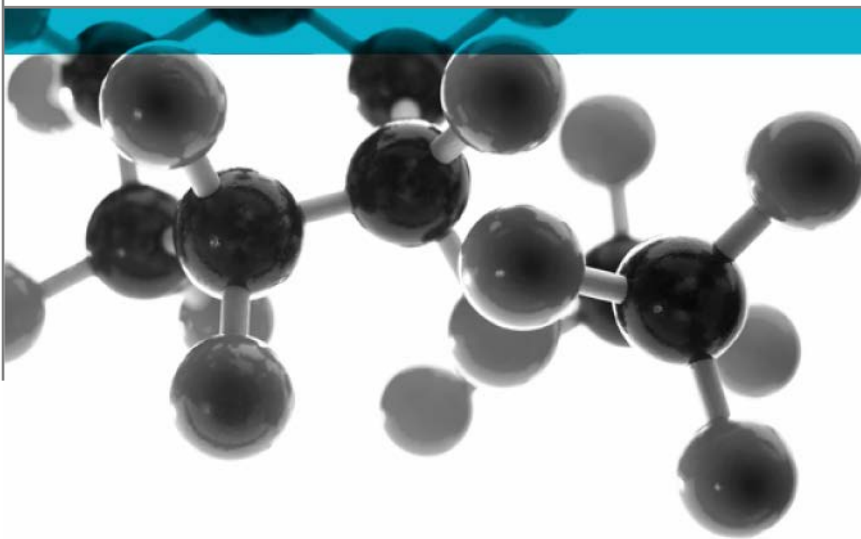


Exova Warringtonfire
Holmesfield Road
Warrington
WA1 2DS
United Kingdom

T : +44 (0) 1925 655116
F : +44 (0) 1925 655419
E : warrington@exova.com
W: www.exova.com



BS EN 13823:2010+A1:2014



**Reaction to Fire Tests for Building Products -
Building Products Excluding Floorings Exposed to
the Thermal Attack by a Single Burning Item**

A Report To: Euro Panel Products Pvt. Ltd.

Document Reference: 364260

Date: 13th June 2016

Issue No.: 2

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the fire performance of the following product when tested in accordance with BS EN 13823:2010+A1:2014.

Generic Description	Product reference	Thickness	Weight per unit area / density / specific gravity
Polyvinyl diene fluoride (PVDF) coated mineral filled flame retardant grade aluminium composite panel	"Eurobond FR Class B1"	4.0±0.2mm	7.6kg/m ² ±5%
Individual components used to manufacture composite:			
Coating (test face)	"PVDF"	2 x 25±3microns	Unwilling to provide
Aluminium	"Aluminium Coil"	0.50±0.02mm	2.71g/cm ³
Adhesive	"Adhesive Film"	Unwilling to provide	Not stated
Core	"Mineral Filled Non-Combustible/Fire Retardant Core"	3.00±0.02mm	1.3 - 1.4g/cm ³
Please see pages 5 & 6 of this test report for the full description of the product tested			

Test Sponsor Euro Panel Products Pvt. Ltd., 702, Aravali Business Centre, Ramdas Sutrale Marg, Borivali (West), Mumbai – 400092, Maharashtra, India.

Test Results (average) :

FIGRA (w/s)		THR 600s (MJ)	SMOGRA (m ² /s ²)	TSP 600s (m ²)
(0.2MJ)	(0.4MJ)	0.92	Recalculated	Recalculated
3.10	3.10		1.37	31.45


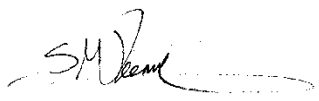
Lateral Flame Spread to End of Specimen? **None**
 Fall of Flaming Drop/Particle? **None**
 Flaming of Fallen Particle Exceeding 10s? **None**

Date of Test: 19th & 20th May 2016

Reason for revision

This document replaces Issue 1 (dated 27th May 2016) of the same number which has been withdrawn. The sponsor has requested additional photographs to be included in the report.

Signatories

	
Responsible Officer K. Hughes * Technical Officer	Authorised S. Deeming* Business Unit Head

* For and on behalf of **Exova Warringtonfire**.

Report Issued: 13th June 2016

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Test Details

Purpose of test	To provide data which, in conjunction with data from other test methods, will enable building products excluding floorings, to be classified in accordance with the Classification requirements specified in BS EN 13501-1:2007+A1:2009. The test was performed in accordance with the procedure specified in BS EN 13823:2010+A1:2014 and this report should be read in conjunction with that standard.
Scope of test	To determine the reaction-to-fire performance of construction products, excluding floorings and excluding products which are indicated in the EC Decision 2000/147/EC, when exposed to thermal attack by a single burning item (SBI) utilising the test procedures defined in BS EN 13823:2010+A1:2014.
Fire test study group/EGOLF	Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.
Instruction to test	The test was conducted on the 19 th & 20 th May 2016 at the request of Euro Panel Products Pvt. Ltd., the sponsor of the test.
Provision of test specimens	The specimens were supplied by the sponsor of the test. Exova Warringtonfire was not involved in any selection or sampling procedure.
Conditioning of specimens	The specimens were received on the 22 nd April 2016 and were conditioned to constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and a relative humidity of $50 \pm 5\%$ prior to testing.
Intended application	External wall cladding.
Test facility	The Single Burning Item (SBI) test facility at Exova Warringtonfire is constructed in accordance with the specifications detailed in BS EN 13823:2010+A1:2014.
Deviations from the test standard	None.
Exposed face	The coated face of the specimens was exposed to the heating conditions of the test when the specimens were mounted in the test position.

Description of Test Specimens

Test specimens The description of the specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

The test specimen comprised two walls (or wings) mounted into an aperture in a specimen trolley such that they formed a vertical 90° corner. The dimensions of the walls were as follows:

Short wall	-	495 ± 5 mm long x 1500 ± 5 mm high
Long wall	-	1000 ± 5 mm long x 1500 ± 5 mm high

Each wall (or wing) consisted of the following product:

General description		Polyvinyl diene fluoride (PVDF) coated mineral filled flame retardant grade aluminium composite panel
Product reference		"Eurobond FR Class B1"
Name of manufacturer		See Note 1 below
Thickness		4.0±0.2mm (stated by sponsor) 4.0mm (determined by Exova Warringtonfire)
Weight per unit area		7.6kg/m ² ±5% (stated by sponsor) 7.02kg/m ² (determined by Exova Warringtonfire)
Product configuration		<ul style="list-style-type: none"> • Coating (test face) • Aluminium • Adhesive • Core • Adhesive • Aluminium
Coating (Test face)	Generic type	PVDF
	Product reference	"PVDF"
	Name of manufacturer	See Note 1 below
	Colour reference	"ER 908 Milky White"
	Number of coats	Two
	Application thickness per coat	25±3microns
	Specific gravity	See Note 1 below
	Application method	Thermo – cured coil coating
	Curing process per coat	See Note 1 below
	Flame retardant details	See Note 2 Below
Aluminium	Generic type	Aluminium
	Product reference	"Aluminium Coil"
	Name of manufacturer	See Note 1 below
	Thickness	0.50±0.02mm
	Density	2.71g/cm ³
	Colour reference	See Note 1 below
	Flame retardant details	The component is inherently flame retardant

Continued on next page

Adhesive	Generic type	Polyethylene
	Product reference	"Adhesive Film"
	Name of manufacturer	Dupont
	Application thickness	See Note 1 below
	Application method	Lamination
	Flame retardant details	See Note 2 below
	Curing process	See Note 1 below
Core	Generic type	See Note 1 below
	Product reference	"Mineral Filled Non-Combustible/Fire Retardant Core"
	Detailed description	See Note 1 below
	Name of manufacturer	See Note 1 below
	Thickness	3.00±0.02mm
	Density	1.3 - 1.4g/cm ³
	Colour reference	"White"
Flame retardant details	See Note 1 below	
Mounting and fixing details		An 80mm ventilated cavity was situated between the reverse face of the specimens and the calcium silicate backing board (as defined in EN 13238: 2010).
Brief description of manufacturing process		Extrusion lamination

Note 1: The sponsor was unwilling to provide this information.

Note 2: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of the component.

The specimen walls (or wings) were placed in the trolley in accordance with the requirements of section 5.3 of the Standard.

Photographs of the installed product are appended as Plates 1 and 2 in Appendix 1 of this report.

Each wing was retained in the trolley using mechanical clamps which pushed the wing against a lip at the top and bottom of the aperture in the trolley.

The trolley incorporated a triangular propane sand burner of side length 250mm, which was positioned in the base of the corner formed by the two wings of the test specimen, with a horizontal separation of 40mm between the edge of the burner and the lower edges of the wings. The burner is referred to as the primary burner and has an output of 30kW. A secondary propane sand burner was attached to the fixed frame, beneath the hood but at the furthest possible distance from the specimen when the trolley was in place. The purpose of this burner is to obtain base line data without affecting the assembled specimen. The trolley incorporated a grill in its base and this was the sole source of ventilation for the test enclosure whilst the test was in progress.

Test Results

Results and observations

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimens of the product in the form in which they were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens which were tested.

A total of three specimens were tested. The results obtained, relevant to the 'Euroclassification' of Building Products are given in Table 1.

Observations made during the test and comments on any difficulties encountered during the test are given in Table 2.

Table 1

Parameter	Result			
	Specimen 1	Specimen 2	Specimen 3	Mean
FIGRA (W/s) (<i>THR(t) threshold of 0.2MJ</i>)	0.00	4.94	4.36	3.10
FIGRA (W/S) (<i>THR(t) threshold of 0.4MJ</i>)	0.00	4.94	4.36	3.10
THR 600s (MJ)	0.63	1.10	1.02	0.92
SMOGRA (m ² /s ²) (Recalculated results)	0.00	0.00	4.10	1.37
TSP 600s (m ²) (Recalculated results)	19.85	33.58	40.93	31.45
Lateral Flame Spread to End of Specimen?	None	None	None	-
Fall of Flaming Drop/Particle?	None	None	None	-
Flaming of Fallen Particle Exceeding 10s?	None	None	None	-

Curves of time averaged rate of heat release contribution of the specimen (HRRav(t)), cumulative heat release (THR(t)), and Fire Growth Rate (FIGRA) are appended as Figures 1 to 3. Curves of time averaged rate of smoke production (SPRav(t)), cumulative smoke production (TSP(t)) and smoke growth rate (SMOGRA) are appended as Figures 4 to 6 in appendix 2 of this report.

Interpretation of the test results given above in the context of Euroclassification of building products should be carried out using BS EN 13501-1:2007+A1:2009.

Table 2

Time		Observations during test of Specimen 1
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred
06	47	The coatings on the surface of the product began to crack and delaminate
26	00	End of test conditions. All flaming ceased at 26:15

Time		Observations during test of Specimen 2
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred
06	43	The coatings on the surface of the product began to crack and delaminate
26	00	End of test conditions. All flaming ceased at 26:12

Time		Observations during test of Specimen 3
min	Sec	
00	00	Pre-checks performed on analysers
02	00	Auxiliary burner switched on to check correct burner operating conditions
05	00	Gas flow switched from auxiliary burner to main burner & test flames impinge on specimen
05	06	Discolouration of the surface of the product occurred
06	36	The coatings on the surface of the product began to crack and delaminate
26	00	End of test conditions. All flaming ceased at 26:15

Note: Impingement of the burner flame onto all three specimens commenced at 5 minutes.

Validity

The specification and interpretation of fire test methods is 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 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 to ensure that they are consistent with current practices, and if required may endorse the test report.

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Appendix 1

Photographs

Plate 1: Total view of the exposed surface of the long wing.



Plate 2: Close up view of the vertical outer edge of the long wing at a height of 500mm



Appendix 2

Graphs

Figure 1. $HRR_{av}(t)$ (kW)

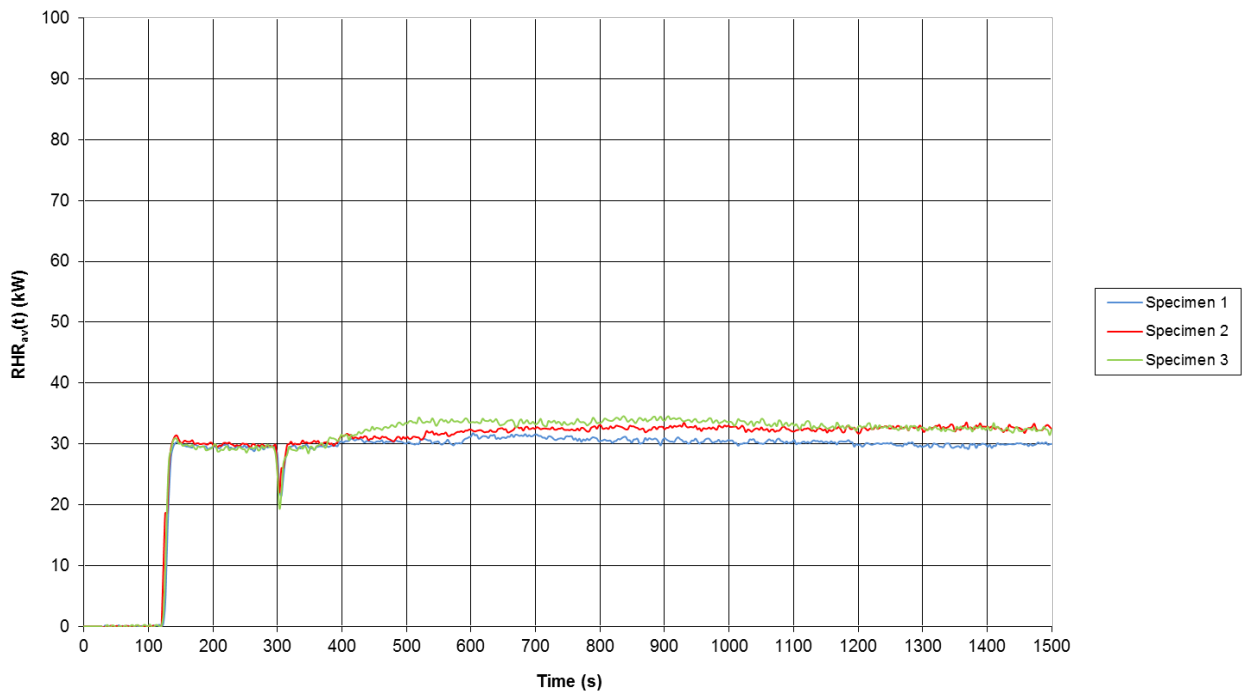


Figure 2. $THR(t)$ (MJ)

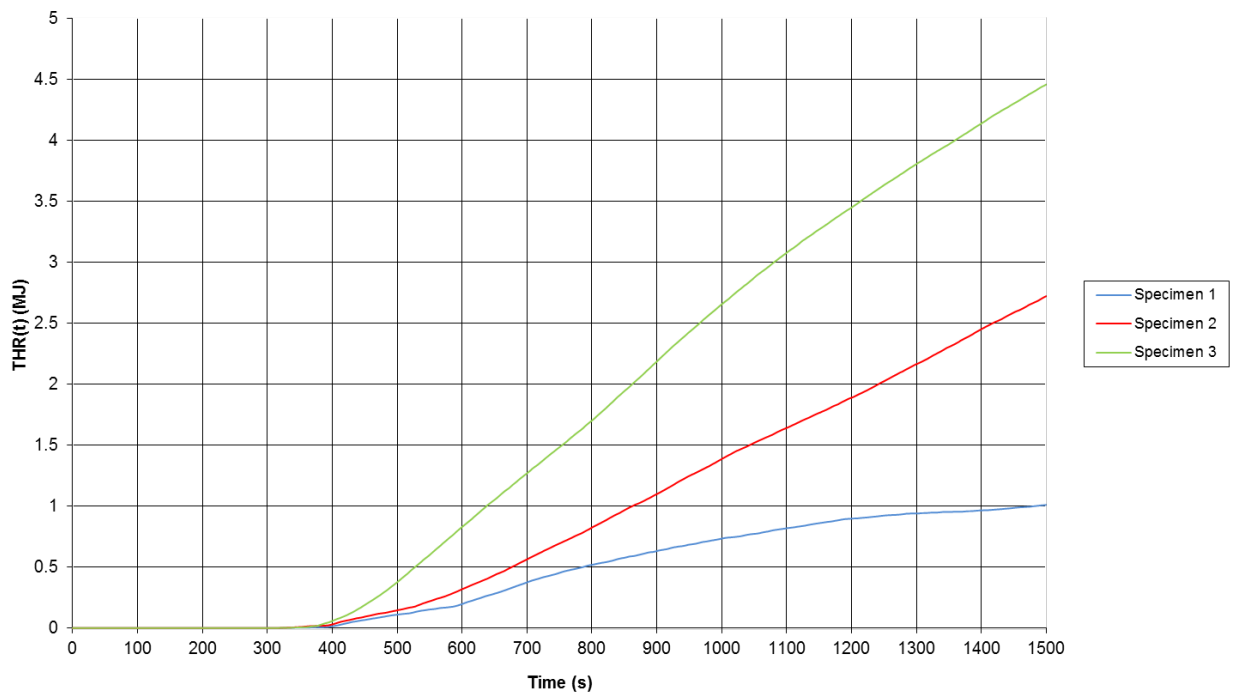


Figure 3. FIGRA

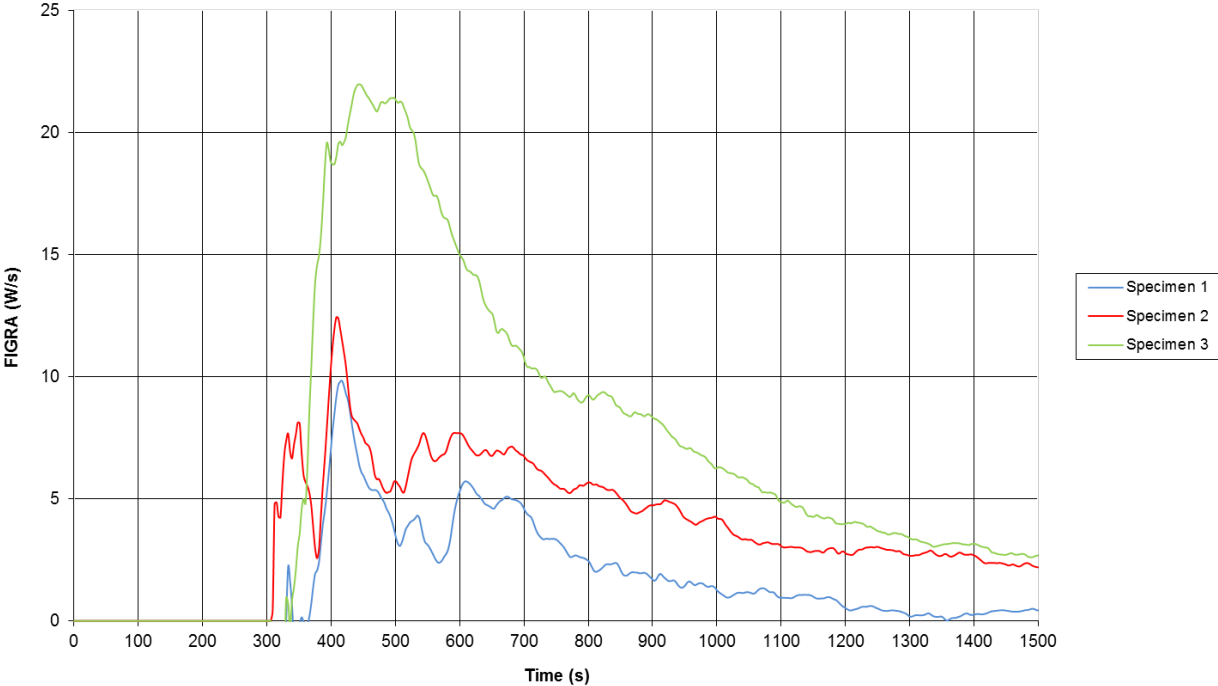


Figure 4. $SPR_{av}(t)$ (m^2/s)

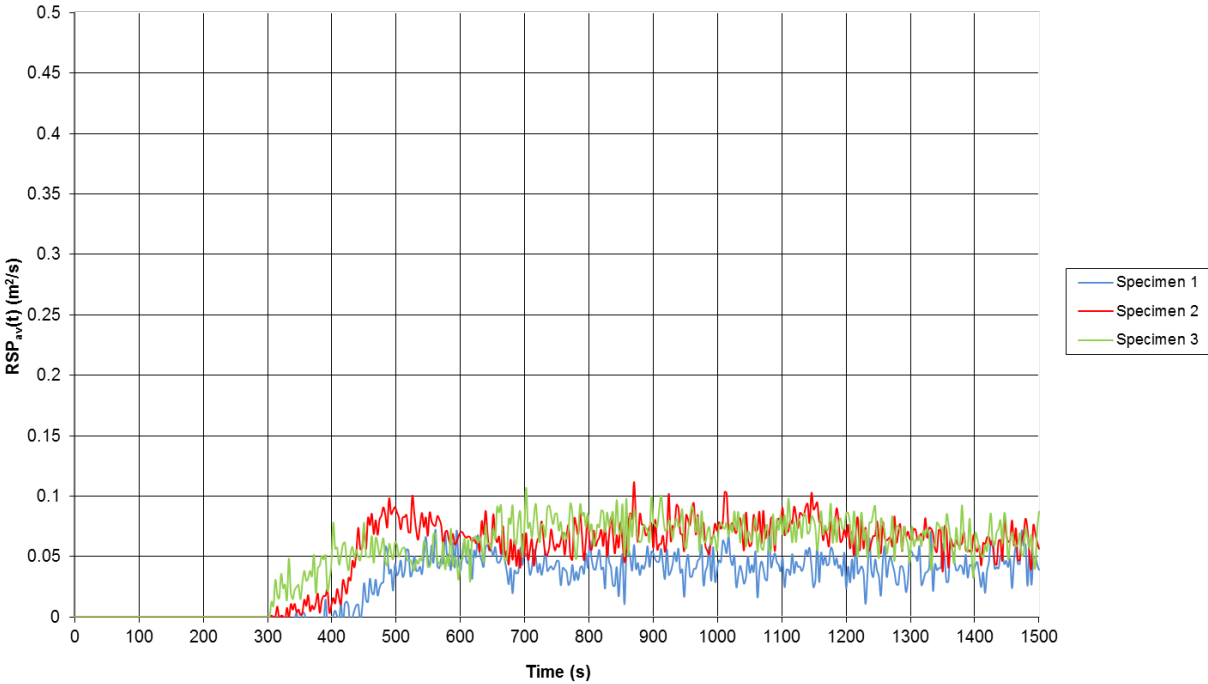


Figure 5. TSP(t) (m²)

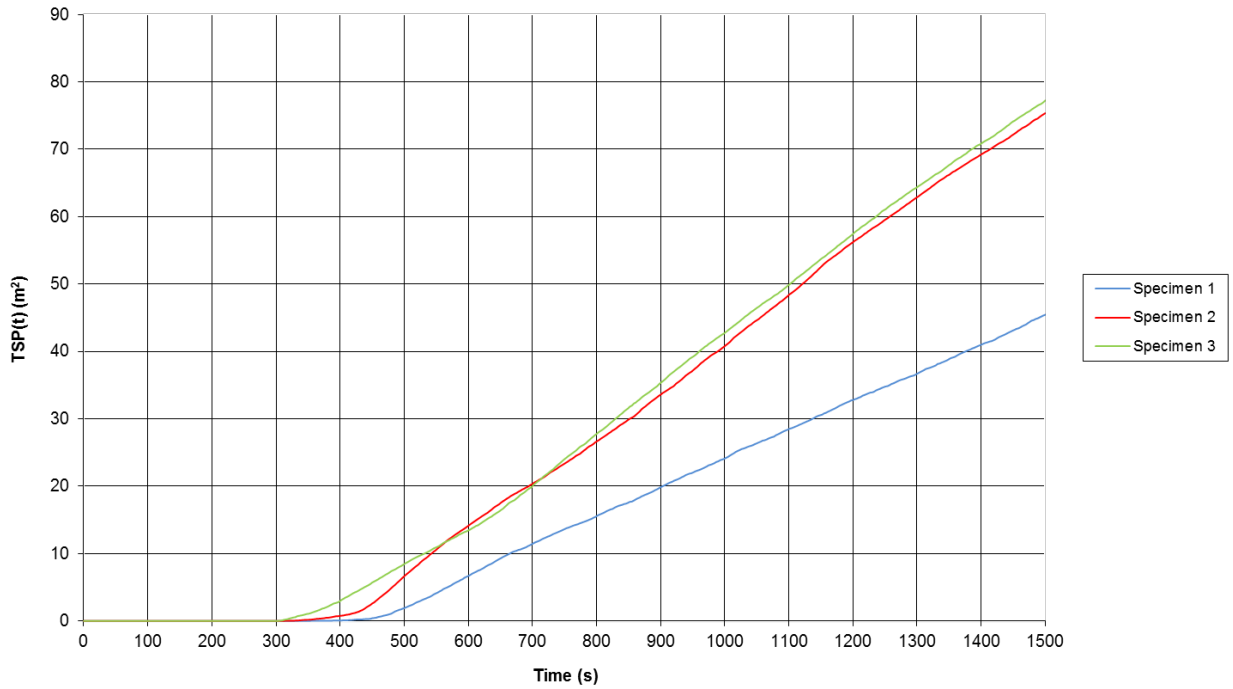
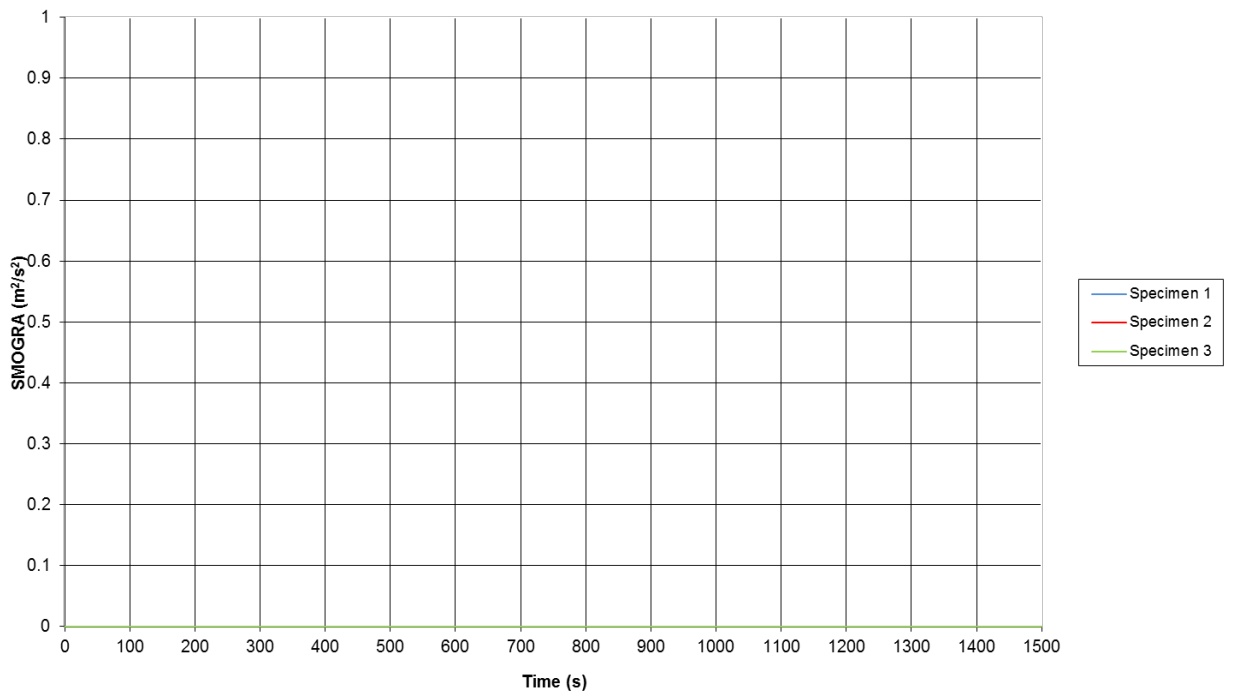


Figure 6. SMOGRA Graph.



Appendix 3

Additional photographs

Plate 3: View of the long wing with protective film



Plate 4: Total view of the exposed surfaces prior to the test



Plate 5: Front view of the exposed surfaces during test



Plate 6: Side view of the exposed surfaces during test



Revision History

Issue No : 1	Re-issue Date:
Revised By: K Hughes	Authorised By:
Reason for Revision: This document replaces Issue 1 (dated 27 th May 2016) of the same number which has been withdrawn. The sponsor has requested additional photographs to be included in the report.	