

**Test on palm fibre and MgO composite board at 50-kW/m<sup>2</sup>  
irradiance in accordance with AS/NZS 3837:1998**

**Report number FNK 10294**  
CSIRO job number NK6432  
Date of Issue: 27 October 2011

Client  
**PalmEco Tech Australia Pty Ltd**

**Commercial-in-confidence**



**CSIRO – Materials Science and Engineering**  
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## SUMMARY

SPONSORED INVESTIGATION REPORT No. FNK 10294

TEST ON PALM FIBRE AND MAGNESIUM OXIDE COMPOSITE BOARD  
AT 50-kW/m<sup>2</sup> IRRADIANCE IN ACCORDANCE WITH AS/NZS 3837:1998

Sample Identification:

PalmEco Fire Board

Sponsor:

PalmEco Tech Australia Pty Ltd  
4/77 Connells Point Road  
SOUTH HURSTVILLE NSW  
AUSTRALIA

Manufacturer:

Zhongshan PalmEco Building Materials Co. Ltd  
NO. 3 Junmin Road  
Shenxi Industrial Park  
Shen Wan Town  
Zhongshan City  
GUANGDONG PROVINCE  
CHINA

Job Number:

NK6432

Test Date:

10 October 2011

Description of Sample:

The sponsor described the tested specimen as a composite board made from a mixture of palm fibre and magnesium oxide, having one layer of glass-reinforced fibre mesh, without post-manufacture surface coating or chemical treatment.

Nominal total thickness: 12 mm  
Nominal total density: 1100 kg/m<sup>3</sup>  
Colour: light beige

Documentation:

The following documents were supplied by the sponsor as a full and complete description of the sample:

Test Agreement and form FTAF33 dated 7 September 2011.

Conditioning of Specimens:

Prior to the test, the specimens were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 10%.

**Test Method:**

Tests were performed in accordance with Australian/New Zealand Standard 3837:1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter. All test specimens were exposed in the horizontal orientation with the standard pilot operating.

Nominally 100 x 100-mm specimens were tested as supplied. Specimens were tested with the use of an edge frame. The edge frame reduces the test surface area to 0.0088-m<sup>2</sup>, and this is the area used in calculations.

For the test, specimens were wrapped in aluminium foil so that the four edges and the bottom of the specimen were covered. The foil formed a shallow tray that retained any molten material during testing.

Three specimens were tested at an irradiance level of 50-kW/m<sup>2</sup>.

The nominal exhaust system flow rate for all tests was 0.024-m<sup>3</sup>/s.

A measured quantity of ethanol was burnt to obtain a C factor to be used in the Heat Release calculations.

**Duration of Test:**

The test is terminated when any one of the following is applicable:

1. 2 minutes have passed since all flaming from the specimen ceased; and
2. the average mass loss over a 1 minute period has dropped below 150-g/m<sup>2</sup>;
3. 60 minutes have elapsed; or
4. the specimen fails to ignite after a 10 minute exposure.

**Observations:****Specimen 1**

There was no discernible smoke from the specimen after prolonged exposure to the test. The specimen failed to ignite during the test. The test was terminated when 10 minutes had elapsed.

**Specimen 2**

There was no discernible smoke from the specimen after prolonged exposure to the test. The specimen failed to ignite during the test. The test was terminated when 10 minutes had elapsed.

**Specimen 3**

There was no discernible smoke from the specimen after prolonged exposure to the test. The specimen failed to ignite during the test. The test was terminated when 10 minutes had elapsed.

Results:

The results of tests as specified in the Standard are summarised in Table 1.

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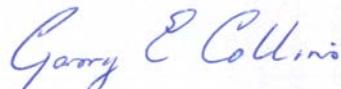
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TESTED BY:



Heherson Alarde  
Testing Officer

27 October 2011



Garry E Collins  
Manager, Fire Testing and Assessments

Test Details:

Date of test: 10/10/11

Test Report Date: 27/10/11

Ethanol burn ('C' factors): 0.046236

|          | Irradiance (kW/m <sup>2</sup> ) | Time to sustained burning (s) | Test duration (s) | Thickness (mm) | Specimen mass (g) | Mass remaining (g) | Mass loss (g) | Percent of mass pyrolysed (%) | Average rate of mass loss (g/m <sup>2</sup> .s) | Peak HRR (kW/m <sup>2</sup> ) | Average HRR (first 60s after ign) | Average HRR (first 180s after ign) | Average HRR (first 300s after ign) | Total heat released (MJ/m <sup>2</sup> ) | Average EHC (MJ/kg) | Average specific extinction area (m <sup>2</sup> /kg) |
|----------|---------------------------------|-------------------------------|-------------------|----------------|-------------------|--------------------|---------------|-------------------------------|---|-------------------------------|-----------------------------------|------------------------------------|------------------------------------|--|---------------------|---|
| Sample 1 | 50                              | n/a                           | 600               | 12.22          | 115.33            | 93.23              | 22.10         | 19.16                         | 4.40  | 12.5                          | n/a                               | n/a                                | n/a                                | 3.57                                     | 1.42                | 16.4  |
| Sample 2 | 50                              | n/a                           | 600               | 11.67          | 120.78            | 97.18              | 23.60         | 19.54                         | 4.65  | 10.1                          | n/a                               | n/a                                | n/a                                | 2.27                                     | 0.85                | 8.6   |
| Sample 3 | 50                              | n/a                           | 600               | 11.55          | 121.15            | 97.35              | 23.80         | 19.65                         | 4.67  | 6.3                           | n/a                               | n/a                                | n/a                                | 1.03                                     | 0.38                | 6.7   |
| Mean     |                                 |                               | 600.0             |                | 119.1             | 95.9               | 23.2          | 19.4                          | 4.6   | 9.6                           |                                   |                                    |                                    | 2.3                                      | 0.9                 | 10.6  |
| SD       |                                 |                               | 0.0               |                | 3.3               | 2.3                | 0.9           | 0.3                           | 0.2   | 3.1                           |                                   |                                    |                                    | 1.3                                      | 0.5                 | 5.1   |

Table 1- Results of tests

Figure 1 - Heat Release Rate

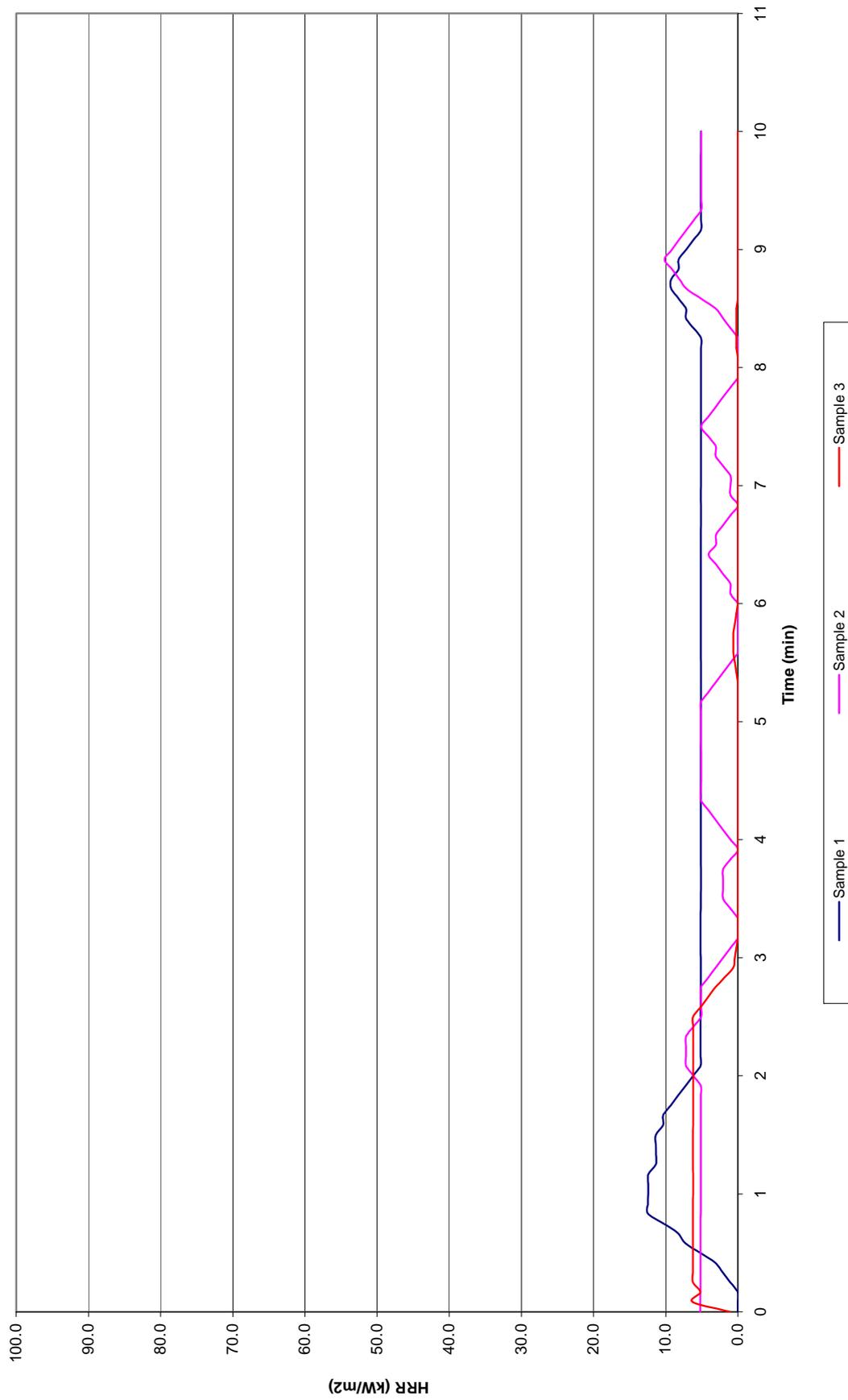
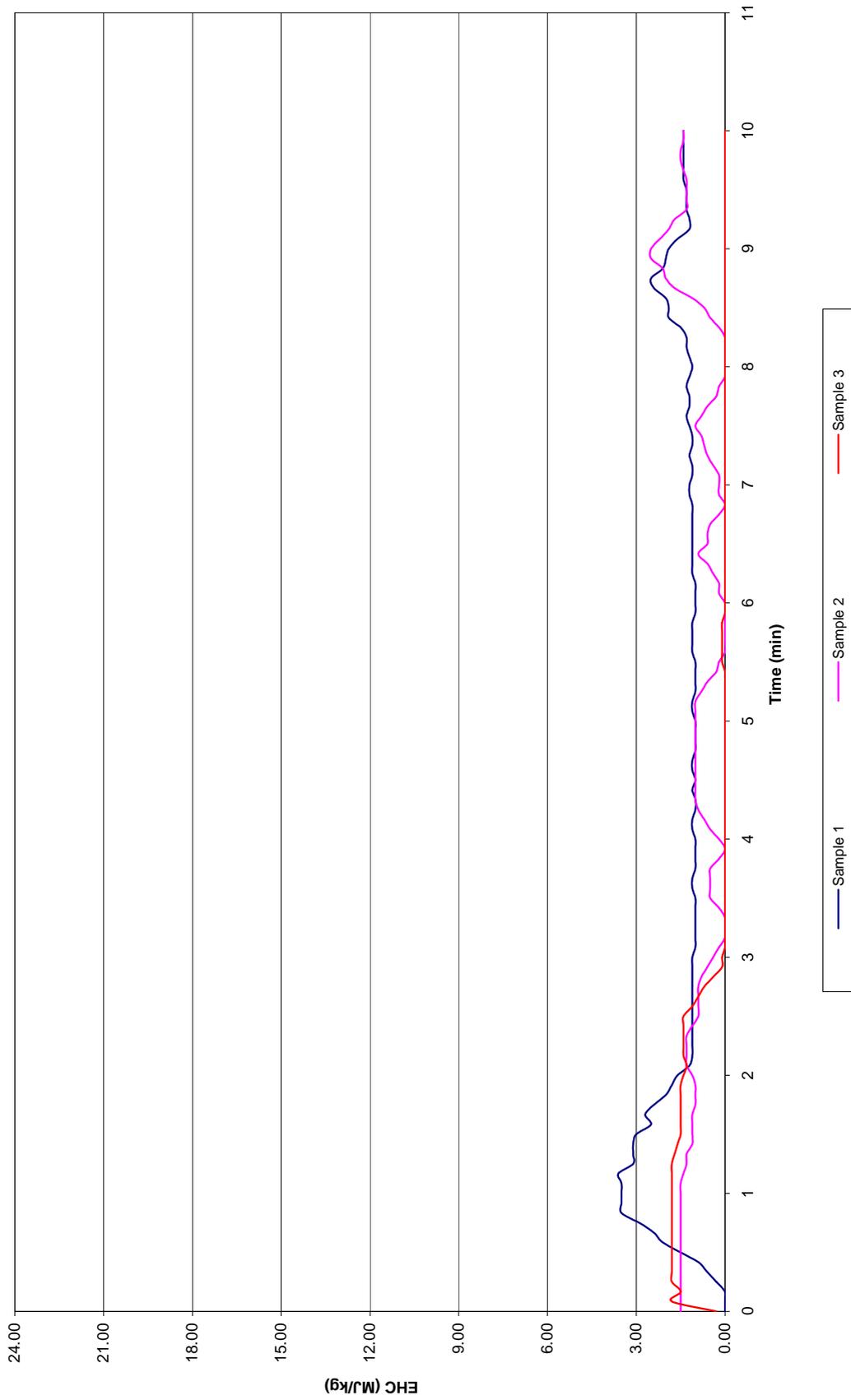


Figure 2 - Effective Heat of Combustion



## Certificate of Assessment 1-1621

# Certificate of Assessment

NK6432

No. 1621

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This is to certify that the specimen described below was tested by the CSIRO Division of Materials Science and Engineering in accordance with Australian/ New Zealand Standard 3837, Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter, 1998, at 50 kW/m<sup>2</sup>, on behalf of:

PalmEco Tech Australia Pty Ltd  
4/77 Connells Point Road  
SOUTH HURSTVILLE NSW  
AUSTRALIA

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FNK 10294.

SAMPLE  
IDENTIFICATION: PalmEco Fire Board

DESCRIPTION OF  
SAMPLE:

The sponsor described the tested specimen as a composite board made from a mixture of palm fibre and magnesium oxide, having one layer of glass-reinforced fibre mesh, without post-manufacture surface coating or chemical treatment.

Nominal total thickness: 12 mm  
Nominal total density: 1100 kg/m<sup>3</sup>  
Colour: light beige

SAMPLE  
CLASSIFICATION: Group Number: Group 1  
(In accordance with Specification A2.4 of the Building Code of Australia.)

Average specific extinction area: 10.6 m<sup>2</sup>/kg  
(Refer to Specification C1.10a section 3(c) of the Building Code of Australia.)

Testing Officer: Heherson Alarde Date of Test: 10 October 2011

Issued on the 27<sup>th</sup> day of October 2011 without alterations or additions.



Garry E Collins  
Manager, Fire Testing and Assessments



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