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صندوق بريد ٣٤٩٢٤، دبي، الإمارات العربية المتحدة

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Classification Report of an External Cladding System

As per BR135:2013 Annex B

Test Sponsor : Sotech Limited

Project : Chalcots Estate, Swiss Cottage, London, England (Test 1)

Report No. : SR1105 Rev.0

Report Date : 22/10/2019

Al Futtaim Element Materials Technology Dubai L.L.C
Façade Testing & Advisory Services Division

1. Introduction

This report details the classification of the aluminium panel cladding system (described in Section 2 of this report) in accordance with BR135:2013 Annex B, when tested in accordance with BS 8414-2:2015 + A1:2017 at the Al Futtaim Element Materials Technology Dubai L.L.C (AFE) laboratory in Dubai at the request of:

Sotech Limited,
2 Traynor Way, Whitehouse Business Park,
Peterlee, County Durham,
SR8 2RU, England.

Contact: Graham Todd Contact no.: +44 191 587 2287

2. Test Sample

The test specimen was an external wall cladding system (4mm Anodised Aluminium Sotech FC Panel with Siderise Cavity Barriers and Rockwool Duo Slab Insulation) fixed on to pre-cast concrete panels (Burnham profile) which in turn were fixed on to the steel substrate.

All the terminations of the cladding system were left open. The interface between the cladding system and the combustion chamber was covered with 4mm Anodised Aluminium Sotech FC Panel folded inwards. The distance of the finished face of the wing wall to the side opening of the combustion chamber was 140mm.
Combustion chamber opening, distance of the finished face of the wing wall to the side opening of the combustion chamber and dimensions of the test specimen were as per the project specific requirements.

Materials used in the system are detailed in the table below:

Component	Description	Installation Details
Slab bracket	12mm steel angle bracket.	12mm steel angle bracket was fixed to the steel box section with TDB-S-6.3x38mm fixings. 12mm steel angle bracket was fixed to the floor concrete with MMS-S-12x120mm fixings.
Pre-cast concrete panel	175mm thick profiled pre-cast concrete panel.	Pre-cast concrete panel was fixed to 12mm steel angle bracket with MMS-S-12x120mm fixings. Horizontal and vertical joints were filled with rockwool and sealed with Kemstop FR flexi intumescent sealant.
Thermal insulation	180mm thick Rockwool Duo Slab insulation	Rockwool insulation was fixed to pre-cast concrete panel with MIDS-S-8x250 and IDR-70x70x12 fixings. Additional rockwool insulation was provided to fill the cavity at FFL locations at levels 1 & 2.
Sheathing board	Horizontal and vertical Kemwell cement board	Kemwell cement boards were provided at cavity barrier locations and fixed to pre-cast concrete panel with TI-S-Z10-6.3x45mm screws.

Component	Description	Installation Details
		Rockwool insulation was provided behind the horizontal cement boards and PFC Corofil sealant was provided at top and bottom side of the horizontal Kemwell boards.
Cavity barrier	**Horizontal open state intumescent fire cavity barrier:** Siderise RH25S-90/60 open state horizontal intumescent cavity barrier	The horizontal open state cavity barriers were fixed to the pre-cast concrete panel through the Kemwell board with steel brackets and TI-S-Z10-6.3x45mm screws. 3 nos. of horizontal open state intumescent cavity barriers were fixed to the main wall and wing wall, at approximately 900mm, 3570mm and 6230mm above the combustion chamber opening.
	Horizontal closed state fire cavity barrier: Siderise CW-FS120 closed state horizontal fire cavity barrier	The horizontal closed state cavity barriers were fixed to the pre-cast concrete panel through the Kemwell board with steel brackets and TI-S-Z10-6.3x45mm screws. 3 nos. of horizontal closed state cavity barriers were fixed to the main wall and wing wall, at approximately 625mm, 3295mm and 5910mm above the combustion chamber opening.
	Vertical cavity barrier: Siderise RV-120/120 closed state vertical fire cavity barrier	Vertical cavity barriers were fixed to the pre-cast concrete panel through the Kemwell board with steel brackets and TI-S-Z10-6.3x45mm screws. 1 no. of continuous vertical cavity barrier was fixed on both the main and wing wall.
	Cassette insert: Siderise open state cassette insert 135mmx50mm	Siderise inserts were placed at the folding of the aluminium panels at cavity barrier locations.
Brackets	**Top Hat bracket:** 3mm Aluminium Top hat bracket **Helping Hand bracket:** Nvelope VB240 Helping hand bracket with thermal isolator.	Aluminium Top Hat brackets were packed with rockwool and fixed to pre-cast concrete panel with MMS-S-7.5x75mm screws. Helping Hand brackets were fixed to Top Hat bracket with SX5/8-S16/A4-5.5x31mm screws.

Component	Description	Installation Details
Carrier rails and hook plate	**Carrier rails:** Aluminium FC carrier rails with gaskets **Hook plate:** FC aluminium hook plate	FC carrier profiles were fixed to helping hand brackets with SDA5/3.5-8-H13-S4-5.5x22mm screws. Aluminium hook plates were fixed to carrier rails with JT4-4-4.8x19mm screws.
Cavity tray	Aluminium cavity tray flashing	2 nos. of cavity tray flashings were fixed together with TI-S-Z10-6.3x45mm screws and fixed to pre-cast concrete panel through cement board with SDA5/3.5-8-H13-S4-5.5x22mm screws.
Cladding panel	Anodised Aluminium Sotech FC panel, 4mm thick.	Aluminium panels were hooked on to the aluminium hook plates. 20mm joints were provided between the panels.

Figure 1: Tested Sample Elevation Showing the Thermocouple and Cavity Barrier Locations

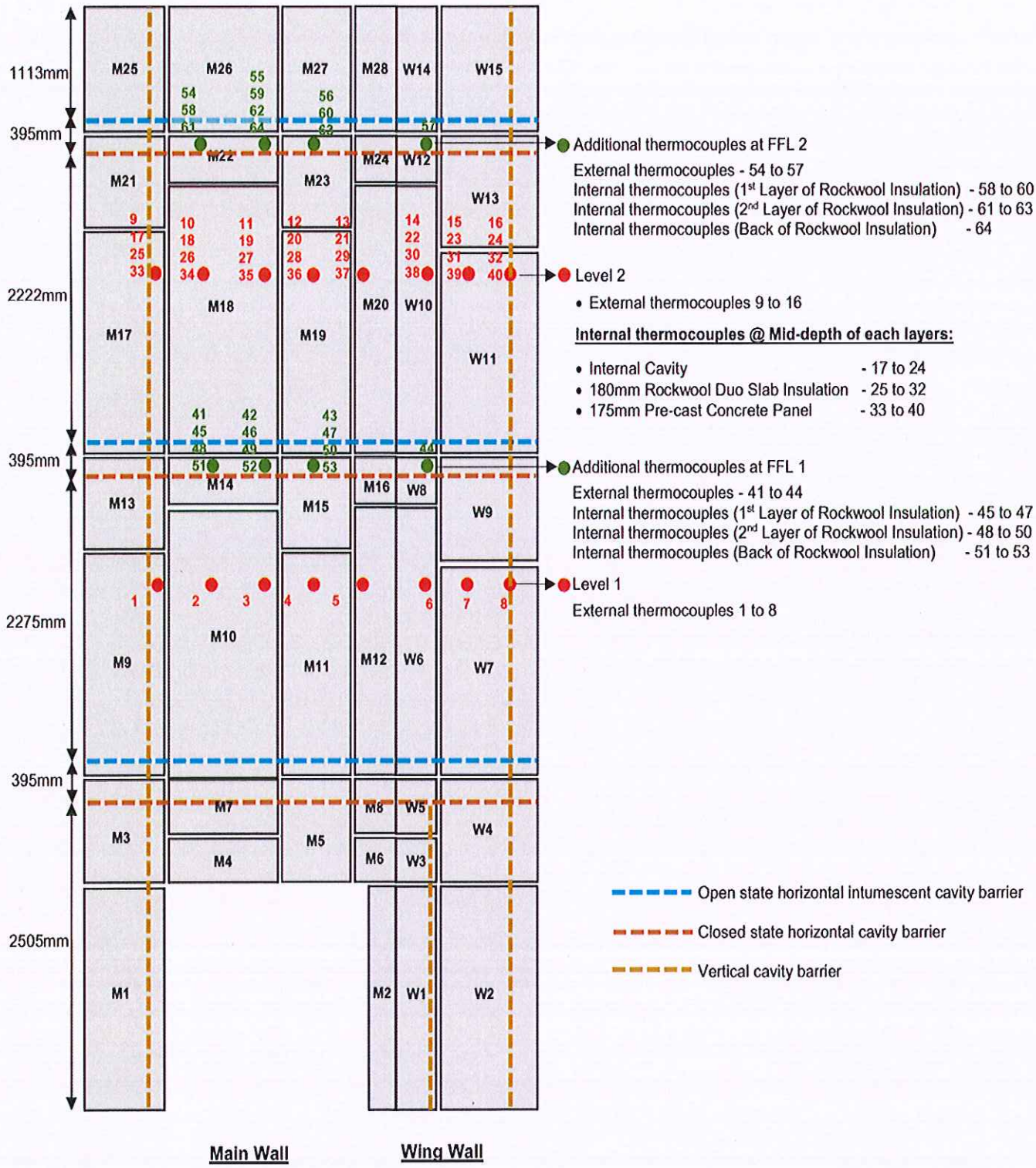

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Figure 2: Corner Detail of the Tested System

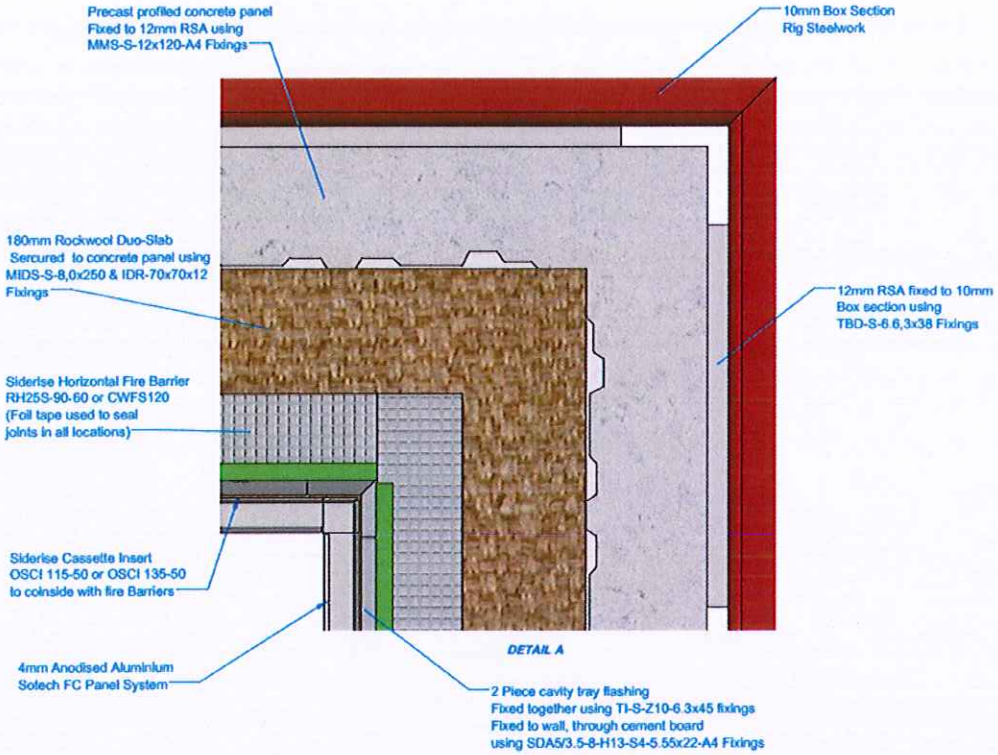


Figure 3: Detail of the System Above the Combustion Chamber

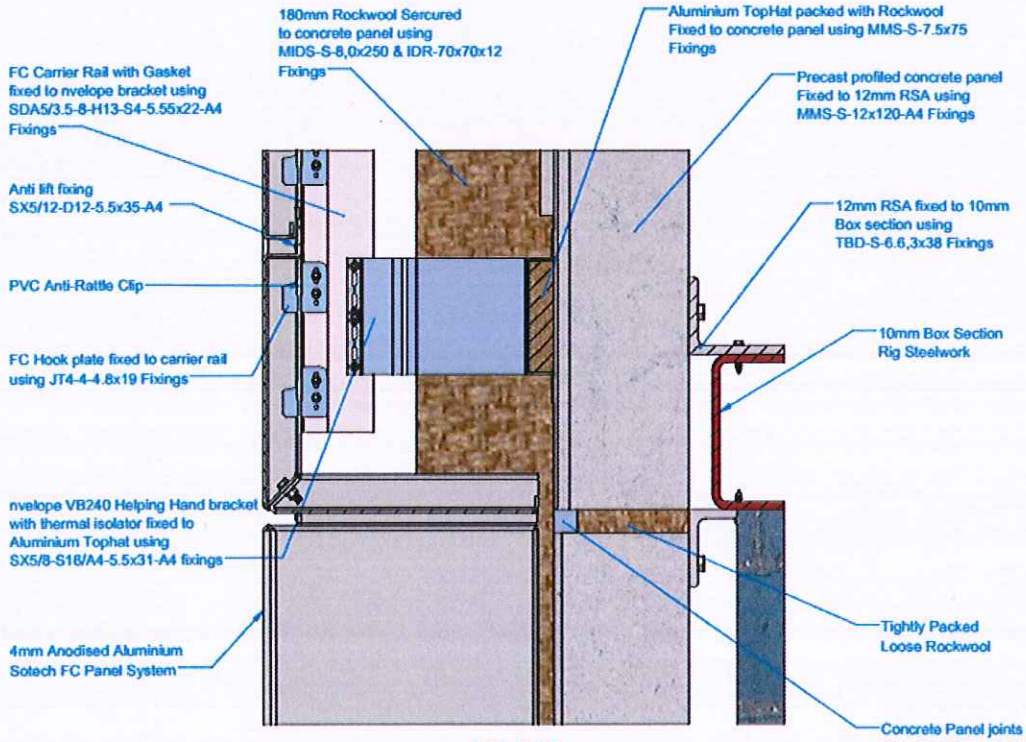
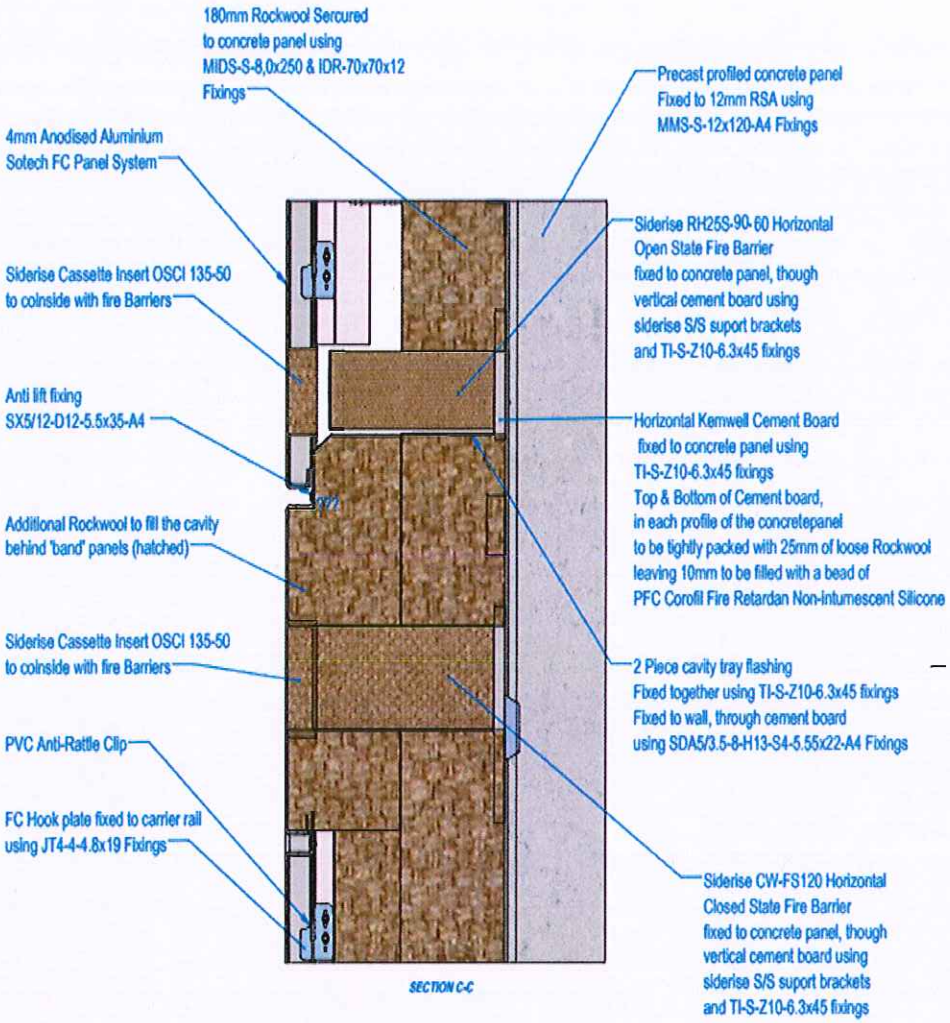


Figure 4: Vertical Section Detail of the Sample



3. Summary of Test Data

Parameters	Temperature Data
T_s, start temperature	33°C
t_s, start time	124 seconds after ignition of the crib (thermocouple 4)
Has temperature exceeded 633°C (600°C above T_s) within 15 minutes from t_s and sustained for at least 30 seconds?	No
Peak temperature & time at Level 2 (External)	516°C at 1056 seconds from t_s (thermocouple 14)
Peak temperature & time at Level 2 (Mid-depth of Cavity)	288°C at 1305 seconds from t_s (thermocouple 21)
Peak temperature & time at Level 2 (Mid-depth of 180mm Rockwool Duo Slab Insulation)	224°C at 1354 seconds from t_s (thermocouple 31)
Peak temperature / time at Level 2 (Mid-depth of 175mm Pre-cast Concrete Panel)	47°C at 1330 seconds from t_s (thermocouple 39)

See Figure 2 for the thermocouple locations.

Level 1 Height: 2500mm above the top of the combustion chamber opening in the test apparatus.

Level 2 Height: 5000mm above the top of the combustion chamber opening in the test apparatus.

Start Temperature, T_s: Mean temperature of the thermocouples at Level 1, five minutes prior to ignition of the heat source.

Start Time, t_s: Time when the temperature recorded by any external thermocouple at Level 1 ≥ 200°C above T_s and remains above this value for at least 30 seconds.

4. Compliance Criteria

External fire spread

Failure due to external fire spread is deemed to have occurred if the temperature rise above T_s of any of the external thermocouples at level 2 exceeds 600°C, for a period of at least 30 seconds, within 15 minutes of the start time, t_s.

Internal fire spread

Failure due to internal fire spread is deemed to have occurred if the temperature rise above T_s of any of the internal thermocouples at level 2 exceeds 600°C, for a period of at least 30 seconds, within 15 minutes of the start time, t_s.

5. Test Results

Parameters	Fire Spread Time, t_s	Result
External fire spread	>15 minutes	**Compliant**
Internal fire spread (Mid-depth of Cavity)	>15 minutes	**Compliant**
Internal fire spread (Mid-depth of 180mm Rockwool Duo Slab Insulation)	>15 minutes	**Compliant**
Internal fire spread (Mid-depth of 175mm Pre-cast Concrete Panel)	>15 minutes	**Compliant**
Mechanical performance	Approximately 5m² of the total external visible surface area was completely consumed. Approximately 12m² of the total external visible surface area was discoloured. The heat source was extinguished 30 minutes from ignition and observations were continued for another 30 minutes.	

6. Classification

The system described in this report has been tested in accordance BS 8414-2:2015 + A1:2017 and complied with the performance criteria detailed in BR135:2013 Annex B.

This classification report shall be read in conjunction with AFE laboratory test report DLR1640 Rev.0, which fully details all aspects of the tested system and test carried out.

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