EFECTIS UK/Ireland Limited
Shore Road - Newtownabbey
Co Antrim - BT 37 0QB
United Kingdom
Tel: +44(0)2890368766
Fax: +44(0)2890 368726

FIRE PERFORMANCE OF EXTERNAL THERMAL INSULATION - CLASSIFICATION REPORT No EUI-18-000081B

1. INTRODUCTION

This classification report defines the classification assigned to Evolution Quadcore Panels fixed to SFS frame system in accordance with the procedures given in BS 8414-2-2015+A1-2017 and BR 135 third edition 2013.

FIRE PERFORMANCE OF EXTERNAL THERMAL INSULATION CLASSIFICATION IN ACCORDANCE WITH BS 8414-2-2015+A1-2017 and BR 135 third edition 2013.

Sponsor:	KINGSPAN Limited
Prepared by:	Efectis UK/Ireland Ltd
System name:	Evolution Quadcore Panels fixed to SFS frame system
Classification report No.:	EUI-18-000081B
Issue number:	1
Date of issue:	7 October 2019

10169

2. DETAILES OF CLASSIFIED SYSTEM

Technical data and drawings concerning the sample and its composition have been supplied by the sponsor who attests their accuracy.

All test materials were supplied and installed by the sponsor. Efectis UK/IRE were not involved in the sample selection process and therefore cannot take any responsibility for the relationship between samples supplied for testing and product placed on the market.

2.1. GENERAL

2.1.1. Substrate

The system, Evolution Quadcore Panels fixed to SFS frame system, is described below.

2.1.2. Description of system

Based on the information provided by the test sponsor, the materials as used on the as-built façade system are given in the following table.

Material	Reference	Composition	Characteristics	Supplier
Steel Formed Sections - studs	Steel Formed Sections – Code: C100050120	gauge steel	100 mm × 50 mm × 1.2 mm thick	Steel Formed Sections
Steel Formed Sections – Head Track	Steel Formed Sections – Code: U104067180	gauge steel	104 mm × 50 mm × 2 mm thick	Steel Formed Sections
Steel Formed Sections –Base Track	Steel Formed Sections – Code: U104055120	gauge steel	104 mm × 50 mm × 1.2 mm thick	Steel Formed Sections
Insulation fitted within the steel frame	Omni Fit SLAB	Glass mineral wool	100 mm thick Reaction to fire: A1	KNAUF
Vapour/Air control barrier	AirGuard	PP with a Ethylene-Butylacrylate Copolymer coating	0.3 mm thickness Reaction to fire: E	DuPont
Tape for sealing joints of membranes	Tyvek Acrylic	made of durable Tyvek HDPE and acrylic adhesive	White colour	DuPont
Plasterboards of non-exposed face (no. 2 layer)	WallBoard	Gypsum board with ivory paper face	2400 mm x 1200 mm x 12.5 mm thick Reaction to fire: A2	GYPROC
Horizontal fire barriers	Siderise RH25G 90/30	Non-combustible stone-wool lamella core, with reinforced aluminium foil face c/w intumescent	75 mm x 135 mm Reaction to fire: A1	Siderise
Brackets fixed on the concrete slabs	KWC14040	Made of galvanised steel	Bracket height 140 mm	KINGSPAN
External façade cladding	Evolution Axis QuadCore	sleek unprofiled insulated panel system	100 mm thickness Face colour: Jet black Coating: Spectrum	Kingspan
Flashings and closures	-	Aluminium	2 mm thickness	-

Screws used for installation of the frame	CFC26 Tek Screws	Stainless Steel	5.5 mm x 25 mm	-
Screws for fixing the frame on the concrete slabs	Multi-Monti-S-7.5x75	Galvanised screw	7.5 mm x 75 mm	-
Screws for fixing plasterboards on the frame	SCS3/25-PH2-4.8-42	-	4.8 mm x 42 mm at 150 mm centres	-
Screws used for cladding the outer panels on the metal frame	SXC5-L12-S16-5.5x115-A4	-	5.5 mm x 115 mm	-
Screws for fixing flashings	SX5/8-S16-5.5x31A4	-	5.5 mm x 31 mm	-
Screws for fixing closure and pod frame of combustion chamber	SX5/18-S16-5.5X41A4	-	5.5 mm x 41 mm	-

2.2. INSTALLATION SEQUENCE

2.2.1. Frame

The steel frame reference SBS (KINGSPAN) was constructed using 'C' section channel stud reference C100050120 (STEEL FORMED SECTIONS). Studs of dimensions 100 mm x 50 mm x 1.2 mm were fixed to the head and the base track at 300 mm and 600 mm centres using screws reference CFC26 Tek Screws of Ø 5.5 mm x 25 mm dimensions. The head track and the base track were made using rails references U104067180 and U104055120 (STEEL FORMED SECTIONS) respectively. Brackets reference KWC14040 were used for fixing the steel frame on the concrete slabs. The fixings used, reference Multi-Monti-S-7.5x75, were of Ø 7.5 mm x 75 mm dimensions. The outer face of the steel frame was finally attached with the face of the concrete slabs. The assembly of the frame was performed according to client's specification.

2.2.1.1. Insulation fitted within the frame

Within the steel stud frame, Knauf Earthwool insulation reference Omni Fit SLAB (KNAUF) of 100 mm thickness was fitted, covering all areas between the stud frames.

2.2.2. Unexposed face of the facade

2.2.2.1. Vapour barrier

A vapour and air control layer reference AirGuard (DuPont) and thickness 0.3 mm was installed on the unexposed face of the frame. All joints and overlaps were covered using a tape reference Tyvek Acrylic tape (DuPont).

2.2.2.2. Plasterboard

Two layers of plasterboards reference WallBoard (GYPROC) dimensions 2400 mm x 1200 mm and thickness 12.5 mm were installed on top of the vapour barrier on the unexposed face of the frame. The plasterboards were fixed to the steel 'C' studs using fixings reference SCS3/25-PH2-4.8-42 of Ø 4.8 mm x 42 mm dimensions evenly spaced at approx. 150 mm centres. The two layers were installed with 600 mm overlaps.

2.2.3. Exposed face of the facade

2.2.3.1. Fire stop barrier

Horizontal open state cavity fire stop barriers were installed on the vapour/air control layer. The fire barriers reference Siderise RH25G 90/30 (Siderise) thickness 75 mm and width 135 mm were compressed by 10 mm by the cladding. They were fixed using specific system brackets.

A set of no. 3 horizontal fire barriers were installed on the entire width of the facade and wing at height of:

2835 mm above the floor level in line with 1st concrete slab
5835 mm above the floor level in line with 2nd concrete slab
8835 mm above the floor level in line with 3rd concrete slab

2.2.3.2. Outer face

Directly on the metal frame, the outer face panels, reference Evolution Axis QuadCore (KINGSPAN) of 100 mm thickness, were fixed using screws reference SXC5-L12-S16-5.5x115-A4 of Ø 5.5 mm x 114 mm dimensions. The screws were inserted at maximum 500 mm centres. The panels were of Spectrum coating and jet black colour.

2.2.3.3. Air gap

No air gap/cavity was resulted on the facade system.

2.2.4. Flashings and closures

The side edges of the façade system were closed with 'L' shape aluminium closure flashing thickness 2 mm. The flashings were secured directly on the metal frame using screws reference SX5/8-S16-5.5x31A4 of Ø 5.5 mm x 31 mm dimensions, running along the full height of both sides. The dimensions of the flashings were 230mm x 50mm.

The top edge of the façade system was closed using an aluminium top cap flashing of 'L' shape with dimensions 230 mm x 75 mm and thickness 2 mm. The top cap flashing was secured on the top part of the metal frame 'L' shape channel and screws reference SX5/8-S16-5.5x31A4 of Ø 5.5 mm x 31 mm dimensions.

In the gap created between the metal frame and the combustion chamber a double layer of plasterboards reference WallBoard (KNAUF) thickness 12.5 mm was extended.

A pre-fabricated galvanised pod frame of thickness 2 mm was fixed onto the metal frame with screws reference SX5/18-S16-5.5X41A4 of Ø 5.5 mm x 41 mm dimensions.

2.2.5. Joints

The outer face cladding panels were installed so that there was a vertical joint central to the combustion chamber running the full height of the system. The vertical joint was closed using a 30 mm width snap insert. The width of the joint was 40 mm.
Horizontal joints of 10 mm width were resulted by the way the panels were clad, with one of them being at 2400 mm above the combustion chamber. All horizontal joints were open.
At each floor level, a movement/expansion joint was managed on the slab edges.

2.3. SYSTEM IDENTIFICATION OF REFERENCED PARTS

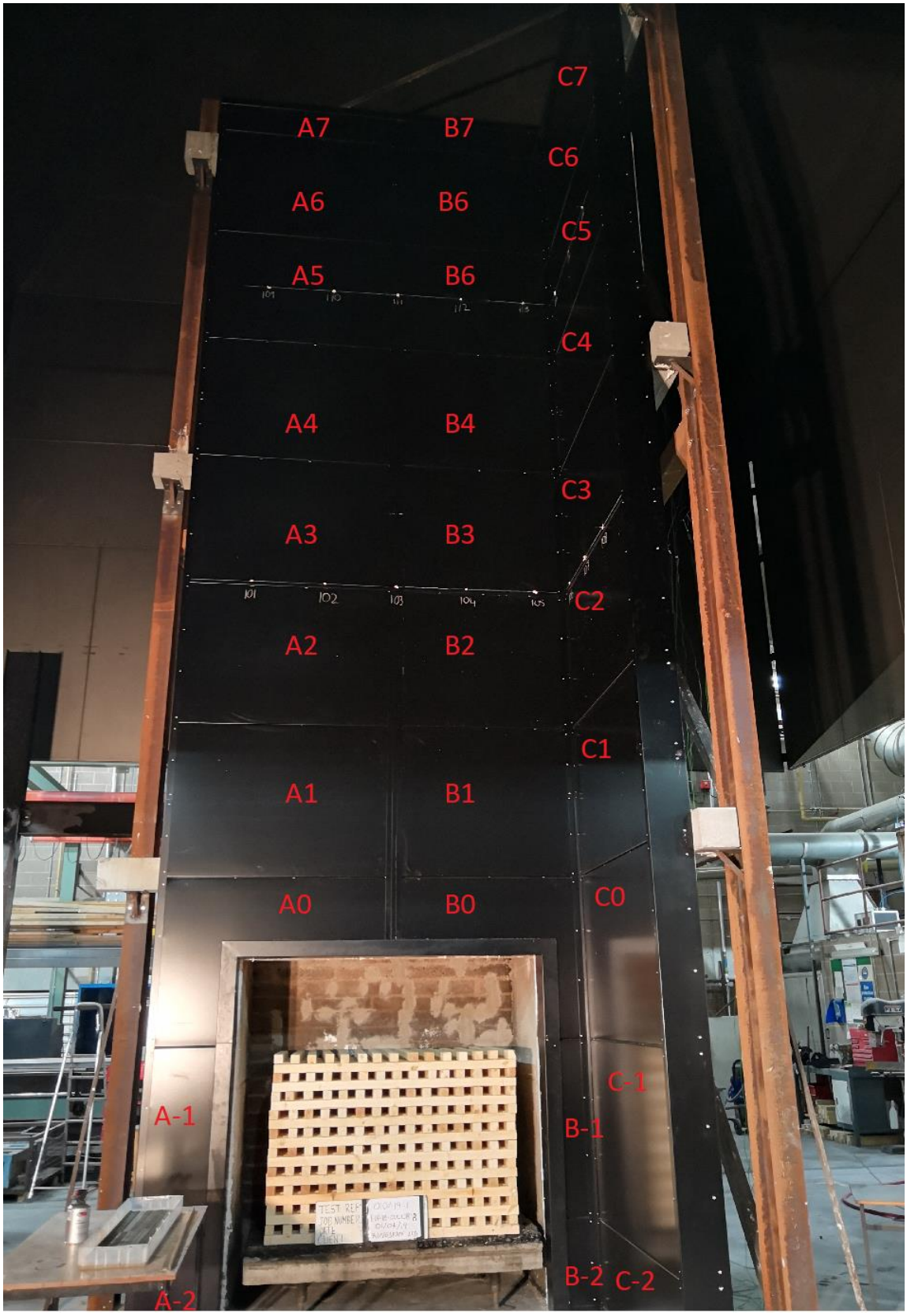

Figure 1. System photo before testing for reference of identified area parts.

3. REPORTS AND RESULTS IN SUPPORT OF THIS CLASSIFICATION

3.1. REPORTS

Name of Laboratory	*Name of sponsor*	*Report ref. no*	*Test method and date*
EFECTIS UK/IRE	KINGSPAN Limited	EUI-18-FF-000081B	BS 8414-2-2015+A1-2017

3.2. RESULTS

3.2.1. Fire spread

Fire-spread start time, t_s = 01:12 min

Test method and test number	*Parameter(s)*	*No. Tests*	*Results*	
			Fire spread test result time, ts (min)	*Compliance with parameters in Annex B of BR135:2013*
BS 8414-2-2015+A1-2017	**External fire spread**	**1**	**> 15 minutes**	**Compliant**
	Internal fire spread (cladding panels layer)		**> 15 minutes**	**Compliant**
	Internal fire spread (insulation within studs layer)		**> 15 minutes**	**Compliant**
	Internal fire spread (plasterboards layer)		**> 15 minutes**	**Compliant**

3.2.2. Mechanical performance

The cladding system has been examined when cooled (within 24 h of the test). Examination compromised external surface and internal layers. In more detail, the performance of the cladding system is described in the following subsections.

3.2.2.1. Outer face Evolution Axis QuadCore cladding

On the main face of the cladding system, panels A6, A7, B6 and B7 remained in place without any major damage. Only some expansion of the vertical joint in between the A and B panels was observed.

Only some minor discolouration was observed on A5 and B5 panels. Expansion of the vertical joint was again observed in that area.

Most damage was observed on panels A0 to A4 and B0 to B4. Centrally above the combustion chamber, facing of the panels was discoloured and delaminated. Reducing levels of damage was observed at greater distance horizontally from the centreline and vertically from the combustion chamber.

The vertical joint running through those panels was expanded and swelling of the panels was also observed. The main face panels were damaged as described more extensively below:

Panels: A0, B0 were 85% delaminated and discoloured, but in-place
Panels: A1, B1 were 80 - 85% delaminated and discoloured, but in-place
Panels: A2, B2 were 45 - 60% delaminated and discoloured, but in-place

Panels: A3, B3 were 35 - 40% delaminated and discoloured, but in-place
Panels: A4, B4 were 15 - 20% delaminated and discoloured, but in-place
Panels: A5, B5 were discoloured
Panels: A6, B6 were intact and in-place
Panels: A7, B7 were intact and in-place

On the wing face, major discolouration and delamination was observed on C-2 to C3. Panels C4 to C7 remained in place without further damage or discolouration.

3.2.2.2. Fire barriers

The bottom horizontal fire barrier placed above the combustion chamber on the main face of façade system, was activated during testing. After the end of the test it was still in place but partially damaged, specifically behind panels A0, A1, B0 and B1. On the wing face, the barrier was intact.

The middle horizontal fire barrier, which was placed in line with the middle concrete slab, was intact and in place after test. Same was the fire barrier on the same height of the wing face of the system. Neither was activated during testing.

The top horizontal fire barrier was intact and in place after test. Same was the fire barrier on the same height of the wing face of the system. Neither was activated during testing.

3.2.2.3. Insulation within the frame

Major damage was observed behind panels A1, A2, B1 and B2, where part of the insulation was completely burned away. Surrounding those areas, insulation was breaking away. Finally, discolouration was observed behind the same panels. All areas are shown in Appendix 4.

3.2.2.4. Vapour barrier

Some part of AirGuard vapour/air control membrane was burned away completely. This area was just above the bottom concrete slab extending upwards, being mainly behind panels A1 and B1.

3.2.2.5. Plasterboards

No major damage was observed to plasterboard layer installed on the supporting metal frame made from C studs. Paper layer was burned away on an area on the centreline above the combustion chamber as is shown in Appendix 4 photos.

3.2.2.6. Frame

No major damage was observed on the metal frame of the façade system. Only discolouration amd heat damage on the studs of the centreline up to 2nd fire barrier stop level.

4. CLASSIFICATION AND FIELD OF APPLICATION

4.1. REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with BS 8414-2-2015+A1-2017 and BR 135 third edition 2013.

4.2. CLASSIFICATION

The element, Evolution Quadcore Panels fixed to SFS frame system, described in this classification report and in the test report referenced in section 3.1 has been tested and met the performance criteria set in Annex B of BR135:2013.

4.3. FIELD OF APPLICATION

This classification is valid only for the system as installed and detailed in this classification report and in the test report referenced in section 3.1.

5. LIMITATIONS

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

The classification applies only to the system as tested and detailed in the classification report. The classification report can only cover the details of the system as tested and should always be read in conjunction with the test report referenced in section 3.1.

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.

WRITTEN BY:

CHOTZOGLOU Konstantinos
Project Leader

APPROVED BY:

FLAMMIER Damien
Lab Manager