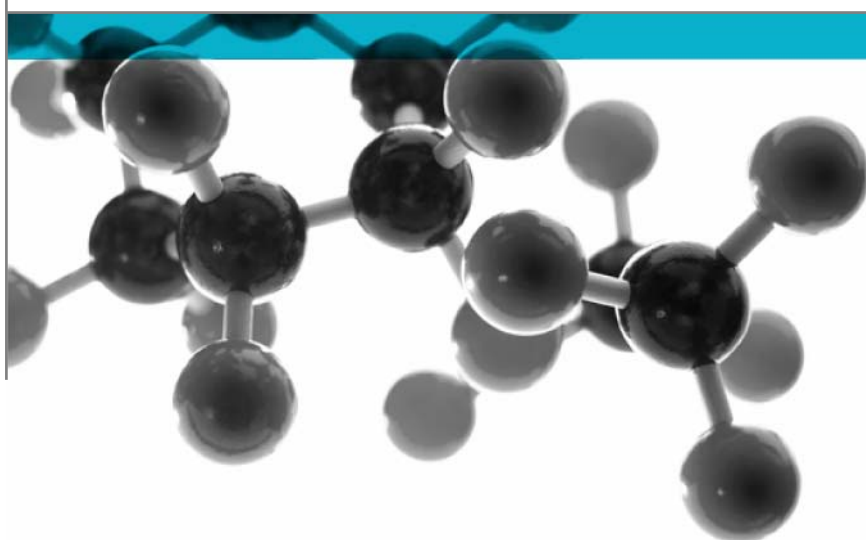


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# BS 476: Part 6: 1989+A1:2009



## Method Of Test For Fire Propagation For Products

A Report To: Parex USA Incorporated

Document Reference: 189824

Date: 15<sup>th</sup> April 2010

Issue No.: 2

Page 1

Testing  
Advising  
Assuring



## Executive Summary

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

| Generic Description  | Product reference  | Thickness or application rate  | Weight per unit area or density |
|--|--|--|---------------------------------|
| External Wall Insulation System  | "Parex Standard System"                                  | 50mm   | 17.3kg/m <sup>2</sup> *         |
| <b>Individual components used to manufacture composite:</b>                          |  |  |                                 |
| Acrylic latex  | "Parex DPR Finish"                                       | 2.5kg/m <sup>2</sup>   | 1.75g/cm <sup>3</sup>           |
| Glass fibre fabric   | "Standard Mesh"  | 0.47mm   | 160g/m <sup>2</sup>             |
| Glass fibre fabric   | "Heavy Mesh"   | 1.1mm  | 525g/m <sup>2</sup>             |
| Portland cement-acrylic  | "Parex Base Coat & Adhesive 121" / "Maite Monocomposant" | 2 <sup>nd</sup> coat: 2.5 kg/m <sup>2</sup><br>1 <sup>st</sup> coat: 4.5 kg/m <sup>2</sup> | 1.45 g/cm <sup>3</sup>          |
| Moulded bead expanded polystyrene  | "Aerobord"   | 35mm *   | 14kg/m <sup>3</sup>             |
| Magnesium base render board  | Unable to provide  | 9mm  | 1050kg/m <sup>3</sup>           |
| *determined by Exova Warringtonfire  |  |  |                                 |
| Please see page 5 of this test report for the full description of the product tested |  |  |                                 |

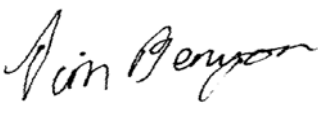
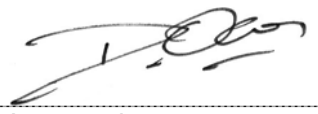
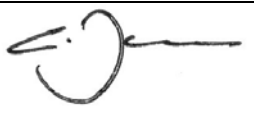
**Test Sponsor** Parex USA Incorporated, 4125 E. LA Palma Ave, Anaheim, California, 92807, USA

**Test Results:**

|                                  |              |
|----------------------------------|--------------|
| <b>Fire propagation index, I</b> | <b>= 7.4</b> |
| <b>Sub index, i<sub>1</sub></b>  | <b>= 0.1</b> |
| <b>Sub index, i<sub>2</sub></b>  | <b>= 6.2</b> |
| <b>Sub index, i<sub>3</sub></b>  | <b>= 1.1</b> |

**Date of Test** 20<sup>th</sup> January 2010

## Signatories

|   |  |
|---|--|
|  |  |
| Responsible Officer<br>T Benyon *<br>Technical Officer                              | Approved<br>D. J. Owen *<br>Senior Technical Officer                                 |
|  | * For and on behalf of <b>Exova Warringtonfire.</b>                                  |
| Authorised<br>C. Dean *<br>Operations Manager                                       | Report Issued: 15 <sup>th</sup> April 2010   |

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## Test Details

|  |  |
|--|--|
| <b>Purpose of test</b>                         | <p>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".</p> <p>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.</p>  |
| <b>Scope of test</b>                           | <p>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.</p>   |
| <b>Fire test study group/EGOLF</b>             | <p>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.</p>   |
| <b>Instruction to test</b>                     | <p>The test was conducted on the 20<sup>th</sup> January 2010 at the request of Parex USA Incorporated, the sponsor of the test.</p>   |
| <b>Provision of test specimens</b>             | <p>The specimens were supplied by the sponsor of the test. <b>Exova Warringtonfire</b> was not involved in any selection or sampling procedure.</p>  |
| <b>Conditioning of specimens</b>               | <p>The specimens for testing to BS 476: Part 6: 1989+A1: 2009 together with the specimens for testing to BS 476: Part 7: 1997 were received on the 22<sup>nd</sup> December 2010.</p> <p>Prior to the tests, all of the specimens were conditioned to constant mass at a temperature of <math>23 \pm 2^{\circ}\text{C}</math> and a relative humidity of <math>50 \pm 5\%</math>. One specimen from the total sample submitted for test was selected for constant mass verification.</p> |
| <b>Form in which the specimens were tested</b> | <p>Composite - Combination of materials which are generally recognised in building constructions as discrete entities, e.g. coated or laminated materials.</p>   |
| <b>Exposed face</b>                            | <p>The coated face of the specimens was exposed to the heating conditions of the test.</p>   |

## 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          |                                   | External Wall Insulation System  |   |
| Overall product reference    |                                   | "Parex Standard System"  |   |
| Overall thickness            |                                   | 50mm (stated by sponsor)<br>51.6mm (determined by <b>Exova Warringtonfire</b> )  |   |
| Overall weight per unit area |                                   | 17.3kg/m <sup>2</sup> (determined by <b>Exova Warringtonfire</b> )   |   |
| Product configuration        |                                   | <ul style="list-style-type: none"> <li>• Final coating(Test face)</li> <li>• Second layer of "Parex Base Coat &amp; Adhesive 121" / "Maite Monocomposant" coating with embedded standard reinforcing scrim</li> <li>• First layer of "Parex Base Coat &amp; Adhesive 121" / "Maite Monocomposant" coating with embedded heavy reinforcing scrim</li> <li>• Polystyrene Insulation</li> <li>• "Parex Base Coat &amp; Adhesive 121" / "Maite Monocomposant"</li> <li>• Magnesium base board</li> </ul> |   |
| Reinforced coating system    | Final coating product (Test face) | Generic type   | Acrylic latex   |
|                              |                                   | Product reference  | "Parex DPR Finish"  |
|                              |                                   | Composition details  | Mineral aggregate, acrylic latex binder, TiO <sub>2</sub> pigment |
|                              |                                   | Name of manufacturer   | Parex USA Incorporated  |
|                              |                                   | Colour   | "White"   |
|                              |                                   | Number of coats  | 1   |
|                              |                                   | Application rate per coat  | 2.5kg/m <sup>2</sup>  |
|                              |                                   | Application method   | Trowel  |
|                              |                                   | Specific gravity   | 1.75  |
|                              |                                   | Flame retardant details  | <b>See Note 1 below</b>   |
|                              | Curing process                    | Air dry  |   |
|                              | Standard reinforcing Scrim        | Generic type   | Glass fibre fabric  |
|                              |                                   | Product reference  | "Standard Mesh"   |
|                              |                                   | Name of manufacturer   | Vertex, a.s.  |
|                              |                                   | Colour   | "White"   |
|                              |                                   | thickness  | 0.47mm  |
|                              |                                   | Weight per unit area   | 160g/m <sup>2</sup>   |
|                              |                                   | Cell dimensions (length x width)   | 3.5mm x 3.5mm   |
| Flame retardant details      |                                   | <b>See Note 2 below</b>  |   |

|                                |   |   |  |
|--------------------------------|---|---|--|
|                                | Heavy reinforcing scrim                           | Generic type  | Glass fibre fabric   |
|                                |   | Product reference   | "Heavy Mesh"   |
|                                |   | Name of manufacturer  | Vertex, a.s.   |
|                                |   | Colour  | "White"  |
|                                |   | thickness   | 1.1mm  |
|                                |   | Weight per unit area  | 525g/m <sup>2</sup>  |
|                                |   | Cell dimensions (length x width)                                    | 5mm x 5mm  |
|                                |   | Flame retardant details   | <b>See Note 2 below</b>  |
|                                | Coating product / adhesive                        | Generic type  | Portland cement-acrylic  |
|                                |   | Product reference   | "Parex Base Coat & Adhesive 121" / "Maite Monocomposant"                                   |
|                                |   | Name of manufacturer  | Parex USA, Inc.  |
|                                |   | Colour  | "Gray"   |
|                                |   | Number of coats   | 2  |
|                                |   | Application rate per coat   | 2 <sup>nd</sup> coat: 2.5 kg/m <sup>2</sup><br>1 <sup>st</sup> coat: 4.5 kg/m <sup>2</sup> |
|                                |   | Application method  | Trowel   |
|                                |   | Specific gravity  | 1.45 (Paste prior to addition of portland cement)  |
|                                |   | Flame retardant details   | <b>See Note 1 below</b>  |
|                                |   | Curing process per coat   | Air Dry  |
|                                |   | Polystyrene Insulation  | General description  |
| Generic type                   | Moulded bead expanded polystyrene                 |   |  |
| Trade name / product reference | "Aerobord"  |   |  |
| Name of manufacturer           | Aerobord  |   |  |
| Thickness                      | 35mm (determined by <b>Exova Warringtonfire</b> ) |   |  |
| Colour                         | "White"   |   |  |
| Density                        | 14kg/m <sup>3</sup>                               |   |  |
| Flame retardant details        | <b>See Note 2 below</b>                           |   |  |
| Substrate                      | General description                               | Magnesium base render board   |  |
|                                | Trade name / product reference                    | <b>See Note 2 below</b>   |  |
|                                | Composition details                               | CaCO <sub>3</sub> , MgO, MgCl <sub>2</sub> and glass and fibre mesh |  |
|                                | Name of supplier                                  | "Tradewood/Unico Render-Pro"  |  |
|                                | Thickness   | 9mm   |  |
|                                | Colour  | "White"   |  |
|                                | Density   | 1050kg/m <sup>3</sup>   |  |
|                                | Amount of flame retardant                         | <b>See Note 1 below</b>   |  |

|   |   |
|---|---|
| Brief description of assembly process of complete product | <p>1) Adhere polystyrene insulation to magnesium base board using “Parex Base Coat &amp; Adhesive 121” / “Maite Monocomposant”.</p> <p>2) Apply 1st coat of “Parex Base Coat &amp; Adhesive 121 “ / “Maite Monocomposant”, to polystyrene foam, embed heavy scrim.</p> <p>3) Apply 2<sup>nd</sup> coat of “Parex Base Coat &amp; Adhesive 121” / “Maite Monocomposant”, to first coat, embed standard scrim.</p> <p>4) Apply “Parex DPR Finish”</p> |
|---|---|

**Note 1: The sponsor of the test has confirmed that no flame retardant additives were utilised in the production of this component.**

**Note 2: 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.**

|                                    |              |
|------------------------------------|--------------|
| <b>Fire propagation index, I</b>   | <b>= 7.4</b> |
| <b>Sub index, <math>i_1</math></b> | <b>= 0.1</b> |
| <b>Sub index, <math>i_2</math></b> | <b>= 6.2</b> |
| <b>Sub index, <math>i_3</math></b> | <b>= 1.1</b> |

**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.

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Table 1

Laboratory Record Sheet
FIRE PROPAGATION TEST - BS 476:PART 6:1989+A1:2009

Specimen No. : 1

Date : 20-Jan-10

| 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                                | 11                                     | 14  | 0.00          |                                |
| 1.00                                | 17                                     | 19  | 0.00          |                                |
| 1.50                                | 24                                     | 26  | 0.00          |                                |
| 2.00                                | 29                                     | 30  | 0.00          |                                |
| 2.50                                | 34                                     | 35  | 0.00          |                                |
| 3.00                                | 39                                     | 38  | 0.03          | 0.03                           |
| 4.00                                | 76                                     | 67  | 0.23          |                                |
| 5.00                                | 142                                    | 108                                       | 0.68          |                                |
| 6.00                                | 208                                    | 136                                       | 1.20          |                                |
| 7.00                                | 244                                    | 157                                       | 1.24          |                                |
| 8.00                                | 280                                    | 173                                       | 1.34          |                                |
| 9.00                                | 288                                    | 186                                       | 1.13          |                                |
| 10.00                               | 277                                    | 196                                       | 0.81          | 6.63                           |
| 12.00                               | 256                                    | 213                                       | 0.36          |                                |
| 14.00                               | 251                                    | 222                                       | 0.21          |                                |
| 16.00                               | 252                                    | 231                                       | 0.13          |                                |
| 18.00                               | 255                                    | 238                                       | 0.09          |                                |
| 20.00                               | 259                                    | 244                                       | 0.08          | 0.87                           |
| <b>Total Index of Performance S</b> |  |   | <b>=</b>      | <b>7.53</b>                    |

SubIndex s1                      0.03

SubIndex s2                      6.63

SubIndex s3                      0.87

Index of Performance S        7.53

Table 2

Laboratory Record Sheet
**FIRE PROPAGATION TEST - BS 476:PART 6:1989+A1:2009**

Specimen No. : 2

Date : 20-Jan-10

| 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                                | 12                                     | 14  | 0.00          |                                |
| 1.00                                | 18                                     | 19  | 0.00          |                                |
| 1.50                                | 25                                     | 26  | 0.00          |                                |
| 2.00                                | 31                                     | 30  | 0.05          |                                |
| 2.50                                | 36                                     | 35  | 0.04          |                                |
| 3.00                                | 40                                     | 38  | 0.07          | 0.16                           |
| 4.00                                | 73                                     | 67  | 0.15          |                                |
| 5.00                                | 127                                    | 108                                       | 0.38          |                                |
| 6.00                                | 169                                    | 136                                       | 0.55          |                                |
| 7.00                                | 231                                    | 157                                       | 1.06          |                                |
| 8.00                                | 267                                    | 173                                       | 1.18          |                                |
| 9.00                                | 291                                    | 186                                       | 1.17          |                                |
| 10.00                               | 294                                    | 196                                       | 0.98          | 5.46                           |
| 12.00                               | 277                                    | 213                                       | 0.53          |                                |
| 14.00                               | 268                                    | 222                                       | 0.33          |                                |
| 16.00                               | 267                                    | 231                                       | 0.23          |                                |
| 18.00                               | 274                                    | 238                                       | 0.20          |                                |
| 20.00                               | 281                                    | 244                                       | 0.19          | 1.47                           |
| <b>Total Index of Performance S</b> |  |   | <b>=</b>      | <b>7.09</b>                    |

SubIndex s1                      0.16

SubIndex s2                      5.46

SubIndex s3                      1.47

Index of Performance S        7.09

Table 3

Laboratory Record Sheet
**FIRE PROPAGATION TEST - BS 476:PART 6:1989+A1:2009**

Specimen No. : 3

Date : 20-Jan-10

| 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                                | 13                                     | 14  | 0.00          |                                |
| 1.00                                | 18                                     | 19  | 0.00          |                                |
| 1.50                                | 25                                     | 26  | 0.00          |                                |
| 2.00                                | 30                                     | 30  | 0.00          |                                |
| 2.50                                | 35                                     | 35  | 0.00          |                                |
| 3.00                                | 40                                     | 38  | 0.07          | 0.07                           |
| 4.00                                | 77                                     | 67  | 0.25          |                                |
| 5.00                                | 138                                    | 108                                       | 0.60          |                                |
| 6.00                                | 199                                    | 136                                       | 1.05          |                                |
| 7.00                                | 244                                    | 157                                       | 1.24          |                                |
| 8.00                                | 274                                    | 173                                       | 1.26          |                                |
| 9.00                                | 291                                    | 186                                       | 1.17          |                                |
| 10.00                               | 286                                    | 196                                       | 0.90          | 6.47                           |
| 12.00                               | 264                                    | 213                                       | 0.43          |                                |
| 14.00                               | 259                                    | 222                                       | 0.26          |                                |
| 16.00                               | 259                                    | 231                                       | 0.18          |                                |
| 18.00                               | 263                                    | 238                                       | 0.14          |                                |
| 20.00                               | 271                                    | 244                                       | 0.14          | 1.14                           |
| <b>Total Index of Performance S</b> |  |   | <b>=</b>      | <b>7.68</b>                    |

SubIndex s1                      0.07

SubIndex s2                      6.47

SubIndex s3                      1.14

Index of Performance S        7.68

## Revision History

|   |   |
|---|---|
| Issue No : 1  | Issue Date: 14 <sup>th</sup> April 2010 |
| Revised By: T. Benyon   | Approved By: C. Dean                    |
| Reason for Revision: Inaccuracy in product description table. |   |

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