

FNK 0166

TEST ON INTUMESCENT PAINT SYSTEM APPLIED TO RADIATA PINE AT 10-kW/m² AND 25-kW/m² IRRADIANCE IN ACCORDANCE WITH AS/NZS 3837:1998

In Confidence to:
CEASE-FIRE TECHNOLOGIES PTY. LTD.

21 October 2004



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SPONSORED INVESTIGATION No. FNK 0166

TEST ON INTUMESCENT PAINT SYSTEM APPLIED TO RADIATA PINE AT
10-kW/m² AND 25-kW/m² IRRADIANCE IN ACCORDANCE WITH AS/NZS 3837:1998

SAMPLE IDENTIFICATION: Cease-Fire FRT (Fire Retardant Timber) System

SPONSOR: Cease-Fire Technologies Pty. Ltd.
32 Mooloolah Meadows Drive
MOOLOOLAH QLD
AUSTRALIA

MANUFACTURER: Cease-Fire Technologies Pty. Ltd.
32 Mooloolah Meadows Drive
MOOLOOLAH QLD
AUSTRALIA

JOB NUMBER: HF07ANK4554

TEST DATES: 21 September 2004, 20 October 2004 ????

DESCRIPTION OF SAMPLE: The sponsor described the tested specimen as an intumescent coating system comprising: one coat of acrylic primer; two coats of flame-retardant intumescent water based coat; and one coat of acrylic exterior UV Grade topcoat. The coatings were applied to 19-mm thick radiata pine.

Nominal wet film thickness of primer:	85 µm
Nominal wet film thickness of intumescent coat:	700 µm
Nominal wet film thickness of topcoat:	170 µm
Colour:	white

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

Test Agreement form and Attachment A dated 11 August 2004.

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 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.



Test No. k0166:

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

Test No. k0180:

Three specimens were tested at an irradiance level of 10-kW/m².

The nominal exhaust system flow rate for all tests was 0.024-m³/s.

A measured quantity of methane 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.

Note: due to the performance of the material, the mass loss criteria was not used to terminate the test.

OBSERVATIONS:**Test No. k0166:****Specimen 1**

The specimen began to smoke and intumesce after 10 seconds exposure to the test. The specimen ignited during the test. The test was terminated when two minutes have passed since all flaming from the specimen ceased.

Specimen 2

The specimen began to intumesce after 11 seconds exposure to the test and smoke after 12 seconds exposure to the test. The specimen ignited during the test. The test was terminated when two minutes have passed since all flaming from the specimen ceased.

Specimen 3

The specimen began to smoke and intumesce after 9 seconds exposure to the test. The specimen ignited during the test. The test was terminated when two minutes have passed since all flaming from the specimen ceased.

Specimen 4

The specimen began to smoke and intumesce after 12 seconds exposure to the test. The specimen ignited during the test. The test was terminated when two minutes have passed since all flaming from the specimen ceased.

Specimen 5

The specimen began to intumesce after 9 seconds exposure to the test and smoke after 12 seconds exposure to the test. Flashing was observed on the specimen after 160 seconds exposure to the test. The specimen failed to ignite during the test. The test was terminated after 10 minutes.

Specimen 6

The specimen began to smoke and intumesce after 10 seconds exposure to the test. The specimen ignited during the test. The test was terminated when two minutes have passed since all flaming from the specimen ceased.

Test No. k0180:

Specimen 1

The specimen began to smoke after 75 seconds exposure to the test. The specimen exhibited some bubbling after 80 seconds exposure to the test. The specimen failed to ignite during the test. The test was terminated after 10 minutes.

Specimen 2

The specimen exhibited some bubbling after 55 seconds exposure to the test. The specimen began to smoke after 110 seconds exposure to the test. The specimen failed to ignite during the test. The test was terminated after 10 minutes.

Specimen 3

The specimen exhibited some bubbling after 60 seconds exposure to the test. The specimen began to smoke after 115 seconds exposure to the test. The specimen failed to ignite during the test. The test was terminated after 10 minutes.

RESULTS:

The results of tests as specified in the Standard for Test No. k0166 are summarised in Table 1.

The results of tests as specified in the Standard for Test No. k0180 are summarised in Table 2.

APPENDICES:

Appendix 1

Figure 1: Graph of heat release rate for each specimen for Test No. k0166..... Page 6

Figure 2: Graph of effective heat of combustion for each specimen for Test No. k0166..... Page 7

Figure 5: Graph of Specific Extinction Area for each specimen for Test No. k0166..... Page 6

Figure 3: Graph of heat release rate for each specimen for Test No. k0180..... Page 8

Figure 4: Graph of effective heat of combustion for each specimen for Test No. k0180..... Page 9

Figure 5: Graph of Specific Extinction Area for each specimen for Test No. k0166..... Page 10

Figure 6: Graph of Specific Extinction Area for each specimen for Test No. k0180..... Page 11

Appendix 2

A copy of Certificate of Assessment No. 532 Page 12

TESTED BY:

Russell Collins
 Testing Officer

Garry E Collins
 Manager, Fire Testing and Assessments

21 October 2004



TEST DETAILS: Test No.: k0180
 Dates of test: 21/9/04 ???
 Test Report Date: 21/10/04
 Methanol burn ('C' factors): ????

Table 2:

	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)	Average HRR (first 600s after ign)	Total heat released (MJ/m ²)	Average EHC (MJ/kg)	Average specific extinction area (m ² /kg)
Sample 1	10	n/a	600	20	98.39	97.5	0.90	0.91	3.42	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-0.3
Sample 2	10	n/a	600	20	92.75	92.8	0.00	0.00	3.41	n/a	n/a	n/a	n/a	n/a	n/a	n/a	44.9
Sample 6	10	n/a	600	20	108.64	108.6	0.00	0.00	3.41	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.1
Mean					99.9	99.6	0.3	0.3	3.41	n/a	n/a	n/a	n/a	n/a	n/a	n/a	16.9
SD					8.1	8.2	0.5	0.5	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	24.5



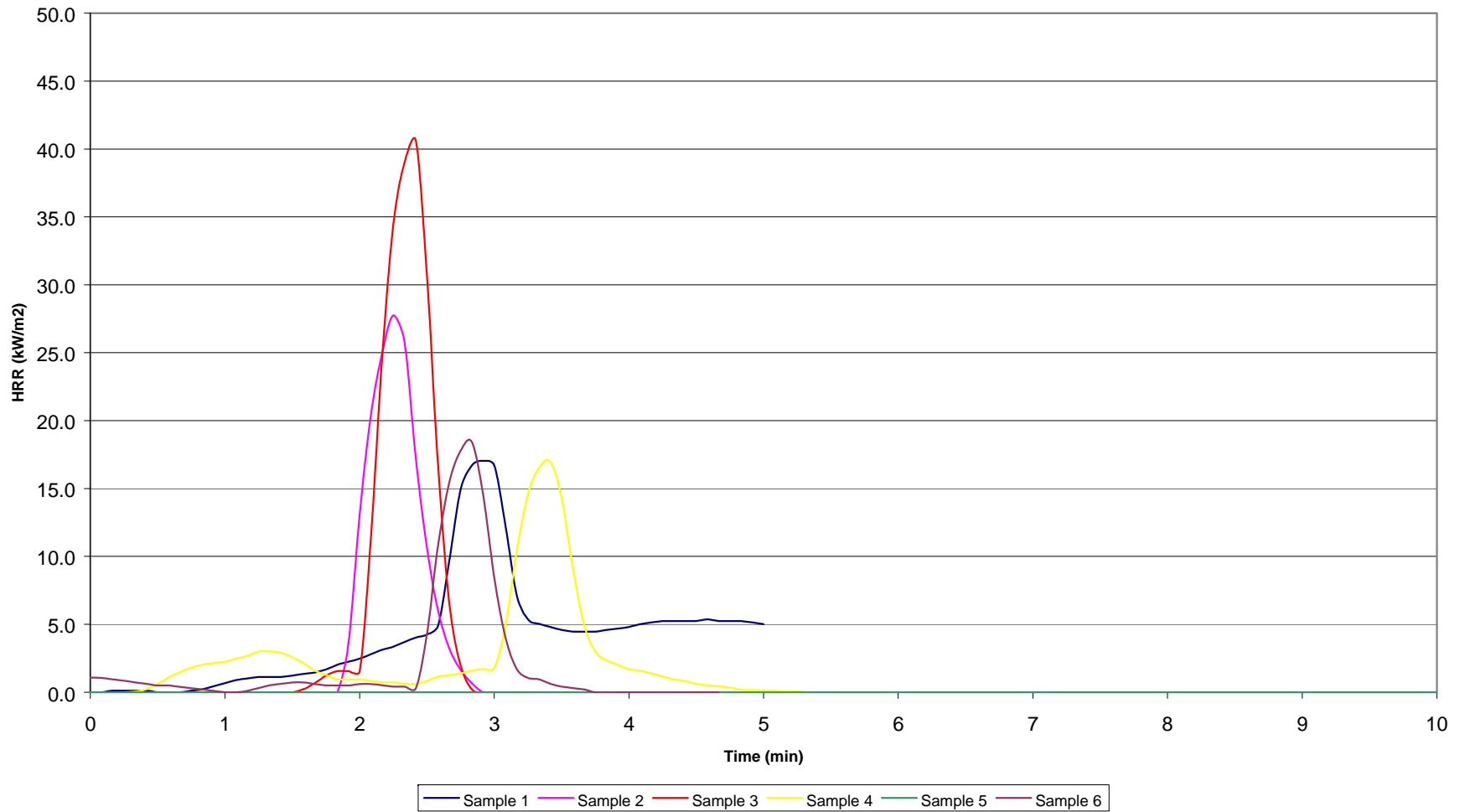


Fig. 1 – Heat Release Rate for Test No. k0166



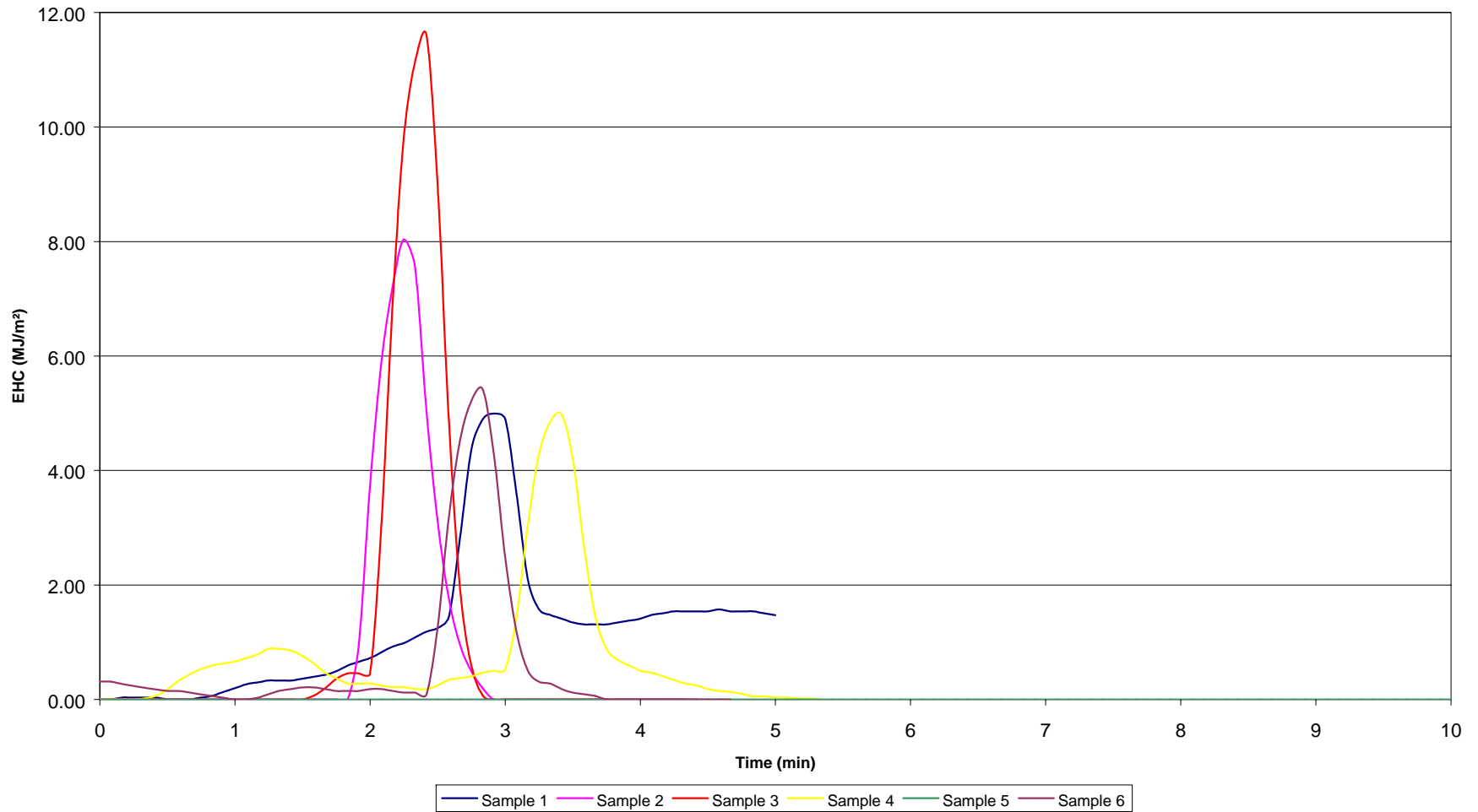


Fig. 2 – Effective Heat of Combustion for Test No. k0166



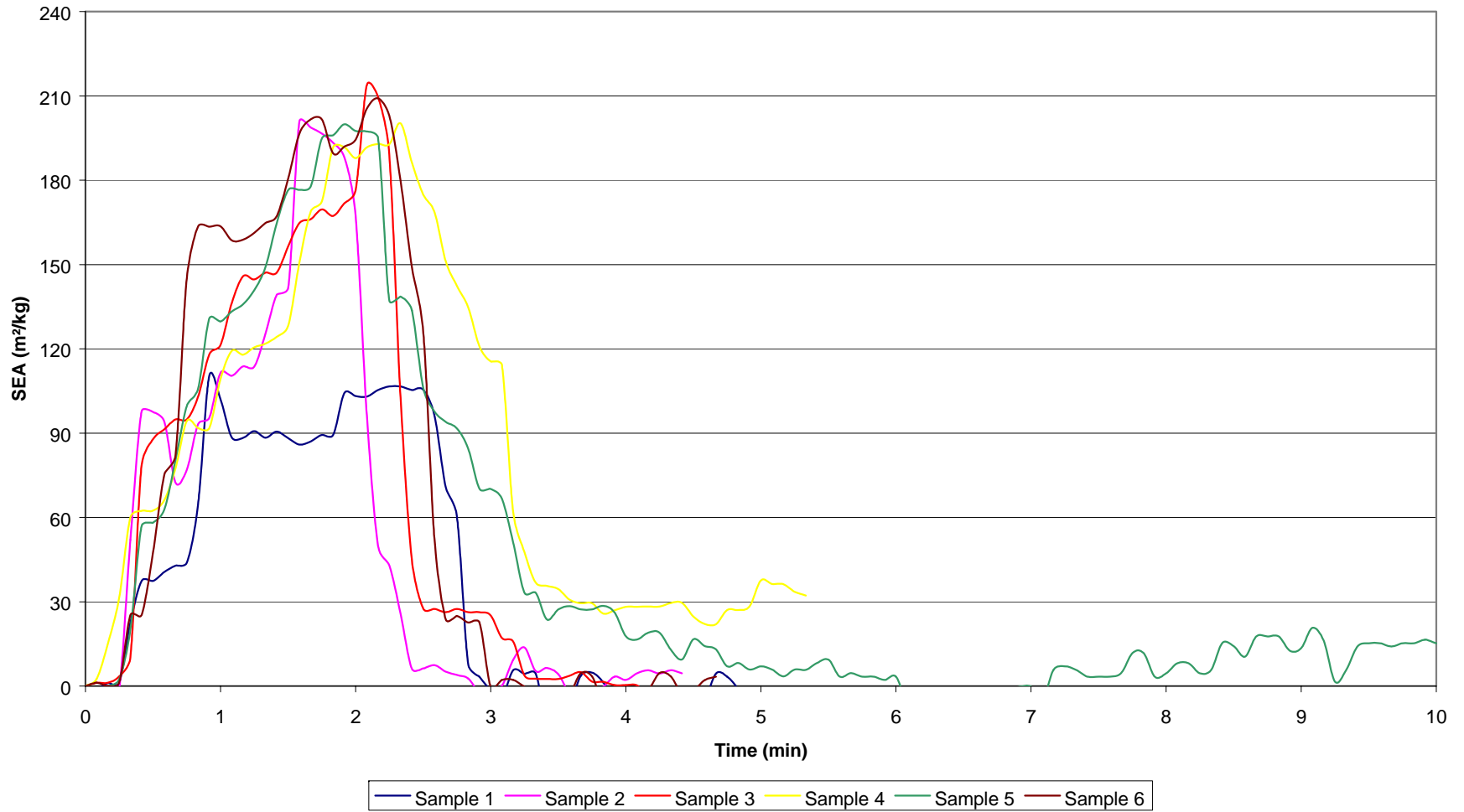


Fig. 3 – Specific Extinction Area for Test No. k0166



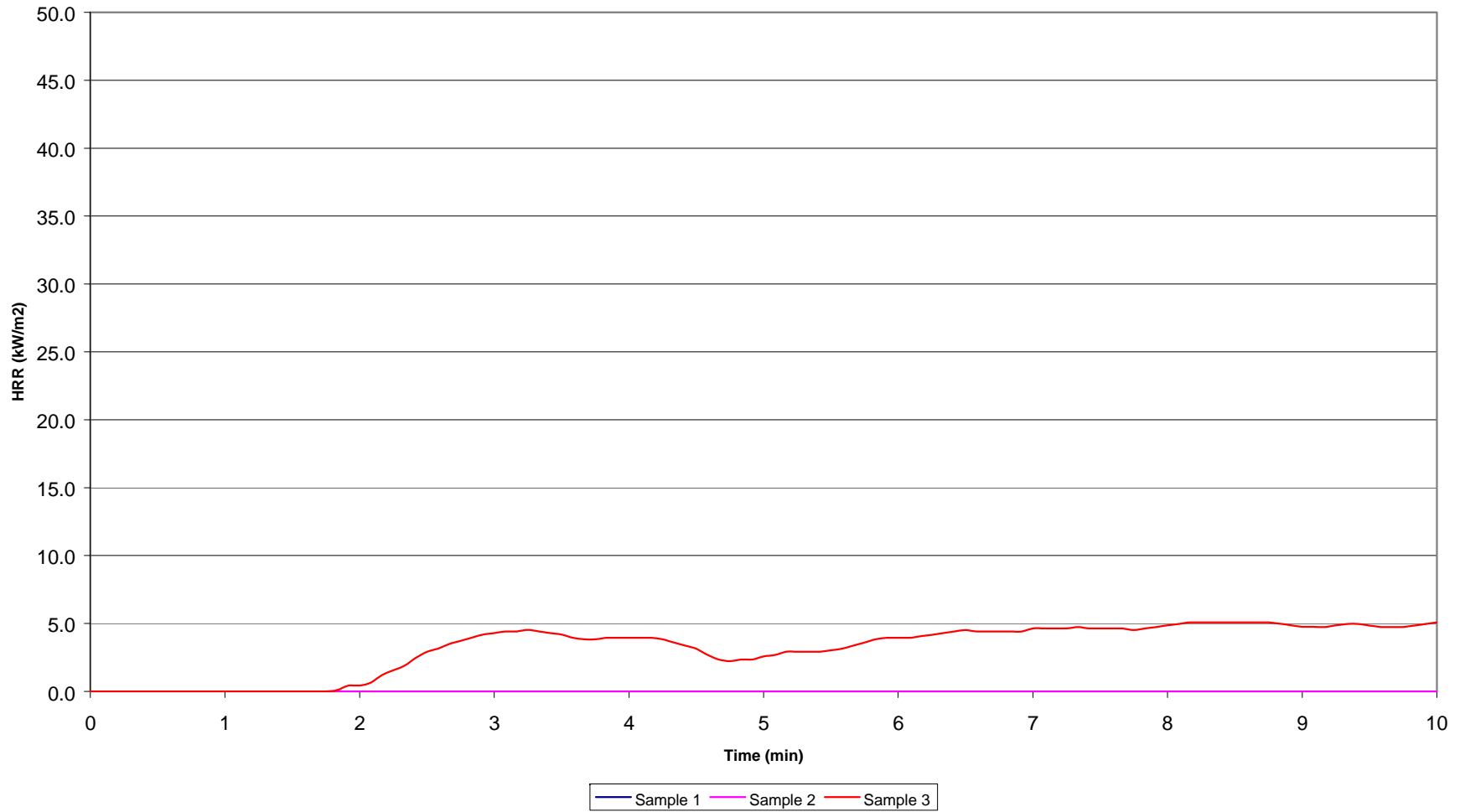


Fig. 4 – Heat Release Rate for Test No. k0180



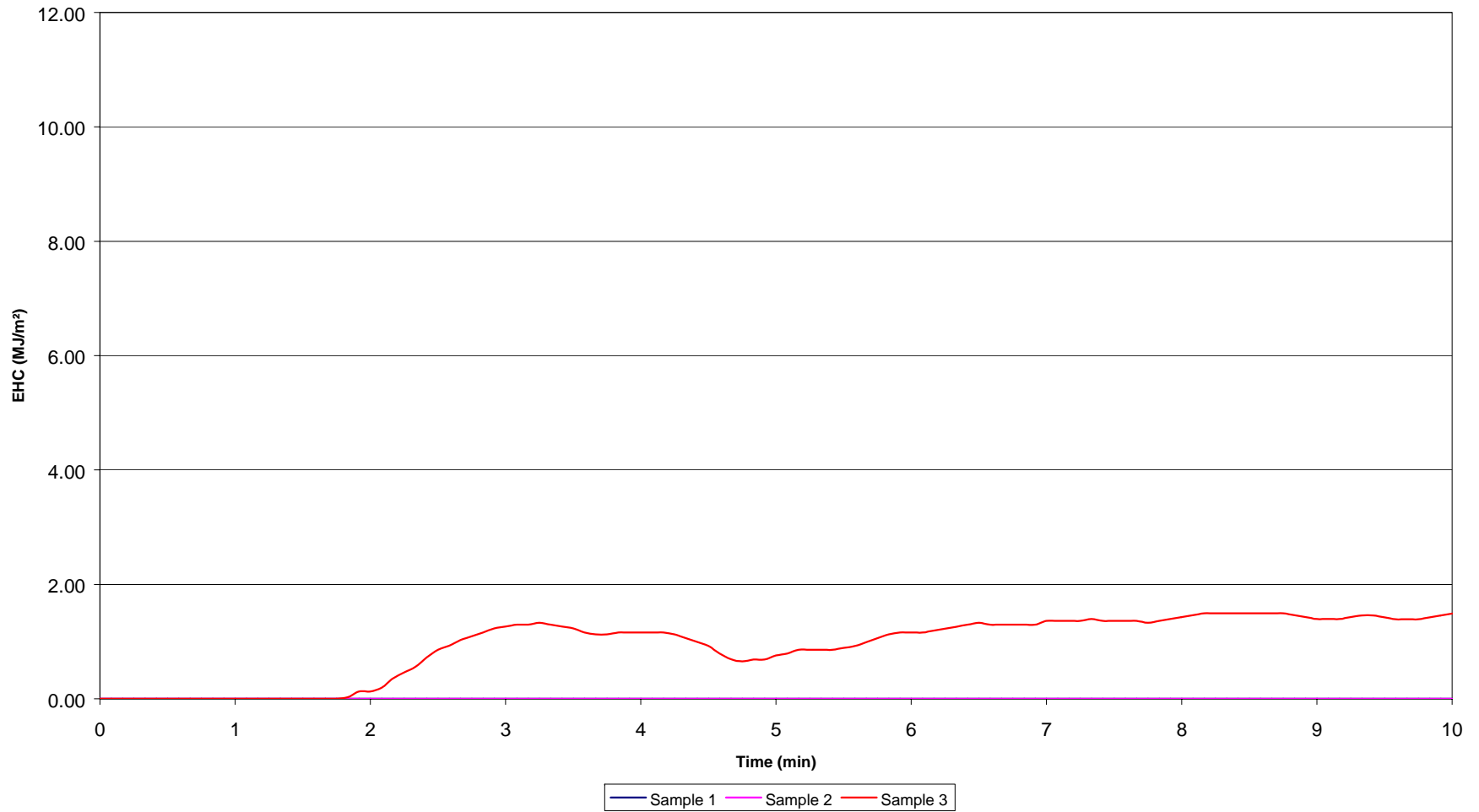


Fig. 5 – Effective Heat of Combustion for Test No. k0180



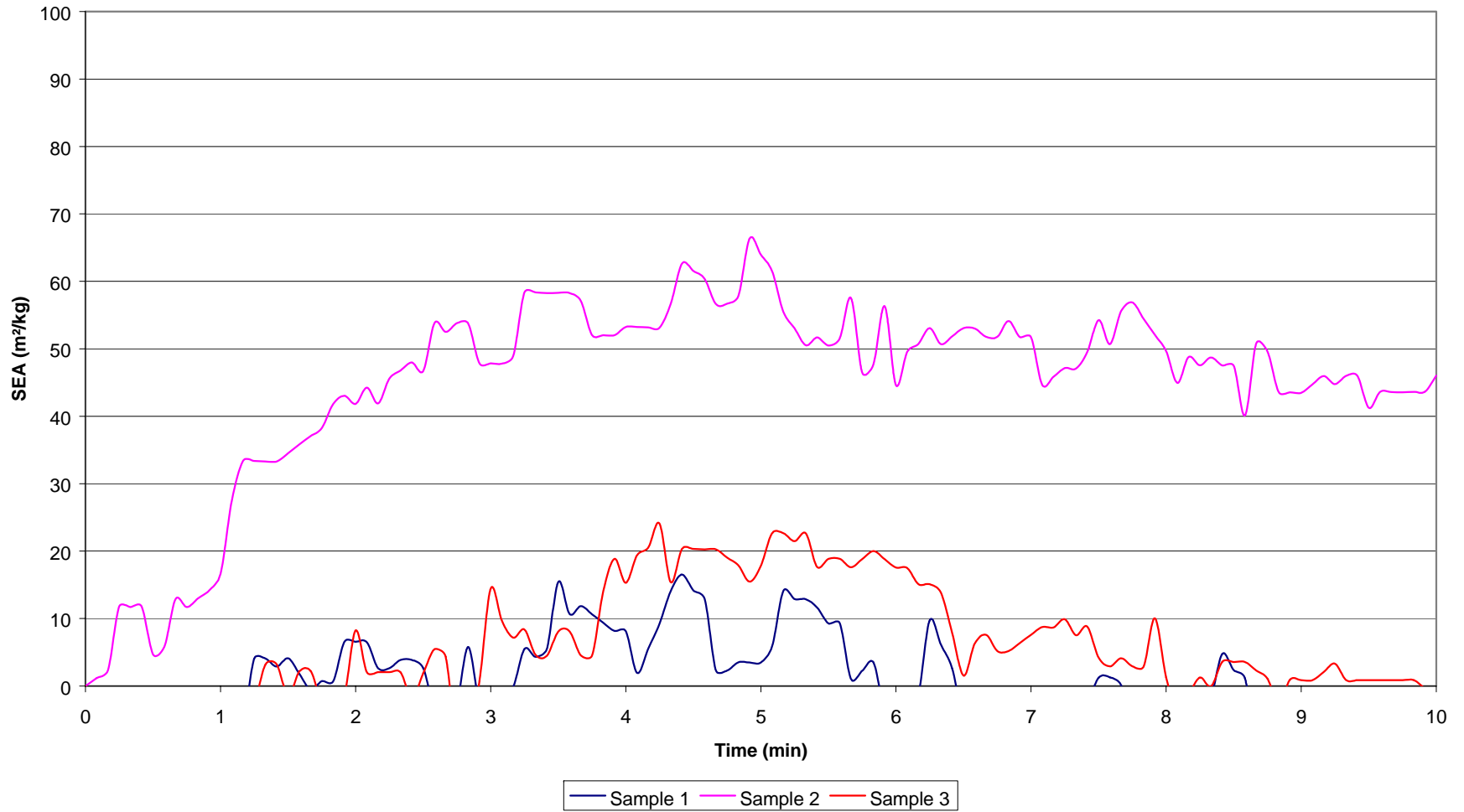


Fig. 6 – Specific Extinction Area for Test No. k0180





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This is to certify that the specimen described below was tested by the CSIRO Division of Manufacturing and Infrastructure Technology 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 25 kW/m² and 10 kW/m², on behalf of:

Cease-Fire Technologies Pty. Ltd.
32 Mooloolah Meadows Drive
MOOLOOLAH QLD
AUSTRALIA

A full description of the test specimen and the complete test results for test No. k0166 and k0180 are detailed in the Division's sponsored investigation report numbered FNK 0166.

SAMPLE

IDENTIFICATION: Cease-Fire FRT (Fire Retardant Timber) System

**DESCRIPTION OF
SAMPLE:**

The sponsor described the tested specimen as an intumescent coating system comprising: one coat of acrylic primer; two coats of flame-retardant intumescent water based coat; and one coat of acrylic exterior UV Grade topcoat. The coatings were applied to 19-mm thick radiata pine.

Nominal wet film thickness of primer: 85 µm
Nominal wet film thickness of intumescent coat: 700 µm
Nominal wet film thickness of topcoat: 170 µm
Colour: white

SAMPLE

CLASSIFICATION: The product meets the AS/NZS 3837 performance specification for the definition of a fire-retardant-treated timber as specified by Clause 1.5.6 of Australian Standard 3959, Construction of buildings in bushfire-prone areas, 1999.

The specimen has not been subjected to the weathering procedure of ASTM D 2898 Method B as specified by Clause 1.5.6 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 Note 1 and Note 2 of Clause 1.5.6 of AS 3959.

Testing Officer: Russell Collins

Dates of Test: 21 September 2004, 20 October 2004

Issued on the 21st day of October 2004 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments