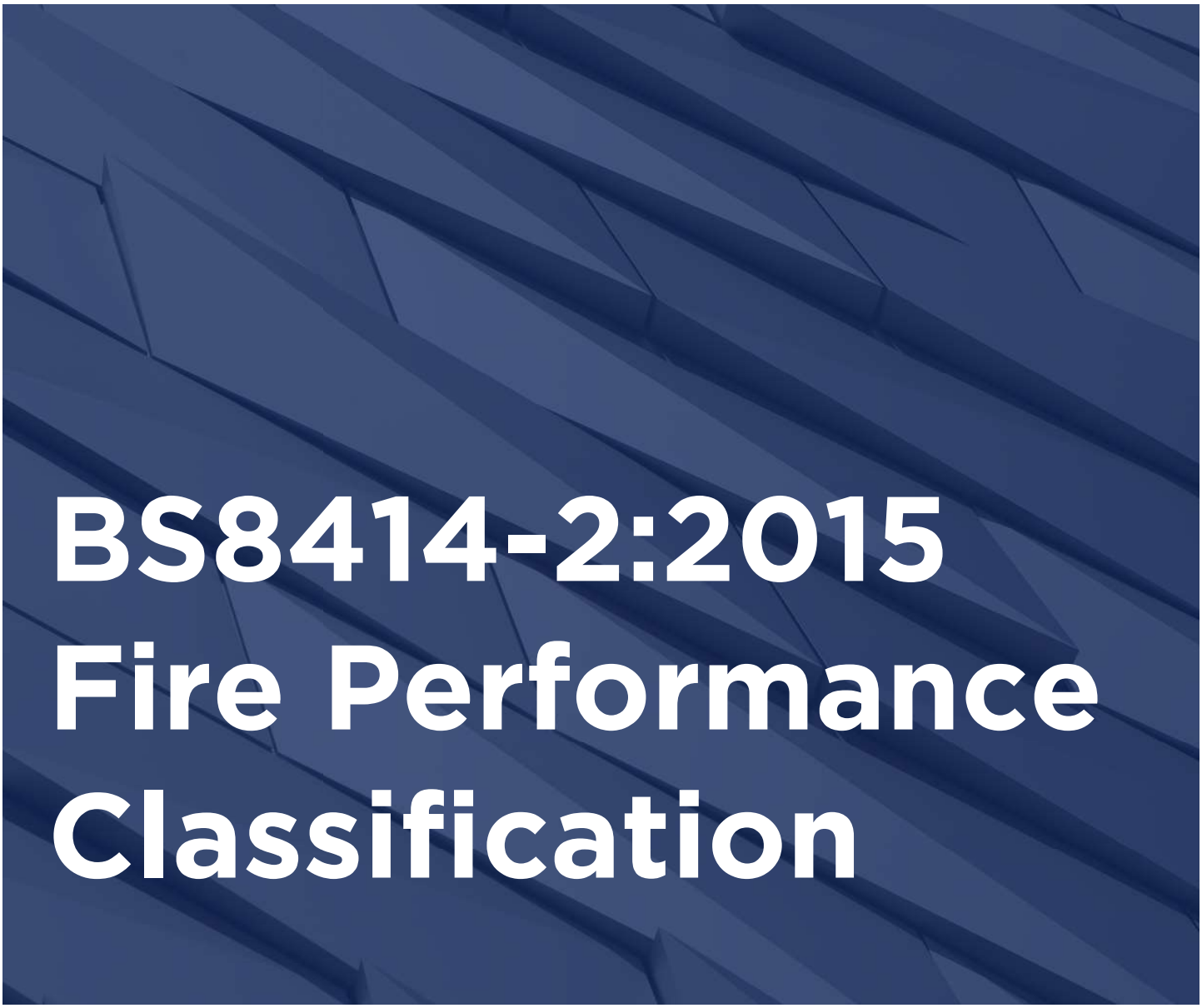
SF40-FR

Shadow Fixed 40mm Fire Rated Rainscreen System



BS8414-2:2015 Fire Performance Classification

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FIRE PERFORMANCE OF EXTERNAL THERMAL INSULATION - CLASSIFICATION REPORT No EUI-18-000094

1. INTRODUCTION

This classification report defines the classification assigned to SF40 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:	EDM SPANWALL FACADES Limited
Prepared by:	Efectis UK/Ireland Ltd
System name:	SF40
Classification report No.:	EUI-18-000094
Issue number:	1
Date of issue:	7 May 2019

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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, SF40, 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	C-shaped folded vertical studs	Galvanised steel	153 mm × 55 mm × 10 mm of thickness 1.5 mm	SPANWALL
Steel Formed Sections – Head and Base Track	U-shape folded horizontal sections	Galvanised steel	158 mm × 75 mm of thickness 1.5 mm	SPANWALL
Sheathing Board	Y-Wall	Calcium Silicate Board	2400 mm x 1200 mm x 12 mm thick Reaction to fire: A1	RCM
Vapour/Air control membrane	Procheck FR200	Fire retardant layer	0.15 mm thickness Reaction to fire: B-s1,d0 Colour: Black	Proctor Group
Helping hand brackets	Angle Helping Hand brackets	Aluminium	76 mm x 165 mm x 3 mm (thickness)	-
Horizontal fire barriers (no.4)	Siderise RH50G 30/30	Non-combustible stone-wool lamella core, with reinforced aluminium foil face	75 mm x 181.7 mm Reaction to fire: A1	Siderise
Vertical fire barriers (no.3)	Siderise RV 90/30	Non-combustible stone-wool lamella core, with reinforced aluminium foil face	75 mm x 241.7 mm Reaction to fire: A1	Siderise
Brackets for fixing horizontal fire barriers	RS350	Galvanised	400 mm centres	Siderise
Brackets for fixing vertical fire barriers	B195	Galvanised	400 mm centres	Siderise
Tape for sealing fire barrier joints	RFT 120/45	Foil tape	120 mm width	Siderise
Insulation of exposed face (no. 2 layer)	Rockwool Rainscreen Duo Slab	Soft and rigid stone mineral wool slab	110 mm and 70 mm thickness Reaction to fire: A1	Rockwool Ltd
Rails	Angles	Aluminium	75 mm x 75 mm	-
External façade cladding	Cassette-shaped flat sheets	3103 Aluminium grade	3 mm thickness flat sheets folded in appropriate size	SPANWALL

Paint finish coating of cladding panels	AE30017002123 RAL 7016 ANTHRACITE GREY	Polyester powder	Film thickness: 70+/- 10µm Reaction to fire: A2	AXALTA Coating Systems
Screws used for installation of the frame	DF3 low profile pancake head self-drilling screws	-	5.5 mm x 50 mm	-
Screws for fixing the frame on the concrete slabs	Tapcon hex head concrete screws H6.3 x 32	-	6.3 mm x 32 mm	-
Screws for fixing sheathing boards on the frame	Wing tip screws	-	4.8 mm x 38 mm	RCM
Screws for fixing the hand brackets and rails on the frame	DF3 hex self-drilling screws	-	5.5 mm x 50 mm	-
Screws used for cladding the cassettes on the rail system	DF3 low profile pancake head self-drilling screws	-	5.5 mm x 50 mm	-
Screws for fixing closures	DF3 low profile pancake head self-drilling screws	-	5.5 mm x 50 mm	-

2.1.3. Installation sequence

2.1.3.1. Frame

The steel frame was constructed using galvanised steel sections of 1.5 mm thickness folded to 'C' section channels of appropriate size forming the vertical and horizontal sections. The vertical studs reference C-shaped folded vertical studs (SPANWALL) were folded resulting dimensions 153 mm x 55 mm x 10 mm. The vertical stud sections were fixed to the head and the base track channels of 'U' type horizontal sections at 300 mm and 600 mm centres using screws reference DF3 low profile pancake head self-drilling screws of Ø 5.5 mm x 50 mm dimensions. The head track and the base track reference U-shape folded horizontal sections (SPANWALL) were made by folding the same galvanised steel sections into resulted dimensions 158 mm x 75 mm. The steel frame was fixed using fixings reference Tapcon hex head concrete screws H6.3 x 32 of Ø 6.3 mm x 32 mm dimensions to the concrete slabs of the testing rig.

2.1.3.2. Exposed face of the facade

2.1.3.2.1. Sheathing boards

One layer of sheathing boards reference Y-wall (RCM) of dimensions 2400 mm x 1200 mm and thickness 12 mm were clad on the exposed face of the frame using fixings reference Wing tip screws (RCM) of Ø 4.8 mm x 38 mm dimensions. Screws were evenly spaced and fixed at 300 mm centres.

2.1.3.2.2. Air/vapour tight membrane

An underlay air/vapour tight membrane reference Procheck FR200 (Proctor Group) of thickness 0.15 mm was installed on top of the sheathing board layer. The membrane was fixed on the sheathing board layer using screws reference DF3 low profile pancake head self-drilling screws of Ø 5.5 mm x 50 mm dimensions, at 600 mm centres.

2.1.3.2.3. Helping hand brackets

Helping hand brackets reference Angle Helping Hand brackets of dimensions 76 mm x 165 mm x 3 mm (thickness) were installed on top of the sheathing board layer using screws reference DF3 Hex self-drilling screw of Ø 5.5 mm x 50 mm dimensions. On the main face the horizontal spacing between the brackets was

1061 mm and the vertical spacing was 600 mm. Same vertical spacing was used on the wing face, with all brackets installed 456.2 mm apart horizontally from the exposed finished corner of the sheathing board layer.

2.1.3.2.4. Insulation

Insulation combining two layers of Rockwool insulation, reference Rockwool Rainscreen Duo Slab (Rockwool Ltd) was fixed on the sheathing board layer. The 1st layer which was attached to the air/vapour membrane was of thickness 110 mm and the 2nd layer attached to this was of 70 mm thickness, giving in total 180 mm thickness of insulation. The installation of the slabs on the two faces of the cladding was performed according to manufacturer's recommendations. Two different fixings were used for securing the slabs on their position per manufacturer's recommendation; combining either metal or polypropylene washers with screws reference Evo insulation screws self-drilling of Ø 4.8 mm x 220 mm dimensions. Three fixings were installed for every square meter of insulation.

2.1.3.2.5. Fire stop barrier

In parallel with insulation, horizontal and vertical fire stop barriers were installed on the membrane.

The fire barriers reference Siderise RH50G 30/30 (Siderise) thickness 75 mm and width 181.7 mm were installed on galvanised brackets reference RS350 (Siderise). The brackets were fixed on the sheathing board layer using screws reference DF3 Hex self-drilling screw of Ø 5.5 mm x 50 mm dimensions.

A set of no. 4 horizontal fire barriers were installed on the entire width of the facade and it's wing at height of:

2047.5 mm above the floor level
4377.5mm above the floor level
6707.5 mm above the floor level
8407 mm above the floor level

A set of no. 3 vertical fire barriers reference Siderise RV 90/30 (Siderise) of thickness 75 mm and width 241.7 mm were installed also on the sheathing board layer using galvanised brackets reference B195 (Siderise). The brackets were fixed on the sheathing board layer using screws reference DF3 Hex self-drilling screw of Ø 5.5 mm x 50 mm dimensions. Two of the fire barriers were placed next to combustion chamber opening vertical sides and the third one on the wing face of the façade system (1358.5 mm to C/L from the angle).

All joints between the cavity barriers were sealed using Siderise foil tape reference RFT 120/45 (Siderise).

2.1.3.2.6. Rail system

For supporting the outer face cassette cladding panels, aluminium angles of 75 mm x 75 mm x 3 mm dimensions were inserted on the helping hand brackets, running vertically along the full height of the system.

2.1.3.2.7. Outer face

The outer face cassette cladding panels, reference cassette-shaped flat sheets (SPANWALL) were made by folding 3 mm thick 3103 grade aluminium flat sheets into cassette profiles. Those cassette profiles were clad on the aluminium angles using screws reference DF3 low profile pancake head self-drilling screws of Ø 5.5 mm x 50 mm dimensions. The cassette profiles were finished with anthracite grey colour polyester powder coating reference AE30017002123 RAL 7016 ANTHRACITE GREY (AXALTA Coating Systems) as specified by the manufacturer. The sides of the façade were closed, as the cassette panels clad on the sides of the façade and fixed directly on the frame using screws reference DF3 low profile pancake head self-drilling screws of Ø 5.5 mm x 50 mm dimensions. Same installation was made on the top side of the specimen.

2.1.3.2.8. Air gap

An air gap layer of 51.7 mm was managed between the insulation and the outer face panels.
The air gap was blocked where the vertical fire barriers were installed.

2.1.3.3. Joints

The cassette panels were installed so that there was a vertical joint central to the combustion chamber running the full height of the system. The width of the joint was 20 mm.
Horizontal joints of 20 mm width were resulted by the way the cassettes were clad, with one of them being at 2400 mm above the combustion chamber.

2.2. SYSTEM IDENTIFICATION OF REFERENCED PARTS

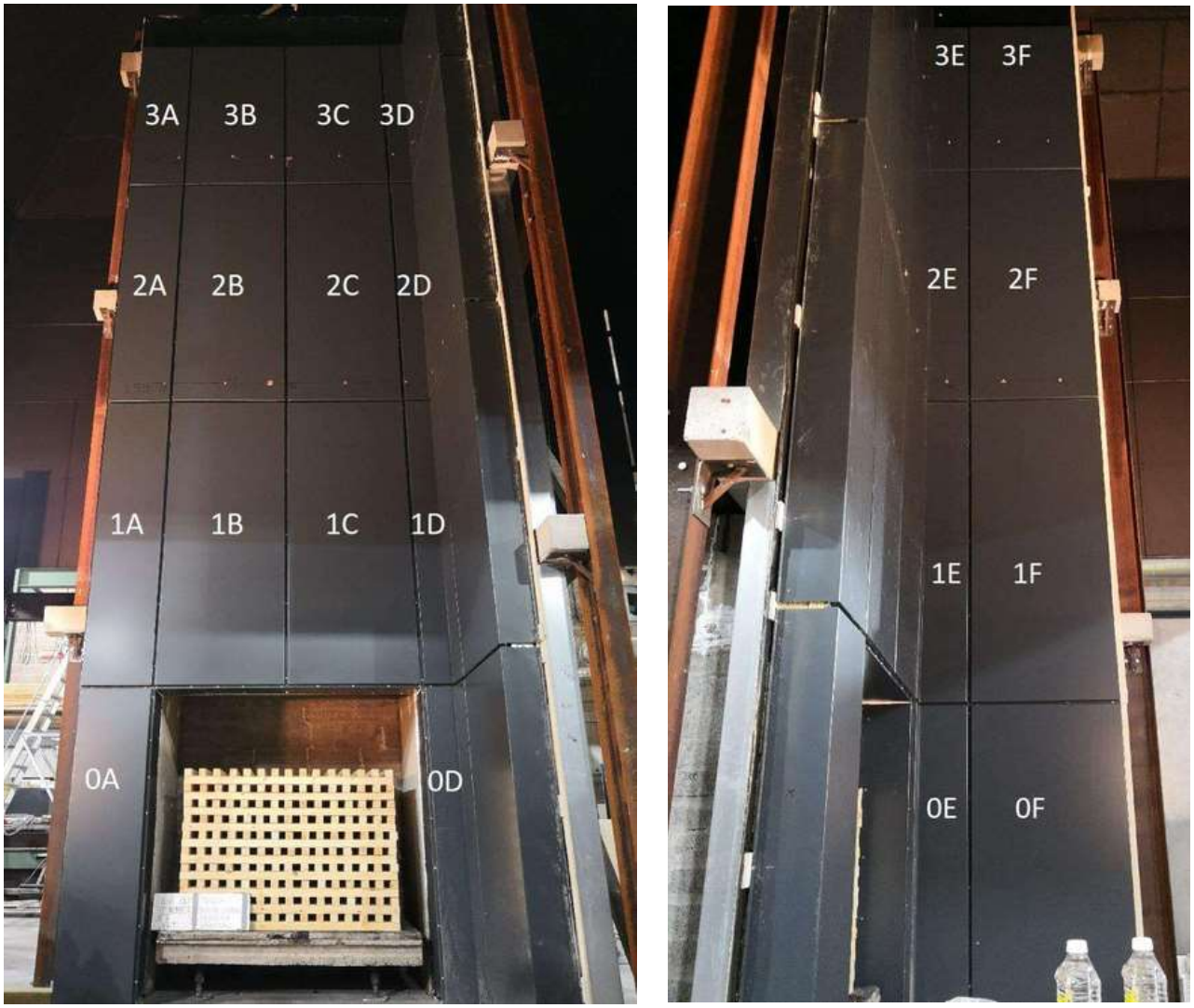


Figure 1. System photos (Main face on the left - Wing face on the right) before testing for reference of identified area parts.

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	EDM SPANWALL FACADES Limited	EUI-18-FF-000094	BS 8414-2-2015+A1-2017

3.2. RESULTS

3.2.1. Fire spread

Fire-spread start time, t_s = 01:24 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 EUI-18-FF-000094	**External fire spread**	**1**	**> 15 minutes**	**Compliant**
	Internal fire spread (cavity layer)		**> 15 minutes**	**Compliant**
	Internal fire spread (Rockwool Rainscreen insulation layer)		**> 15 minutes**	**Compliant**
	Internal fire spread (sheathing board 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. Cassette-shaped flat sheet cladding panels

On the main face of the cladding system, cassette panels 0A, 0D, 1A, 1D, 2A, 2D, 3A, 3B, 3C and 3D remained on their place without any major damage. Minor discolouration was observed on 0A, 0D and 2D panels. Major discolouration was observed on panels 1B, 1C, 1D, 2B and 2C.
Major damage was observed on the panels extending on the centreline above the combustion chamber; 1B, 1C, 2B and 2C. Significant surface area of those panels was melted and the panels were severely damaged as described more extensively below:

Panels: 0A, 0D, 2D minor discoloration
Panels: 1A, 1D major discoloration
Panels: 1B, 1C were 65-70% destroyed and major discoloration observed on what was left
Panels: 2B, 2C were 5% destroyed and major discoloration was observed on 20% of the remaining surface
Panels: 2A, 3A, 3B, 3C and 3D remained in place without damage

On the wing face, major discolouration was observed on panels 0E, 0F, 1E and 1F. No major damage was observed on those panels, only some expansion of the joint between the 0E and 0F panels. Panels 2E, 2F, 3E and 3F remained in place after the end of the test without any damage or discolouration.

3.2.2.2. Helping hand Brackets and Railing system

The helping hand brackets of the main face, supporting the insulation and the vertical aluminium angle rails, were melted on the centreline above the combustion chamber up to the height of the 2nd fire barrier. Rest were intact and in place after removing the cassette panels. On the wing face all brackets were in place.

Regarding the aluminium angle rails supporting the cassette panels, the rail extending vertically above the combustion chamber up to the 2nd horizontal fire barrier was melted. Rest rails were in place after removing the cassette panel and only discolouration was observed on them. On the wing face, all rails were in place with major discolouration on those up to level of the 3rd horizontal fire barrier.

3.2.2.3. Rockwool Rainscreen Duo Slab insulation

On the main face, the Rockwool Rainscreen Duo slab insulation was mainly in place. Above the combustion chamber, contained between the centreline of the combustion chamber and the right hand side vertical fire barrier and up to approx. 600 mm height, part of the 70 mm thickness layer was fallen down during test.
Major discolouration was observed on the area contained between the two vertical fire barriers and extending from the 2nd horizontal fire barrier towards the top of the system.

On the wing face, some discolouration was observed along the vertical aluminium rail installed, extending approx. 300 mm apart horizontally. All slabs remained in place after testing.

3.2.2.4. Fire barriers

All the parts of the horizontal fire barriers which were contained within the bounds of the vertical cavity barriers running across the combustion chamber vertical edges were activated. Those parts of all horizontal fire barriers were all severely damaged, but all remained in place except a part of the bottom fire barrier of approx. width of 190 mm off the centreline of the combustion chamber opening had fallen down.

All parts of the fire barriers installed within the bounds of the left-hand side vertical fire barrier running across the left side ending of the main face were not activated during testing. Same observation was made only for the part of the top horizontal fire barrier running across the right hand side vertical fire barrier and the finished corner of the system. The same parts of the rest horizontal fire barriers were activated and damaged.

On the wing face, the bottom two horizontal fire barriers were activated and severely damaged. The third horizontal fire barrier was activated along half width close to the finished corner. The rest was not activated during testing. Finally, the top fire barrier was not activated during testing and remained intact.

On the vertical fire barriers of the main face mainly discolouration was observed up to the level of the third horizontal fire barrier. Above this level they were intact and in place. There were some parts fallen down close to the first horizontal fire barrier but mainly they remained intact. The vertical fire barrier of the wing face was remained intact and without any sign of discolouration on.

3.2.2.5. Vapour/air membrane layer

The vapour/air membrane was in place without any damage after removing the insulation.

3.2.2.6. Sheathing board layer

All boards were intact and no damage was observed. Only some minor discolouration observed vertically above the right -hand side of the opening running up to almost 4000 mm height above the combustion chamber.

3.2.2.7. Frame

No damage was observed on the metal frame of the façade system.

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, SF40, 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.

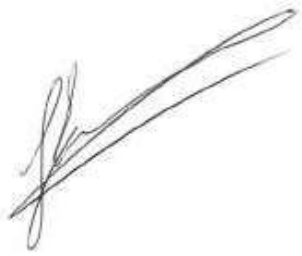
The classification applies only to the system as tested and detailed in the classification report. The classification report can only cover the details of the system as tested.

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:

CHOTZOGLOU Konstantinos
Project Leader

APPROVED:



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