

Test Report No. 7191078502-MEC14/2-YWA
dated 22 Jan 2014



PSB Singapore

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SUBJECT:

Fire propagation test on "GREENLAM" Type-F, HGF Building material submitted by Greenlam Asia Pacific Pte Ltd on 06 Jan 2014.

TESTED FOR:

Greenlam Asia Pacific Pte Ltd
11 Sungei Kadut Crescent
Singapore 728683

DATE OF TEST:

21 Jan 2014

PURPOSE OF TEST:

To determine the Index of Performance of the material when it is exposed to the conditions of the test specified in British Standard 476 : Part 6 : 1989 + A1 : 2009 "Method of test for fire propagation for products".

The test was conducted at TÜV SÜD PSB's 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.

Phone : +65-6885 1333
Fax : +65-6776 8670
E-mail: testing@tuv-sud-psb.sg
www.tuv-sud-psb.sg
Co. Reg : 199002667R

Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
3 Science Park Drive, #04-01/05
The Franklin, Singapore 118223
TÜV®



DESCRIPTION OF SPECIMENS:

Six pieces of specimen, said to be "GREENLAM" (0.8mm thick) Type-F, HGF Building material comprising of High Pressure Laminates, each of nominal size of 225mm x 225mm were submitted. The Adhesive and Additives used were said to be Phenol-formaldehyde and Di-ethyl Glucose (DEG) respectively. The Fire Retardant used was said to be Ammonium Bromide. The bulk density of the specimen was found to be approximately 1522kg/m³. Nine pieces of specimen, each with "GREENLAM" Type-F, HGF Building material adhered onto one face of an approximately 6mm thick calcium silicate board, each of nominal test size of 225mm x 225mm were prepared.

TEST PROCEDURE:

Three specimens, backed with calcium silicate board, were tested with Laminate (smooth) face exposed to the specified heating conditions, in an apparatus conforming to paragraph 5 and illustrated in Figures 1 to 3 of the Standard.

The calibration and test procedures were as defined in paragraphs 8 and 9, respectively, of the specification. The apparatus was calibrated prior to test and the actual calibration curve obtained is shown in Figure 1 of this report.

The mean temperature rise above ambient obtained from three specimens is also shown in Figure 1 (i.e. with the actual calibration curve). The mean temperature readings for the material and the calibration curve were obtained at the following intervals from the start of the test: at 1/2 minute intervals up to 3 minutes, at 1 minute intervals from 4 to 10 minutes, and at 2 minutes intervals from 12 to 20 minutes.

Two handwritten signatures in black ink, one to the left and one to the right, positioned below the main text.

From these readings, the index of performance for the material was determined as follows:

$$s_1 = \sum_{t=0.5}^{t=3} \frac{\Theta_s - \Theta_c}{10t}; \quad s_2 = \sum_{t=4}^{t=10} \frac{\Theta_s - \Theta_c}{10t}$$

and $s_3 = \sum_{t=12}^{t=20} \frac{\Theta_s - \Theta_c}{10t};$

$$S = s_1 + s_2 + s_3$$

where S = Index of performance for each of the specimens tested and s_1 , s_2 and s_3 are sub-indices

t = Time in minutes from the origin at which readings are taken.

Θ_s = Temperature rise in deg. C for the specimen at time, t

Θ_c = Temperature rise in deg. C for the calibration sheet at time, t

In computations only the positive value of $\frac{\Theta_s - \Theta_c}{10t}$ was used.





RESULTS OF TEST:

The following test results were obtained for each specimen tested:

| Specimen | Sub-Indices | | | Index of Performance |
|----------|----------------|----------------|----------------|----------------------|
| | S ₁ | S ₂ | S ₃ | S |
| A | 1.5 | 2.8 | 0.7 | 5.1 |
| B | 0.9 | 2.3 | 0.4 | 3.6 |
| C | 1.1 | 2.7 | 0.4 | 4.3 |


CONCLUSION:

The test results obtained, as an average of the 3 samples tested are as follows:

Index of overall performance, I = 4.3
(Fire propagation index)
Sub-index, i₁ = 1.2
Sub-index, i₂ = 2.6
Sub-index, i₃ = 0.5

REMARKS:

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


Ong Klar Huat
Higher Associate Engineer


Chan Lung Toa
Product Manager
(Fire Property)
Mechanical Centre

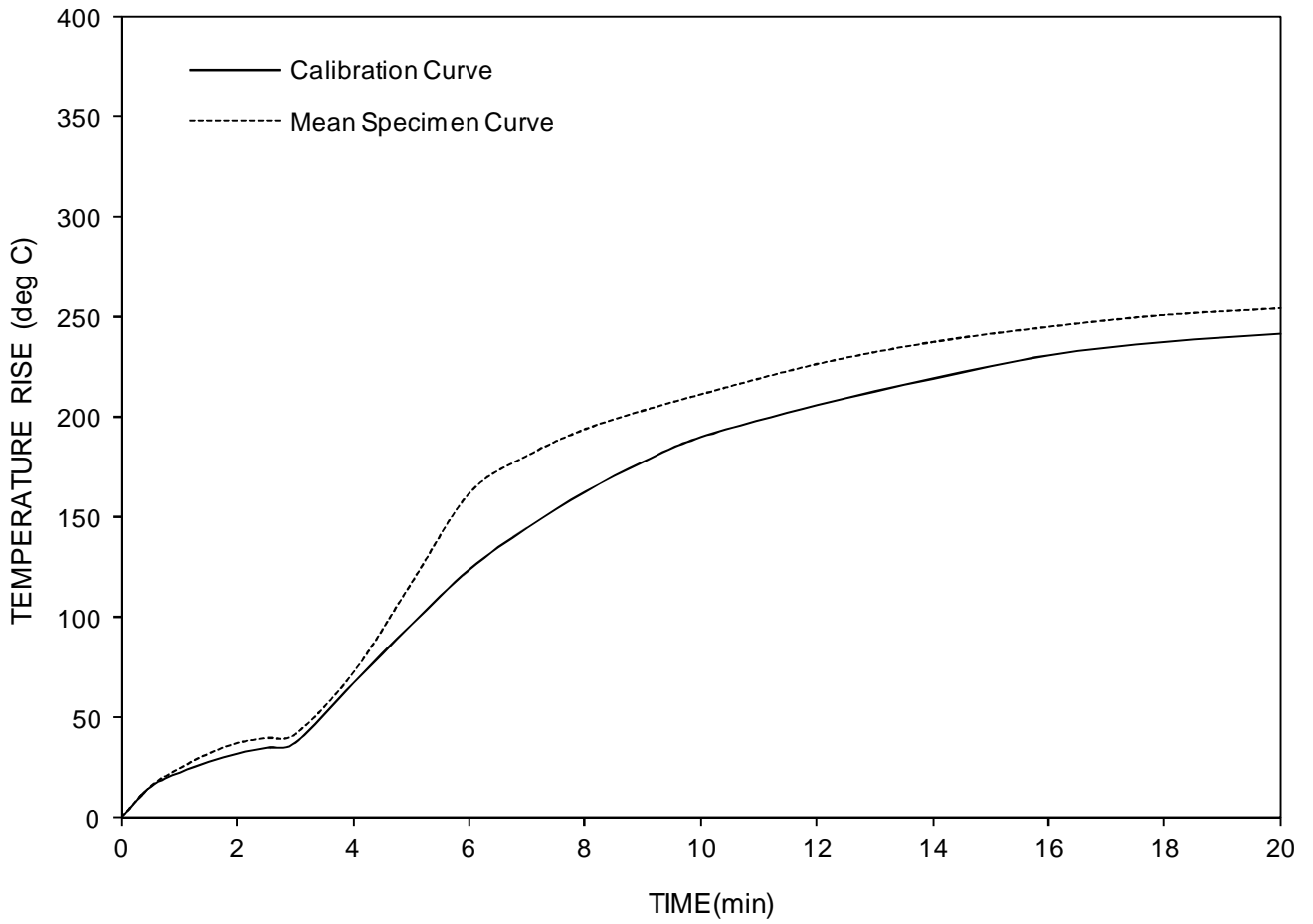


FIGURE 1 : COMPARISON OF MEAN SPECIMEN AND CALIBRATION CURVES

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July 2011

