Test Report No. 7191320364-MEC23/2-YWA_CR1
dated 07 Nov 2023
(re-issue dated 06 Mar 2024)

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PSB Singapore

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SUBJECT:

Fire propagation test on Brand: "Greenlam", Model: "Greenlam High Pressure Laminates" High pressure laminates material for interior application submitted by Greenlam Asia Pacific Pte Ltd on 18 Oct 2023.

TESTED FOR:

Greenlam Asia Pacific Pte Ltd
11 Sungei Kadut Crescent
Singapore 728683

DATE OF TEST:

01 Nov 2023

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.

Amendment (06 Mar 2024):
On page 2, under the details of the product, the nominal mass per unit area was amended.

TÜV SÜD PSB

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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.

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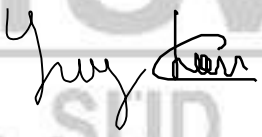
Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
15 International Business Park
TÜV SÜD @ IBP
Singapore 609937

DESCRIPTION OF SPECIMENS:

Six pieces of specimen, said to be Brand: “Greenlam”, Model: “Greenlam High Pressure Laminates” High pressure laminates material for interior application, each of nominal test size of 225mm x 225mm were received. The thickness, mass per unit area and density of the specimen were measured to be 0.8mm, 1.36kg/m^2 and 1697kg/m^3 respectively.

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

Brand	Greenlam
Model reference	Greenlam High Pressure Laminates
Generic product name	Greenlam Laminates
Material composition	Decorative paper with melamine treated surface, Kraft paper impregnated with flame retardant phenolic resin
Country of Origin	India
Nominal thickness	0.8mm
Nominal mass per unit area	1.3kg/m^2
Nominal density	N/A
Fire retardant	Phosphoric Acid & Mono Ethanol Amine



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

Exterior Face : (Fire side) Brand – Material – Nominal thickness – Nominal mass per unit area – Color reference – Fire retardant –	Design Decorative Paper with Melamine Treated Surface Greenlam Paper N/A N/A N/A N/A
Core Material Brand – Material – Nominal thickness – Nominal density – Color reference – Fire retardant –	Kraft Paper impregnated with flame retardant phenolic resin Greenlam Paper N/A N/A N/A Phosphoric acid and Mono Ethanol Amine
Adhesive: Brand – Material – Nominal density – Colo reference – Fire retardant –	Phenolic & Melamine adhesive used for impregnating both kraft & design decorative paper respectively. Greenlam N/A N/A N/A N/A

TEST PROCEDURE:

Prior to test, the specimens were prepared and conditioned in accordance with paragraph 4.4 of the standard.

Three specimens, backed with non-combustible board, were tested with the decorative paper (white) 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.

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	0.4	3.4	1.5	5.3
B	0.0	3.7	1.1	4.8
C	0.3	4.2	1.2	5.7

CONCLUSION:

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

Index of overall performance, I = 5.3
(Fire propagation index)

Sub-index, i_1 = 0.2

Sub-index, i_2 = 3.8

Sub-index, i_3 = 1.3

REMARKS:

1. 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.

2. Photograph of specimen is shown in Plate 1.

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Assistant Vice President
Fire Testing
Mechanical Centre

PSB Singapore

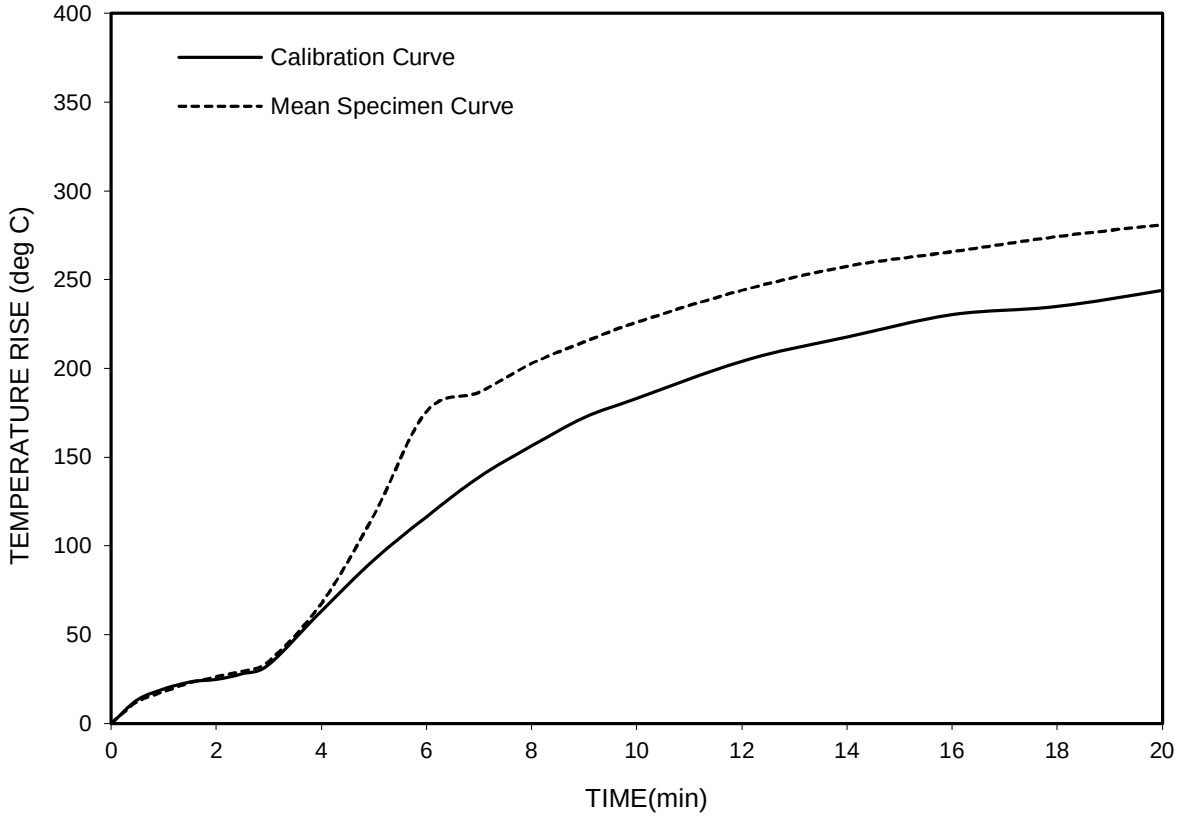


FIGURE 1 : COMPARISON OF MEAN SPECIMEN AND CALIBRATION CURVES



Plate 1: Photograph of specimen

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Effective 26 January 2021