

# APPROVAL REPORT

## APPROVAL TESTING OF POLYPHEN PANEL WALL AND CEILING PANELS INSULATED WITH POLYPHEN™ FOR INSTALLATION TO A MAXIMUM HEIGHT OF 30 ft. (9.1 m)

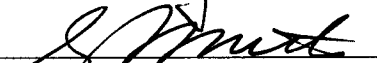
### Prepared for:

**Polyphen (Australia) Pty Ltd.  
P.O. Box 199  
Queenscliff 3225  
Victoria, Australia**

**Project ID: 3026113**

**Class: 4880**

**Date of Approval:** 2 February 2008

**Authorized by:**   
George Smith, Assistant Vice President

**APPROVAL TESTING OF POLYPHEN PANEL WALL AND CEILING PANELS  
INSULATED WITH POLYPHEN™ FOR INSTALLATION  
TO A MAXIMUM HEIGHT OF 30 FT (9.1 M)**

from

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**I INTRODUCTION**

1.1 Polyphen (Australia) Pty Ltd. submitted their Polyphen Panel wall and ceiling panels, insulated with Polyphen™ polystyrene and phenolic composite core, to determine if they meet the Approval requirements of the **Standard** listed below for Class 1 insulated wall and ceiling panels to a maximum height of 30 ft. (9.1 m).

1.2 This Report may be reproduced only in its entirety and without modification.

1.3 **Standard:**

<b>Title</b>	<b>Class Number</b>	<b>Date</b>
Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, and Exterior Wall Systems	4880	October, 2005

1.4 Examination included a Flammability Characterization conducted under project ID 3020247.

1.5 Tests show that Polyphen Panel wall and ceiling panels insulated with Polyphen™ core, as tested, meet the Approval requirements of the **Standard** listed above for Class 1 insulated wall and ceiling panels for installation to a maximum height of 30 ft. (9.1 m).

1.6 **Listings:** The tested constructions meet the Approval criteria of FM Approvals when installed as specified in the **CONCLUSIONS** of this report and when Approval is effective will be listed in the FM Approval Guide.

**II DESCRIPTION**

Polyphen Panel wall and ceiling panels consist of polyester coated steel facers and a polystyrene and phenolic composite core known as Polyphen™. Panels are 47.5 in. (1200 mm) wide, maximum 10 in. (250 mm) thick, and are available in various lengths. The core has a density of 2.4-2.7 lb/ft<sup>3</sup> (38-42 kg/m<sup>3</sup>) and is adhered to the facers with a two-part polyurethane adhesive. Panel edges are tongue and groove. Flashing is 0.024 in. (0.6 mm) thick steel painted with the same coating as the facers and is secured with stainless steel rivets. The core formulation and panel specifications are on file at FM Approvals.

### III EXAMINATIONS AND TESTS

- 3.1 Samples were submitted for examination and testing as follows:
- 3.1.1 Tests conducted were as required by the **Standard** listed in paragraph 1.3 above. UBC 26-3 room testing was waived due to satisfactory results of similar wall and ceiling panels tested under project ID 3020247.
- 3.1.2 Production of sample Polyphen™ cores was witnessed by a representative of FM Approvals at the HiTech Poly Ltd. production facility in Tauranga, New Zealand on July 22, 2004. All samples were considered to be representative of standard production and were examined and tested as indicated below.
- 3.1.3 Sample panels incorporated into test samples were selected by FM Approvals personnel. Test samples were prepared by, or under the supervision of, FM Approvals personnel.
- 3.1.4 All data is on file at FM Approvals under Project ID 3020247 along with other documents and correspondence applicable to this program.
- 3.2 Flammability Characterization
- 3.2.1 A series of measurements was made in the 50 kW FM Approvals Flammability Apparatus to determine the material flammability properties of the Polyphen™ core.
- 3.2.1.1 The critical heat flux for ignition ( $q''_{cr}$ ) and the thermal response parameter (TRP) were determined by exposing the coated surfaces of several samples to known radiant heat fluxes and recording the time to piloted ignition. The inverse square root of the time to ignition was plotted against the applied external radiant heat flux. The intercept on the applied heat flux axis is defined as the critical heat flux for ignition (the value of the external heat flux at or below which the sample can no longer achieve piloted ignition during the 15 minute exposure). The inverse of the slope at large external heat fluxes is the thermal response parameter (a measure of the thermal inertia of the material).
- 3.2.1.2 The chemical heat of combustion ( $\Delta H_{ch}$ ) was determined by measuring the sample mass loss and heat generation rate history during exposure of a sample to an external heat flux of 50 kW/m<sup>2</sup>. The chemical heat of combustion was obtained by measuring the chemical heat release rate by CO/CO<sub>2</sub> generation at the applied external heat flux, time integrating to obtain the total energy released and dividing by the total mass lost.
- 3.2.1.3 The convective flame spread parameter (FSP<sub>c</sub>) was determined from the chemical heat of combustion, effective heat of gasification, net heat flux and the thermal response parameter.
- 3.2.1.4 Performance in the 50 kW FM Approvals Flammability Apparatus is considered acceptable if the FSP<sub>c</sub> is 0.39 or less.
- 3.2.2 A specimen of Polyphen™ core was cut into 3 by 4 by 4 in. (76 by 102 by 102 mm) samples. Each sample was coated with a high absorptivity selective black coating prior to placement in the sample holder of the 50 kW FM Approvals Flammability Apparatus.

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3.2.3 The material flammability properties of the test samples were as follows.

		Class 1 limit
$\bar{H}_{ch}$ (kJ/g)	21.2	-
$q''_{cr}$ (kW/m <sup>2</sup> )	25	-
TRP (kW/m <sup>2</sup> s <sup>-1/2</sup> )	194	-
FSP <sub>c</sub> (s <sup>-1/2</sup> )	0.17	0.39

#### IV MARKING

- 4.1 The manufacturer shall mark each panel or packing container with the manufacturer's name and product trade name. In addition, the panel or container must be marked with the Approval Mark of FM Approvals.
- 4.2 Markings denoting Approval by FM Approvals shall be applied by the manufacturer only within and on the premises of manufacturing locations which are under the FM Approvals Facilities and Procedures Audit program.
- 4.3 The manufacturer agrees that use of the FM Approvals name or Approval Mark is subject to the conditions and limitations of the Approval by FM Approvals. Such conditions and limitations must be included in all references to Approval by FM Approvals.

#### V REMARKS

The Polyphen™ core has not been evaluated for the toxicity of the products of combustion.

#### VI FACILITIES AND PROCEDURES AUDITS

The Polyphen™ manufacturing location at HiTech Poly Ltd in Tauranga, New Zealand and Polyphen Panel manufacturers Bondor New Zealand in Auckland, New Zealand and The Insulation Panel and Door Co. Ltd in Palmerston North, New Zealand are subject to periodic audit inspections to determine that the quality and uniformity of the materials have been maintained and will provide the same level of performance as originally Approved. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

#### VII MANUFACTURER'S RESPONSIBILITIES

- 7.1 To ensure compliance with his procedures in the field, the manufacturer shall supply to the installer and owner such necessary instruction or assistance required to produce the desired performance achieved in the tests.
- 7.2 The manufacturer shall notify FM Approvals of any planned change in the Approved product, prior to general sale or distribution, using Form 797, Approved Product Revision Report.

### VIII DOCUMENTATION

The following documents describe Polyphen™ insulation and Polyphen Panel wall and ceiling panels and are filed under project ID 3020247.

Documents	Revision	Description
Facilities And Procedures Audit Manual for Polyphen™ Foam Core	Issued 1/06	F&PA Manual
Facilities And Procedures Audit Manual for Unipanel™ and Polyphen Panel Wall and Ceiling Panels	Issued 1/06	F&PA Manual

### IX CONCLUSIONS

- 9.1 Test results indicate that Polyphen Panel wall and ceiling panels produced with Polyphen™ polystyrene and phenolic composite core, as described in paragraph II, meet the Approval requirements of the **Standard** listed above for Class 1 insulated wall and ceiling panels to a maximum height of 30 ft (9.1 m).
- 9.2 Tests show 1) that the panels in and of themselves would not create a need for automatic sprinklers and 2) that the panels would be acceptable in a combustibile occupancy protected by automatic sprinklers as defined by FM Global Loss Prevention Data Sheets.
- 9.3 The steel facings of the panels must be positively secured to the foam core by 1) attachment of the entire panel assembly to supporting structural members with mechanical fasteners or 2) positive attachment of the interior panel facer to the external panel facer with mechanical fasteners.
- 9.4 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 9.5 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

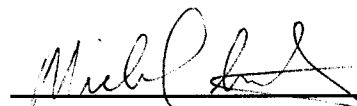
**TESTING SUPERVISED BY:** Michael Slocumb

**PROJECT DATA RECORD:** none

**ORIGINAL TEST DATA:** project ID 3020247

**ATTACHMENTS:** None

**REPORT BY:**

  
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**REPORT REVIEWED BY:**

  
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