

Test Report No. 7191061185-MEC13/09-ED
dated 4 Oct 2013



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SUBJECT:

Testing of fibre cement board submitted by Visaka Industries Ltd

TESTED FOR:

Visaka Industries Limited
Visaka Towers
1-8-303/69/3, S.P. Road
Secunderabad
A.P. 500003
India

Attn: Mr Jawahar Rawtani

TEST METHOD:

Adopted ISO 8336 : 2009 Fibre-Cement Flat Sheets - Product Specifications And Test Methods

Section 5.6.2 Modulus Of Rupture

Section 5.6.11 Soak-Dry Performance

Section 7.3.8 Soak-Dry Test

Annex D Test Method For The Determination Of Fibre-Cement Sheet Modulus of Rupture (Bending Strength)

Annex K Test Method For Soak-Dry Evaluation Test Of Fibre-Cement Sheets

Soak-Dry cycle consists of :

i. Immersion in water >5°C for 18 hours

ii. Drying in oven at 60°C for 6 hours

Total : 50 cycles

DESCRIPTION OF SAMPLE:

Fibre Cement Board 'V-Premium'



Laboratory:
TUV SUD PSB Pte. Ltd.
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Singapore 118221

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The Franklin, Singapore 118223
TUV[®]



REMARKS:

The no. of cycles for soak-dry was specified by the client.

Handwritten signature of Eddie Suwand in black ink.

Eddie Suwand
Senior Associate Engineer

Handwritten signature of Eng Aik How in black ink.

Eng Aik How
Engineer
Building
Mechanical Centre



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TEST RESULTS:

Size : 250 mm x 250 mm

Direction : Parallel, 1st bending

Test condition : Before soak-dry

Crosshead speed : 50 mm/min

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	445.99	490.96	462.44	448.26	467.24	480.32	482.51	480.49	512.21	433.92
Length of Span (mm)	200									
Width of Specimen (mm)	200	200	200	200	200	200	200	200	200	200
Thickness (mm)	7.71	7.80	7.65	7.91	7.85	7.59	7.76	7.80	7.89	7.65
Flexural Strength (MPa)	11.25	12.10	11.85	10.75	11.37	12.51	12.02	11.85	12.34	11.12
Average Flexural Strength (MPa)	11.72									

Direction : Parallel, 2nd bending

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	250.41	257.58	244.17	329.05	263.32	229.15	341.95	223.07	288.12	224.68
Length of Span (mm)	200									
Width of Specimen (mm)	200	200	200	200	200	200	200	200	200	200
Thickness (mm)	7.72	8.11	7.65	7.90	7.78	7.76	7.83	7.72	8.05	7.63
Flexural Strength (MPa)	6.30	5.87	6.26	7.91	6.53	5.71	8.37	5.61	6.67	5.79
Average Flexural Strength (MPa)	6.50									

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TEST RESULTS:

Size : 250 mm x 250 mm

Direction : Perpendicular, 1st bending

Test condition : Before soak-dry

Crosshead speed : 50 mm/min

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	337.56	300.19	382.95	285.00	357.90	333.34	361.35	340.26	277.74	390.29
Length of Span (mm)	200									
Width of Specimen (mm)	200	200	200	200	200	200	200	200	200	200
Thickness (mm)	7.85	7.80	7.91	7.68	7.93	7.90	7.93	7.93	7.72	7.73
Flexural Strength (MPa)	8.22	7.40	9.18	7.25	8.54	8.01	8.62	8.12	6.99	9.80
Average Flexural Strength (MPa)	8.21									

Direction : Perpendicular, 2nd bending

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	445.99	461.16	452.73	481.41	501.91	423.70	419.15	463.44	456.19	409.36
Length of Span (mm)	200									
Width of Specimen (mm)	200	200	200	200	200	200	200	200	200	200
Thickness (mm)	7.61	7.73	7.76	7.57	7.61	7.85	7.85	7.85	7.85	7.60
Flexural Strength (MPa)	11.55	11.58	11.28	12.60	13.00	10.31	10.20	11.28	11.10	10.63
Average Flexural Strength (MPa)	11.35									
Overall Average Flexural Strength, before soak-dry, two directions, 1 st and 2 nd bendings	9.33	9.24	9.64	9.63	9.86	9.14	9.80	9.22	9.28	9.34

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TEST RESULTS:

Size : 250 mm x 250 mm

Direction : Parallel, 1st bending

Test condition : After soak-dry

Crosshead speed : 20 mm/min

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	645.08	635.04	646.52	667.27	564.68	637.91	647.53	555.57	631.75	641.29
Length of Span (mm)	200									
Width of Specimen (mm)	249.5	249.8	249.5	249.8	249.9	249.9	250.1	250.1	250.1	250.0
Thickness (mm)	7.78	7.82	7.52	7.81	7.48	7.58	7.57	7.52	7.55	7.84
Flexural Strength (MPa)	12.81	12.47	13.75	13.14	12.12	13.33	13.55	11.78	13.29	12.52
Average Flexural Strength (MPa)	12.88									

Direction : Parallel, 2nd bending

Crosshead speed : 20 mm/min

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	384.64	350.64	358.99	391.81	277.07	349.62	339.42	294.53	353.42	347.43
Length of Span (mm)	200									
Width of Specimen (mm)	250.0	250.0	250.0	250.1	250.1	250.1	250.1	250.1	250.0	249.9
Thickness (mm)	7.84	7.67	7.87	7.75	7.38	7.53	7.73	7.51	7.66	7.86
Flexural Strength (MPa)	7.52	7.15	6.96	7.82	6.10	7.40	6.81	6.26	7.23	6.75
Average Flexural Strength (MPa)	7.00									

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TEST RESULTS:

Size : 250 mm x 250 mm

Direction : Perpendicular, 1st bending

Test condition : After soak-dry

Crosshead speed : 12 mm/min

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	366.58	384.72	300.86	376.62	294.53	370.04	283.48	363.71	345.49	284.49
Length of Span (mm)	200									
Width of Specimen (mm)	250.1	250.2	249.8	250.0	250.0	250.0	250.0	250.2	250.1	250.0
Thickness (mm)	7.87	7.82	7.45	7.85	7.41	7.74	7.44	7.74	7.65	7.33
Flexural Strength (MPa)	7.10	7.54	6.51	7.33	6.44	7.41	6.15	7.28	7.08	6.35
Average Flexural Strength (MPa)	6.92									

Direction : Perpendicular, 2nd bending

Crosshead speed : 20 mm/min

Sample Reference	1	2	3	4	5	6	7	8	9	10
Maximum Load (N)	661.20	643.82	550.59	664.57	567.55	665.58	557.85	633.10	623.15	553.63
Length of Span (mm)	200									
Width of Specimen (mm)	250.0	250.0	250.1	249.8	249.7	249.9	250.0	250.1	250.0	250.0
Thickness (mm)	7.70	7.65	7.61	7.80	7.45	7.79	7.45	7.62	7.53	7.41
Flexural Strength (MPa)	13.38	13.20	11.40	13.12	12.29	13.17	12.06	13.08	13.19	12.10
Average Flexural Strength (MPa)	12.70									
Overall Average Flexural Strength, after soak-dry, two directions, 1 st and 2 nd bendings	10.20	10.09	9.66	10.35	9.24	10.33	9.64	9.60	10.20	9.43

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TEST RESULTS:

Direction : Parallel, 1st bending

Sample Reference	1	2	3	4	5	6	7	8	9	10
Ratio (R)	1.14	1.03	1.16	1.22	1.07	1.07	1.13	0.99	1.08	1.13
Average Ratio (R)	1.10									
Standard Deviation (s)	0.07									
Lower Estimation At 95% Confidence Level (R _L)	1.06									

Direction : Parallel, 2nd bending

Sample Reference	1	2	3	4	5	6	7	8	9	10
Ratio (R)	1.19	1.22	1.11	0.99	0.93	1.30	0.81	1.12	1.08	1.17
Average Ratio (R)	1.09									
Standard Deviation (s)	0.14									
Lower Estimation At 95% Confidence Level (R _L)	1.01									

Direction : Perpendicular, 1st bending

Sample Reference	1	2	3	4	5	6	7	8	9	10
Ratio (R)	0.86	1.02	0.71	1.01	0.75	0.93	0.71	0.90	1.01	0.65
Average Ratio (R)	0.86									
Standard Deviation (s)	0.14									
Lower Estimation At 95% Confidence Level (R _L)	0.77									

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TEST RESULTS:

Direction : Perpendicular, 2nd bending

Sample Reference	1	2	3	4	5	6	7	8	9	10
Ratio (R)	1.16	1.14	1.01	1.04	0.95	1.28	1.18	1.16	1.19	1.14
Average Ratio (R)	1.12									
Standard Deviation (s)	0.10									
Lower Estimation At 95% Confidence Level (R _L)	1.07									

Sample Reference	1	2	3	4	5	6	7	8	9	10
Average Ratio (R), before soak-dry	9.33	9.24	9.64	9.63	9.86	9.14	9.80	9.22	9.28	9.34
Average Ratio (R), after soak-dry	10.20	10.09	9.66	10.35	9.24	10.33	9.64	9.60	10.20	9.43
Individual Ratio (R _i), each pair of samples	1.09	1.09	1.00	1.08	0.94	1.13	0.98	1.04	1.10	1.01
Average Ratio (R)	1.05									
Standard Deviation (s)	0.06									
Lower Estimation At 95% Confidence Level (R _L)	1.01									

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July 2011

