

Test Report No. 7191141775-MEC16/1-JV
dated 14 Jul 2016



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 'MKS PIR100' MKS PIR sandwich insulation panel (nominally 100mm thick, 125kg/m³) with 0.5mm thick steel facings submitted by Munkong Steel Co., Ltd on 15 Jun 2016.

TESTED FOR:

Munkong Steel Co., Ltd
1/348 Soi.Onnuch59/1, Sukhumvit 77 Rd
Prawet, Bangkok
Thailand 10250

DATE OF TEST:

04 to 05 Jul 2016

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.



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

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

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

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Co. Reg : 199002667R

Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
1 Science Park Drive, #02-01
Singapore 118221
TUV®



DESCRIPTION OF SPECIMEN:

Six sets of specimen, said to be 'MKS PIR100' MKS PIR sandwich insulation panel (nominally 100mm thick, 125kg/m³) with 0.5mm thick steel facings, each of the following nominal size were received.

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

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

Product manufactured / supplied by :	
Company Address	Munkong Steel Co., Ltd 1/348 Soi.Onnuch 59/1, Sukhumvit 77 Rd Prawet, Bangkok Thailand 10250
Brand	MKS PIR100
Generic product name	MKS PIR Sandwich Insulation Panel
Material composition	Polyisocyanurate (PIR) Insulated Sandwich Panel
Nominal mass per unit area	12.5kg/m ²
Nominal thickness	100mm
Fire retardant	TCPD and TEP



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

Exterior face #1: Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –	Metal Sheet NS Blue Scope (Thailand) Limited 0.50mm (BMT) 4.26kg/m ² Off White -
Exterior face #2: Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –	Metal Sheet NS Blue Scope (Thailand) Limited 0.50mm (BMT) 4.26kg/m ² Off White -
Core material: Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –	Polyisocyanurate (Polyol Voratherm CN633 + Isocyanurate Voranate M600) Dow Chemical (Thailand) Limited 100mm 50kg/m ² Yellowish TCPP and TEP
Adhesive: Material – Manufacturer – Thickness – Mass per unit area – Color reference – Fire retardant –	Polyol Voracore CM938 + Isocyanate Voranate M600 Dow Chemical (Thailand) Limited - 80g/m ² Dark Brown/Yellowish

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:

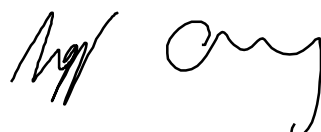
Prior to test, the specimens were conditioned in accordance to EN 13238 and clause 6 and installed onto the test trolley in accordance with clause 5.3 of the standard.

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



TEST RESULTS:

Test Perimeters	Specimen			Mean
	1	2	3	
FIGRA _{0.2MJ} (W/s)	24.3	26.5	23.6	24.8
FIGRA _{0.4MJ} (W/s)	24.3	26.5	23.6	24.8
THR _{600s} (MJ)	3.4	3.2	2.6	3.1
LFS to edge (Yes / No)	No	No	No	No
SMOGRA (cm ² /s ²)	7.1	7.2	6.0	6.8
TSP _{600s} (m ²)	100.2	90.8	80.0	90.3
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.

WITNESSES:


The test was witnessed by the following representatives:

Munkong Steel Co., Ltd : Mr Jeerasak Jommongkol
Mr Thana Chaichanpant

Dow Chemical (Thailand) Limited : Mr Narakan Puapan
Mr Kanmetha Nuamsiri



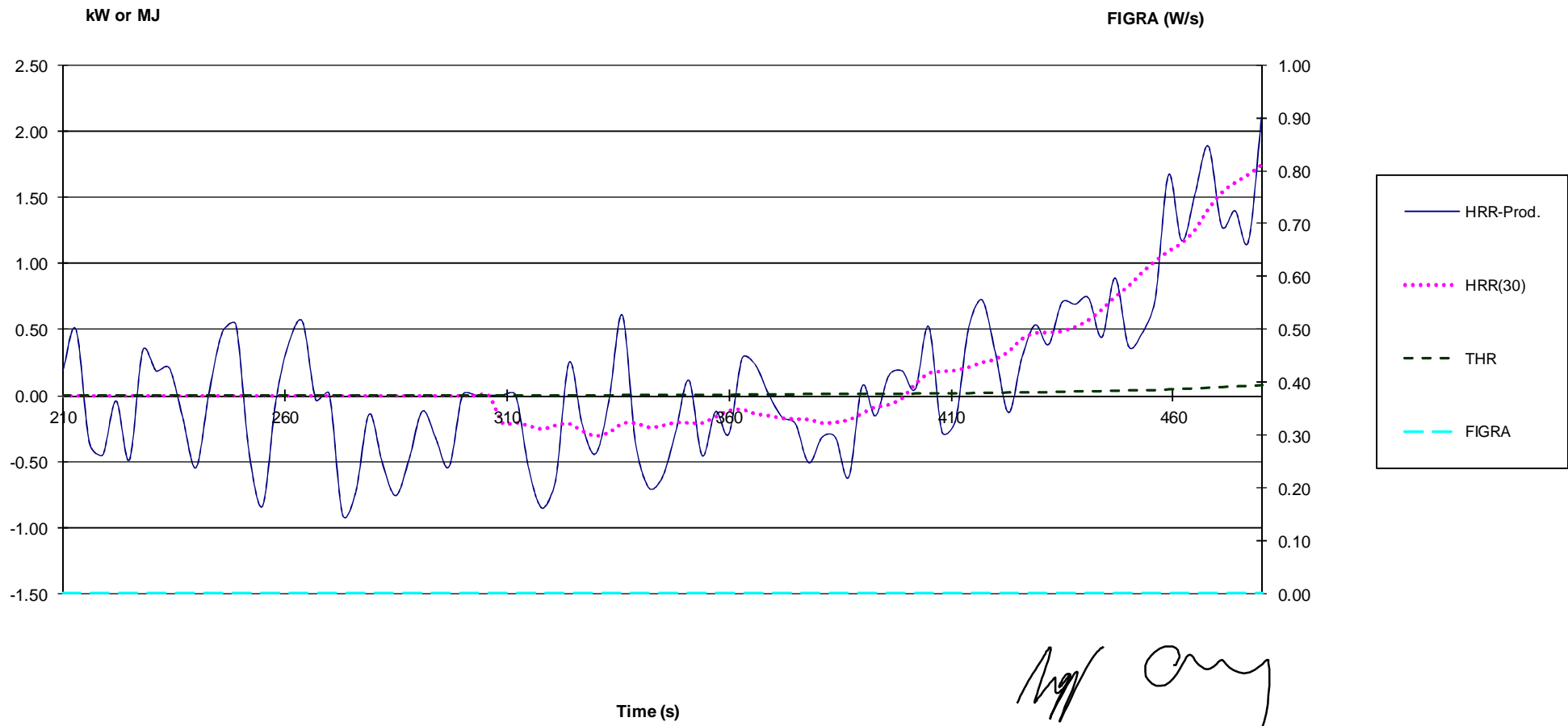
Leong Gene-Jhou
Senior Associate Engineer



Joseph Chng
Assistant Vice President
(Fire Property)
Mechanical

Appendix A: Graphs

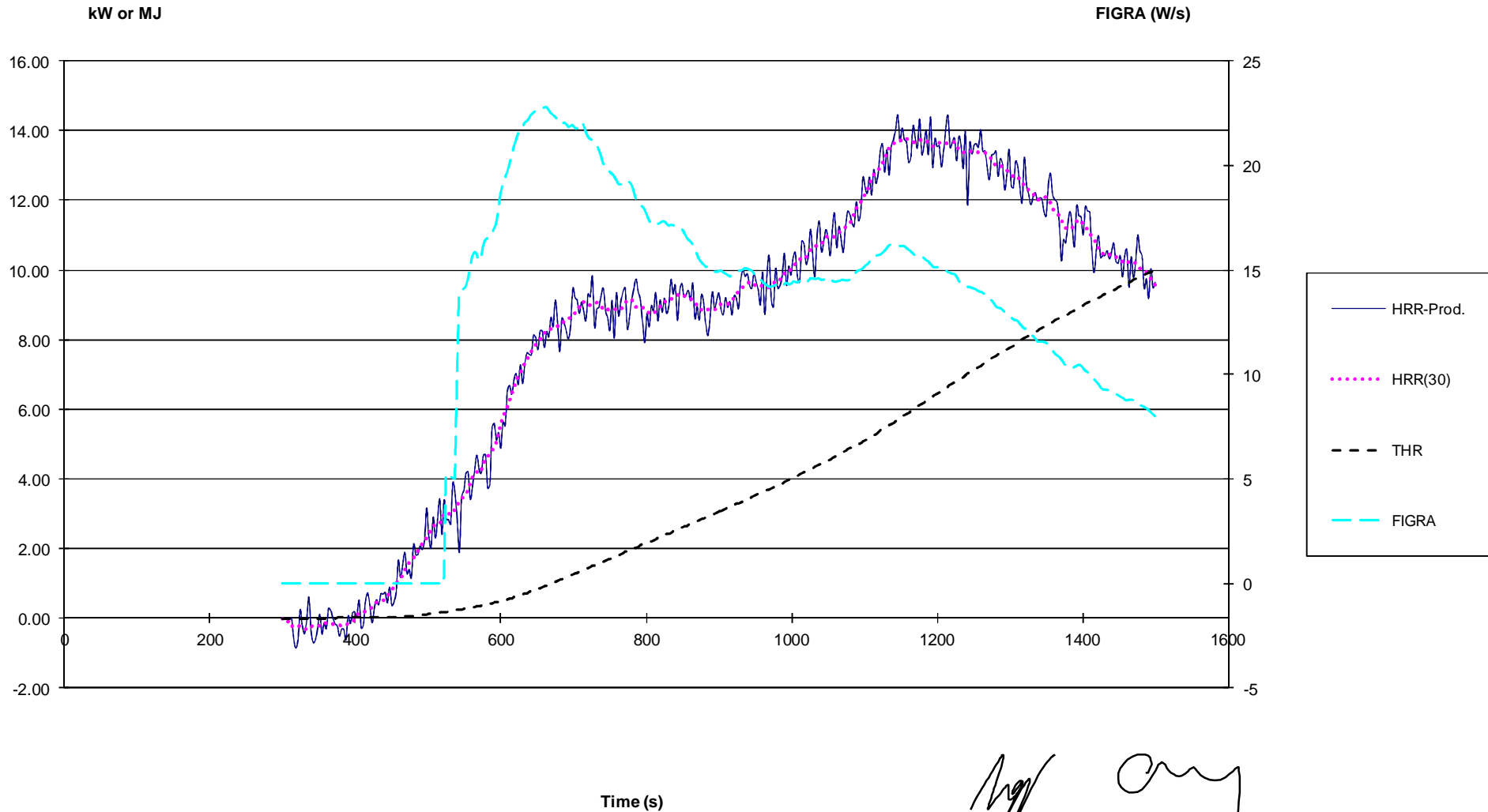
Average HRR, THR and FIGRA values (Zoom)



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Average HRR, THR and FIGRA values

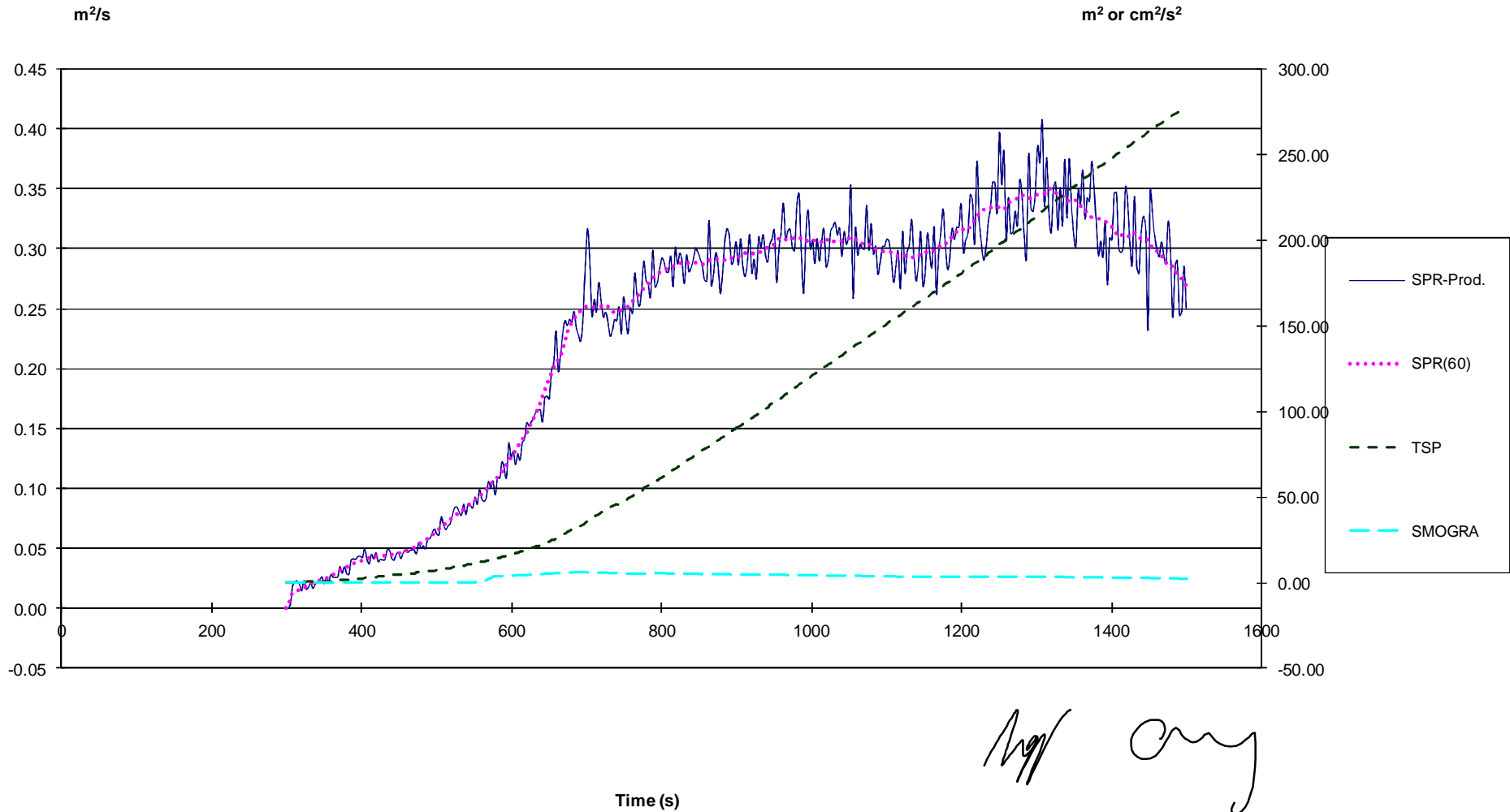


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Average SPR, TSP and SMOGRA values



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Appendix B: Photographs of test



Plate 1: At start of test



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Plate 2: At 10 mins of test



Plate 3: At end of test

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July 2011

