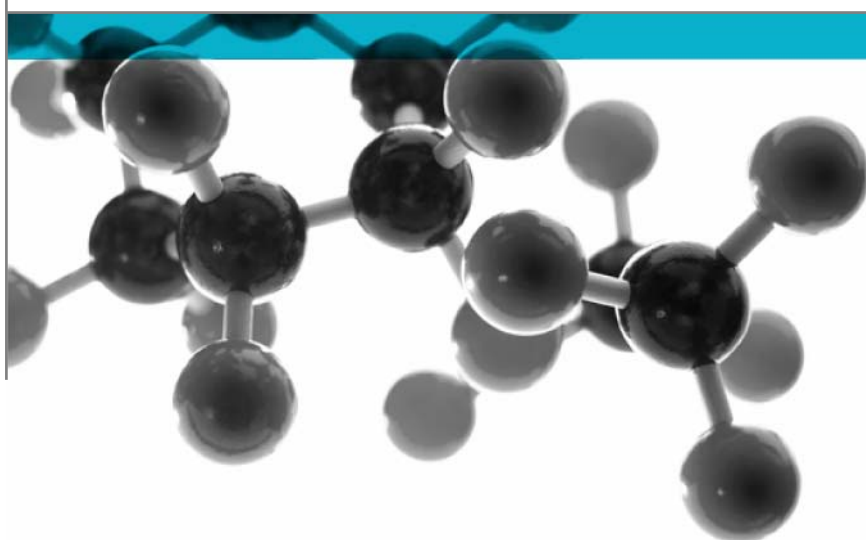


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BS 476: Part 7: 1997



Method For Classification Of The Surface Spread Of Flame Of Products

A Report To: Eco-Sol Ltd

Document Reference: 304043

Date: 9th February 2011

Issue No.: 1

Page 1

Testing
Advising
Assuring



Executive Summary

Objective To determine the surface spread of flame classification of the following product when tested in accordance with BS 476: Part 7: 1997.

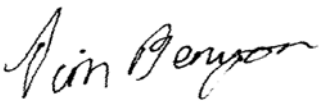
| Generic Description | Product reference | Thickness or application rate | Weight per unit area or density |
|---|---|-------------------------------------|---------------------------------|
| A Yellow Pine timber treated with a flame retardant | "Yellow Pine treated with Flametect C-WD" | 12mm | 7.82kg/m ^{2*} |
| 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

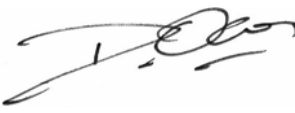
Test Results: **Class 1**

Date of Test 1st February 2011


Signatories



Responsible Officer
T. Benyon *
Technical Officer



Approved
D. J. Owen *
Senior Technical Officer



Authorised
C. Dean *
Operations Manager

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

Report Issued: 9th February 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 7: 1997, "Fire tests on building materials and structures, method for classification of the surface spread of flame of products". This test was therefore performed in accordance with the procedure specified in BS 476: Part 7: 1997, and this report should be read in conjunction with that British Standard. |
| Scope of test | BS 476: Part 7: 1997 specifies a method of test for measuring the lateral spread of flame along the surface of a specimen of a product orientated in the vertical position, and a classification system based on the rate and extent of flame spread. It provides data suitable for comparing the performances of essentially flat materials, composites, or assemblies, which are used primarily as the exposed surfaces of walls or ceilings. |
| 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 1 st February 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 27 th January 2011 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. |
| Form in which the specimens were tested | Assembly - Fabrication of materials and/or composites that can contain air gaps. Each specimen was placed over 25mm thick by 20mm wide calcium silicate based spacers positioned around its perimeter and mounted onto a backing board so that a 25mm enclosed air gap was provided between the unexposed face of the specimen and the backing board. |
| 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 | | 7.82kg/m ² (determined by Exova Warringtonfire) |
| Thickness | | 12mm (stated by sponsor) 14.95mm (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 and observations The test results for the individual specimens, together with observations made during the test and comments on any difficulties encountered during the test are given in Appendix 1.

Classification **In accordance with the class definitions given in BS 476: Part 7: 1997, the specimens tested are classified as Class 1.**

Criteria for classification If the prefix 'D' or suffix 'R' or 'Y' is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for the prefix and suffixes is given in Appendix 2, together with the classification limits specified in the Standard.

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.

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Appendix 1 – Test Results

| SPECIMEN No. | 1 | 2 | 3 | 4 | 5 | 6 |
|--|-----|-----|-----|-----|-----|-----|
| Maximum distance travelled at 1.5 minutes (mm) | <50 | <50 | <50 | <50 | <50 | <50 |

| Distance (mm) | Time to travel to indicated distance (minutes : seconds) | | | | | |
|---|--|------|------|------|------|------|
| 75 | | | | | | |
| 165 | | | | | | |
| 190 | | | | | | |
| 215 | | | | | | |
| 240 | | | | | | |
| 265 | | | | | | |
| 290 | | | | | | |
| 375 | | | | | | |
| 455 | | | | | | |
| 500 | | | | | | |
| 525 | | | | | | |
| 600 | | | | | | |
| 675 | | | | | | |
| 710 | | | | | | |
| 750 | | | | | | |
| 785 | | | | | | |
| 825 | | | | | | |
| Time to reach maximum distance travelled | 1:00 | 1:00 | 1:00 | 1:00 | 1:00 | 1:00 |
| Maximum distance travelled in 10 minutes (mm) | <50 | <50 | <50 | <50 | <50 | <50 |

Note: Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the Standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

Observations made during test and comments on any difficulties encountered during the test:

In the case of each specimen tested, flash flaming occurred from the sixth minute of the test, up to a distance of 90mm. This flash flaming became transitory flaming from the seventh minute of the test, up to a distance of 165mm.

Appendix 2 – Classification criteria

| Classification of spread of flame | Spread of Flame at 1.5 min | | Final Spread of Flame | |
|-----------------------------------|----------------------------|------------|-----------------------------|------------|
| | Classification | Limit (mm) | Limit for one specimen (mm) | Limit (mm) |
| Class 1 | 165 | 165 + 25 | 165 | 165 + 25 |
| Class 2 | 215 | 215 + 25 | 455 | 455 + 45 |
| Class 3 | 265 | 265 + 25 | 710 | 710 + 75 |

Class 4 Exceeding the limits for class 3

Explanation of prefix and suffixes which may be added to the classification

1. A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).
2. A prefix D is added to the classification of any product which does not comply with the surface characteristics specified in the Standard and has therefore been tested in a modified form (e.g. class D3).
3. A suffix Y is added to the classification if any softening and/or other behaviour that may affect the flame spread occurs (e.g. class 3Y).

For example, a classification of D3RY could be achieved indicating (a) a modified surface has been used; (b) a class 3 result has been obtained; (c) additional specimens have been used to obtain 6 valid results and; (d) softening and/or other behaviour has occurred which is considered to have affected the test result.

Revision History

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

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|----------------------|--------------|
| Issue No : | Issue Date: |
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| Reason for Revision: | |