

Test Report No. 7191087533-MEC14/1-JV
dated 06 Jan 2015



PSB Singapore

Note: This report is issued subject to the Testing and Certification Regulations of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD PSB Pte Ltd. In addition, this report is governed by the terms set out within this report.

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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 Exterior Grade Compact Laminate' Greenlam Clads™ submitted by Greenlam Industries Limited on 15 Jul 2014.

TESTED FOR:

Greenlam Industries Ltd
1501-1505, Narain Manzil
23, Barakhamba Road
New Delhi-110001, India

DATE OF TEST:

23 to 24 Dec 2014

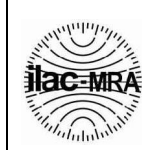
PURPOSE OF TEST:

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.



Laboratory:
TÜV SÜD PSB Pte. Ltd.
No.1 Science Park Drive
Singapore 118221



LA-2007-0380-A
LA-2007-0381-F
LA-2007-0382-B
LA-2007-0383-G
LA-2007-0384-G
LA-2007-0385-E
LA-2007-0386-C
LA-2010-0464-D

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests/Calibrations marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

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TUV®



DESCRIPTION OF SPECIMEN:

Five sets of specimen, said to 'Greenlam Exterior Grade Compact Laminate' Greenlam Clads™, each of the following nominal size were received.

1. Panel of 1500mm x 1000mm x 6mm thick
2. Panel of 1500mm x 495mm x 6mm thick

The overall nominal bulk density and thickness of the specimen were found to be 1396kg/m³ and 6mm respectively.

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

Product manufactured / supplied by :	
Company Address	Greenlam Industries Ltd Vill. Paterh Bhonku, PO Panjehra, Teh. Nalagarh, Dist. Solan Himachal Pradesh -174101, India
Brand & Model reference	Greenlam Exterior Grade Compact Laminate
Generic product name	Greenlam Clads™
Material composition	Product is made up of multiple layers of kraft paper impregnated with flame retardant grade phenolic thermosetting resin, with both side exterior grade decorative paper surface, impregnated with melamine thermosetting resins, along with special protective polymeric film layer on top & bottom
Nominal mass per unit area (kg/m ²)	1.39 g/cm ³
Nominal thickness (mm)	6.0mm
Flame retardant	Phosphoric Acid & Mono Ethanol Amine



Details of the product, as provided by the sponsor of test, are as follows:
(Cont'd)

<p>Exterior face #1:</p> <p>Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –</p>	<p>Design decorative paper with melamine treated surface</p> <p>Decorative paper N.A N.A N.A Various N.A</p>
<p>Interior face #2:</p> <p>Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –</p>	<p>Design decorative paper with melamine treated surface</p> <p>Decorative paper N.A N.A N.A Various N.A</p>
<p>Core material:</p> <p>Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –</p>	<p>Core with kraft paper flame retardant phenolic resin impregnated</p> <p>Kraft paper N.A N.A N.A N.A Phosphoric acid & mono ethanol amine</p>
<p>Adhesive:</p> <p>Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –</p>	<p>Phenolic & melamine adhesive used for impregnating both kraft & design decorative paper respectively</p> <p>N.A N.A N.A N.A N.A Phosphoric acid & mono ethanol amine</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. This quantities are recorded automatically and used to calculate the volume flow, the heat release rate (HRR) and the smoke production rate (SPR).

TEST PROCEDURE:

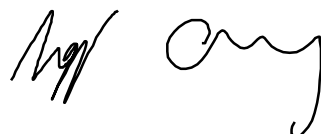
Prior to test, the specimens were conditioned in accordance to EN 13238 and clause 6 and installed onto the test trolley in accordance with clause 5.3 of the standard.

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 according 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






TEST RESULTS:

Test Perimeters	Specimen			Mean
	1	2	3	
FIGRA _{0.2MJ} (W/s)	48.9	124.8	0.0	57.9
FIGRA _{0.4MJ} (W/s)	33.9	56.3	0.0	30.1
THR _{600s} (MJ)	1.7	2.6	0.7	1.7
LFS to edge (Yes / No)	No	No	No	No
SMOGRA (cm ² /s ²)	0.0	0.0	0.0	0.0
TSP _{600s} (m ²)	33.2	32.9	35.3	33.8
FDP flaming ≤ 10s (Yes / No)	No	No	No	No
FDP flaming > 10s (Yes / No)	No	No	No	No


'*' - denotes '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.



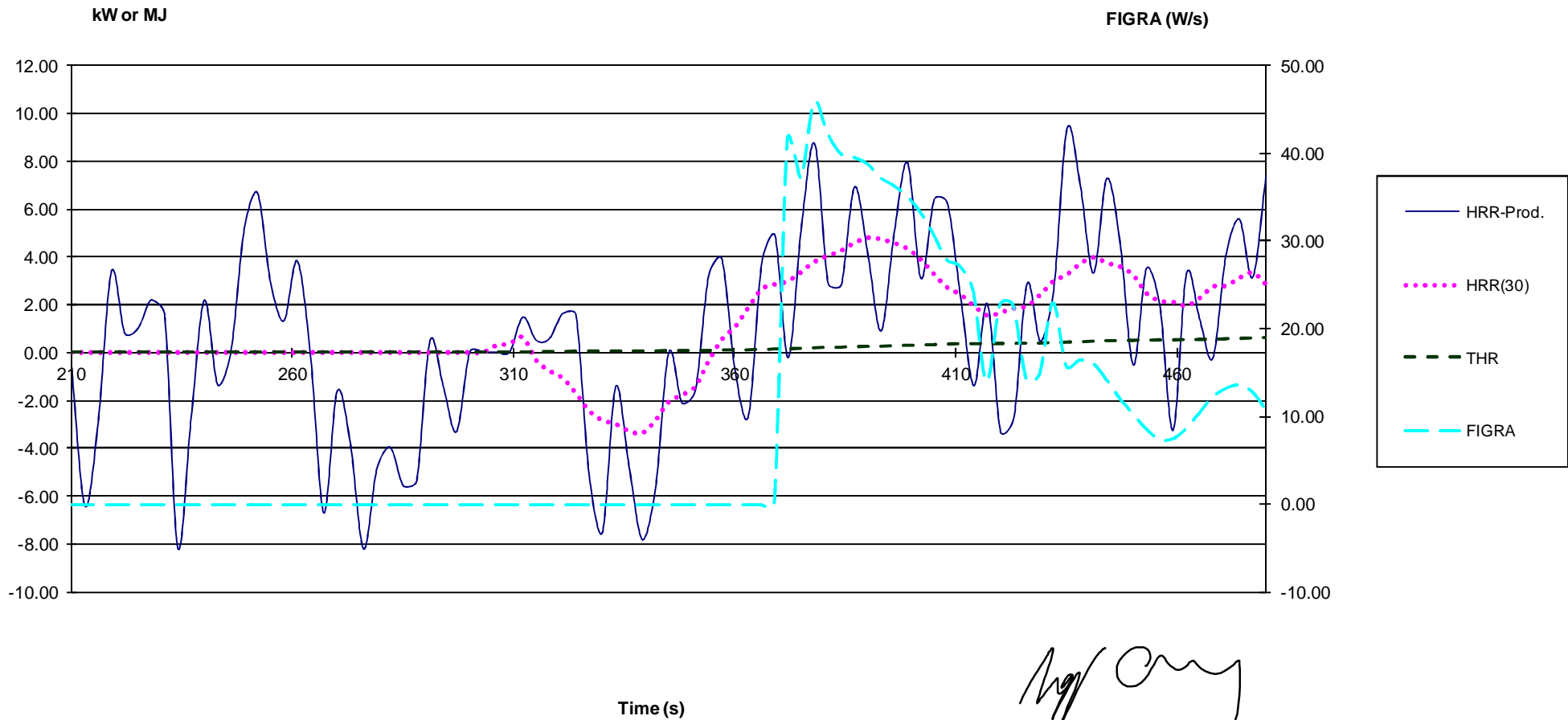
Leong Gene-Jhou
Senior Associate Engineer



Joseph Chng
Assistant Vice President
(Fire Property)
Mechanical Centre

Appendix A: Graphs

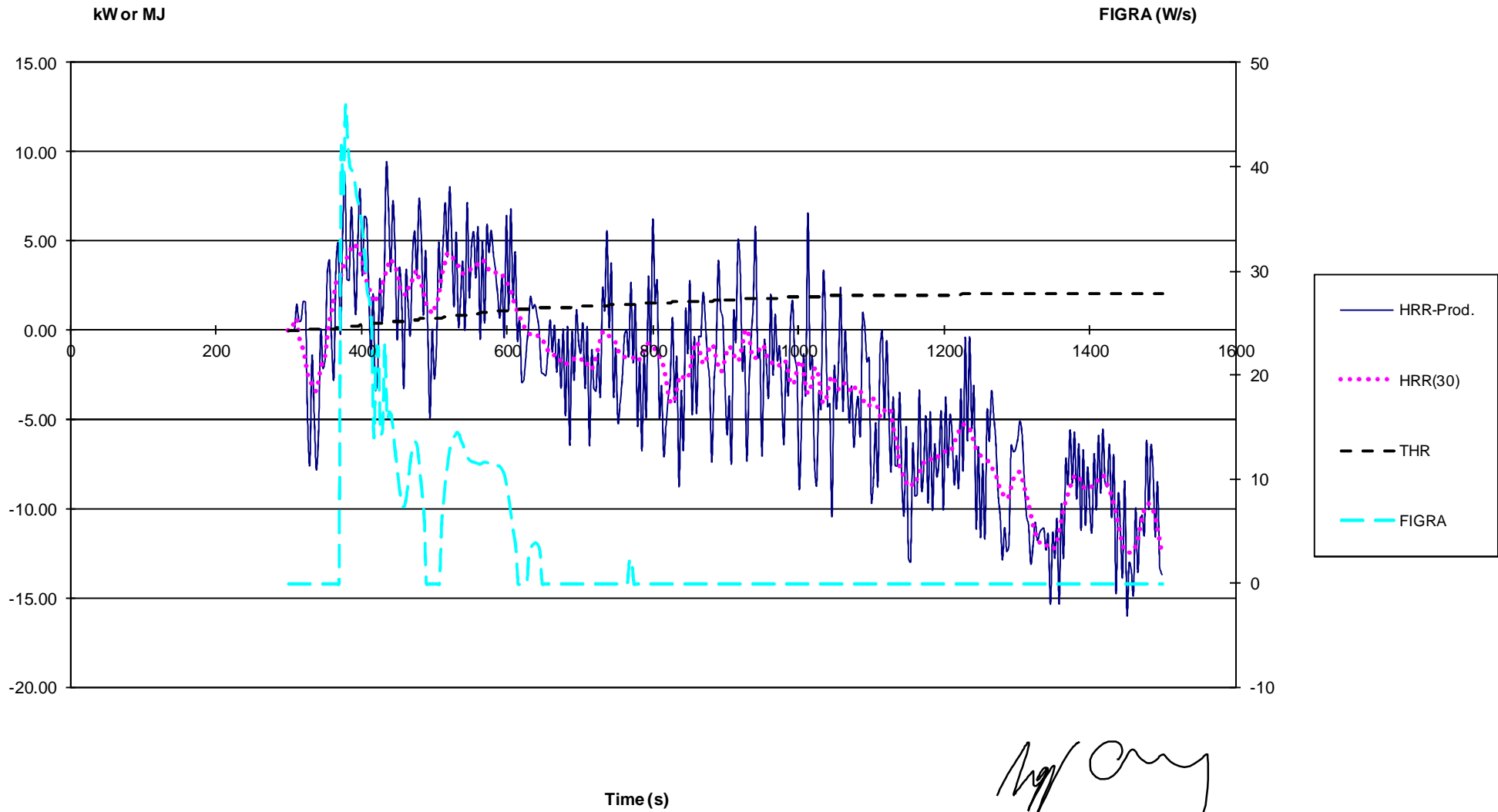
Average HRR, THR and FIGRA values (Zoom)



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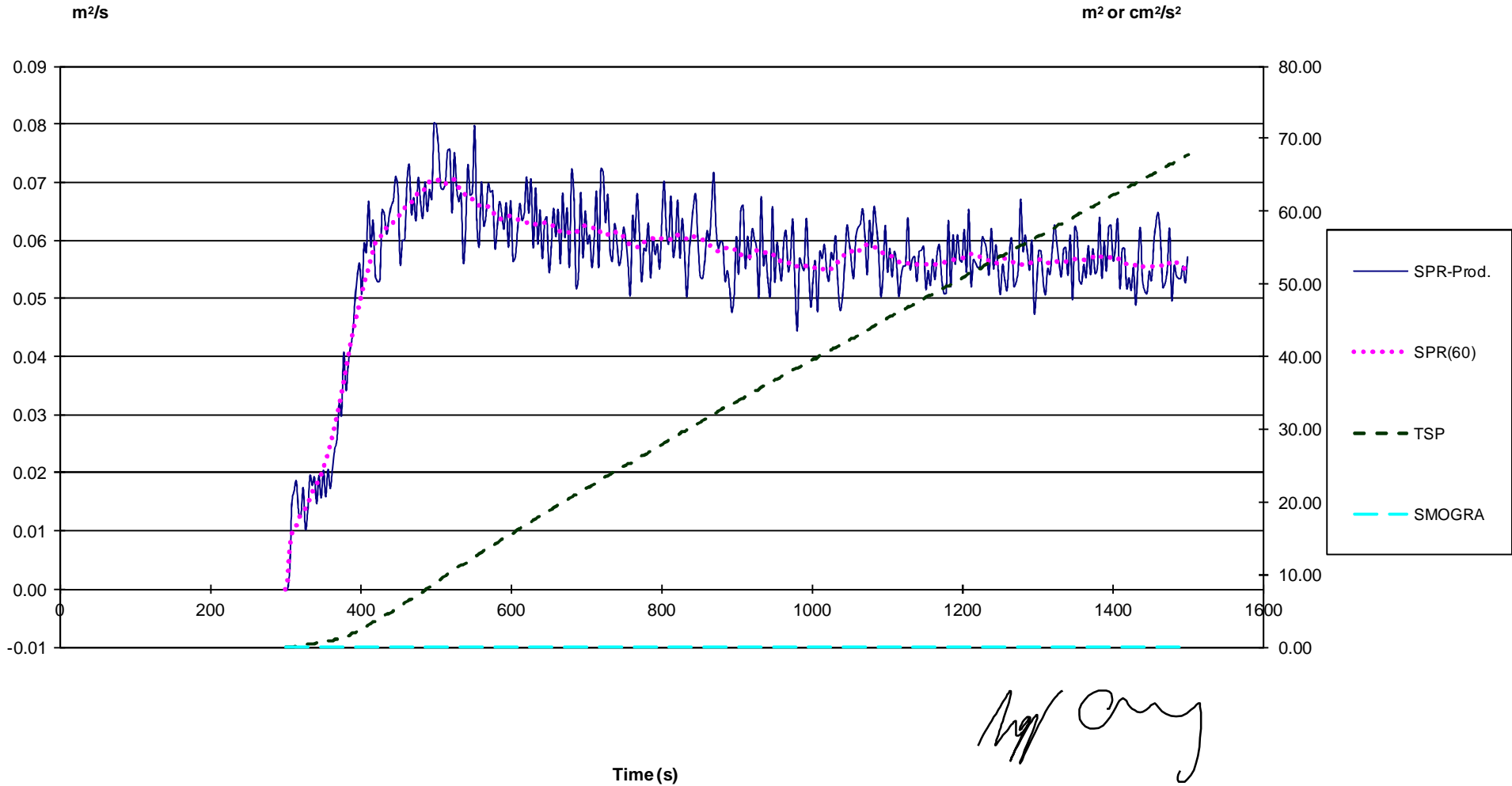
Average HRR, THR and FIGRA values



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Average SPR, TSP and SMOGRA values



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Appendix B: Photographs of test



Plate 1: At start of test



Plate 2: At 10 mins of test





Plate 3: At end of test

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Please note that this Report is issued under the following terms :

1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.
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5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

July 2011

