



دفترچه مشخصات فنی و استانداردهای صفحات سمنت برد

SCG SmartBOARD

آزمون تکرانسی ابعادی ، مدول گسیختگی ، دانسیته و ترکیبات

سمنت برد SCG Smart Board

ترکیبات

(Composition)

ابعاد و رواداری ها

(Dimension and tolerances)

راستای لبه (مستقیم بودن لبه)

(Straightness of edge)

گونیا بودن لبه (عمود بودن لبه ها)

(Squareness of edge)

مدول گسیختگی (مقاومت خمشی)

(Modulus of rupture)

چگالی ظاهری

(Apparent density)



Test report

Client Name : Siam Fibre Cement Group Co., Ltd.

Client Address : 1 Siam Cement Road, Bangsue, Bangkok,
Thailand 10800

Contact Person : K.Suradej Sucharitakul

Test Report No. : EIC250516-01B

Date Received : September 16, 2025

Date Test : September 22-24, 2025

Date Reported : September 26, 2025

Sample Name : Smartboard 1200x2400x12 mm

Sample Description : -

Test Standard : ISO 8336-2017: Fibre-cement flat sheets-Product specification and test methods

5.3 Composition and manufacture

5.4 Appearance and finish

5.5 Dimension and tolerances

5.5.3.4.2 Straightness of edge

5.5.3.4.3 Squareness of edge

5.6.2 Modulus of rupture (Bending strength)

5.6.3 Apparent density

ASTM E1131-03: Standard Test Method for Compositional Analysis by Thermogravimetry

ASTM E1252- 98 (Reapproved 2013): Standard Practice for General Techniques for obtaining

Infrared Spectra for Qualitative Analysis

Test Condition : Test conditions were shown on next page

Test Equipments : See table 1

Test Results : Detailed test results presented on the subsequent pages of this report.

Examined by

Mr. Wichai Delogthammakul

Testing Engineer 2

Approved by

Mr. Somjit Putdee

Assistant Manager

Reported by

Mr. Siwakorn Boonyang

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Table 1: Test Equipments

Test items	Equipments	Calibration date	Calibration due date
Composition	Optical Microscope	January 20, 2025	January 19, 2026
	Thermogravimetry Analysis (TGA), Brand: NETZSCH Model: TG 209 F3.	February 20, 2024	February 19, 2026
	Fourier Transform Infrared Spectroscopy, ATR mode (Diamond window), Brand Bruker, Tensor II	Verify before use	Verify before use
Straightness of edge and Squareness of edge	Steel ruler/ Shinwa/ EST-014	August 7, 2025	August 6, 2026
Dimension and tolerances	Steel tape/ Stanley/ 30-696	June 16, 2025	June 15, 2026
	thickness gauge/ Insize/ 2366-30	August 18, 2025	August 17, 2026
Apparent density	Programmable Temp & Humidity Chamber / ETSP/TM-1000C	March 10, 2025	March 9, 2026
	Balance/ Mettler Toledo/ MS3002S	August 26, 2025	August 25, 2026
Modulus of rupture	Universal testing machine/ Instron/ 3367	July 23, 2025	July 22, 2026
	Digital Vernier caliper/ Mitutoyo/ CD-12"C	February 25, 2025	February 24, 2026

Test Condition

Composition

- Optical microscope The sample was evaluated the appearance by optical microscope (50x).
- Thermogravimetry analysis (TGA) Heat from 30°C to 850°C under nitrogen atmosphere of 20 ml/min with scanning rate 10°C/min.
- Fourier-transform infrared spectroscopy (FTIR) The functional group of sample was analysis by FTIR at 23±2°C and 50±5% relative humidity.

Straightness of edge

- Measure on all four edges the greatest distance between the edge of the sheet and a string or wire stretched from corner to the adjacent corner with a steel rule.
- Record the measured value.

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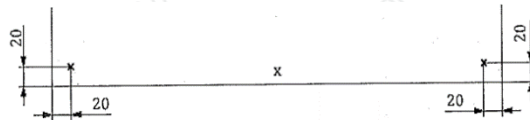


Squareness of edge

1. Place two adjacent corners of the sheet in succession between the arms of the square, keeping one edge against the full length of the large arm and the other in contact with the small arm at least one point.
2. Measure to the nearest 0.5 mm the greatest distance of the sheet edge from the small arm of the square.
3. Record the measured value.

Dimension and tolerances

1. Measurement of thickness, make three thickness measurements with a dial gauge along one side of the sheet as show Figure C.1 according to the ISO 8336;



2. Measurement of length and width, measure each dimension three times on each sheet, i.e. one in the middle and one at about 50 mm from either end.

Apparent density

1. Immerse specimen in water at temperature 23°C for at least 24 h.
2. Take the saturated specimen remove excess water from surfaces and then determine the volume of the water displaced by the saturated specimen when placed into a water bath. Record this value.
3. Remove specimen form the water bath and place it into a ventilated oven which is maintained at a temperature of 100±5°C until constant mass. Record this value.
4. Calculate the apparent density value.

Modulus of rupture (Bending strength)

1. Immersion specimen in water at temperature 23°C for 24 h.
2. Take the saturated specimen, remove excess water from surface.
3. Arrange the supports to be at the appropriate spacing for the specimen.
4. Measure the thickness of smooth sheets along the imaginary line of breakage at two points
5. Arrange the specimen with the under face against the supports and the loading bar on the upper face equidistant between and parallel with the supports.
6. Load the specimen such the breakage occurs within 10 s and 30 s. Record the load at break.
7. For square specimen, reassemble the broken pieces and submit the specimen to a second bending test with the line of load supplication at right angles to that of the first test. Record the load at break.

Note: Length of span 200 mm / test specimen 250 mm x 250 mm

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Test results

Table 2: Analysis result of Smartboard 1200x2400x12 mm

Item	Observations	
Summary	The Smartboard 1200x2400x12 mm was cement board with cellulose fiber	
Appearance	Flat sheet without texture, without coating, non-coloured	
Sample Description	- Brand : SCG - Model: Smartboard 1200x2400x12 mm - Made in Thailand - Size: 120x240x1.2cm - Manufacturer name: Siam Fiber Cement Group Co., Ltd. - Manufacturer's identification code: N/A - Manufacturing date: 12/07/2025	
Raw materials (result from TGA and FTIR)	TGA decomposition	%wt
	- Moisture	4.95
	- Cellulose fiber	8.23
	- Carbon dioxide (CO ₂) from Calcium carbonate (CaCO ₃)	1.79
	- Residue such as Silicon dioxide (SiO ₂), CaO, etc.	84.86
Dimension	Length (mm):	2399.9 mm
	Width (mm):	1200.6 mm
	Thickness (mm):	11.76 mm
Straightness of edge	0.05%	
Squareness of edge	0.08%	
Apparent density	1381 kg/m ³	
Modulus of rupture	1 st Bending– Wet conditioning for 24 hours : 13.30 MPa	
	2 nd Bending– Wet conditioning for 24 hours: 8.10 MPa	

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Appendix



Figure 1 Picture of Smartboard 1200x2400x12 mm by optical microscope

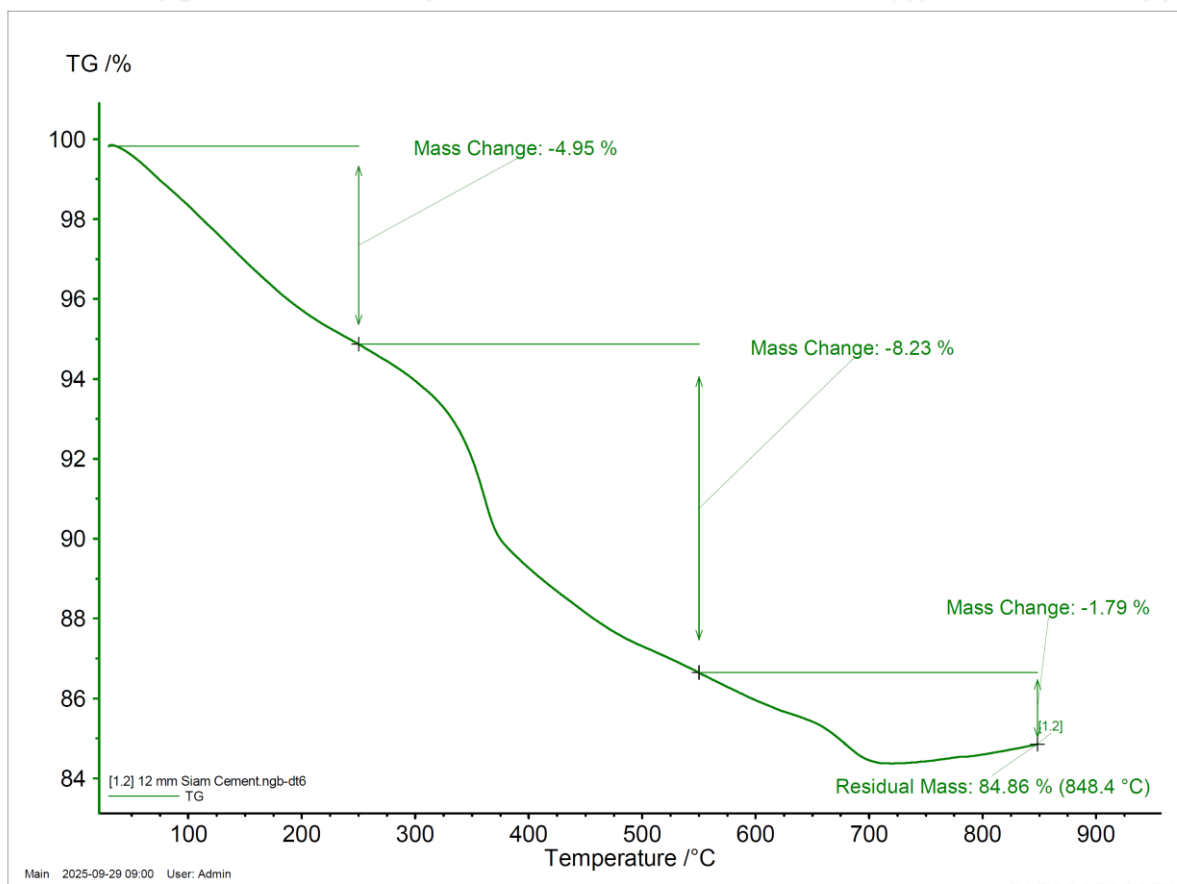


Figure 2 TGA thermogram of Smartboard 1200x2400x12 mm.

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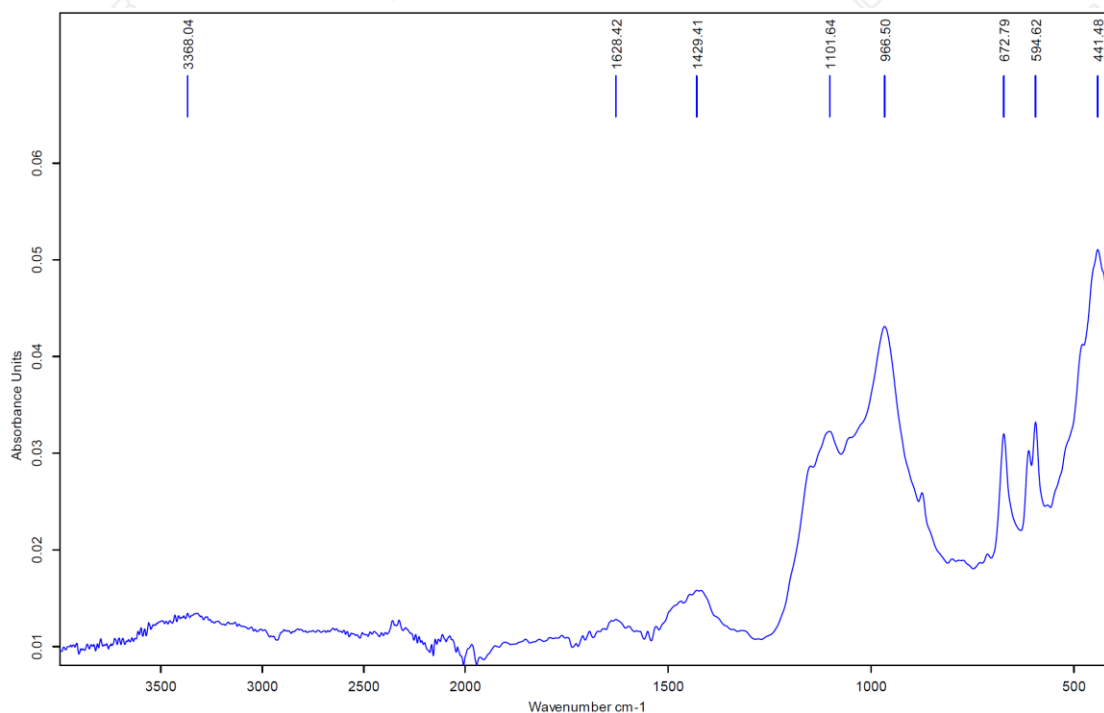
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Table 3 The FT-IR interpretation of Smartboard 1200x2400x12 mm.

Material	Wavenumber (cm ⁻¹)	Functional groups
Moisture	3368	O-H stretching
Lignin	1628	C=O stretching
Cellulose	672	Disubstituted Alkene
Calcium oxide (CaO)	1429	Ca-OH stretching
	872	Ca-O stretching
Silicon dioxide (SiO ₂)	966	Si-OH vibration
	776	Asymmetric stretching vibration or bending vibration of Si-O-Si bonds
	441	



D:\Job17. Job 2025\EIC250516-01 Siam cement board\Siam cement board 12 mm.0 Siam cement board 12 mm Instrument type and / or accessory 9/24/2025

Figure 3 FTIR spectra (% Absorbance) of Smartboard 1200x2400x12 mm.

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Table 4: Test result for dimension

Sample name	Properties	Unit	Measurement value								
			No.1			No.2			No.3		
Smartboard 1200x2400x12 mm	Length	mm	2400.0	2400.0	2399.0	2400.0	2401.0	2400.0	2400.0	2400.0	2399.0
	Average	mm	2399.7			2400.3			2399.7		
	Width	mm	1200.0	1201.0	1200.0	1200.0	1201.0	1201.0	1200.0	1201.0	1201.0
	Average	mm	1200.3			1200.7			1200.7		
	Thickness	mm	11.74	11.76	11.85	11.84	11.91	11.62	11.86	11.69	11.66
			11.74	11.86	11.76	11.50	11.86	11.70	11.66	11.84	11.86
	Average	mm	11.79			11.74			11.76		



Figure 4 On operation process

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Table 5: Test result for straightness of edge

Sample name	Properties	Unit	Measurement value					
			No.1		No.2		No.3	
			Length	Width	Length	Width	Length	Width
Smartboard 1200x2400x12 mm	Straightness of edges	mm	1.0	0.5	0.5	0.5	1.0	0.5
			1.0	0.5	2.0	1.0	1.0	0.5
	Average	mm	0.75		1.00		0.75	
	Straightness of edges	%	0.04	0.04	0.02	0.04	0.04	0.04
			0.04	0.04	0.08	0.08	0.04	0.04
	Average	%	0.04		0.06		0.04	

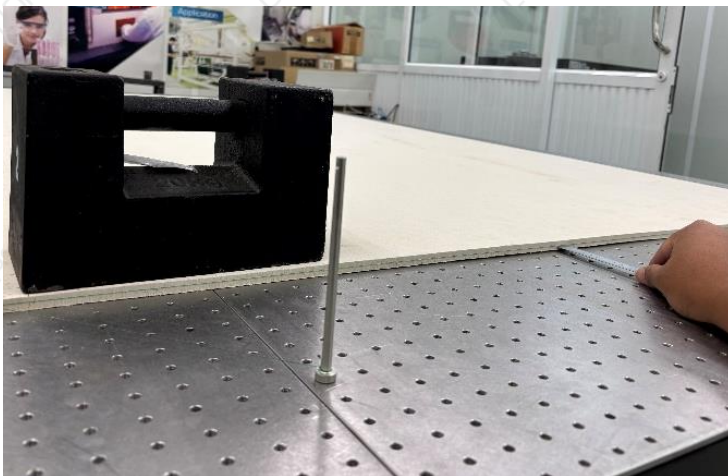


Figure 5 On operation process

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Table 6: Test result for squareness of edge

Sample name	Properties	Unit	Measurement value					
			No.1		No.2		No.3	
Smartboard 1200x2400x12 mm	Squareness of edge	mm	0.5	1.0	0.5	1.0	0.5	1.0
			1.5	0.5	0.5	1.0	1.5	0.5
	Average	mm	0.88		0.75		0.88	
	Squareness of edge	%	0.05	0.10	0.05	0.10	0.05	0.10
			0.15	0.05	0.05	0.10	0.15	0.05
	Average	%	0.09		0.08		0.09	

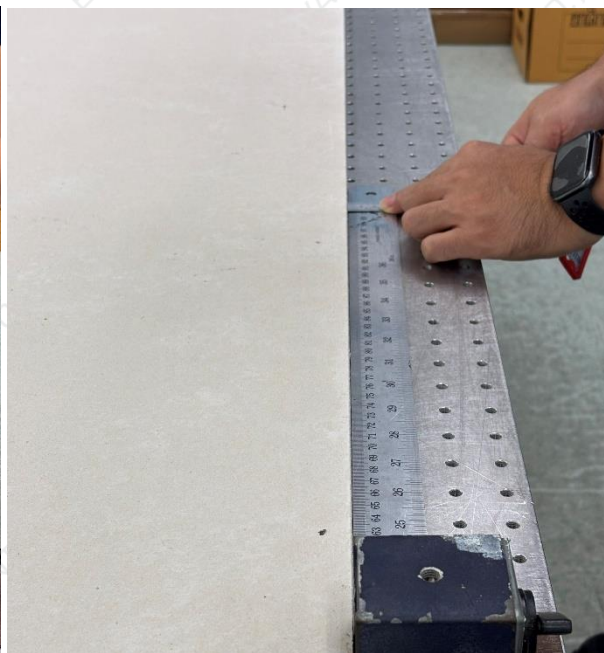


Figure 6 On operation process

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Table 7: Test result for apparent density

Sample name	Properties	Unit	Measurement value		
			No.1	No.2	No.3
Smartboard 1200x2400x12 mm	Dry Mass	kg	1.02575	1.03624	1.03589
	Volume	m ³	0.000767	0.000747	0.000730
	Apparent Density	kg/m ³	1338	1387	1419
	Average Apparent Density	kg/m ³	1381		



(a) Immerse specimen in water at temperature 23°C for at least 24 h.



(b) Determine the volume of the water displaced.



(c) Determine the non-immersed mass of the specimen.

Figure 7 On operation process

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Table 8: Modulus of rupture: 1st Bending– Wet condition 24 hours

Properties	Unit	Measurement value									
		(1 st bending : Wet conditioning)									
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10
Thickness	mm	12.11	12.00	11.98	11.75	12.02	11.99	11.87	11.71	12.10	12.02
Maximum load	N	1655.7	1606.4	1578.5	1620.5	1589.3	1625.7	1582.5	1602.3	1594.0	1661.7
Length of span	mm	200									
Bending strength (Modulus of rupture)	MPa	13.32	13.12	12.89	13.76	12.94	13.38	13.27	13.78	12.81	13.68
Average bending strength (Modulus of rupture)	MPa	13.30									

Note: The test was conducted at 23±2°C and 50±5 % relative humidity

Table 9: Modulus of rupture: 2nd Bending – Wet condition 24 hours

Properties	Unit	Measurement value									
		(2 nd bending : Wet conditioning)									
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10
Thickness	mm	12.11	12.00	11.98	11.75	12.02	11.99	11.87	11.71	12.10	12.02
Maximum load	N	1655.7	1606.4	1578.5	1620.5	1589.3	1625.7	1582.5	1602.3	1594.0	1661.7
Length of span	mm	200									
Bending strength (Modulus of rupture)	MPa	7.96	8.25	7.80	8.55	7.72	8.05	8.26	8.51	8.01	7.91
Average bending strength (Modulus of rupture)	MPa	8.10									

Note: The test was conducted at 23±2°C and 50±5 % relative humidity

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Date: 24/05/2024

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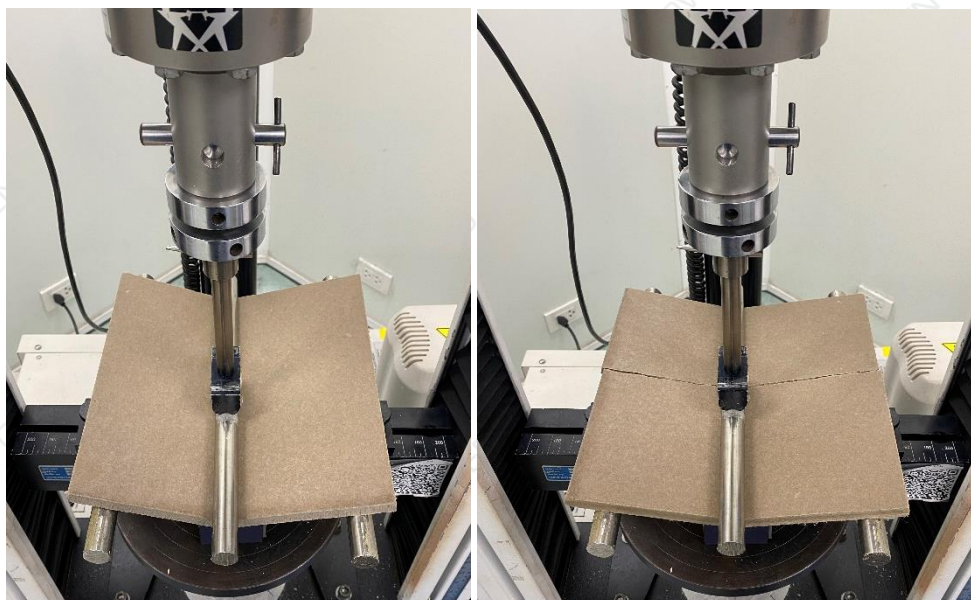
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Appendix



(a) Immersion specimen in water at temperature 23°C for 24 h



(b) Bending test

Figure 8 On operation process

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Appendix

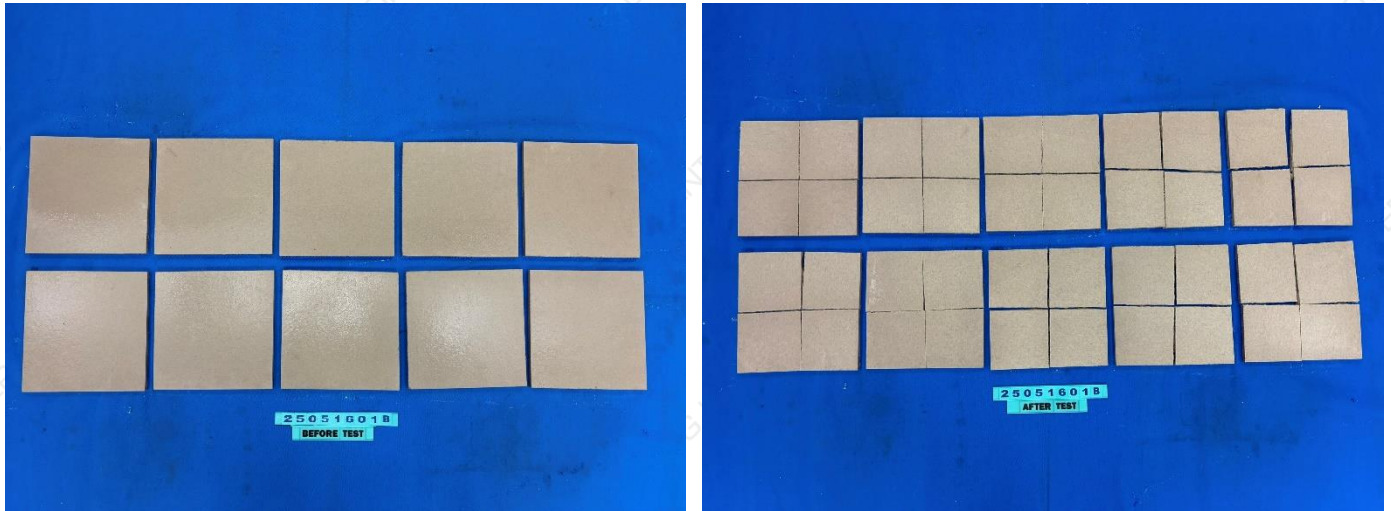


Figure 9 Appearance of test samples.



Figure 10 The sample as received.

***** End of Report *****

Signature: [Handwritten Signature]
Date: 25/05/2016

This result is certified only for the tested sample(s) as indicated in this report.
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