

**Test on flame-retardant treated Radiata Pine timber at
25-kW/m² irradiance in accordance with AS/NZS 3837:1998**

Report number FNK 9900

CSIRO job number NK6258

Date of Issue: 21 September 2010

Client

Trend Shield Australia Pty Ltd trading as Fire Defender

Commercial-in-confidence



CSIRO – Materials Science and Engineering

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SUMMARY

SPONSORED INVESTIGATION REPORT No. FNK 9900

TEST ON FLAME-RETARDANT TREATED RADIATA PINE TIMBER
AT 25-kW/m² IRRADIANCE IN ACCORDANCE WITH AS/NZS 3837:1998

Sample Identification:

Fire Defender – Timber Defence

Sponsor:

Trend Shield Australia Pty Ltd trading as Fire Defender
13 Burwood Terrace
CLONTARF QLD
AUSTRALIA

Manufacturers:

Fire Defender
13 Burwood Terrace
CLONTARF QLD
AUSTRALIA

Job Number:

NK6258

Test Date:

23 September 2010

Description of Sample:

The sponsor described the tested specimen as two heavy coats of clear liquid Fire Defender Timber Defence fire retardant applied to Radiata Pine natural timber.

Nominal total thickness: 38 mm
Nominal mass: 18.5 kg/m²
Colour: clear coating over natural timber (light brown)

Documentation:

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

Test Agreement and form FTAF33 dated 30 July 2010.

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 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-m², 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.

Six specimens were tested at an irradiance level of 25-kW/m².

The nominal exhaust system flow rate for all tests was 0.024-m³/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/m²;
3. 60 minutes have elapsed; or
4. the specimen fails to ignite after a 10 minute exposure.

Observations:**Specimen 1**

The specimen began to char and smoke after 6 seconds exposure to the test. The specimen ignited during the test. The test was terminated when 60 minutes had elapsed.

Specimen 2

The specimen began to char and smoke after 5 seconds exposure to the test. The specimen ignited during the test. The test was terminated when 60 minutes had elapsed.

Specimen 3

The specimen began to char and smoke after 5 seconds exposure to the test. The specimen ignited during the test. The test was terminated when 60 minutes had elapsed.

Specimen 4

The specimen began to char and smoke after 5 seconds exposure to the test. The specimen ignited during the test. The test was terminated when 60 minutes had elapsed.

Specimen 5

The specimen began to char and smoke after 4 seconds exposure to the test. The specimen failed to ignite during the test. The test was terminated when 60 minutes had elapsed.

Specimen 6

The specimen began to char and smoke after 5 seconds exposure to the test. The specimen failed to ignite during the test. The test was terminated when 60 minutes had elapsed.

Results:

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

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APPENDICES:

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TESTED BY:


Heherson Alarde
Testing Officer

23 September 2010


Garry E Collins
Manager, Fire Testing and Assessments

Test Details:

Date of test: 23/8/10
 Test Report Date: 21/9/10
 Ethanol burn ('C' factors): 0.044104

	Irradiance (kW/m ²)	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 ² .s)	Peak HRR (kW/m ²)	Average HRR (first 60s after ign)	Average HRR (first 180s after ign)	Average HRR (first 300s after ign)	Total heat released (MJ/m ²)	Average EHC (MJ/kg)	Average specific extinction area (m ² /kg)
Sample 1	25	555	3600	38.48	177.42	82.82	94.80	53.43	3.62	50.1	28.3	40.2	37.3	71.70	6.66	26.9
Sample 2	25	875	3600	38.25	181.81	87.61	94.20	51.81	3.62	44.8	31.7	38.8	35.3	54.72	5.11	29.1
Sample 3	25	451	3600	38.57	180.19	78.69	101.50	56.33	3.74	67.1	44.6	48.3	41.2	77.71	6.74	14.5
Sample 4	25	1450	3600	38.23	182.26	93.1	89.20	48.94	3.50	30.3	15.0	23.1	24.5	51.61	5.09	91.8
Sample 5	25		3600	38.24	189.15	114.2	75.00	39.65	3.45	5.1				6.92	0.81	79.7
Sample 6	25		3600	39.23	206.85	136.7	70.20	33.94	3.43	0.8				0.57	0.07	20.5
Mean		832.8	3600.0		186.3	98.8	87.5	47.4	3.6	33.0	29.9	37.5	34.6	43.9	4.1	43.7
SD		449.3	0.0		10.6	22.3	12.3	8.7	0.1	26.2	12.2	10.6	7.2	32.7	2.9	33.1

Table 1- Results of tests

Figure 1- Heat Release Rate

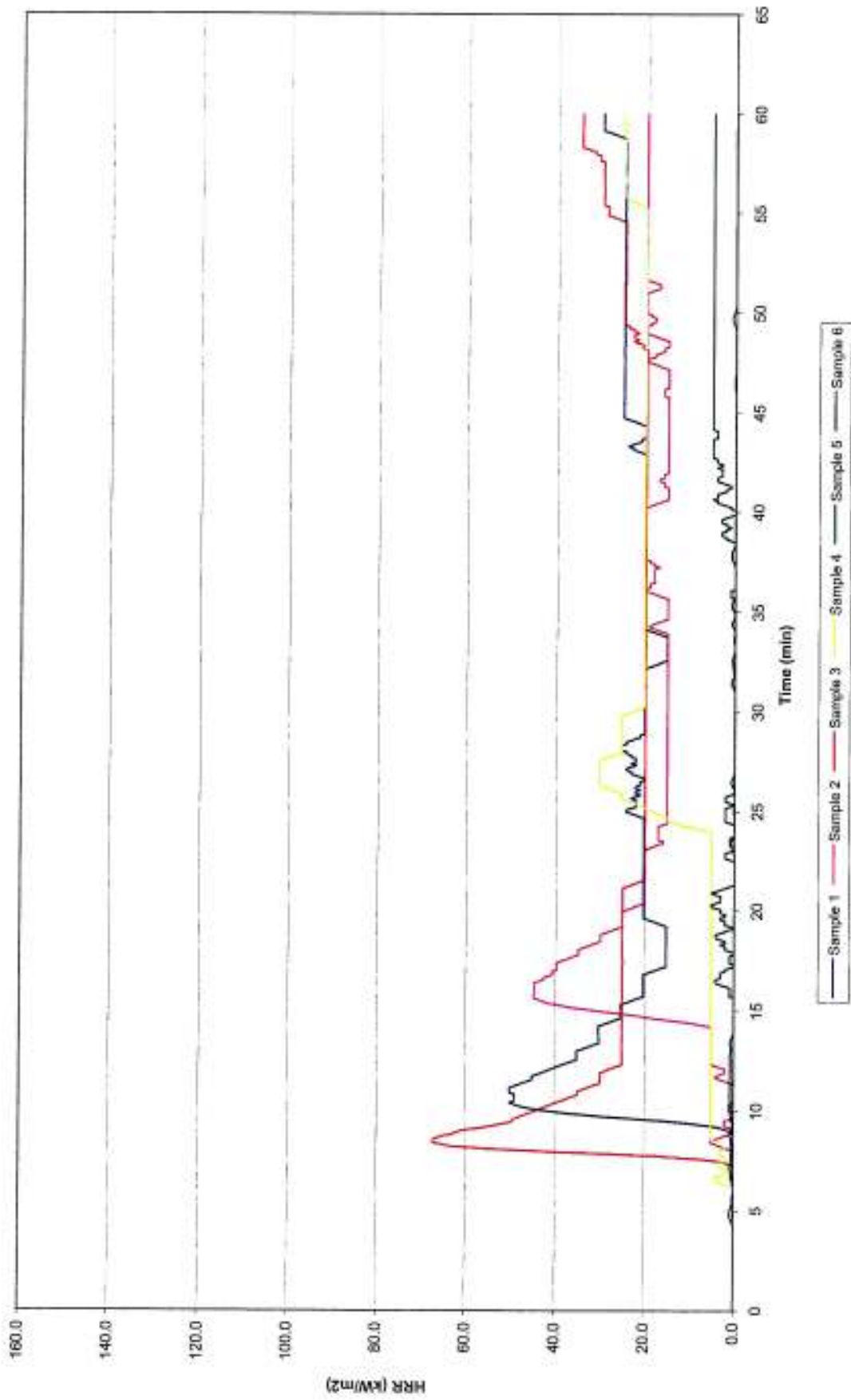
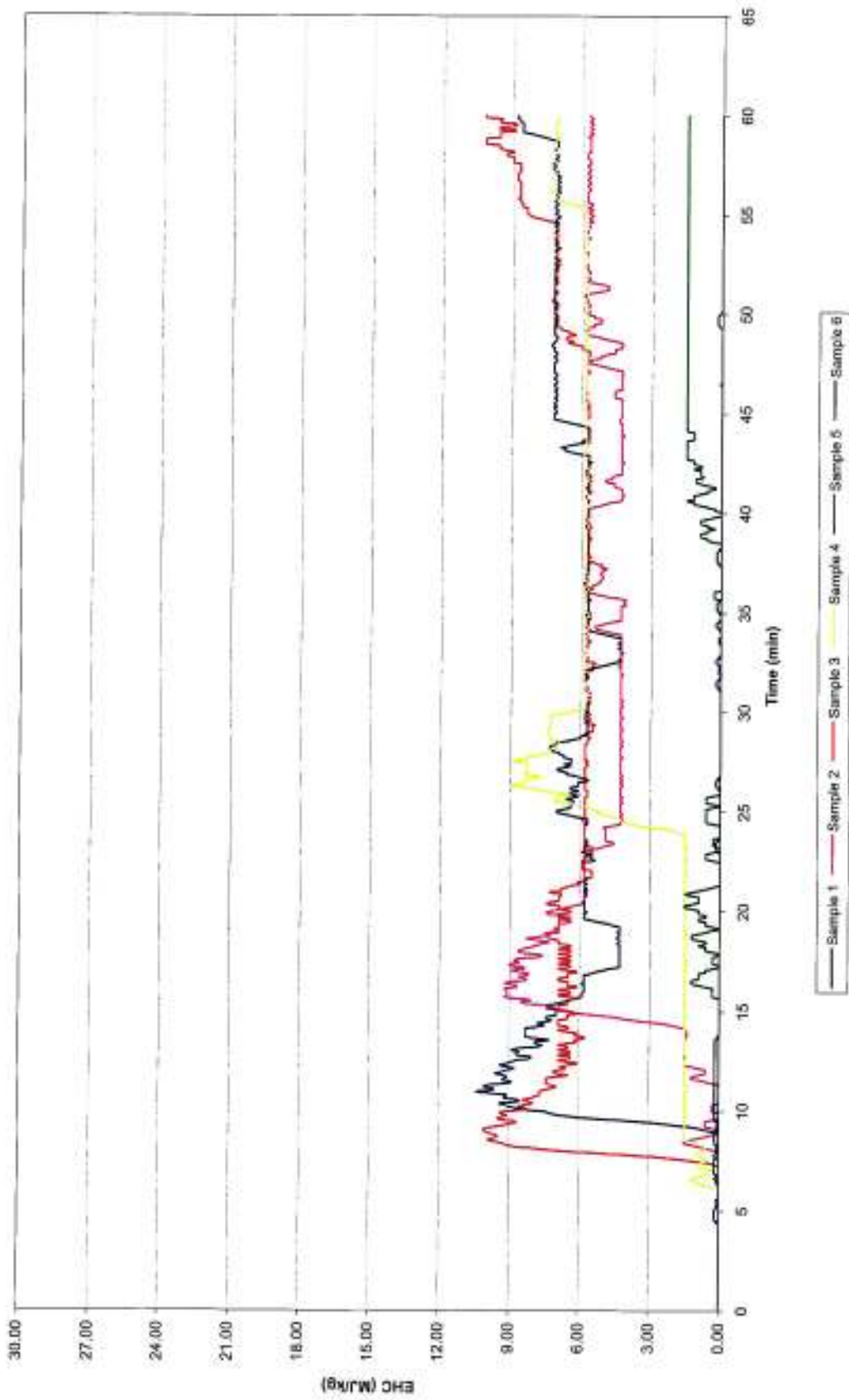


Figure 2- Effective Heat of Combustion



Certificate of Assessment 1-1440

Certificate of Assessment

NK6258

No 1440

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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 Standard 3959:2009 Construction of Buildings in bushfire-prone areas Appendix F, on behalf of:

Trend Shield Australia Pty Ltd trading as Fire Defender
13 Burwood Terrace
CLONTARF QLD
AUSTRALIA

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FNK 9900.

SAMPLE IDENTIFICATION: Fire Defender – Timber Defence

DESCRIPTION OF SAMPLE: The sponsor described the tested specimen as two heavy coats of clear liquid Fire Defender Timber Defence fire retardant applied to Radiata Pine natural timber.

Nominal total thickness: 38 mm
Nominal mass: 18.5 kg/m²
Colour: clear coating over natural timber (light brown)

TEST RESULT:
Maximum Heat Release Rate: 87.1 kW/m²
Average Heat Release Rate: 18.7 kW/m²

The specimen satisfies the requirement for bushfire-resisting timber specified in AS 3959:2009 Construction of Buildings in bushfire-prone area Appendix F.

The specimen has not been subjected to the weathering procedure of ASTM D 2898 Method B as specified by Appendix F F2(b) of AS 3959. At the discretion of the regulatory authority this material may be approved for use in situations where it is protected from the weather as referenced in Appendix F F2(b) of AS 3959.

Testing Officer: Heherson Alarde Date of Test: 23 August 2010

Issued on the 21st day of September 2010 without alterations or additions.


Garry E Collins
Manager, Fire Testing and Assessments



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