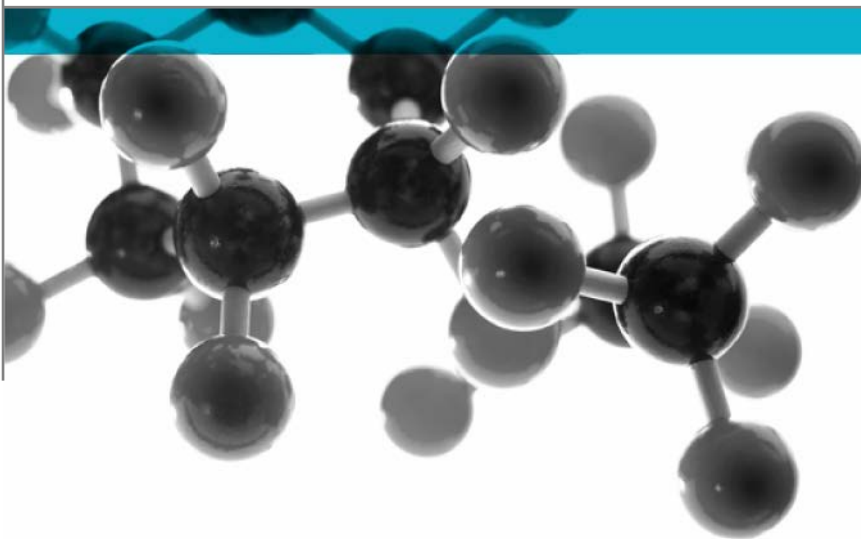


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# BS EN 13823: 2010



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

A Report To: Newmor

Document Reference: 330244

Date: 6<sup>th</sup> August 2013

Issue No.: 1

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.

Generic Description	Product reference	Thickness	Weight per unit area or density
20oz non-woven backed wallcovering bonded to one face of a fibre cement board substrate utilising a PVA based adhesive	"145046"	8.71mm*	16.24kg/m <sup>2</sup> *
<b>Individual components used to manufacture composite:</b>			
PVC film	"Vinyl"	0.25mm	1.4g/cm <sup>3</sup>
Fabric	"Heavy Weight"	0.19mm	0.06kg/m <sup>2</sup>
Adhesive (wallcovering to substrate)	"Dixon Turner Heavy"	Not stated	200g/m <sup>2</sup>
Primer	"ET Primaseal"	Not stated	85g/m <sup>2</sup>
Substrate	"NT D4 604"	8mm	1800kg/m <sup>3</sup>
<b>Please see pages 5 and 6 of this test report for the full description of the product tested</b>			
*determined by <b>Exova Warringtonfire</b>			

**Test Sponsor** Newmor, Madoc Works, Henfaes Lane, Welshpool, Montgomeryshire, SY21 7BE


**Test Results (average) :**


FIGRA (w/s)		THR 600s (MJ)	SMOGRA (m <sup>2</sup> /s <sup>2</sup> )		TSP 600s (m <sup>2</sup> )	
(0.2MJ)	(0.4MJ)	1.56	Original	Recalculated	Original	Recalculated
20.15	9.14			0.00	0.00	77.24

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

**Date of Test:** 27<sup>th</sup> June & 15<sup>th</sup> July 2013

## Signatories

  
 Responsible Officer  
 K. Hughes \*  
 Technical Officer

  
 Authorised  
 S. Deeming\*  
 Operations Manager

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

Report Issued: 6<sup>th</sup> August 2013

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Document No.: 330244  
 Author: K Hughes  
 Client: Newmor

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## Test Details

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<b>Purpose of test</b>	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 and this report should be read in conjunction with that standard.
<b>Scope of test</b>	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.
<b>Fire test study group/EGOLF</b>	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.
<b>Instruction to test</b>	The test was conducted on the 27 <sup>th</sup> June & 15 <sup>th</sup> July 2013 at the request of Newmor, the sponsor of the test.
<b>Provision of test specimens</b>	The specimens were supplied by the sponsor of the test. <b>Exova Warringtonfire</b> was not involved in any selection or sampling procedure. The sponsor supplied the adhesive and <b>Exova Warringtonfire</b> supplied the substrate, primer and bonded the composite together.
<b>Conditioning of specimens</b>	The specimens were received on the 13 <sup>th</sup> June 2013 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.
<b>Intended application</b>	Internal wall lining.
<b>Test facility</b>	The Single Burning Item (SBI) test facility at <b>Exova Warringtonfire</b> is constructed in accordance with the specifications detailed in BS EN 13823: 2010.
<b>Deviations from the test standard</b>	None.
<b>Exposed face</b>	The decorative 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		20oz non-woven wallcovering bonded to one face of a fibre cement board substrate utilising a PVA based adhesive
Product reference of overall composite		"145046"
Name of manufacturer of overall composite		"Roysons"
Thickness of wallcovering		0.46mm (stated by sponsor) 0.45mm (determined by <b>Exova Warringtonfire</b> )
Weight per unit area of wallcovering		0.66kg/m <sup>2</sup> (stated by sponsor) 0.44kg/m <sup>2</sup> (determined by <b>Exova Warringtonfire</b> )
Overall thickness of composite		8.71mm (determined by <b>Exova Warringtonfire</b> )
Overall weight per unit area of composite		16.24kg/m <sup>2</sup> (determined by <b>Exova Warringtonfire</b> )
PVC film	Generic type	Polyvinyl chloride (PVC) film
	Product reference	"Vinyl"
	Name of manufacturer	<b>See Note 1 below</b>
	Colour reference	"Off White"
	Number of coats	One
	Thickness	0.25mm
	Density	1.4g/cm <sup>3</sup>
	Application method	Lamination to backing
	Curing process per coat	Hot lamination – 300°F for a duration of 30 seconds
	Flame retardant details	<b>See Note 2 below</b>
Fabric	Generic type	Polyester cellulose non-woven
	Product reference	"Heavy Weight"
	Name of manufacturer	Ahlstrom
	Thickness	0.19mm
	Weight per unit area	0.06kg/m <sup>2</sup>
	Colour reference	"White"
	Pattern reference	"Plain"
	Flame retardant details	<b>See Note 2 below</b>
Adhesive	Generic type	Polyvinyl acetate (PVA) / starch / water
	Product reference	"Dixon Turner Heavy"
	Name of manufacturer	<b>See Note 1 below</b>
	Application rate	200g/m <sup>2</sup>
	Application method	Lambswool roller
	Flame retardant details	<b>See Note 2 below</b>
	Curing process	Air dry

Continued on next page

Primer	Generic type	Polyvinyl acetate (PVA) / starch / water
	Product reference	"ET Primaseal"
	Name of manufacturer	<b>See Note 1 below</b>
	Number of coats	One
	Application rate	85g/m <sup>2</sup>
	Application method	Lambswool roller
	Curing process per coat	Air dry
	Flame retardant details	<b>See Note 2 below</b>
Substrate	Generic type	Fibre cement board
	Product reference	"NT D4 604"
	Name of manufacturer	Scheeders van de Kerkhove (SVK)
	Thickness	8mm
	Density	1800kg/m <sup>3</sup>
	Colour reference	"Grey"
	Flame retardant details	The substrate is inherently flame retardant
Brief description of manufacturing process		Laminate vinyl with water-based ink to woven backing

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

**Note 2. The sponsor of the test has confirmed that no flame retardant additive were utilised in the production of the product / 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> )	19.54	18.35	22.58	20.15
FIGRA (W/S) ( <i>THR(t) threshold of 0.4MJ</i> )	8.75	5.89	12.78	9.14
THR 600s (MJ)	1.57	1.38	1.75	1.56
SMOGRA (m <sup>2</sup> /s <sup>2</sup> ) (Original results)	0.00	0.00	0.00	0.00
SMOGRA (m <sup>2</sup> /s <sup>2</sup> ) (Recalculated results)	0.00	0.00	0.00	0.00
TSP 600s (m <sup>2</sup> ) (Original results)	80.98	74.66	76.10	77.24
TSP 600s (m <sup>2</sup> ) (Recalculated results)	68.50	61.39	63.25	64.38
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		<b>Observations during test of Specimen 1</b>
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	15	Charring of the surface of the product occurred in the region of the burner.
05	45	The surface of the product began the flake and peel in the region of the burner.
26	00	End of test conditions. All flaming ceased.

Time		<b>Observations during test of Specimen 2</b>
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	12	Charring of the surface of the product occurred in the region of the burner.
05	57	The surface of the product began the flake and peel in the region of the burner.
26	00	End of test conditions. All flaming ceased.

Time		<b>Observations during test of Specimen 1</b>
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	12	Charring of the surface of the product occurred in the region of the burner.
05	54	The surface of the product began the flake and peel in the region of the burner.
26	00	End of test conditions. All flaming ceased.

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)

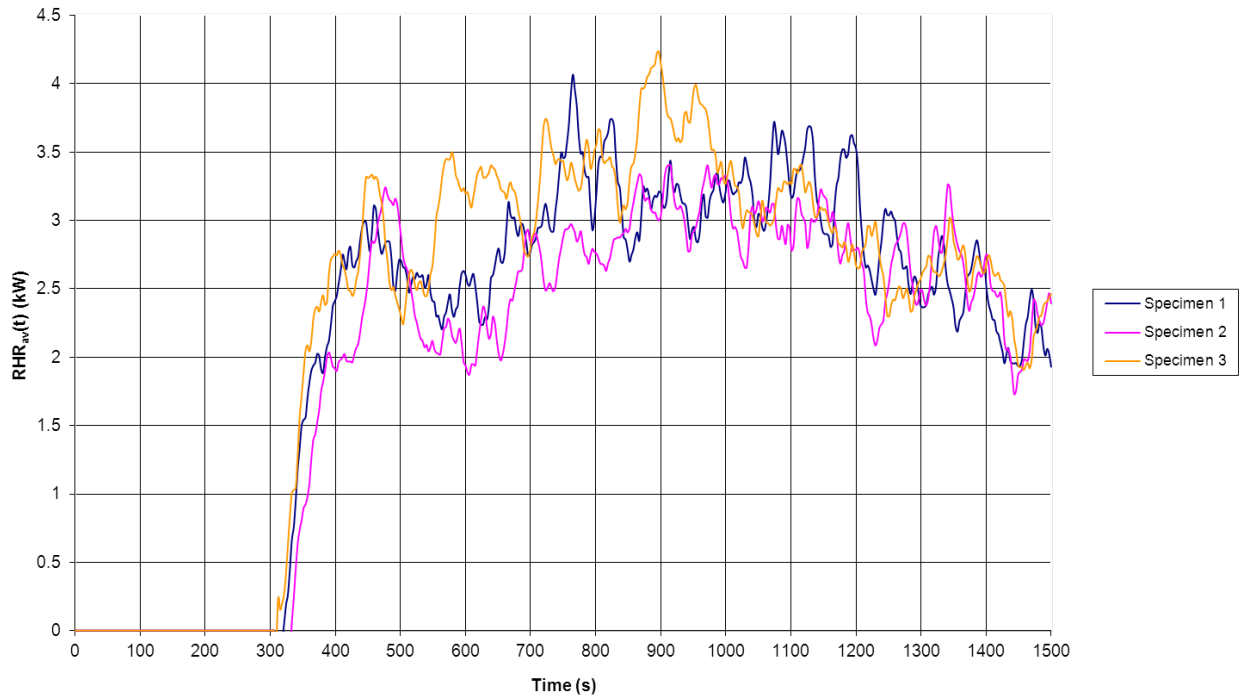


Figure 2.  $THR(t)$  (MJ)

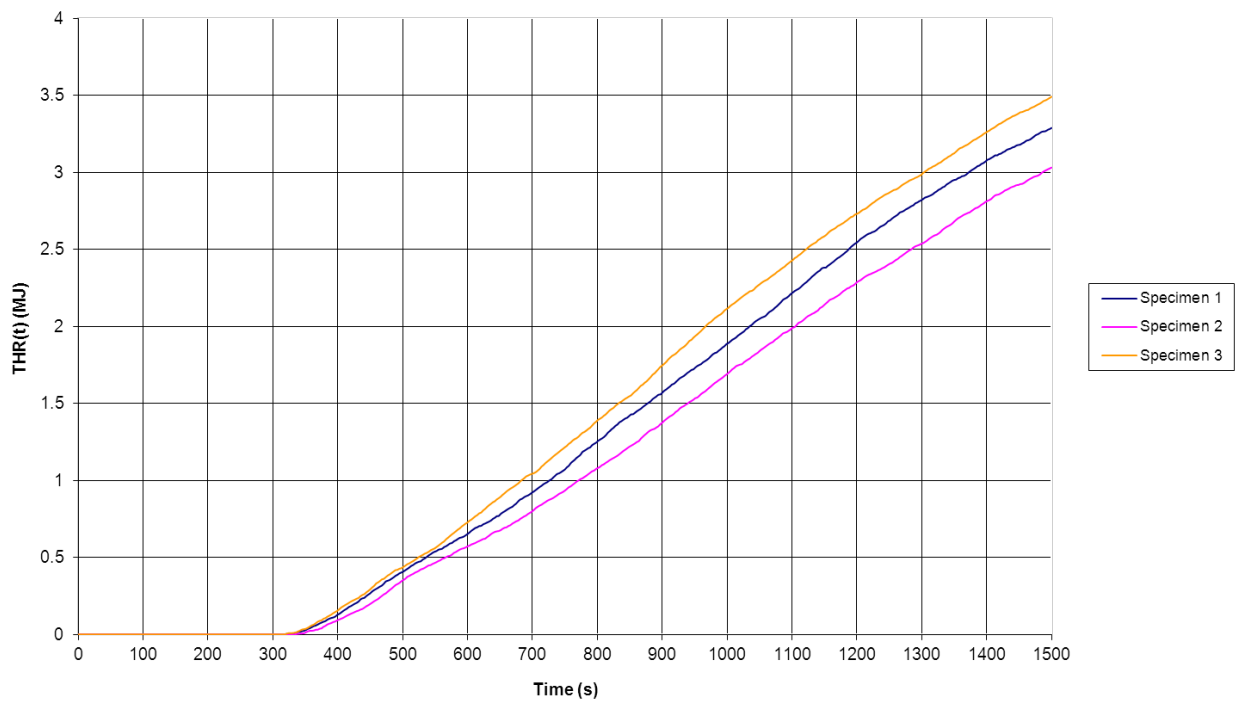


Figure 3. FIGRA

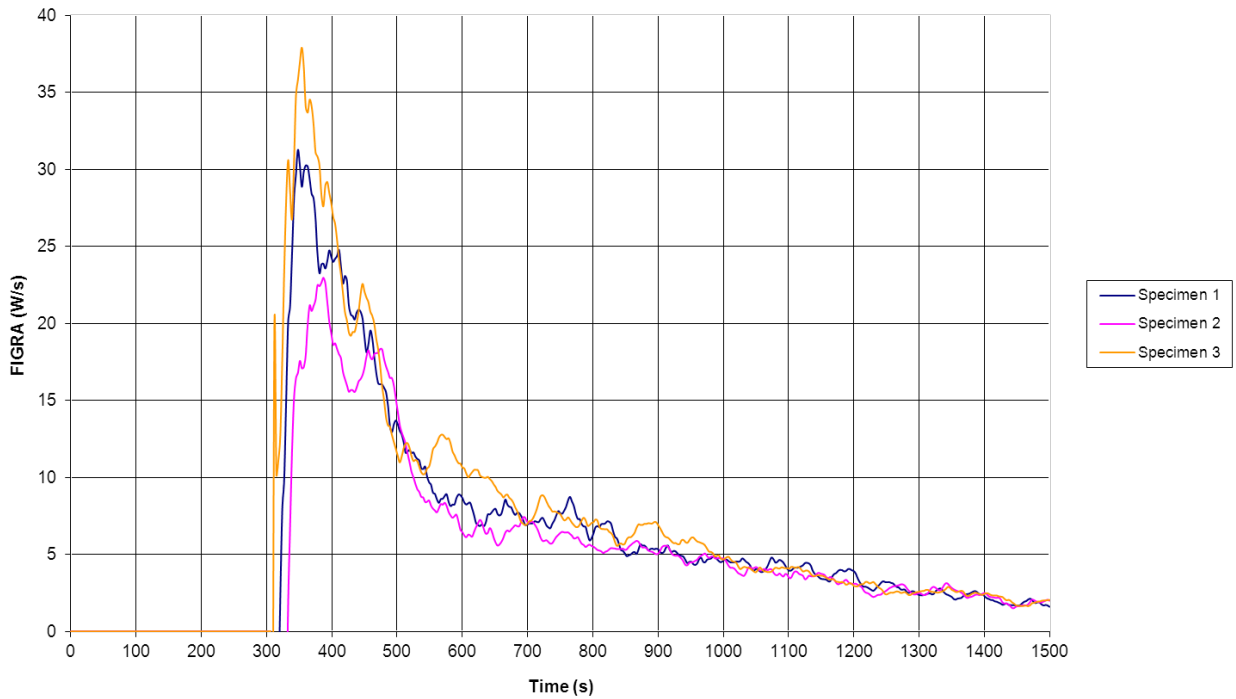


Figure 4.  $SPR_{av}(t)$  ( $m^2/s$ )

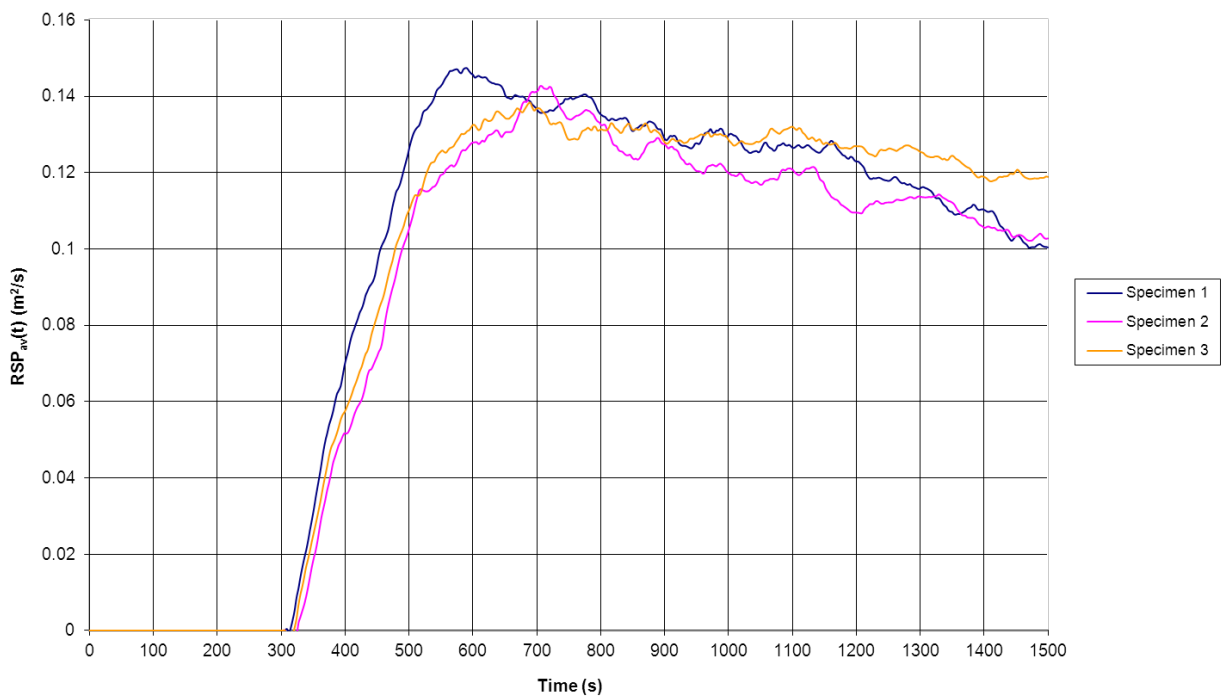


Figure 5. TSP(t) (m<sup>2</sup>)

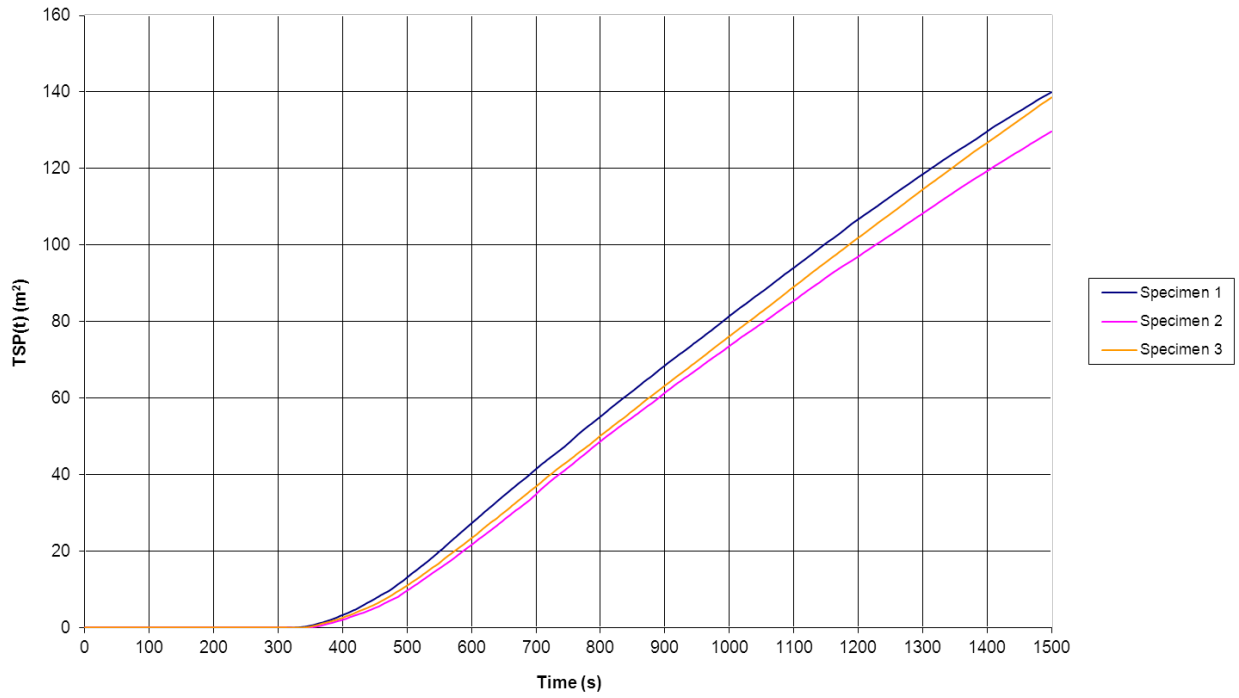
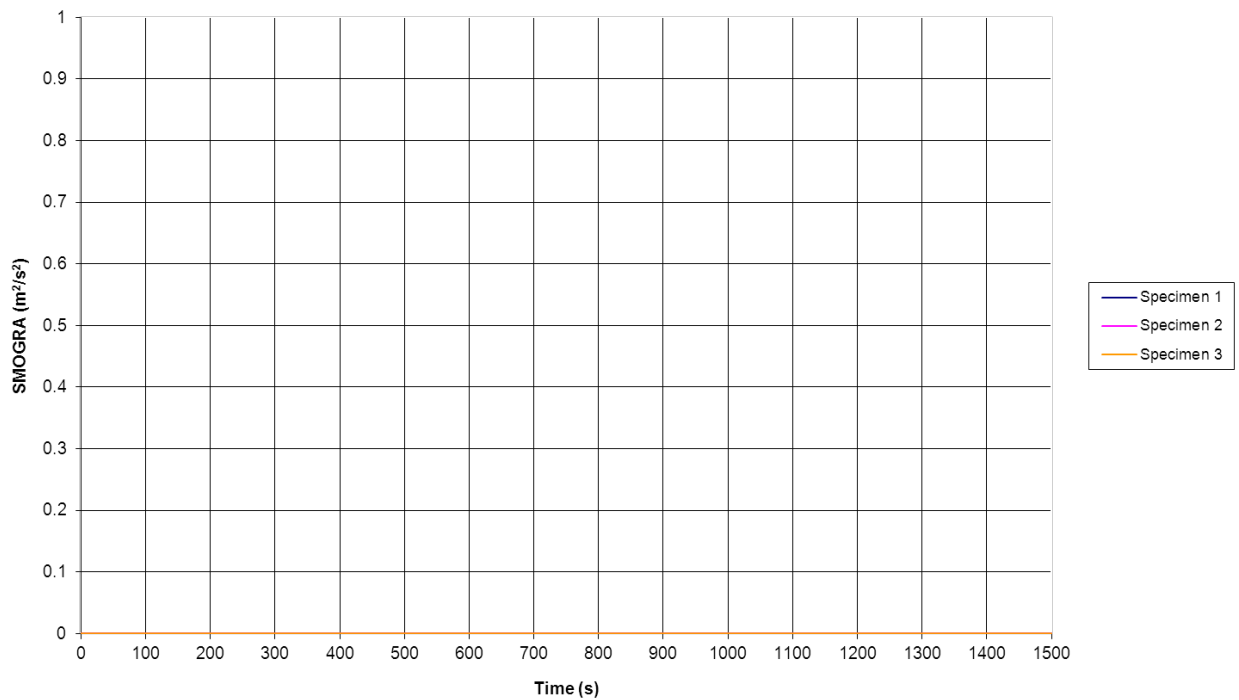


Figure 6. SMOGRA Graph.



## Revision History

Issue No :	Re-issue Date:
Revised By:	Authorised By:
Reason for Revision:	

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Revised By:	Authorised By:
Reason for Revision:	