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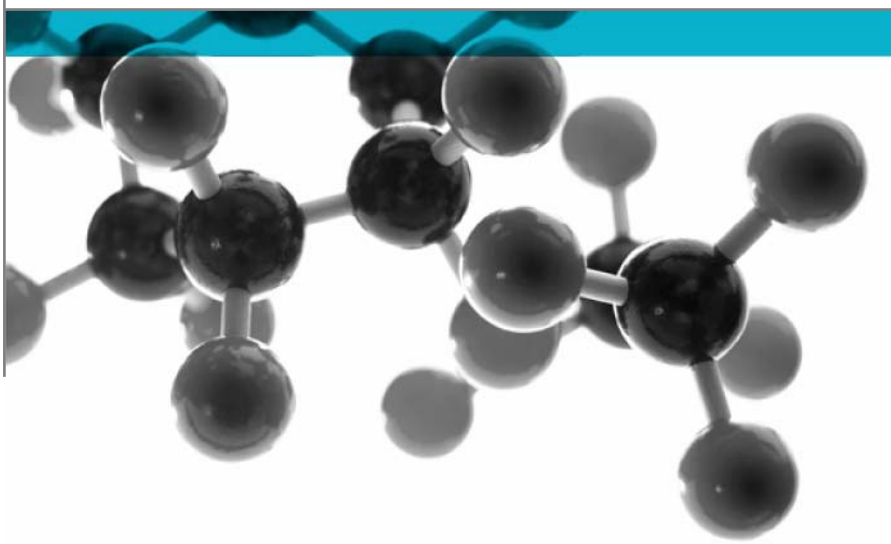
# BS 476: Part 6: 1989+A1:2009



**Method Of Test For**
**Fire Propagation For Products**

A Report To: Eco-Sol Ltd

Document Reference: 305479

**Date:** 29th March 2011

**Issue No.: 1**



Testing
Advising
Assuring



UKAS TESTING
0249

# Executive Summary

**Objective** To determine the performance of the following product when tested in accordance with BS 476: Part 6: 1989+A1: 2009.

| Generic Description | Product reference | Thickness | Weight per unit area or density |
|---|---|---|---|
| A Yellow Pine timber treated with a flame retardant | "Yellow Pine treated with Flametect C-WD" | 12mm | 9.61kg/m²* |
| **Individual components used to manufacture composite:** | | | |
| Coating product | "Flametect C-WD" | 20 to 30g/m$^2$ (per coat) | 1060kg/m$^3$ |
| Timber | "Yellow Pine" | 12mm | Unable to provide |
| ***Determined by Exova Warringtonfire** | | | |
| **Please see page 5 of this test report for the full description of the product tested** | | | |

**Test Sponsor** Eco-Sol Ltd, Cardiff House, Cardiff Road, Barry, Vale of Glamorgan, CF63 2AW

**Test Results:**

| | | |
|---|---|---|
| **Fire propagation index, I** | **=** | **10.8** |
| **Sub index, $i_1$** | **=** | **4.7** |
| **Sub index, $i_2$** | **=** | **4.4** |
| **Sub index, $i_3$** | **=** | **1.7** |

**Date of Test** 24th and 28th March 2011

# Signatories

Responsible Officer
T. Mort *
Senior Technical Officer

Authorised
D. J. Owen *
Senior Technical Officer

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

Report Issued: 29th March 2011

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# Test Details

**Purpose of test**

To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 6: 1989+A1: 2009, "Fire tests on building materials and structures, method for fire propagation for products".

The test was performed in accordance with the procedure specified in BS 476: Part 6: 1989+A1: 2009, and this report should be read in conjunction with that British Standard.

**Scope of test**

BS 476: Part 6: 1989+A1: 2009 specifies a method of test, the result being expressed as a fire propagation index, that provides a comparative measure of the contribution to the growth of fire made by an essentially flat material, composite or assembly. It is primarily intended for the assessment of the performance of internal wall and ceiling linings.

**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 24th and 28th March 2011 at the request of Eco-Sol 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 10th March 2011 and were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5% prior to testing.

**Form in which the specimens were tested**

Assembly - Fabrication of materials and/or composites that can contain air gaps. An air space was provided at the back of the product by testing over spacers of non-combustible insulation board 20 mm wide and 12.5mm thick.

**Exposed face**

The coated face of the specimens was exposed to the heating conditions of the test.

# Description of 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.

| | | |
|---|---|---|
| General description | | A Yellow Pine timber treated with a flame retardant |
| Product reference | | "Yellow Pine treated with Flametect C-WD" |
| Weight per unit area | | 9.61kg/m²(determined by **Exova Warringtonfire**) |
| Thickness | | 12mm (stated by sponsor)<br>13.54mm (determined by **Exova Warringtonfire**) |
| Coating product (Test face) | Generic type | Water based flame retardant |
| | Product reference | "Flametect C-WD" |
| | Name of manufacturer | Eco-Sol Ltd |
| | Colour | "Clear" |
| | Number of coats | 3 |
| | Application rate per coat | 20 to 30g/m$^2$ |
| | Application method | Roller |
| | Specific gravity | 1060kg/m$^3$ |
| | Trade name of flame retardant | "Flametect C-WD" |
| | Generic type of flame retardant | Water based |
| | Amount of flame retardant | 60 to 100g/m$^2$ |
| | Curing process per coat | Air dry |
| Substrate | Product reference | "Yellow Pine" |
| | Generic type | Pine |
| | Name of manufacturer | Robert Price Ltd |
| | Thickness | 12mm |
| | Density / weight per unit area | **See Note 1 below** |

**Note 1: The sponsor of the test was unable to provide this information.**

# Test Results

## Results

A total of three specimens were tested. The laboratory record sheet relating to each of the test specimens is appended to this report (refer to Tables 1, 2 and 3).

Throughout the test on each specimen careful observation was made of the product's behaviour within the apparatus and special note was taken of any of the phenomena listed in clause 9.2 of the Standard. None of the listed phenomena was observed and the test results on all three specimens tested were valid.

**The following test results were obtained for the product.**

| | | |
|---|---|---|
| **Fire propagation index, I** | **=** | **10.8** |
| **Sub index, $i_1$** | **=** | **4.7** |
| **Sub index, $i_2$** | **=** | **4.4** |
| **Sub index, $i_3$** | **=** | **1.7** |

**NOTE**: If a suffix 'R' is included in the above fire propagation index, I, then this indicates that the results should be treated with caution.

## Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of 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.

## Validity

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 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.

**Table 1**

## Laboratory Record Sheet

### FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

**Specimen No. : 1** **Date : 24-Mar-11**

| Time mins t | Specimen Temperature Deg C Ts | Calibration Temperature Deg C Tc | Ts-Tc/10t | Sub Index Of Performance |
|---|---|---|---|---|
| 0.50 | 20 | 15 | 1.00 | |
| 1.00 | 34 | 21 | 1.30 | |
| 1.50 | 46 | 27 | 1.27 | |
| 2.00 | 52 | 31 | 1.05 | |
| 2.50 | 56 | 35 | 0.84 | |
| 3.00 | 59 | 39 | 0.67 | 6.12 |
| 4.00 | 96 | 68 | 0.70 | |
| 5.00 | 144 | 103 | 0.82 | |
| 6.00 | 175 | 132 | 0.72 | |
| 7.00 | 200 | 153 | 0.67 | |
| 8.00 | 224 | 173 | 0.64 | |
| 9.00 | 240 | 187 | 0.59 | |
| 10.00 | 254 | 195 | 0.59 | 4.72 |
| 12.00 | 275 | 213 | 0.52 | |
| 14.00 | 284 | 224 | 0.43 | |
| 16.00 | 283 | 232 | 0.32 | |
| 18.00 | 284 | 239 | 0.25 | |
| 20.00 | 289 | 245 | 0.22 | 1.73 |
| Total Index of Performance S | | | = | 12.58 |

**SubIndex s1** **6.12**

**SubIndex s2** **4.72**

**SubIndex s3** **1.73**

**Index of Performance S** **12.58**

**Table 2**

## Laboratory Record Sheet

### FIRE PROPAGATION TEST - BS 476:PART 6:1989+A1:2009

**Specimen No. : 2** **Date : 28-Mar-11**

| Time mins t | Specimen Temperature Deg C Ts | Calibration Temperature Deg C Tc | Ts-Tc/10t | Sub Index Of Performance |
|---|---|---|---|---|
| 0.50 | 14 | 12 | 0.40 | |
| 1.00 | 24 | 17 | 0.70 | |
| 1.50 | 32 | 22 | 0.67 | |
| 2.00 | 38 | 26 | 0.60 | |
| 2.50 | 43 | 31 | 0.48 | |
| 3.00 | 47 | 35 | 0.40 | 3.25 |
| 4.00 | 79 | 61 | 0.45 | |
| 5.00 | 125 | 94 | 0.62 | |
| 6.00 | 152 | 124 | 0.47 | |
| 7.00 | 179 | 146 | 0.47 | |
| 8.00 | 200 | 163 | 0.46 | |
| 9.00 | 218 | 177 | 0.46 | |
| 10.00 | 234 | 188 | 0.46 | 3.39 |
| 12.00 | 254 | 205 | 0.41 | |
| 14.00 | 274 | 218 | 0.40 | |
| 16.00 | 284 | 227 | 0.36 | |
| 18.00 | 286 | 231 | 0.31 | |
| 20.00 | 284 | 239 | 0.23 | 1.70 |
| **Total Index of Performance S** | | | **=** | **8.33** |

**SubIndex s1** **3.25**

**SubIndex s2** **3.39**

**SubIndex s3** **1.70**

**Index of Performance S** **8.33**

**Table 3**

## Laboratory Record Sheet

### FIRE PROPAGATION TEST - BS 476:PART 6:1989+A1:2009

**Specimen No. : 3** **Date : 28-Mar-11**

| Time<br>mins<br>t | Specimen<br>Temperature<br>Deg C<br>Ts | Calibration<br>Temperature<br>Deg C<br>Tc | Ts-<br>Tc/10t | Sub Index<br>Of<br>Performance |
|---|---|---|---|---|
| **0.50** | **14** | **12** | **0.40** | |
| **1.00** | **27** | **17** | **1.00** | |
| **1.50** | **37** | **22** | **1.00** | |
| **2.00** | **45** | **26** | **0.95** | |
| **2.50** | **49** | **31** | **0.72** | |
| **3.00** | **52** | **35** | **0.57** | **4.64** |
| **4.00** | **85** | **61** | **0.60** | |
| **5.00** | **135** | **94** | **0.82** | |
| **6.00** | **169** | **124** | **0.75** | |
| **7.00** | **201** | **146** | **0.79** | |
| **8.00** | **222** | **163** | **0.74** | |
| **9.00** | **237** | **177** | **0.67** | |
| **10.00** | **252** | **188** | **0.64** | **5.00** |
| **12.00** | **273** | **205** | **0.57** | |
| **14.00** | **283** | **218** | **0.46** | |
| **16.00** | **287** | **227** | **0.38** | |
| **18.00** | **290** | **231** | **0.33** | |
| **20.00** | **281** | **239** | **0.21** | **1.94** |
| **Total Index of Performance S** | | | **=** | **11.58** |

**SubIndex s1** **4.64**

**SubIndex s2** **5.00**

**SubIndex s3** **1.94**

**Index of Performance S** **11.58**

# Revision History

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

| | |
|---|---|
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| Revised By: | Approved By: |
| Reason for Revision: | |