reference 244806

This test was performed to BS 8414-2: 2005 at BRE Global, Watford, on 19 December 2008. The test specimen was a StoTherm Vario M 150mm EPS system with secondary reinforcing mesh including the following elements;

- Metsec lightweight steel frame
- 150mm StoTherm Vario M expanded polystyrene (EPS) insulation
- Lamella fire breaks
- 20mm cavity
- Mineral base coat Sto Armat Novo
- Sto Glass fibre reinforcement mesh
- Primer
- Stolit K2.0 finish coat

The results of the test are summarised below;

Thermocouple Position	Maximum Temperature
External at Second Level	330°C
Mid-point of EPS Insulation at Second Level	100°C
First Cavity at Second Level	69°C
Sheathing Board at Second Level	49°C
Second Cavity at Second Level	47°C
Plasterboard at Second Level	26°C

The system did not collapse during the test.

3.3 Test Reference 246677

This test was performed to BS 8414-2: 2005 at BRE Global, Watford, on 19 September 2008. The test specimen was a StoTherm Mineral M 150mm mineral wool system with reinforcing mesh including the following elements;

- Metsec lightweight steel frame
- 150mm Sto Mineral Wool insulation
- Organic bound base coat Sto Armat Classic including reinforcing mesh
- Primer
- Stolit K2.0 finish coat

The results of the test are summarised below;

Thermocouple Position	Maximum Temperature
External at Second Level	370°C
Mid-point of Mineral Wool Insulation at Second Level	35°C
First Cavity at Second Level	28°C
Sheathing Board at Second Level	26°C
Second Cavity at Second Level	26°C
Plasterboard at Second Level	22°C

The system did not collapse during the test.

3.4 Test Reference 248983

This test was performed to BS 8414-2: 2005 at BRE Global, Watford, on 4 November 2008. The test specimen was a StoTherm Vario M 60mm EPS system with secondary reinforcing mesh including the following elements;

- Metsec lightweight steel frame
- 60mm StoTherm Vario M expanded polystyrene (EPS) insulation
- Lamella fire breaks
- 20mm cavity
- Mineral base coat Sto Armat Novo
- Sto Glass fibre reinforcement mesh
- Primer
- Stolit K2.0 finish coat

The results of the test are summarised below;

Thermocouple Position	Maximum Temperature
External at Second Level	460°C
Mid-point of EPS Insulation at Second Level	122°C
First Cavity at Second Level	76°C
Sheathing Board at Second Level	64°C
Second Cavity at Second Level	60°C
Plasterboard at Second Level	30°C

The system did not collapse during the test.

3.5 Test Reference 252651

This test was performed to BS 8414-1: 2002 at BRE Global, Watford, on 7 April 2009. The test specimen was a StoTherm Vario M 150mm EPS system with reinforcing mesh including the following elements;

- Blockwork substrate
- 150mm StoTherm Vario M expanded polystyrene (EPS) insulation
- Lamella fire breaks
- Mineral base coat Sto Armat Novo including reinforcing mesh
- Primer
- Stolit K2.0 finish coat

The results of the test are summarised below;

Thermocouple Position	Maximum Temperature
External at Second Level	470°C
Mid-point of EPS Insulation at Second Level	184°C

The system did not collapse during the test.

3.6 Test Reference 252440

This test was performed to BS 8414-2: 2005 at BRE Global, Watford, on 5 May 2009. The test specimen was a StoTherm Mineral M 60mm mineral wool system with reinforcing mesh including the following elements;

- Metsec lightweight steel frame
- Mechanical rail system, with PVC interlocking vertical T splines
- 60mm StoTherm Mineral M insulation
- Mineral base coat Sto Armat Classic including reinforcing mesh
- Stolit K2.0 finish coat

The results of the test are summarised below;

Thermocouple Position	Maximum Temperature
External at Second Level	410°C
Mid-point of Mineral Wool Insulation at Second Level	112°C
First Cavity at Second Level	38°C
Cement Particle Board at Second Level	29°C

The system did not collapse during the test.

3.7 Test Reference 266899-1

This test was performed to BS 8414-2: 2005 at BRE Global, Watford, on 18 January 2011. The test specimen was a StoTherm Vario K 200mm EPS system including the following elements;

- Metsec lightweight steel frame
- 200mm StoTherm Vario K expanded polystyrene (EPS) insulation
- Sto Turbofix adhesive for insulation
- Sto Mineral Lamella fire breaks
- Sto-Rotofix Plus fixings for fire breaks
- Sto Levell Duo Plus base coat
- Sto Glass fibre reinforcement mesh
- Primer
- Sto Miral K1.5 finish coat

The results of the test are summarised below;

Thermocouple Position	Maximum Temperature
External at Second Level	390°C
Mid-point of EPS Insulation at Second Level	184°C
Sheathing Board at Second Level	47°C
Cavity at Second Level	52°C
Plasterboard at Second Level	46°C

The system did not collapse during the test.

4. ANALYSIS

Evaluation of the fire performance of the proposed StoTherm Vario, Mineral and Lamella systems will address the elements that influence overall performance under test conditions to the BS 8414-1: 2002 and BS 8414-2: 2005 test methodologies. All assemblies will be assessed in respect of the performance criteria of BRE 135 Annex A and B, respectively.

A summary of commercially available systems is included in Appendix A and this should be read alongside the analysis herein.

4.1 Substrate

Construction

The StoTherm Vario, Mineral and Lamella systems can be installed on either of the following substrates;

- Blockwork wall, constructed in accordance with the specifications in BS 8414-1: 2002
- Structural steel frame, constructed in accordance with the specifications in BS 8414-2: 2005, with 12mm thick sheathing boards.

It is the opinion of IFC that the generic blockwork utilised in the BS 8414-1: 2002 test would permit the utilisation of the systems on high and medium density blockwork, brickwork or concrete walls.

Test evidence

The StoTherm Vario system has been tested to BS 8414-1: 2002 including a medium density blockwork wall as the substrate.

The StoTherm Vario and Mineral systems have been tested to BS 8414-2: 2005 with the substrate utilised being Metsec SFS 150mm lightweight stud and track sections. In all of the lightweight stud and tracks tested the fixings where 48 x 38mm Ejot WDLS at joints. The substrate also included 12mm thick Euroform Versapanel cement particle board fixed back to the studs.

Each of the constructions utilised different thicknesses of insulation, fire breaks and finishes, however, following an analysis of the results of the tests, reported in Section 3, it is the opinion of International Fire Consultants Ltd that fixing the system to either of the substrates outlined above would not be detrimental to the performance of either the Sto Therm Vario, Mineral or Lamella systems when adjudged against the performance criteria of BRE 135 Annex A or B.

4.2 Insulation

Construction

The StoTherm Vario system includes a layer of expanded polystyrene insulation, with a thickness of between 60mm and 200mm.

The StoTherm Mineral system includes a layer of mineral fibre insulation, with a thickness of between 60mm and 200mm.

The StoTherm Lamella system includes a layer of mineral fibre lamella board, with a thickness of between 60mm and 300mm.

The insulation is secured back to the substrate using one of the following methods;

- PVC horizontal intermediate rails and interlocking vertical T splines and shims. Secured with Sto-Screw fixings at maximum 300mm centres, Ejot SDF_KB 0.8 x 60mm in blockwork and 5.5 x 50mm counter sunk self-tapping screws in structural steel frame and sheathing boards substrate. An example of the rail system and shims on a steel frame substrate is shown in **Figure PAR/10811/01A:02** in Appendix A.
- Square edged insulation, bonded with Sto Levell Uni adhesive.
- Tongue and grooved interlocking of the insulation and bonded with Sto-Turbofix adhesive. (StoTherm Vario system only).
- Tongue and grooved insulation, secured with Sto-Rotofix Plus fixings at a typical rate of 4no per square metre. An example of fixings on a steel frame substrate is shown in **Figure PAR/10811/01A:03** in Appendix A.
- Square edged insulation, secured with Sto-Rotofix Plus fixings at a typical rate of 8no per square metre. An example of fixings on a steel frame substrate is shown in **Figure PAR/10811/01A:03** in Appendix A.

A 20mm cavity may be formed behind the insulation using Sto plastic shims.

Test evidence

The StoTherm Vario system has been tested to BS 8414-1: 2002 with 150mm thick EPS insulation using Ejot fixings. One of the specimens also included a cavity behind the insulation.

The StoTherm Vario system has also been tested to BS 8414-2: 2005 with 60mm, 150mm and 200mm thick EPS insulation. The 60mm and 150mm specimens included a cavity behind the insulation, whereas the 200mm specimen only included a cavity behind the fire break, as the insulation was bonded to the substrate. The 60mm and 150mm thick insulation specimens were fixed using Sto-Screws and the 200mm thick insulation specimen was fixed using Sto-Turbofix adhesive.

The Sto Therm Mineral system has been tested to BS 8414-2: 2005 with 60mm and 150mm thick mineral fibre insulation using Sto-Screws and PVC intermediate support rails.

Following an analysis of the results of the tests, reported in Section 3, it is the opinion of International Fire Consultants Ltd that fixing of insulation using any of the methods outlined above would not be detrimental to the performance of the Sto Therm Vario, Mineral or Lamella systems when adjudged against the performance criteria of BRE 135 Annex A or B.

4.3 Fire Breaks

Construction

Fire breaks are required directly above openings and at each storey. In the test these are simulated by fire breaks above the combustion chamber and at distances of 1500mm and 3000mm above the chamber. Fire breaks can also, optionally, be included to each side of openings.

The fire breaks above openings are 200mm high Sto Mineral Fibre Lamella insulation fixed back to the supporting construction with StoLevel Uni adhesive. If the insulation is Sto Mineral Fibre then the fire break does not need to be a separate board.

The fire breaks at each storey are 200mm Sto Mineral Fibre Lamella and 500mm high Sto Mineral Fibre board insulation fixed back to the supporting construction with one of the following fixing methods;

- Stainless steel support rails with drainage holes and with an optional 10 x 2mm graphite based intumescent strip on the lower rail. Secured with Sto-Screw fixings at maximum 300mm centres *Note 1*, Ejot SDF_KB 0.8 x 60mm in blockwork and 5.5 x 50mm self-tapping screws in structural steel frame and sheathing boards substrate.
- Square edged insulation, bonded with Sto Levell Uni adhesive.
- Square edged insulation, secured with Sto-Rotofix Plus fixings at a typical rate of 8no per square metre and a stainless steel support rail with drainage holes.

Note 1 *Sto SS Firebreak fixing screws with Sto SS washers were utilised as a securing method when tested to BS 8414-1:2002 and BS 8414-2: 2005. In some tests, these were not included and the adhesive alone was effective in securing the system. As a result, these fixings are optional.*

Test evidence

In test reference 266899-1 fire breaks were included above the combustion chamber, at the required heights to simulate storey heights. They were not, however, included to the sides of the combustion chamber. Test reference 266899-1 demonstrates that they are not required to the sides of the combustion chamber, even though in all of the other tests references in Section 3 they were included around the combustion chamber and at storey heights.

It is the opinion of IFC that the fire breaks outlined above made a contribution to the fire resistance performance of the system when adjudged against the criteria of BRE 135 Annex A or B.

4.4 Base Coat

Construction

In the StoTherm Vario, Mineral and Lamella systems the base coat, applied to the insulation, should be one of the following;

- StoArmat Novo lightweight polymer cement applied in two passes to a total nominal depth of 10mm. Sto Glass Fibre reinforcing mesh applied to the first coat once it had become firm. An optional second layer of Sto Glass Fibre reinforcing mesh may be applied to the fire impingement zone of the combustion chamber, with a further coating to StoArmat Novo to fully encapsulate the mesh.

- StoLevell Duo Plus or Sto Levell Uni applied to a total nominal depth of 5mm. Sto Glass Fibre reinforcing mesh embedded into the base coat. An overlap of minimum 100mm applied to areas where edges of the Sto Glass Fibre reinforcing mesh met.
- StoArmat classic lightweight organic render applied in two passes to a total nominal depth of 6mm. Sto Glass Fibre reinforcing mesh applied to the second coat. (StoTherm Mineral and Lamella systems only).

Test evidence

In the StoTherm Vario system the StoArmat Novo base coat was included in test references 244806, 248983 and 252651 and the Sto Levell Duo Plus base coat was included in test reference 266899-1. In the StoTherm Mineral system the StoArmat classic lightweight organic reinforcing render was included in test references 246677 and 252440.

In all of the tests the base coat made a contribution to the performance of the systems and it is the opinion of IFC that the interchangability of based coats outlined above will not be detrimental to the systems when adjudged against the performance criteria of BRE 135 Annex A or B, however, Sto Armat Classic may only be used with Sto Mineral Fibre board or Sto Mineral Fibre Lamella insulation.

4.5 Finishes

Construction

Sto Primer or StoPrep Miral is applied to the dry mineralic reinforcement coats. The drying process can vary depending on thickness and may take up to seven days prior to the application of the primer.

The finish coat should be one of the following options;

- Stolit 2.0 cement free acrylic resin render with various colour tints
- StoMiral K1.5 cement based textured finish (or any other Sto mineral cement-based render)
- Stolit K (particle size 1.0 to 6.0mm)
- Stolit R (particle size 1.5 to 6.0mm)
- Stolit Effect
- Stolit MP
- Stolit QS K (particle size 1.0 to 3.0mm)
- Stolit QS R (particle size 1.5 to 3.0mm)
- Stolit QS MP
- StoMarlit K (particle size 1.5 to 3.0mm)
- StoMarlit R (particle size 1.5 to 3.0mm)
- StoSilco K (particle size 1.0 to 3.0mm)
- StoSilco R (particle size 1.5 to 3.5mm)
- StoSilco MP
- StoSilco QS K (particle size 1.0 to 3.0mm)
- StoSilco QS R (particle size 1.5 to 3.0mm)
- StoSilco QS MP

- StoLotusan K (particle size 1.0 to 3.0mm)
- StoLotusan MP
- Sto-Superlit (particle size 1.5 to 2.0mm)
- StoNivellit + StoSilco Colour
- Sto-Klebe und Fugenmortel + Sto-Flachverblender
- Stolit Milano
- Stolit K1.5 + Stolit Milano

Test evidence

The white Stolit 2.0 finish was included in test references 244806 and 246677. The red Stolit 2.0 finish was included in test references 248983, 252651 and 252440. The StoMiral K finish was included in test reference 266899-1. In all of the tests the finish was not detrimental to the performance of the system. It is the opinion of IFC that the finish coats given above would not be detrimental to the performance of the system when adjudged against the performance criteria of BRE 135 Annex A or B.

5. CONCLUSION

In the tested assemblies the maximum temperature given by;

- external thermocouples at the second level was 470°C
- internal thermocouples at the second level was 184°C

These temperatures were significantly below the failure criteria of a 600°C temperature rise.

The mechanical performance recorded in the tests referenced in Section 3 state that there was no collapse during the tests, indeed there is an indication in each test report that sections of the external layer had to be physically removed after the test in order for the specimen to be viewed. The system, therefore, was not showing signs of collapse.

It is the opinion of International Fire Consultants Ltd, therefore, that, if the proposed StoTherm Vario, Mineral or Lamella systems were manufactured and installed in accordance with the requirements of this Assessment Report, and tested to the methodology of BS 8414-1: 2002 or BS 8414-2: 2005, they would satisfy the performance criteria of BRE 135 Annex A or B, respectively.

6. LIMITATIONS

This Assessment Report, which is only valid for the proposed StoTherm Vario, Mineral or Lamella systems, addresses itself solely to the ability of the assemblies described to satisfy the performance criteria of the specified test method. It does not imply any suitability for use with respect to other unspecified criteria.

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS

This document only considers the proposed StoTherm Vario, Mineral and Lamella systems described herein, and assumes that the surrounding construction will provide no less restraint than the tested assembly, and that it will remain in place and be substantially intact.

Where the constructional information in this report is taken from details provided to International Fire Consultants Ltd (IFC) and/or from test reports referenced herein, it is, therefore, limited to the information given in those documents. It is necessarily dependent upon the accuracy and completeness of that information. Where constructional or manufacturing details are not specified, or discussed herein, it should not, therefore, be taken to infer approval of variation in such details from those tested or otherwise approved.

The analysis and conclusions within this report are based upon the likely performance of a complete assembly that is manufactured and installed in accordance with this document, and offered for testing in 'perfect' condition. In practice, management procedures must be in place for any building, to ensure that no parts of the assemblies are damaged or faulty.

Any materials specified in this report have been selected and judged primarily on their fire performance. IFC do not claim expertise in areas other than fire safety. Whilst observing all possible care in the specification of solutions, we would draw the reader's attention to the fact that during the construction and procurement process, the materials used should be subjected to more general examination regarding the wider Health and Safety, and CoSHH Regulations.

This Report is provided to the sponsor on the basis that it is a professional independent engineering opinion as to what the fire performance of the construction/system would be should it be tested to the named standard. It is IFC's experience that such an opinion is normally acceptable in support of an application for building approvals, certainly throughout the UK and in many parts of Europe and the rest of the world.

However, unless IFC have been commissioned to liaise with the Authorities that have jurisdiction for the building in question for the purpose of obtaining the necessary approvals, IFC cannot assure that the document will satisfy the requirements of the particular building regulations for any building being constructed.

It is, therefore, the responsibility of the sponsor to establish whether this evidence is appropriate for the application for which it is being supplied and IFC cannot take responsibility for any costs incurred as a result of any rejection of the document for reasons outside of our control. Early submittal of the Report to the Authorities will minimise any risks in this respect.

7. VALIDITY

This assessment has been prepared based on International Fire Consultants Ltd's present knowledge of the products described, the stated testing regime and the submitted test evidence. For this reason anyone using this document after April 2017 should confirm its ongoing validity.

Prepared by:

Dr. Parina Patel
BSc (Hons) PhD
Fire Safety Engineer
International Fire Consultants Ltd. (IFC)

Checked by:

David Cooper
BEng (Hons) MIWSc
Senior Engineer
International Fire Consultants Ltd. (IFC)

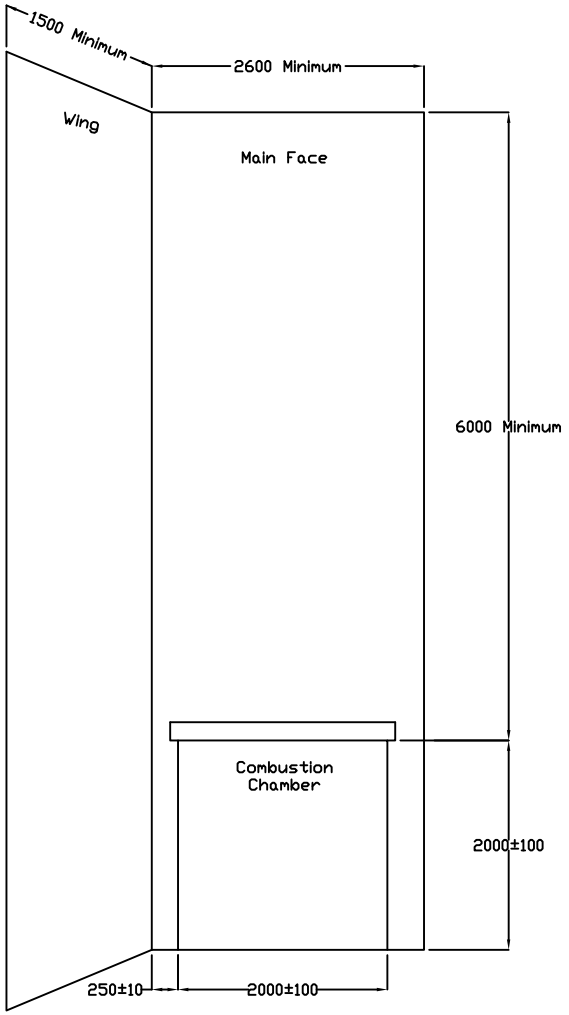
APPENDIX A

Test Facility and Examples of Construction Details

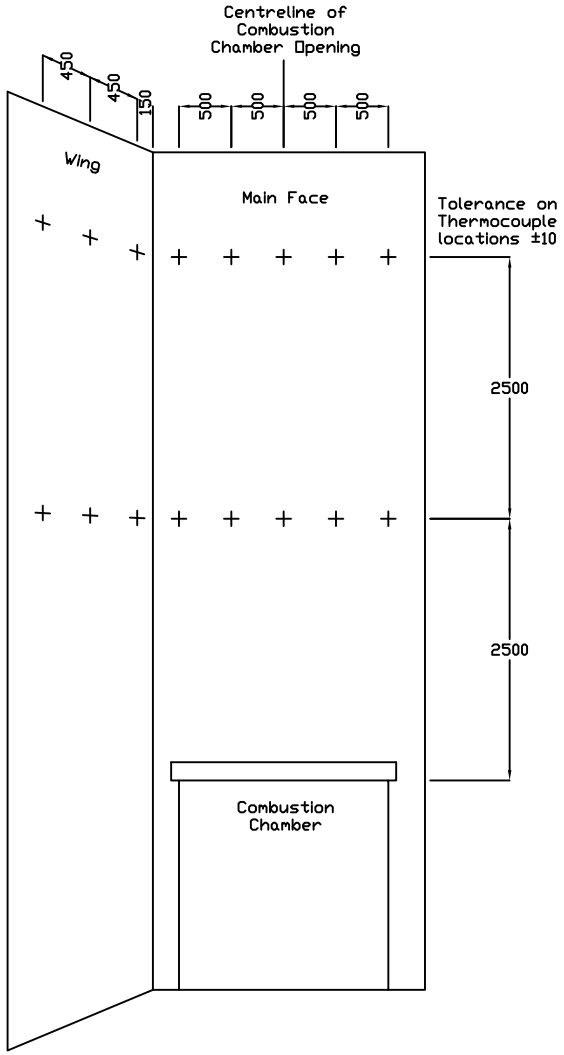
Figures PAR/10811/01A:01 to 03

The figures in this Appendix are not included in the sequential page numbering of this report

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS



Schematic of Test Facility (dims in mm)



Location of Thermocouples (dims in mm)

INTERNATIONAL FIRE CONSULTANTS LTD
20 Park Street
PRINCES RISBOROUGH
Buckinghamshire
HP27 9AH
United Kingdom
Tel: +44 (0) 1844 275500
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Website: http://www.intfire.com

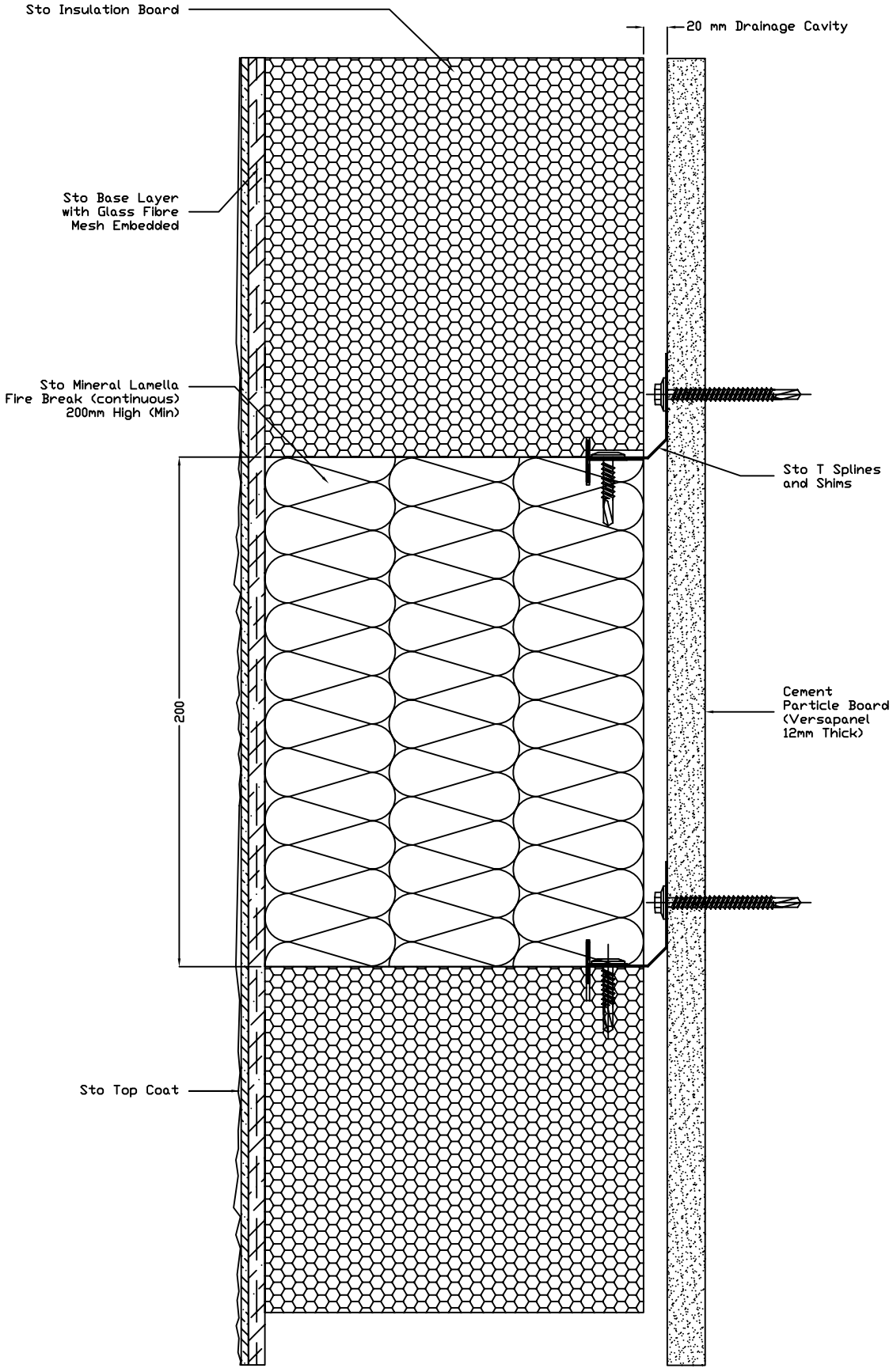
Sto Ltd
Field of Application of StoTherm Vario, Mineral and Lamella Systems in Accordance with BRE 135 Annex A or B

Apparatus for BS8414-1:2002 & BS8414-2:2005 Tests

Job number : 11506	
Drawn by : PB	Checked by : DC
Not To Scale	January 2012

PAR/10811/01A:01

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS



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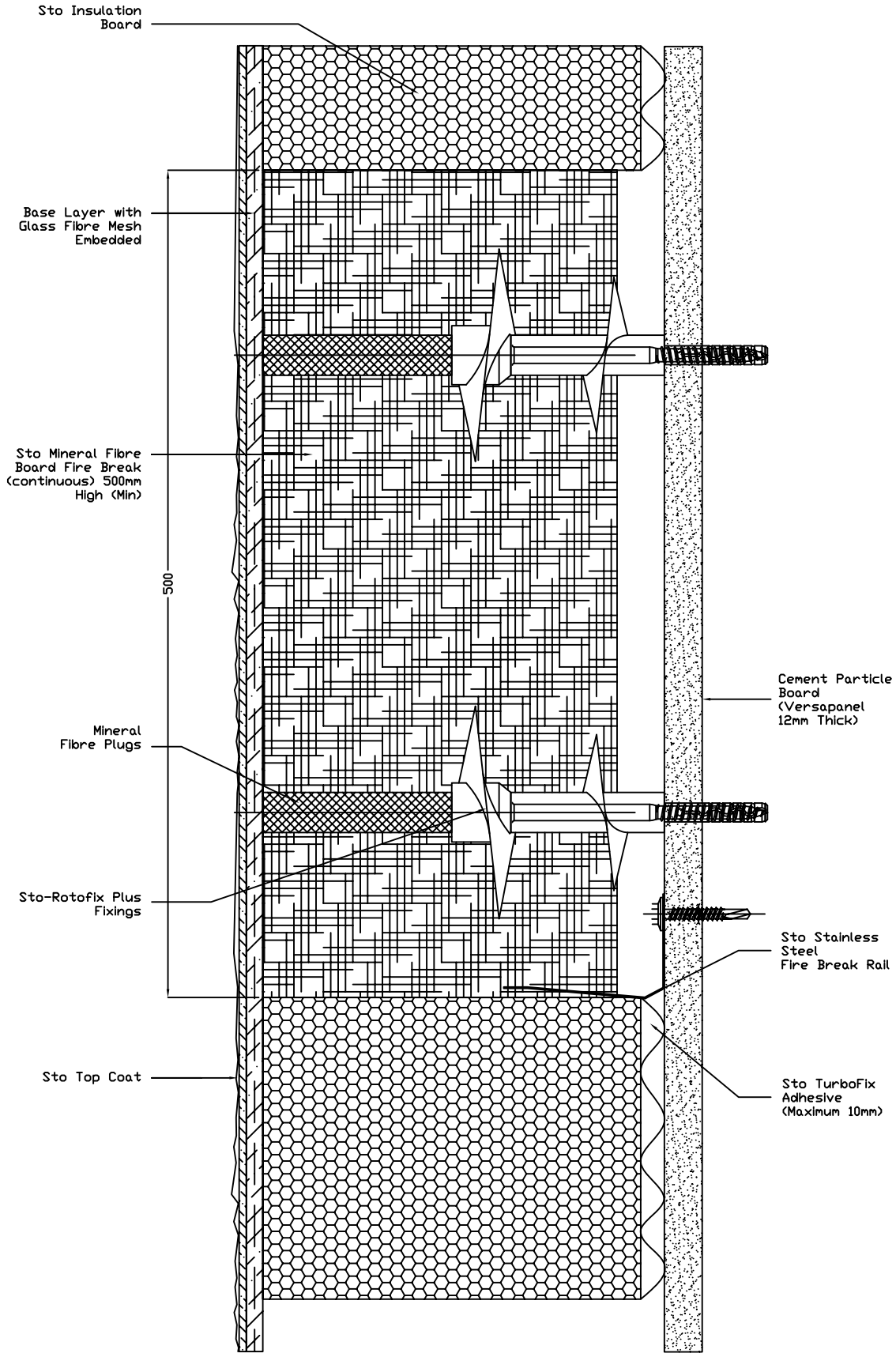
Sto Ltd
Field of Application of StoTherm Vario, Mineral and Lamella Systems in Accordance with BRE 135 Annex A or B

Example of Rail System and Shims on a Steel Frame Substrate

Job number : 11506	
Drawn by : PB	Checked by : DC
Not To Scale	January 2012

PAR/11081/01A:02

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS



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Sto Ltd
Field of Application of StoTherm Vario, Mineral and Lamella Systems in Accordance with BRE 135 Annex A or B

Example of Sto-Rotofix Plus Fixings on a Steel Frame Substrate

Job number : 11506	
Drawn by : PB	Checked by : DC
Not To Scale	January 2012

PAR/11081/01A:03

APPENDIX B

Summary of Commercially Available Systems

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS

Summary of Commercially Available Systems

System	StoTherm Vario *	StoTherm Vario	StoTherm Vario *	StoTherm Vario
Insulation Type	Expanded polystyrene	Expanded polystyrene	Expanded polystyrene	Expanded polystyrene
Insulation Fixing System	PVC rails, splines and shims	StoLevell Duo Plus or StoLevell Uni adhesive	Rotofix Plus fixings	StoTurbofix adhesive
Floor Level Fire Breaks	Mineral fibre lamella	Mineral fibre lamella	Mineral fibre board	Mineral fibre lamella
Floor Level Fire Break Fixing System	Stainless steel support rails	StoLevell Uni adhesive	Rotofix Plus fixings	StoLevell Uni adhesive
Over Opening Fire Breaks	Mineral fibre lamella	Mineral fibre lamella	Mineral fibre lamella	Mineral fibre lamella
Over Opening Fire Break Fixing System	StoLevell Uni adhesive	StoLevell Uni adhesive	StoLevell Uni adhesive	StoLevell Uni adhesive
Base Coat	StoArmat Novo or StoLevell Duo Plus	StoArmat Novo or StoLevell Duo Plus	StoArmat Novo or StoLevell Duo Plus	StoArmat Novo or StoLevell Duo Plus
Reinforcement	Sto Glass Fibre	Sto Glass Fibre	Sto Glass Fibre	Sto Glass Fibre
Finish	See Section 4.5	See Section 4.5	See Section 4.5	See Section 4.5

* *These systems are designed to satisfy the more onerous requirements of NHBC detailing, i.e. with drained and vented cavities. For non-NHBC buildings the floor level breaks may be made with non-combustible material for the full thickness (substrate to render). Sto Ltd should be contacted for clarification.*

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS

System	StoTherm Mineral *	StoTherm Mineral *	StoTherm Mineral	StoTherm Lamella
Insulation Type	Mineral fibre board	Mineral fibre board	Mineral fibre board	Mineral fibre lamella
Insulation Fixing System	PVC rails, splines and shims	Rotofix Plus fixings	StoLevell Uni or Duo Plus adhesive	StoLevell Uni or Duo Plus adhesive
Floor Level Fire Breaks	Mineral fibre lamella	Mineral fibre board	*Provided by insulation material so no separate specification required*	*Provided by insulation material so no separate specification required*
Floor Level Fire Break Fixing System	Stainless steel support rails	Rotofix Plus fixings and stainless steel rail		
Over Opening Fire Breaks	*Provided by insulation material so no separate specification required*	*Provided by insulation material so no separate specification required*		
Over Opening Fire Break Fixing System				
Base Coat	StoArmat Novo or StoLevell Duo Plus	StoArmat Novo or StoLevell Duo Plus	StoArmat Novo or StoLevell Duo Plus	StoArmat Novo or StoLevell Duo Plus
Reinforcement	Sto Glass Fibre	Sto Glass Fibre	Sto Glass Fibre	Sto Glass Fibre
Finish	See Section 4.5	See Section 4.5	See Section 4.5	See Section 4.5

* *These systems are designed to satisfy the more onerous requirements of NHBC detailing, i.e. with drained and vented cavities. For non-NHBC buildings the floor level breaks may be made with non-combustible material for the full thickness (substrate to render). Sto Ltd should be contacted for clarification.*

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS

System	StoTherm Mineral *	StoTherm Mineral *	StoTherm Lamella
Insulation Type	Mineral fibre board	Mineral fibre board	Mineral fibre lamella
Insulation Fixing System	PVC rails, splines and shims	Rotofix Plus fixings	StoLevell Uni or Duo Plus adhesive
Floor Level Fire Breaks	Mineral fibre board	Mineral fibre board	*Provided by insulation material so no separate specification required*
Floor Level Fire Break Fixing System	Stainless steel support rails	Rotofix Plus fixings and stainless steel rail	
Over Opening Fire Breaks	*Provided by insulation material so no separate specification required*	*Provided by insulation material so no separate specification required*	
Over Opening Fire Break Fixing System			
Base Coat	StoArmat Classic	StoArmat Classic	StoArmat Classic
Reinforcement	Sto Glass Fibre	Sto Glass Fibre	Sto Glass Fibre
Finish	See Section 4.5	See Section 4.5	See Section 4.5

* *These systems are designed to satisfy the more onerous requirements of NHBC detailing, i.e. with drained and vented cavities. For non-NHBC buildings the floor level breaks may be made with non-combustible material for the full thickness (substrate to render). Sto Ltd should be contacted for clarification.*

APPENDIX C

International Fire Consultants Ltd

APPENDIX 2 - BRE GLOBAL TEST REQUIREMENTS

International Fire Consultants Ltd

International Fire Consultants Ltd (IFC) is an independent fire engineering consultancy practice within the IFC Group of companies. IFC is a specialist fire safety engineering, design and product evaluation organisation.

As well as providing the fire safety engineering design of complex buildings, IFC are unique, as a non-laboratory based specialist engineering practice, in undertaking the evaluation of construction products for their ability to meet legislative requirements and/or the performance criteria of fire tests. In performing this latter function we rely on the quality of the results and data that we and our clients receive from fire test facilities.

International Fire Consultants Ltd does not operate its own furnaces, primarily because it would dilute the focus away from our specialist engineering knowledge, and further we do not want to compete for testing in this already crowded market. Instead, as specialist professional engineers we arrange, manage and observe clients' testing programmes in 3rd party laboratories. The location and furnace selected for each test may for example depend on which is the most convenient for the client.

IFC staff witness numerous fire resistance and 'reaction-to-fire' tests in a range of furnaces and laboratories around the world each year and we also review photographic and video supported evidence of hundreds more. Unusually perhaps, IFC staff have extensive knowledge of the tests and the way products behave under test, probably as a direct result of witnessing a greater variety of testing conditions, than staff permanently employed or stationery in any one specific laboratory. IFC staff have for example designed and managed fire test laboratories and have extensive testing backgrounds.

To demonstrate our intimate knowledge of the standards and requirements, IFC technical staff provide design, implementation and training on EN 17025 accreditation systems for independent fire testing laboratories, prior to them seeking approval from their own national accreditation bodies. IFC produce the quality control procedures, write their quality manuals and train their staff as part of this process. It would be impossible to do this without having the necessary detailed knowledge of the testing standards, the testing procedures, laboratory practice and report requirements.

International Fire Consultants Ltd carry out our engineering work under Lloyds ISO 9001, 3rd party accreditation, the highest level of 3rd Party certification available to consultancy practices such as IFC.

Interestingly, it is prohibited for engineering assessment or extended field of application reports to be produced under EN 17025 accreditation. EN 17025; is only an accreditation of **testing** facilities covering, for example, the calibration of laboratory hardware, equipment and the procedures for running of the test. Testing can be sourced from 3rd Party furnaces and test facilities, and an additional layer of quality control added by independent expert witnessing, if required, by IFC engineers and experts.

The data outputs of EN 17025 tests are used by IFC to generate information, in the form of technical engineering documents covered by the appropriate standard, ISO 9000.

Further, regarding quality control within the IFC Group, IFC Certification Ltd, the Group's certification body, is UKAS (United Kingdom Accreditation Service) 3rd party accredited against EN 45011, the appropriate level for a third party certification organisation. IFC Certification Ltd is also a Construction Products Directive Notified Body for fire safety products (Notified Body Number 1720).

International Fire Consultants Ltd and IFC Certification Ltd have the highest levels of independent 3rd party accreditation appropriate to their independent engineering status in the fire safety industry.

The Technical Director and Senior Technical staff within IFC either chair or are members of the appropriate British Standard Committees, the CEN Committees and Working Groups and the ISO Technical Committees and Working Groups responsible for generating and maintaining fire resistance testing standards and associated test methods.

Note: Whilst not being related to the use of IFC Report and Assessments outside of the UK, IFC have been providing this service in the UK for more than 25 years and our outputs are accepted throughout the UK, and generally in other parts of the world, e.g., Far East, Middle East.

If you require further details of International Fire Consultants Ltd's independence, professionalism and engineering status and experience, please contact:

Peter E Jackman MIFireE IEng FBEng AIWSc
Technical Director

or

Paul McGahey
Commercial Manager

Visit www.intfire.com for a more detailed explanation of the IFC Group and its services.

APPENDIX 3 - REVIEW OF BUILDING REGULATIONS MATTERS IN RELATION TO CLADDING WORKS

In relation to the works carried out at Carnet House a full plans application was submitted on 12 January 2017 and the plans associated with the application were approved on 20 April 2017. Works were commenced on site for the purposes of the Building Regulations on 3 February 2017. Under Building Regulations it is possible to start works on site prior to the approval of any plans associated with an application and this would not be uncommon. The works on this building were still ongoing at the time of inspection.

With regard to the works to Eithné House and Cúchulainn House the applications were submitted as building notice applications meaning that no formal assessment of plans is carried out and no approval is issued. These applications should not have been submitted as building notice applications as the works are not within the rules for acceptance of such applications under regulation 9.

The Building Regulations application for Eithné House was submitted on 14 June 2016 and the application for Cúchulainn House was submitted on 18 May 2015.

The works to Eithné House were commenced for the purposes of the Building Regulations on 29 July 2016 and works were completed for the purpose of the regulations on 11 April 2017. A completion certificate was issued by Belfast Building Control Service on 12 April 2017 as required by regulation 14 of the regulations.

In relation to the works to Cúchulainn House whilst the works were completed the Building Control Service have no records of any inspections being carried out in relation to the works and do not appear to have been provided with the necessary commencement and completion notifications for the works.

In relation to the works carried out at Whincroft House a full plans application was submitted on 12 January 2017. The plans associated with the application were approved on 7 April 2017 and works commenced on site for the purposes of the Building Regulations on 2 February 2017. The works on this building were still ongoing at the time of inspection.

APPENDIX 4 - BUILDING REGULATION/NIFRS ISSUES

Chief Executive's Department

Building Control

Being dealt with by: Alan Mayrs

Tel: 028 90270625

Date: 2 August 2017

F.A.O. Adrian Blythe
Housing Executive
2 Adelaide Street
Belfst
BT2 8PB

Dear Sir

RE: Eithné House, Cúchulainn House and Whincroft House, Belfast

We write in relation to the above residential tower blocks and the recent inspections carried out to ascertain compliance with Building Regulations as requested by the Housing Executive.

All three tower blocks have recently undergone a refurbishment that primarily included a new external cladding system incorporating insulation to improve the thermal efficiency of the blocks and a new pitched roof to encapsulate the existing flat roof plant rooms.

Inspections of all three blocks were carried out on Thursday 27 July 2017 with the Housing Executive, NIFRS, VB Evans and Piperhill Construction Ltd with a follow up review meeting taking place on 1 August 2017 with the Housing Executive at 2 Adelaide Street, Belfast.

Based on our observations and discussions with all relevant parties we identified a number of areas that we consider to be in contravention of building regulations with respect to the works that have been carried out. The main issues that have been identified are detailed below along with the associated building regulation.

Regulation 35 - Internal Fire Spread
Structure.

The provision of a new pitched roof over all three tower blocks has been carried out without the extension of various service shafts such as ventilation and drainage which potentially compromises fire compartmentation within the building.

Regulation 36 - External fire spread

The new cladding panels installed at the drying area in Eithné House and Cúchulainn House have been installed at variance with the full scale fire test assembly without the non-combustible backing being provided. Whilst we cannot confirm that this specifically would constitute a breach this omission would need to be reviewed to identify if any risk in terms of external fire spread exists.

Regulation 37 - Facilities and Access for the Fire and Rescue Service and Regulations 33 - Means of Escape

The new pitched roof on all three tower blocks has compromised the existing stairwell natural smoke ventilation which now discharges into the roof void. This smoke vent previously discharged direct to external air.

In addition the cladding panels have compromised the existing stair lobby smoke ventilation in the two blocks at Eithné House and Cúchulainn House. Whilst the original facility would not be in accordance with current fire safety codes the ability of NIFRS to vent this area has been greatly reduced by the application of external wall cladding which leaves no provision to vent this area.

In relation to the lobby ventilation at Whincroft House whilst no contravention was identified in relation to the works carried out we can advise that the facility in this building would not comply with modern fire safety codes.

Regulation 65 - Means of Ventilation

The provision of a new pitched roof means that ventilation shafts previously discharging to external air now terminate within the roof void.

Regulation 80 - Sanitary Pipework

The provision of a new pitched roof means that soil vent pipes previously discharging to external air not now terminate within the roof void.

These issues would need to be addressed to ensure compliance with the Building Regulations (NI) 2012. The Building Control Service have powers of enforcement if remedial action is not taken to address the matters raised however we are aware that the Housing Executive are fully committed to the remedy of these defects as originally identified by your own internal fire safety manager.

If you require any clarification on any of these matters please do not hesitate to contact me.

Yours Faithfully,

Assistant Building Control Manager

Housing Executive

ASSET MANAGEMENT
Asset Strategy

The Housing Centre
2 Adelaide Street
Belfast
BT2 8PB
T 03448 920 900
W nihe.gov.uk
@nihecommunity

F.A.O Alan Mayrs
Belfast City Council
Cecil Ward Building,
4-10 Linenhall Street
Belfast
BT2 8PB

Date: 8th January 2018

Dear Sir

RE: Cúchulainn House, Eithné House and Whincroft House, Belfast

Further to your letter of 2nd August 2017, and a number of subsequent meetings which took place to agree remedial works at the above tower blocks, to ensure compliance with Building Regulations, I wish to document our up to date position.

On the 22nd December 2017, our consultants on behalf of Piperhill Construction submitted two new building control applications to install Automatic Open Ventilators (AOV's) to stair lobbies on each floor. The application numbers for these are as follows:-

- Cúchulainn House – FP 2017/2920
- Eithné House – FP/2017/2921

Amendments have also been proposed by our consultants for the three existing applications at Cúchulainn House (BN/2015/2563), Eithné House (BN/2016/2674) and Whincroft House (FP/2017/0116) to provide a new 2 hour protected shaft within the new roof voids above the existing staircase, terminating with a 1.0m^2 AOV on each pitched roof. In addition the existing shunt outlets and soil vent pipes are to be fitted with fire dampers at the existing concrete roof level and extended to the external air via the eaves soffit. It is further proposed that the ventilation openings at the top of the bin chutes are extended to external air in each block.

In Cúchulainn House and Eithné House the external cladding at the drying areas is to be removed and replaced with a permanent louvered vent with fire stopping provided at floor level.

In respect of your listed building regulation contraventions in your letter, I will summarise as follows;

Regulation 35 – Internal Fire Spread Structure

All three tower blocks (Cúchulainn, Eithné and Whincroft) to have protected shafts extended to the underside of the new roof to accommodate a new stairwell AOV's and fire

dampers will be fitted to the shunt vents and soil vent pipes at the existing concrete roof level.

Regulation 36 – External Fire Spread

The cladding at Cúchulainn House and Eithné House is to be removed at the drying areas and replaced with a permanent louvered vent and fire stopping provided at each floor level.

Regulation 37 – Facilities and Access for the Fire and Rescue Service and Regulation 33 – Means of Escape

The construction of protected shafts to the three tower blocks within the roof void and the new stairwell AOV's along with the additional lobby vents at Cúchulainn and Eithné House discussed above should address this issue.

It is noted that in relation to the lobby ventilation at Whincroft House, there is no new or greater contravention of the regulations and therefore any improvements will be dealt with outside the current submissions.

Regulation 65 – Means of Ventilation

Existing ventilation shafts are to be extended to terminate to the external air via the eaves soffit.

Regulation 80 – Sanitary Pipework

All soil vent pipes will be fitted with fire dampers at the existing concrete roof level and vented to the external air via the eaves soffit.

These issues will be dealt with by our appointed consultants and Programme Delivery Team. However if you have any queries in the meantime or require any further clarification on any of these matters, please do not hesitate to contact me.

Yours faithfully

Adrian Blythe

Quality Improvement Manager

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Chief Fire & Rescue Officer
Gary Thompson BSc (Hons) MSc CMgr FCMI MIFireE MIoD

Our Ref: GS/SM/LETS/15584
1 August 2017

Mr Clarke Bailie
The Housing Centre
2 Adelaide Street
Belfast
BT2 8PB

Dear Mr Bailie

Re: Cúchulainn House, Victoria Parade, New Lodge, Belfast
Eithné House, Duncairn Parade, New Lodge, Belfast
Carnet House, Ardcarn Park, Dundonald, Belfast
Whincroft House, Southland Dale, Braniel, Belfast

On 26 July 2017, Northern Ireland Housing Executive and Northern Ireland Fire & Rescue Service (NIFRS) met to discuss a review of the fire risk assessment for each of the above properties, which was followed by a site visit to each property on 27 July 2017.

A number of fire safety concerns were identified for which NIFRS recommends the following:

1. A separate fire risk assessment be prepared for each property.

2. From each fire risk assessment, the significant findings be summarised and a prioritised action plan be developed, to detail the measures to be taken to reduce the risk to residents and firefighters.

3. Ensure that the smoke alarm in each flat is working. An initial method of achieving this could be to provide a leaflet to each resident telling them how to test their smoke alarm, remind them to test it weekly and how to arrange for it to be replaced if it is not working. Or, task the caretaker for each block to visit each flat and test the alarm with the resident in attendance.

4. Ensure compartmentation between each flat, common area and floor is checked and is re-instated on a systematic risk based approach.

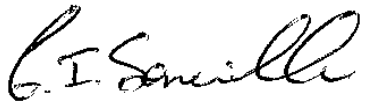
5. Ensure smoke control measures are re-instated to the previous standard installed prior to the cladding installation. The maintenance of smoke control measures are enforceable by NIFRS and immediate action should be taken to reinstate to at least the minimum standard detailed in BS5588-1: 1990 as follows:

a. In fire-fighting shafts, a window having a clear openable area at high level of not less than 1 m^2 at each upper storey or landing level; or a window or vent at the top having a clear openable area of not less than 1m^2.

b. In the common areas, smoke control may be achieved by providing openable windows. All openable windows and vents provided for smoke control should be outward opening, not be top hung, open a minimum of 30˚, be clearly identifiable and accessible, and should be fitted with simple lever handles, or locks that can be operated by the fire service. BS5588-1: 1990 does not specify the size; BS9990 specifies 1.5 m^2 fitted at as high a level as is practicable.

This list summarises only initial immediate actions and does not cover the other issues identified.

Yours sincerely



Group Commander Geoff Somerville
Prevention & Protection

Copy to file: E21/14974/E - Cúchulainn House E21/14974/D - Eithné House
E11/23807 - Carnet House E11/10917 - Whincroft House

Housing Executive

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12 October 2017 Your Ref: GS/SM/LETS/15584

Dear Geoff

Cúchulainn House / Eithné House / Carnet House & Whincroft House

Thank you for your letter of 1 August 2017. I apologise for the delay in providing you with a formal response.

I note your Fire Safety concerns and wish to offer you the following assurances in regard to the issues raised.

1. A separate and comprehensive Fire Risk Assessment is being prepared for each Tower Block by our Fire Safety Manager, David Adamson. The majority are now documented, with the remainder in progress.

2. Each Fire Risk Assessment has a summarised list of issues arising from the Assessment Process. Each issue has been given a priority status and an action plan based on priorities will be implemented with the aim of reducing the risks to both residents and fire-fighters.

3. We are currently implementing a programme of checks of the smoke detectors within these blocks and information will be provided to tenants on how to test alarms and the process for replacement, if required, during this process.

4. Each Tower Block has been critically assessed in respect of all areas where a breach of compartmentation may exist. Breaches, where identified, will be restored to the required levels of fire resistance and it is proposed to put in place a cyclical inspection process.

5. In the case of both Cúchulainn & Eithné Houses, we accept that the current smoke control measures to both Drying Area / Refuse Chute and Lift Lobbies requires to be reviewed.

Meetings have already been held with the Consultant and Contractor involved with the cladding systems. Remediation solutions have been requested and are currently being agreed with all concerned. We have also requested that interim measures be introduced to reduce the level of risk immediately.

It is also proposed to reinstate the smoke control measures in both these blocks to meet the required standard.

In the case of Whincroft House, although the works created no worsening of any smoke control measures, we intend to review the Lift Lobby **/** Drying Area door and screen arrangement.

Yours sincerely

Clark Bailie
Chief Executive

Northern Ireland Fire & Rescue Service (NIFRS)

Enforcement Role in Respect of Domestic Premises

NIFRS is the enforcing authority for fire safety duties as detailed by The Fire and Rescue Services (Northern Ireland) Order 2006.

Under Article 30 of the Order, the Department of Health, Social Services and Public Safety (now the Department of Health) has the power to make regulations about fire safety in relevant premises. This power was used to introduce The Fire Safety Regulations (Northern Ireland) 2010, which came into effect on 15 November 2010.

The relevant premises in which NIFRS can enforce fire safety duties are defined in Article 50 of the Order. Article 50 excludes domestic premises and the common areas of private dwellings, but does not exclude a House in Multiple Occupation.

Under Article 31 of the Order, the Department of Health, has the power to make regulations for or in connection with the maintenance of premises, facilities or equipment with a view to securing the safety of firefighters in the event of a fire in relevant premises. This power was used to introduce Regulation 24 of The Fire Safety Regulations (Northern Ireland) 2010 which requires the maintenance of measures provided in the common areas of private dwellings for protection of firefighters.

Therefore, in domestic premises, NIFRS can enforce the maintenance of:

- firefighting lifts;
- firefighting shafts;
- firefighting stairs;
- smoke control systems;
- rolling shutters in compartment walls; and
- dry or wet rising fire mains.

NIFRS cannot enforce any other fire safety measure in domestic premises, unless it is a House in Multiple Occupation. In a House in Multiple Occupation, NIFRS can enforce all fire safety measures.

NIFRS is lobbying for legislation change to enable NIFRS to enforce all fire safety measures in the common areas of private dwellings.

The measures which NIFRS cannot enforce in a domestic premises include:

- fire alarm systems, unless they are used to control a smoke control system, or other measure which protects firefighters;
- provision and protection of the means of escape, other than firefighting stairs or shafts;
- emergency lighting;
- the carrying out and review of a fire risk assessment;
- signage, unless in relation to measures which protect firefighters;
- provision and maintenance of fire extinguishers; or
- external cladding systems.

NIFRS' advice in respect of domestic premises is that the managing agent:

- must ensure the maintenance of measures provided in the common areas of private dwellings for protection of firefighters;
- should carry out a fire risk assessment, record the significant findings and review it when any material change occurs;
- should, in relation to the common areas, take all practicable fire safety measures as is reasonable for a person in their position to take to ensure the safety of persons in respect of harm caused by fire in the premises.
- should make arrangements for maintenance of the means of escape and keeping free from obstruction in case of fire;
- should manage the disposal of rubbish to reduce the risk of arson or accidental ignition;
- should make arrangements to ensure that the front door of each flat is maintained as a fire door of the required fire resistance, including any opening in the door such as a letter box; and
- should maintain compartmentation throughout the building, in respect of ducts, services, shafts, or external cladding.