



MAHIDOL UNIVERSITY

TEST CERTIFICATE

Client: Conwood Co., Ltd.
Test Method: ASTM C 1185 Freeze-Thaw Test
Tested by: Department of Civil and Environmental Engineering, Mahidol University
25/25 Phuttamonthon 4 Rd., Nakhon Pathom, 73170 Thailand
Test Date: February 2013
Specimen Size: 150mm x 300 mm plate
Test Cycles: 25 Cycles of 3 hours to -20 °C freezing and 3 hours to +20 °C thawing
Damages after Cycles: No observable crack. Minor surface stains.
Testing Machine: Instron 1000-kN Capacity Universal Testing Machine using 250 mm simple span
Flexural Test Results:

Sample	Flexural Strength for 25 mm-Thick Specimens (MPa)			
	Longitudinal Direction		Transverse Direction	
	Control	Freeze-Thaw	Control	Freeze-Thaw
1	8.93	9.17	6.48	7.19
2	9.17	8.43	6.60	7.25
3	8.04	9.00	5.92	6.66
4	8.83	-	5.73	5.93
5	8.52	8.49	7.68	7.92
Average	8.70	8.77	6.48	6.99
Standard Deviation	0.43	0.37	0.76	0.74
Ratio of Flexural Strength*	1.01		1.08	

Sample	Flexural Strength for 11 mm-Thick Specimens (MPa)			
	Longitudinal Direction		Transverse Direction	
	Control	Freeze-Thaw	Control	Freeze-Thaw
1	8.09	8.73	5.96	7.10
2	8.05	7.19	3.73	7.44
3	-	7.33	3.48	4.34
4	9.07	7.02	7.96	4.02
5	9.58	7.12	3.99	7.17
Average	8.70	7.48	5.02	6.01
Standard Dev.	0.76	0.71	1.91	1.68
Ratio of Flexural Strength*	0.86		1.20	

Note: ASTM C 1186 requires that the ratio of the flexural strength must not be less than 0.80

Checked and Approved

Asst. Prof. Dr. Praveen Chompreda