

Test Report No. 7191114321-MEC15/2-YWA
dated 02 Jun 2015
(221407301Rev1)

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.



PSB Singapore

**Choose certainty.
Add value.**

SUBJECT:

Fire propagation test on “MBond ACP – MB17MS” Aluminium Composite Panel material submitted by MBond Manufacturer Sdn Bhd on 20 Mar 2015.

TESTED FOR:

MBOND MANUFACTURER SDN BHD
No.9 Jalan TPP3
Taman Perindustrian Putra
47130 Puchong, Selangor
Malaysia

DATE OF TEST:

28 May 2015

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.



LA-2007-0380-A
LA-2007-0381-F
LA-2007-0382-B
LA-2007-0382-B-1
LA-2007-0383-G
LA-2007-0383-G-1

LA-2007-0384-G
LA-2007-0385-E
LA-2007-0386-C
LA-2010-0464-D
FFT-2013-0002-A

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.

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

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 “MBond ACP – MB17MS” (4mm thick) Aluminium Composite Panel material comprising of Top: approximately 0.45mm thick Aluminium skin with PVDF (25µm) coating / Core: Flame Retardant Polyethylene core / Bottom: approximately 0.45mm thick Aluminium skin with Mill Finish, each of nominal test size of 225mm x 225mm were submitted. The Adhesive used was said to be Adhesive Film (0.035mm thick). The Fire Retardant used was said to be FR-888 Flame Retardant Polyethylene. The area bulk density of the specimen was found to be approximately 7.6kg/m².

TEST PROCEDURE:

Three specimens, backed with 25mm air gap calcium silicate spacer, were tested with the PVDF coated 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, and appendix B clause (b) 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	0.0	0.0	0.0	0.0
B	0.0	0.0	0.0	0.0
C	0.0	0.0	0.0	0.0

CONCLUSION:

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

Index of overall performance, I = 0.0
(Fire propagation index)

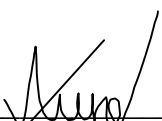
Sub-index, i₁ = 0.0

Sub-index, i₂ = 0.0

Sub-index, i₃ = 0.0

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.


Ye Wint Aung
Associate Engineer


Ong Kian Huat
Senior Associate Engineer
(Fire Property)
Mechanical Centre

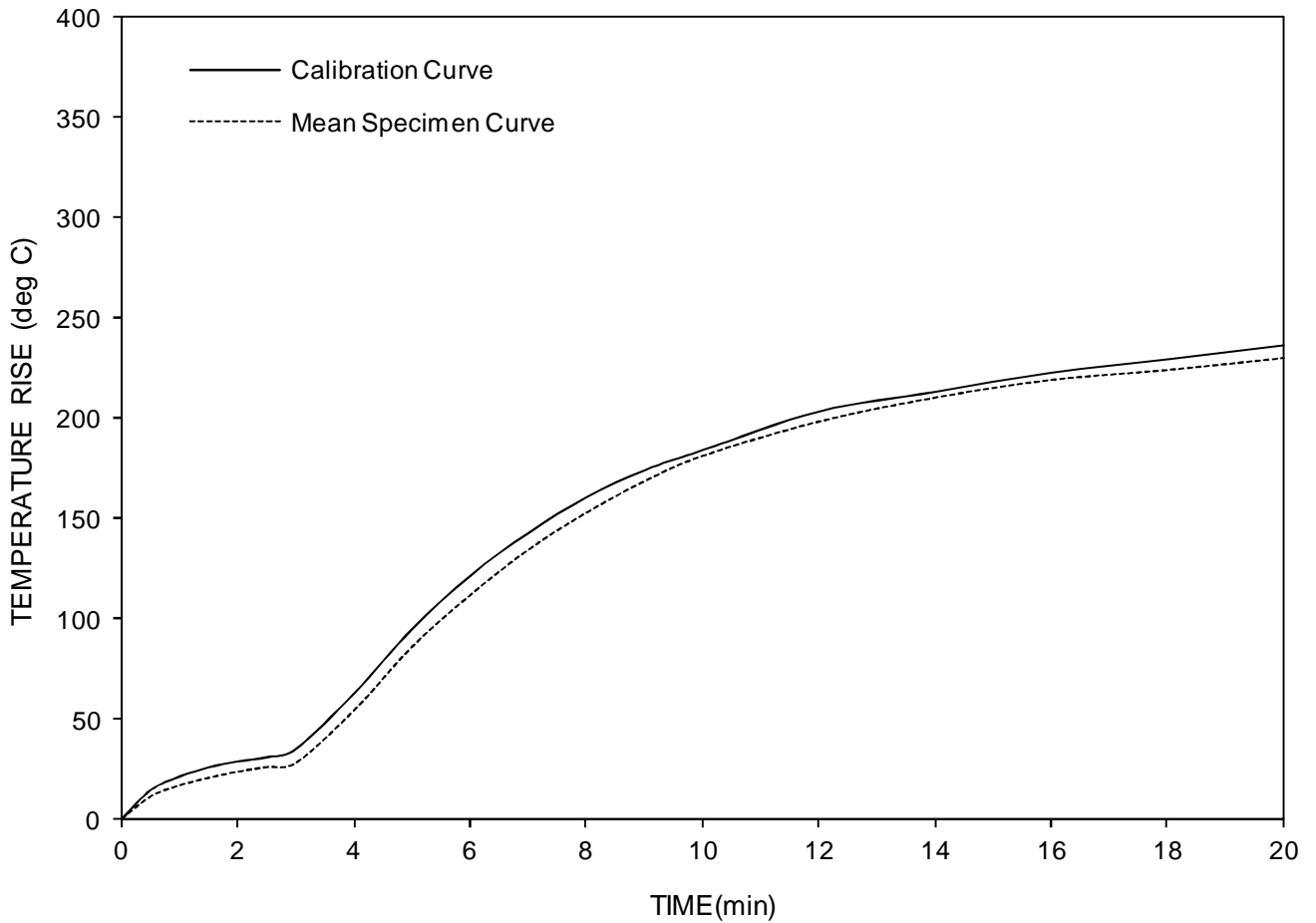


FIGURE 1 : COMPARISON OF MEAN SPECIMEN AND CALIBRATION CURVES

Test Report No. 7191114321-MEC15/2-YWA
dated 02 Jun 2015
(221407301Rev1)



PSB Singapore

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.
2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.
3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.
4. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.
5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

July 2011

