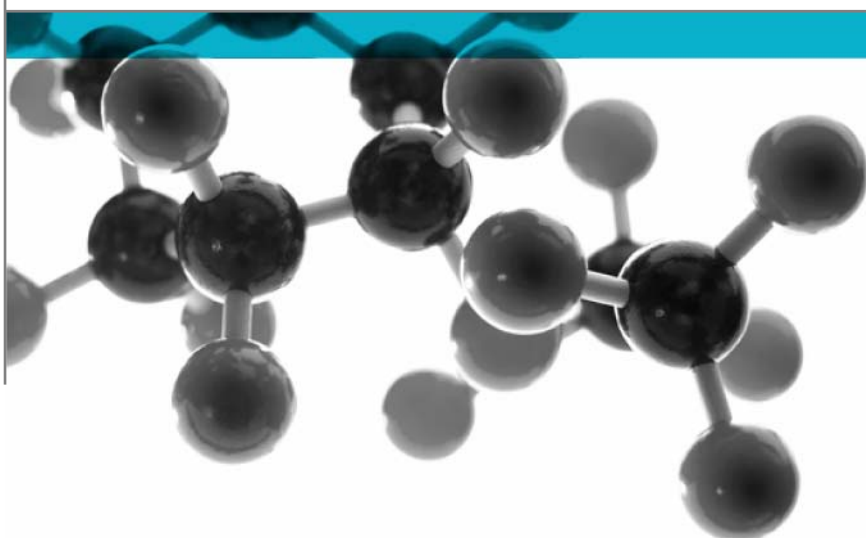


Exova Warringtonfire
Holmesfield Road
Warrington
WA1 2DS
United Kingdom

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



BS EN 13823: 2010



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

A Report To: Renco Nets Limited

Document Reference: 342758

Date: 31st July 2014

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 |
|---|-------------------------------------|-----------|--------------------------|
| Polyester netting | "Flame Retardant Anticlimb Netting" | 1.18mm* | 222.5 g/m ² * |
| * determined by Exova Warringtonfire | | | |
| Please see page 5 of this test report for the full description of the product tested | | | |

Test Sponsor Renco Nets Limited, King Edward Street, Grimsby, NE Lincolnshire, DN31 3LA

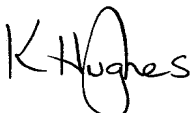
Test Results (average) :


| FIGRA (w/s) | | THR 600s (MJ) | SMOGRA (m ² /s ²) | | TSP 600s (m ²) | |
|-------------|---------|---------------|--|--------------|----------------------------|--------------|
| (0.2MJ) | (0.4MJ) | 0.48 | Original | Recalculated | Original | Recalculated |
| 0.00 | 0.00 | | | 0.00 | 0.00 | 29.55 |

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

Date of Test: 15th July 2014

Signatories


 Responsible Officer
 K. Hughes *
 Technical Officer


 Authorised
 S. Deeming*
 Operations Manager

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

Report Issued: 31st July 2014

This version of the report has been produced from a .pdf format electronic file that has been provided by **Exova Warringtonfire** to the sponsor of the report and must only be reproduced in full. Extracts or abridgements of reports must not be published without permission of **Exova Warringtonfire**.

| CONTENTS | PAGE NO. |
|--|-----------------|
| EXECUTIVE SUMMARY | 2 |
| SIGNATORIES | 2 |
| TEST DETAILS | 4 |
| DESCRIPTION OF TEST SPECIMENS | 5 |
| TEST RESULTS | 6 |
| APPENDIX 1 | 8 |
| APPENDIX 2 | 9 |
| REVISION HISTORY | 12 |

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 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. |
| 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 15 th July 2014 at the request of Renco Nets Limited, 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 10 th July 2014 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 | Netting. |
| 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. |
| Deviations from the test standard | None. |
| Exposed face | One of the two identical faces 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 | Polyester netting |
| Generic type | Polyester |
| Product reference | "Flame Retardant Anticlimb Netting" |
| Name of manufacturer | Renco Nets Limited |
| Colour reference | "Black" |
| Thickness | 250 / 1000 Denier (stated by sponsor) 1.18mm (determined by Exova Warringtonfire) |
| Weight per unit area | 170g/m ² ±5% (stated by sponsor) 222.5 g/m ² (determined by Exova Warringtonfire) |
| Cell dimensions | 8mm |
| Flame retardant details | See Note 1 Below |
| Mounting and fixing details | The specimens were fastened to a "window" frame manufactured from 5mm steel sheet using metal wire |
| Air gap details | A 180mm ventilated cavity was situated between the reverse face of each specimen and the backing board |
| Brief description of manufacturing process | See Note 1 Below |

Note 1: The sponsor was unwilling to provide this information

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 | 0.00 | 0.00 | 0.00 |
| FIGRA (W/S) (<i>THR(t) threshold of 0.4MJ</i>) | 0.00 | 0.00 | 0.00 | 0.00 |
| THR 600s (MJ) | 0.28 | 0.45 | 0.70 | 0.48 |
| SMOGRA (m ² /s ²) (Original results) | 0.00 | 0.00 | 0.00 | 0.00 |
| SMOGRA (m ² /s ²) (Recalculated results) | 0.00 | 0.00 | 0.00 | 0.00 |
| TSP 600s (m ²) (Original results) | 25.7 | 25.56 | 37.94 | 29.55 |
| TSP 600s (m ²) (Recalculated results) | 7.56 | 9.41 | 19.58 | 12.19 |
| 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 | 09 | Flames penetration through netting in the region of the burner. |
| 26 | 00 | End of test conditions. All flaming ceased. |

| 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 | 09 | Flames penetration through netting in the region of the burner. |
| 26 | 00 | End of test conditions. All flaming ceased. |

| 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 | 09 | Flames penetration through netting in the region of the burner. |
| 05 | 21 | Flaming of molten material observed in the channel along the short wall |
| 26 | 00 | End of test conditions. Flaming continued until 15 minutes 6 seconds into the test |

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.

This report may only be reproduced in full. Extracts or abridgements shall not be published without permission of **Exova Warringtonfire**.

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)

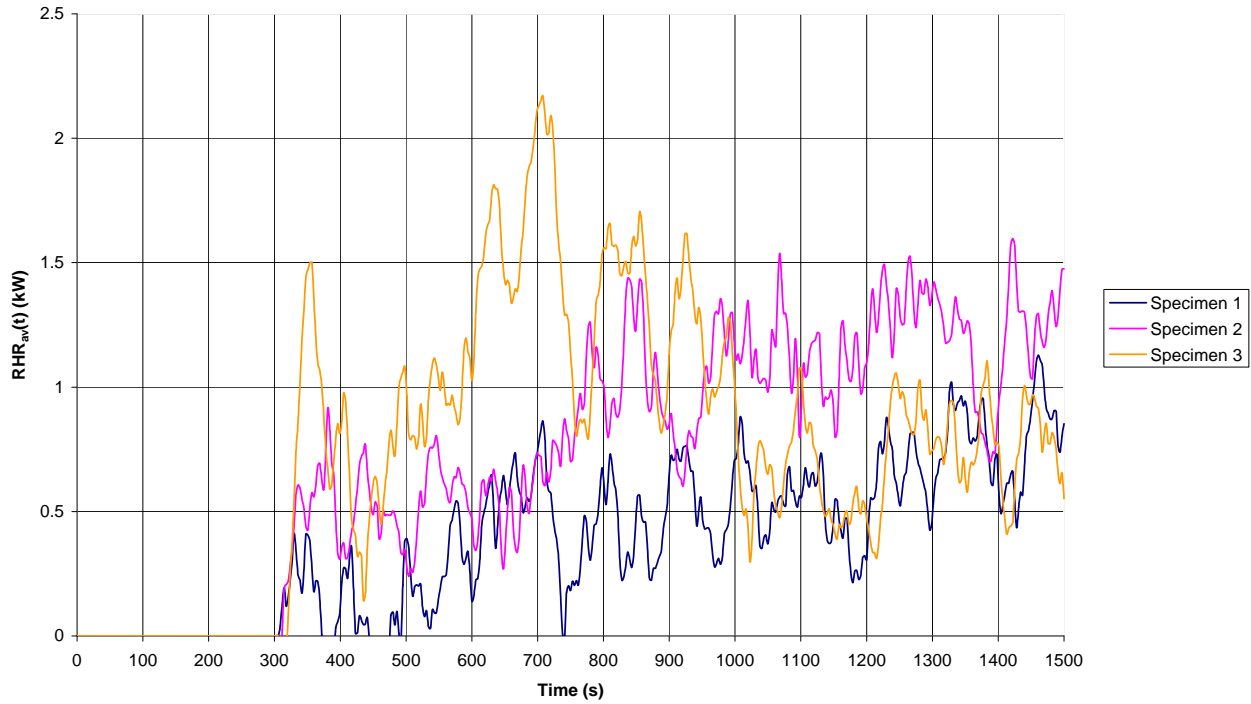


Figure 2. $THR(t)$ (MJ)

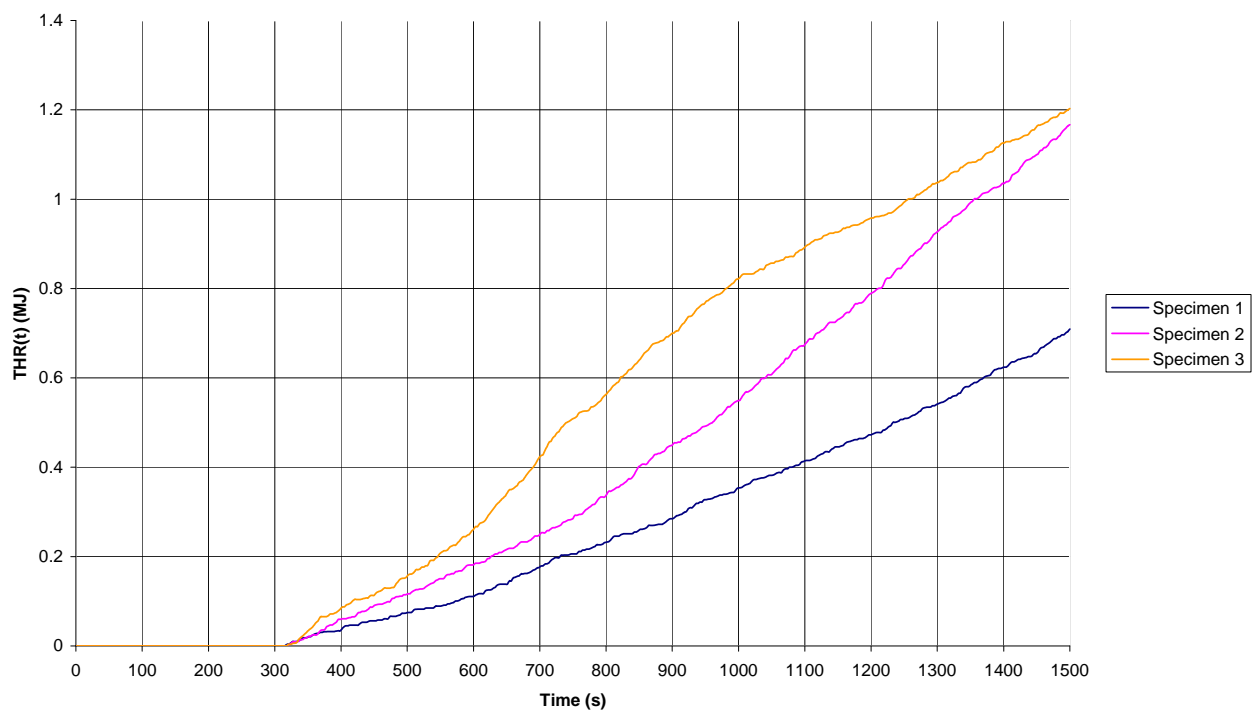


Figure 3. FIGRA

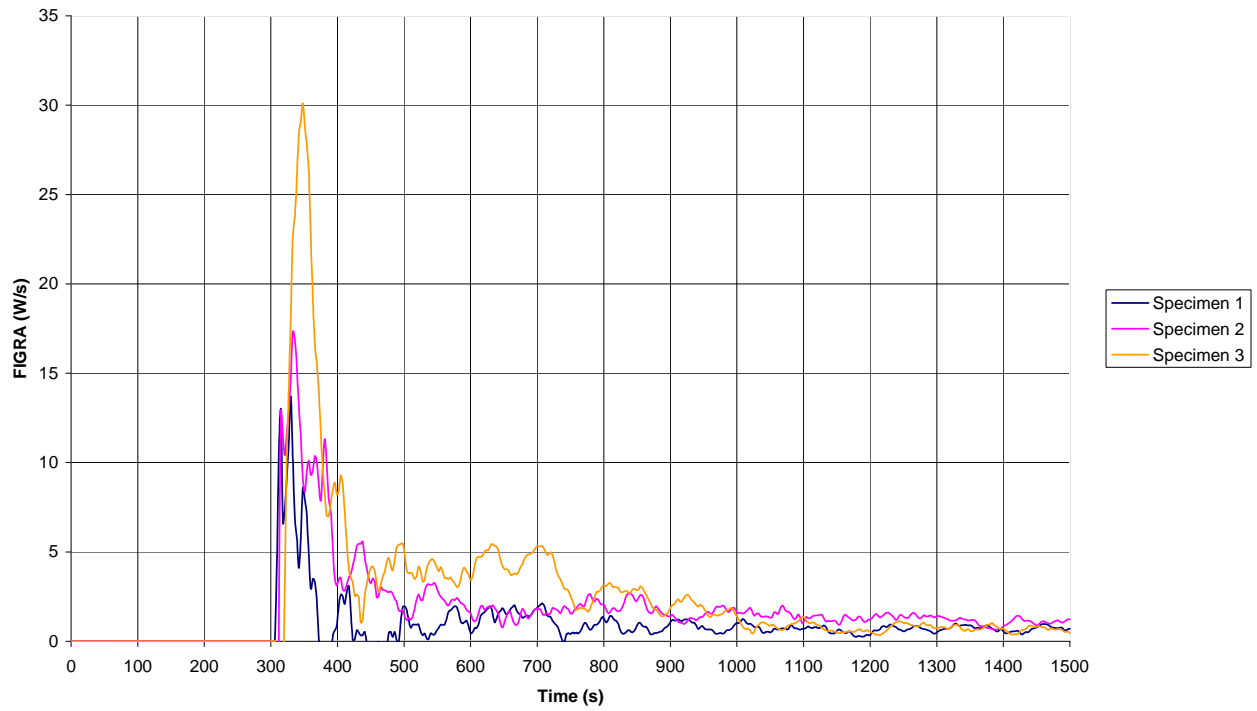


Figure 4. $RSP_{av}(t)$ (m^2/s)

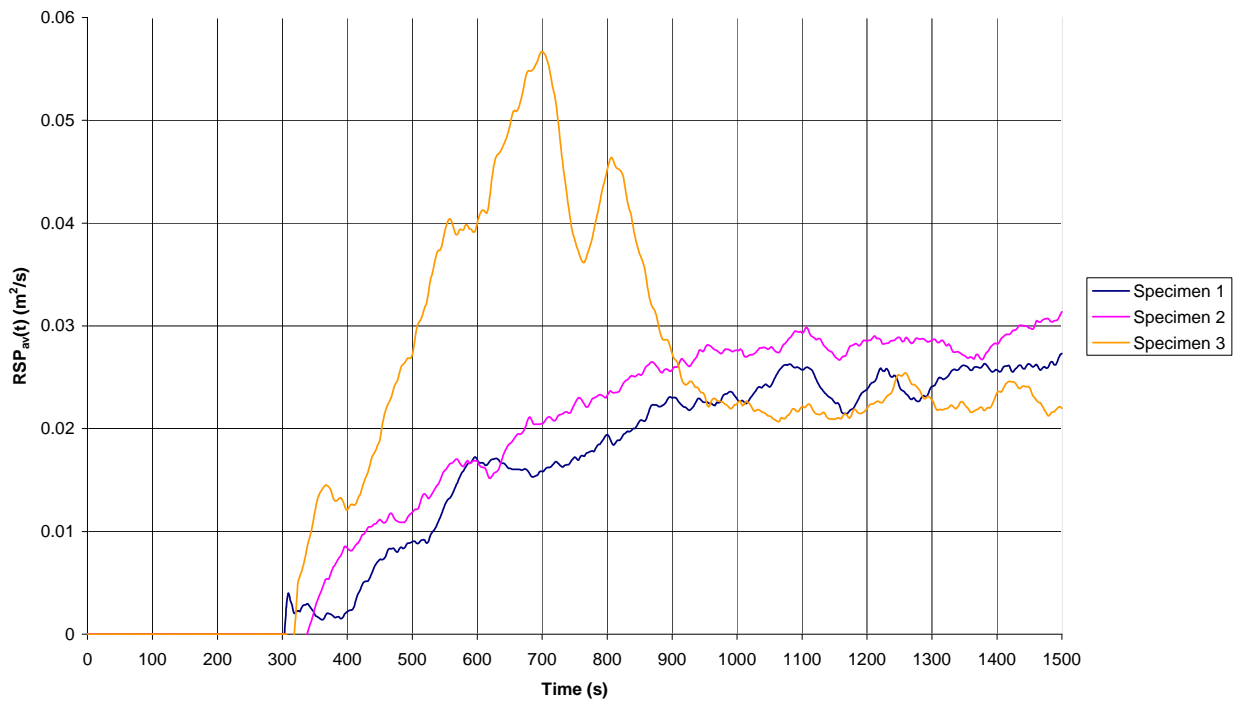


Figure 5. TSP(t) (m²)

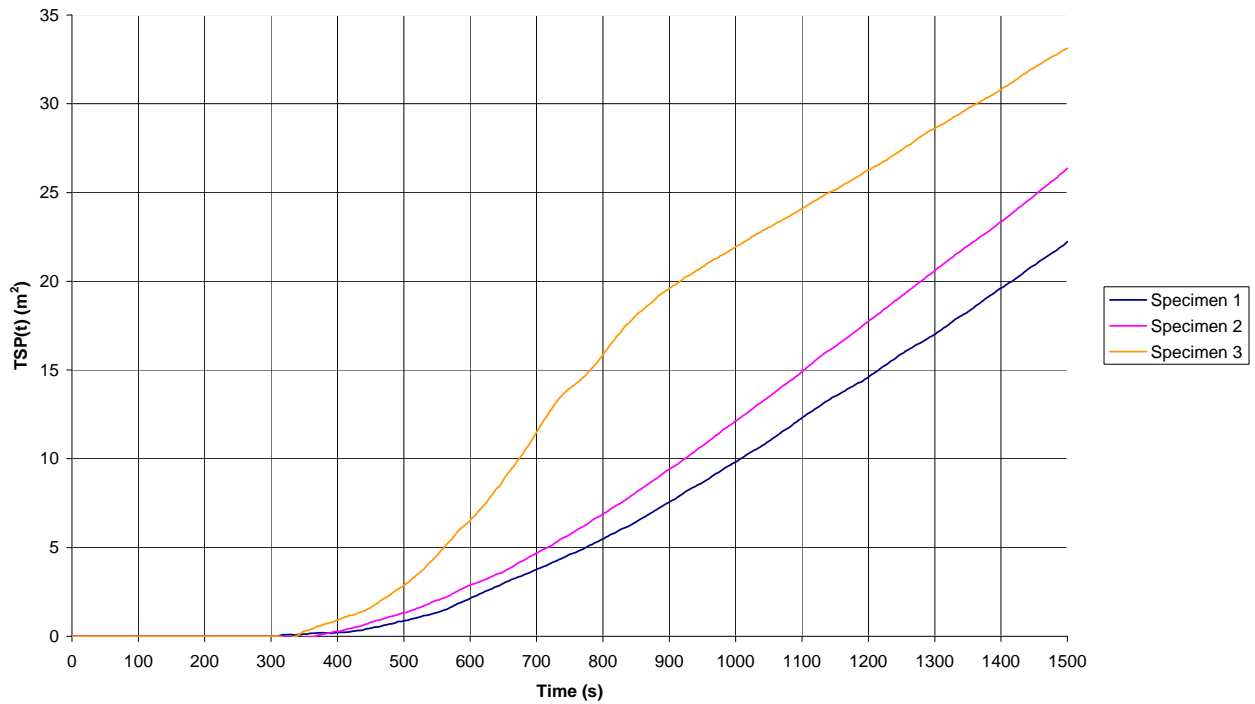
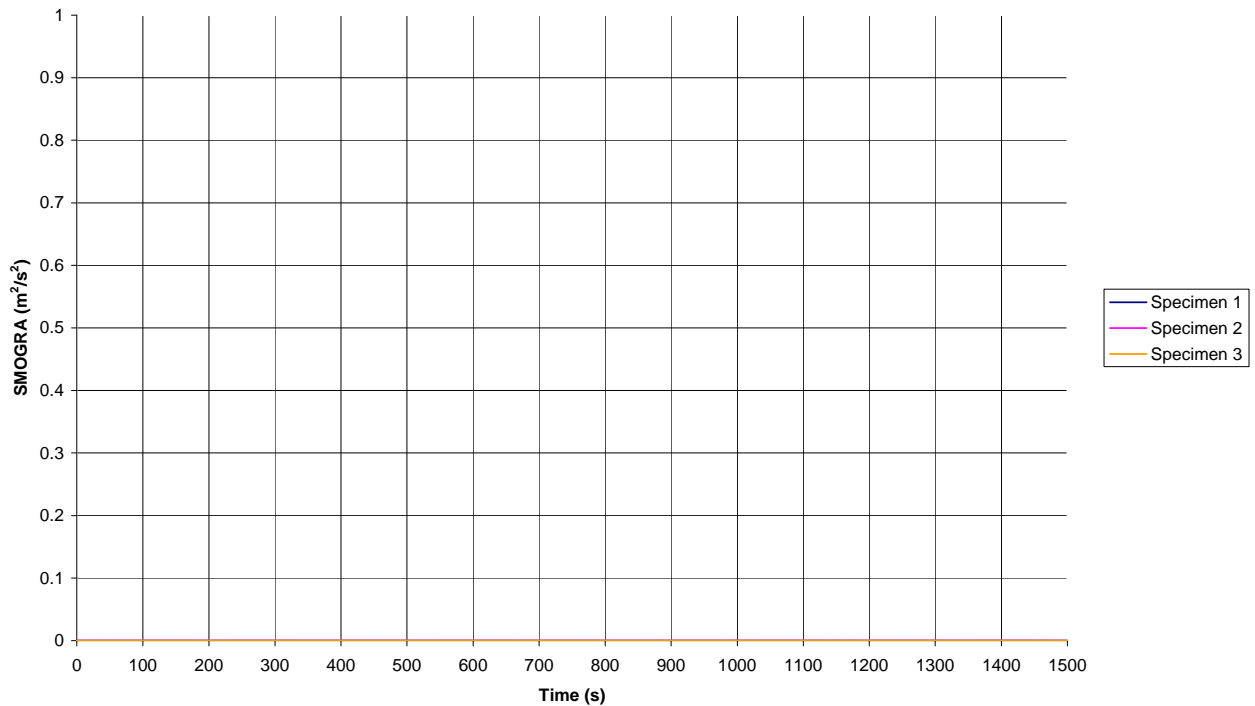


Figure 6. SMOGRA Graph.



Revision History

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

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