

Test Report No. 7191054408-MEC13/1-JV
dated 29 Apr 2013



PSB Singapore

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SUBJECT:

Determination of the reaction to fire tests for building products excluding floorings, when exposed to the thermal attack by a single burning item on "Greenlam Laminates" High Pressure Laminate material submitted by Greenlam Asia Pacific Pte Ltd on 21 Mar 2013.

TESTED FOR:

Greenlam Asia Pacific Pte Ltd
11 Sungei Kadut Crescent
Singapore 728683

DATE OF TEST:

26 to 29 Apr 2013

PURPOSE OF TEST:

To determine the reaction to fire performance of building products excluding floorings, when exposed to the thermal attack by a single burning item (SBI), according to EN 13823 : 2010 (BS EN 13823:2010).

The test was conducted at TÜV SÜD PSB fire test laboratory located at No. 10 Tuas Avenue 10, Singapore 639134.



TÜV SÜD PSB

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3 Science Park Drive, #04-01/05
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TUV®



DESCRIPTION OF SPECIMEN:

Five sets of specimen, said to be "Greenlam Laminates" High Pressure Laminate material, of the following nominal size were received.

1. Board of 1500mm x 1000mm x 0.8mm thick
2. Board of 1500mm x 495mm x 0.8mm thick
3. Board of 250mm x 90mm x 0.8mm thick

The specimen was prepared by bonding it onto calcium silicate board using water based adhesive. The nominal thickness and bulk density of the board were found to be 1mm and 1433kg/m³ respectively.

Details of the product, as provided by the sponsor of test, are as follows:

Product manufactured / supplied by :	
Company Address	Greenply Industries Ltd Vill. Panjehra , Teh.Nalagarh , Distt. Solan H.P Nalagarh, Himachal Pradesh - 174101
Brand	Greenlam Laminates
Model reference	-
Generic product name	High Pressure Laminate
Material composition	87% Paper, 13% resin
Nominal density (kg/m ³)	1.40 g/cm ³
Nominal mass per unit area (kg/m ²)	1.12 kg/sqm
Nominal thickness (mm)	0.8 mm
Color reference	Various
Fire retardant	Ethanol Amine Group- Phosphoric



Details of the components, as provided by the sponsor of test, are as follows:

<p>Exterior facing:</p> <p>Generic name – Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –</p>	<p>Decorative Side</p> <p>Decorative side Paper Greenply Industries Ltd 0.8mm 1.12 kg/sqm Various Ethanol Amine Group – Phosphoric Acid</p>
<p>Interior facing:</p> <p>Generic name – Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –</p>	<p>Brown side</p> <p>Backer side Paper Greenply Industries Ltd 0.8mm 1.12 kg/sqm Brown Ethanol Amine Group – Phosphoric Acid</p>
<p>Core material:</p> <p>Generic name – Material – Manufacturer – Thickness – Mass per unit area – Color reference – *Fire retardant –</p>	<p>Brown side</p> <p>Backer side Paper Greenply Industries Ltd 0.8mm 1.12 kg/sqm Brown Ethanol Amine Group – Phosphoric Acid</p>
<p>Adhesive:</p> <p>Generic name – Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –</p>	<p>Melamine Resin, Phenolic Resin</p>



TEST PRINCIPLE:

The principle behind the test is to evaluate the fire performance of the specimen over a duration of 20 minutes, by exposing the specimen to the flames of a sandbox burner placed at the bottom corner of two vertical wings constructed at right-angle. The performance parameters are: heat production, smoke production, lateral (horizontal) flame spread and falling flaming droplets and particles.

A short period before ignition of the main (primary) burner is used to measure the heat output and smoke development of the burner only, using an identical burner away from the specimen (the "auxiliary" (secondary burner)).

Some measurements are performed automatically, some are made by visual observation. The exhaust duct is equipped with sensors to measure the temperature, light attenuation, O₂ and CO₂ mole fraction and a flow induced pressure difference in the duct. These quantities are recorded automatically and used to calculate the volume flow, the heat release rate (HRR) and the smoke production rate (SPR).

TEST PROCEDURE:

Prior to test, the specimens were conditioned in accordance to EN 13238 and clause 6 and installed onto the test trolley in accordance with clause 5.3 of the standard.

The data calculations are calculated according to the formulations in Annex A and measuring sensors calibrated according to Annex C and D of the standard.

The test was conducted in accordance to clause 8 with data and observations recorded in accordance to clause 8.3 and 8.4 of the standard.

Additional information of the product are shown in the following Appendices, attached to this report:

- Appendix A: Graph of average:
 - HRR, THR & FIGRA values (zoom)
 - HRR, THR & FIGRA values
 - SPR, TSP & SMOGRA values
- Appendix B: Photographs of test

Two handwritten signatures in black ink, one appearing to be 'Ng' and the other 'Cng', located at the bottom right of the page.



TEST RESULTS:

Test Perimeters	Specimen			Mean
	1	2	3	
FIGRA _{0.2MJ} (W/s)	181.1	107.7	122.0	136.9
FIGRA _{0.4MJ} (W/s)	111.4	66.5	77.2	85.0
THR _{600s} (MJ)	2.5	2.4	2.6	2.5
LFS to edge (Yes / No)	No	No	No	No
SMOGRA (m ² /s ²)	10.2	19.1	13.2	14.2
TSP _{600s} (m ²)	35.2	41.2	35.8	37.4
FDP flaming ≤ 10s (Yes / No)	No	No	No	No
FDP flaming > 10s (Yes / No)	No	No	No	No

“*” – threshold not reached

REMARKS:

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

Leong Gene-Jhou
Senior Associate Engineer

Joseph Chng
Assistant Vice President
(Fire Property)
Mechanical Centre

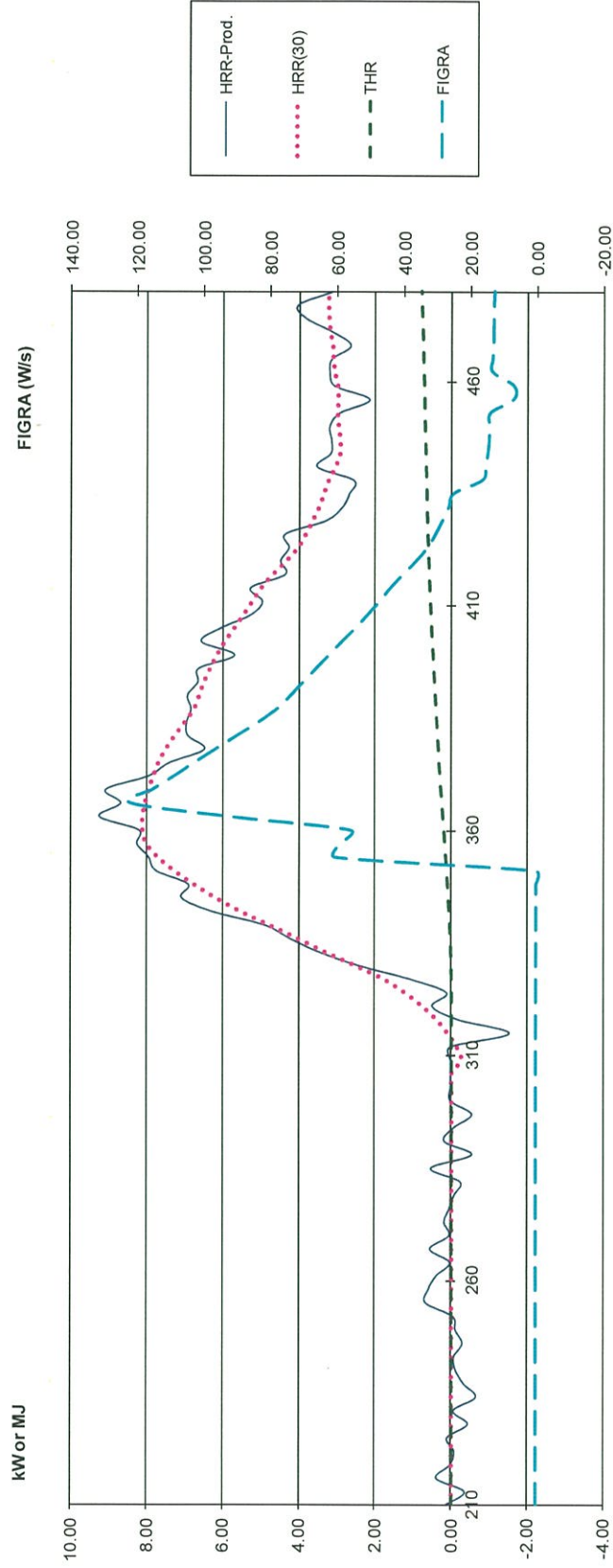


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Appendix A: Graphs

Average HRR, THR and FIGRA values (Zoom)



Time (s)

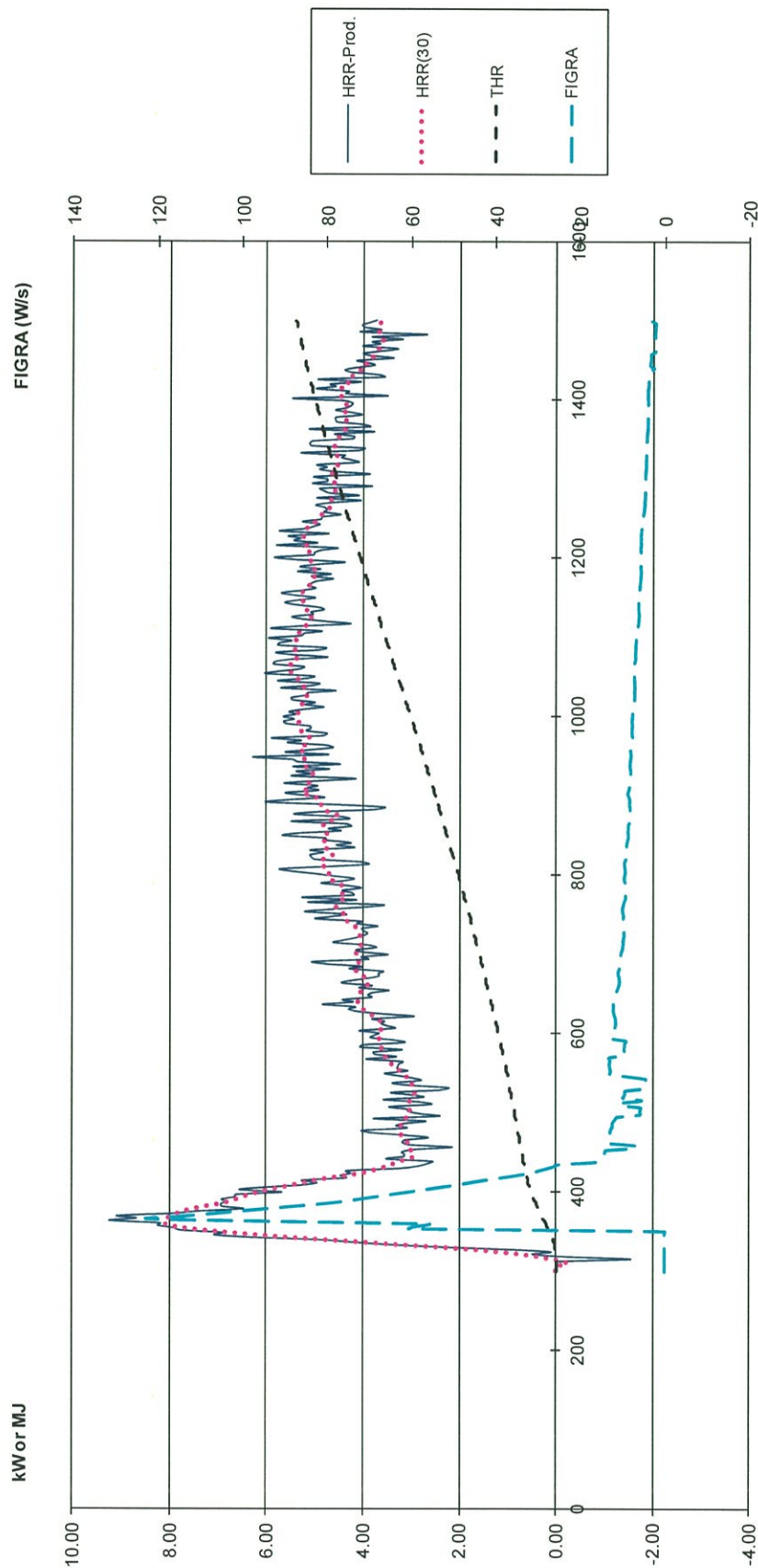
Ang Ong



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Average HRR, THR and FIGRA values



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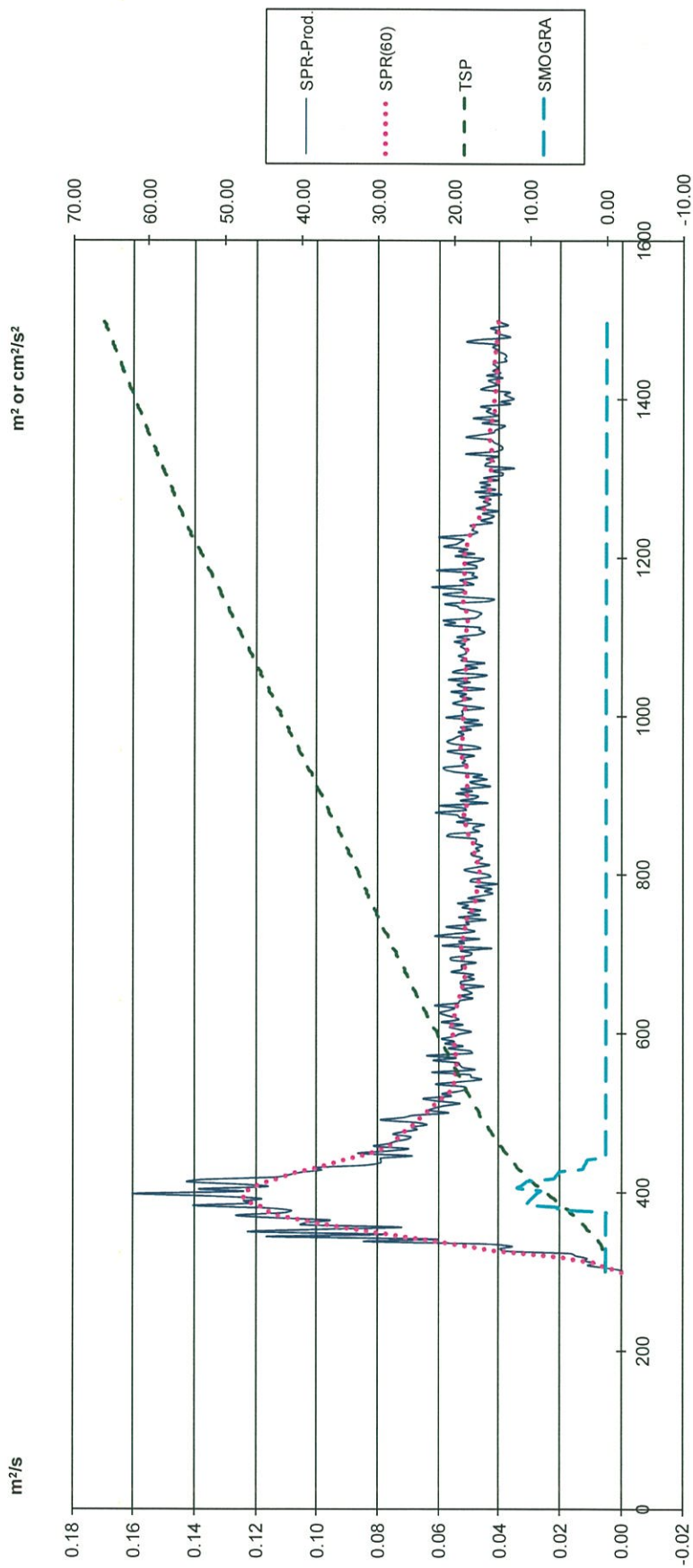
Time (s)



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Average SPR, TSP and SMOGRA values



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Time (s)

Appendix B: Photographs of test



Plate 1: At start of test



Plate 2: At 10 mins of test

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Plate 3: At end of test



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July 2011

