psi Information To Build On
Engineering • Consulting • Testing

Cali Bamboo
9365 Waples Street, Suite D
San Diego, CA 92121
Attn: Cyndi Janetka cjanetka@calibamboo.com

Project #: 0721341-9
Lab #: 4532
Date: February 16, 2011

BamDeck Composite Bamboo Decking - Physical Properties Testing

Multiple samples of **BamDeck Composite Bamboo Decking** were submitted to this Laboratory for **Physical Properties testing**. Testing was based on the ASTM Test Standards listed in the table below. Any modifications or changes to the standards listed will be footnoted below the individual test tables listed on the test results pages beginning on page two of this report.

Tests and Standards	
Properties of Structural Panels in Flexure	ASTM D 3043
Fastener Holding Strength (Nail & Screw)	ASTM D 1037
Water Absorption	ASTM D 1037
Hardness	ASTM D 143
Falling Ball Impact	ASTM D 1037
Tension Parallel to Grain	ASTM D 143
Block Shear	ASTM D 143
Compression - Parallel to Grain	ASTM D 143
Compression - Perpendicular to Grain	ASTM D 143
Specific Gravity	ASTM D 2395
Moisture Content	ASTM D 4442
Taber Abrasion (Modified)	ASTM D 4060
Coefficient of Friction	ASTM D2394

All Test Equipment was verified to be in good working condition and calibrated according to NIST Traceability Standards. Test results begin on page two of this report.

This report has been produced for the exclusive use of **Cali Bamboo Flooring**, and may not be reproduced except in its entirety, and only with the expressed, written approval of PSI/PTL. No one other than PSI's client shall be entitled to rely upon this report or the information contained herein. Any such unauthorized reliance on or use of this report will be at the third party's sole risk

Services performed for this project have been conducted with a level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar conditions and restraints. No warranty, expressed or implied, is made.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.
~~Pittsburgh~~ Testing Laboratory Division

Randy T. Webb
Director, Technical Services
Engineered Wood Products

Project #: 0721341-9
Lab #: 4532
Date: February 16, 2011

Test Results

Static Bending Test Results (ASTM D3043 "D")

Sample ID.	Moisture Content (%)	Thickness (in)*	Density (lbs/ft3)	Max Load (lbs/f)	MOR (psi)	MOE (psi)	EI (lbs-in2/ft)
1	0.4	0.801	80.6	326	4,650	597,980	308,219
2	0.4	0.801	80.6	317	4,518	602,936	295,078
Average	**0.4**	**0.801**	**80.6**	**321**	**4,584**	**600,458**	**301,649**

Screw Withdrawal ASTM D1037

Face (lbs)	Edge 1 (lbs)	Edge 2 (lbs)
213	**213**	**188**

Nail Withdrawal ASTM D1037

Direct (lbs)	Lateral (lbs)
124	**1,197**

Water Absorption and Thickness Swell (ASTM D 1037)

Sample ID	TS (%)	WA (%)
Sanded 1	0.14	0.41
Sanded 2	0.12	0.41
Average	**0.13**	**0.41**
Unsanded 1	0.09	0.35
Unsanded 2	0.12	0.32
Average	**0.11**	**0.33**

Hardness ASTM D 143

Sample	Test 1 (lbf)	Test 2 (lbf)	Average
1	2,617	2,811	**2,714**

Tension Parallel to Grain ASTM D 143

Deflection @ Failure (in)	Area (in²)	Ult load (lbs)	PSI
0.079	0.07566	164	**2,168**

Block Shear ASTM D 143 (Modified)*

Shear Area (in²)	Ult Load (lbs)	PSI
1.251	2,740	**2,191**

** This test calls for a 2"x2" block but due to sample size limitations a .725"x 1.725" block was used.*

Falling Ball Impact ASTM D 1037 (Modified)*

Specimen Thickness: .802"		
Drop Ht (in)	Width (in)	Depth (in)
6	**0**	**0**
12	**0.220**	**0.003**
18	**0.225**	**0.004**
24	**0.230**	**0.005**
30	**0.235**	**0.005**
36	**0.245**	**0.005**
42	**0.260**	**0.006**
48	**0.290**	**0.008**
54	**0.310**	**0.008**
60	**0.320**	**0.008**
66	**0.330**	**0.009**

** Rather than report the drop height at failure this test was modified to report the indentation diameter and depth caused by a 2in diameter Steele ball from various increasing heights. No splitting or cracking occurred.*

Compression Parallel to Grain
ASTM D 143 (Modified) (Fig. 1)

Length (in)	Thickness (in)	Width (in)	Weight (gr)	Ultimate Load (lbs)	Deflection @ Ult Load (in)	MC (%)
3.99	0.802	0.996	67.70	**3,949**	**0.1596**	**0.4**

** This method requires a 1in x 1in specimen however due to limited sample size the method was modified by using a .996x.802in sample.*

Compression - Perpendicular to Grain
ASTM D 143 (Fig. 2)

Length (in)	Thickness (in)	Width (in)	Weight (gr)	Ultimate Load (lbs)	Deflection @ Ult Load (in)	MC (%)
6.017	0.798	1.989	203.60	**32,380**	**0.1000**	**0.3**

Fig. 1

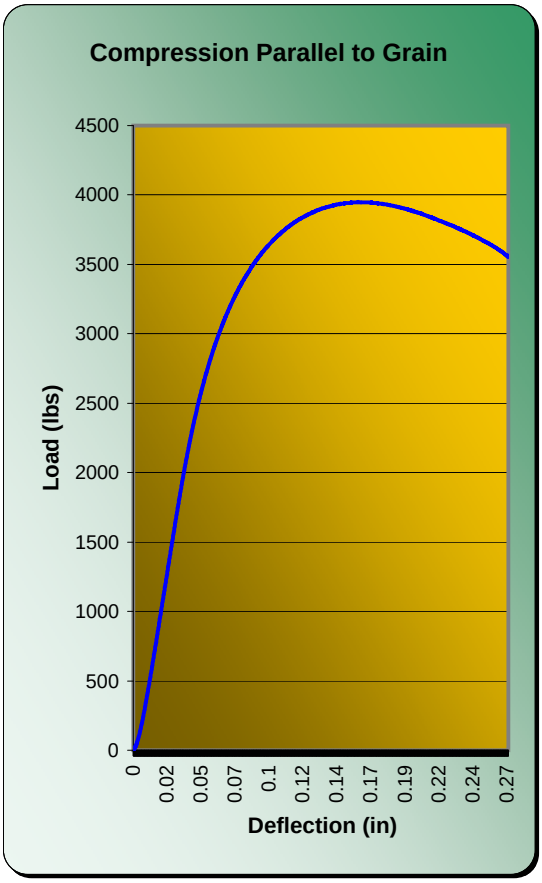
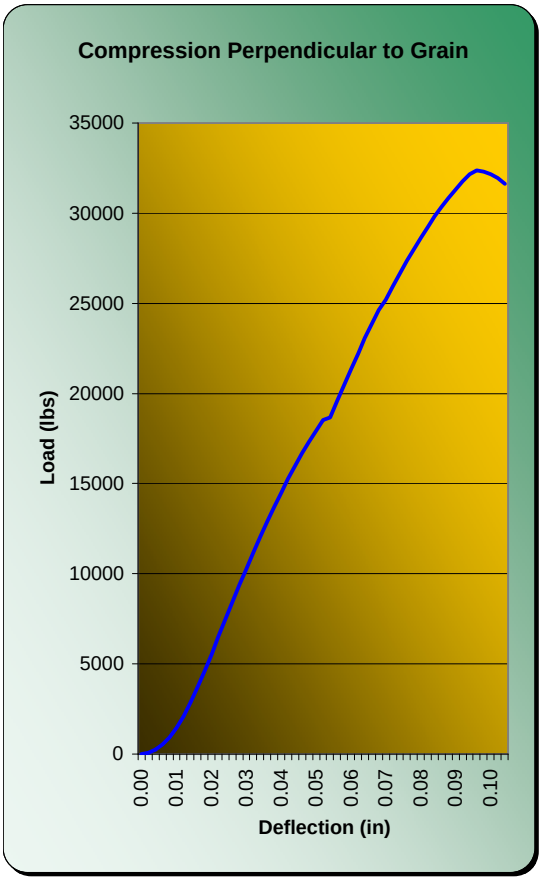


Fig. 2



Specific Gravity and Moisture Content

Specific Gravity ASTM D 2395	Moisture Content ASTM D 4442-A (%)
1.343	0.25

Taber Abrasion Resistance (Modified)
ASTM D 4060

Abrasion resistance based on procedures of **ASTM D4060** Standard using the standardized "Taber Abrasion" machine. Each of the two CS-17 Taber Abrasive wheels used in the test were weighted to 500 grams (1000 grams total for the two wheels). **Abrasion resistance was determined by the amount of wear that occurred after each 1000 cycle interval up to 10,000 cycles.** Each wear measurement is the result of the average of four measurements.

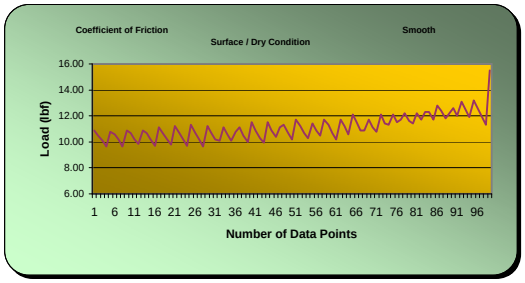
Taber Abrasion (Modified)

Cycles	Average Depth of Wear (in)	Wear Per 1K Cycles (in)
1000	0.0028	0.0028
2000	0.0036	0.0008
3000	0.0042	0.0006
4000	0.0046	0.0004
5000	0.0051	0.0005
6000	0.0056	0.0005
7000	0.006	0.0004
8000	0.0063	0.0003
9000	0.0066	0.0003
10000	0.0071	0.0005
	Average	**0.0005**

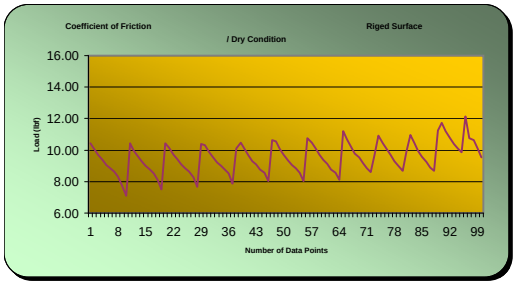
Static and Dynamic Coefficient of Friction (Slip Resistance)

Static Coefficient of Friction is determined by the Initial Amount of Force (lbf) required to pull a Dead-weight (25.00 lbs) glued to Prime-Grade Shoe Sole Leather across the surface of the product, divided by the Deadweight. Lineal Coefficient of Friction is likewise determined using the Amount of Force (lbf) required to keep the Dead-Weight moving across the surface of the product. Wet samples were prepared by pouring 400ml of tap water over the surface of the sample.

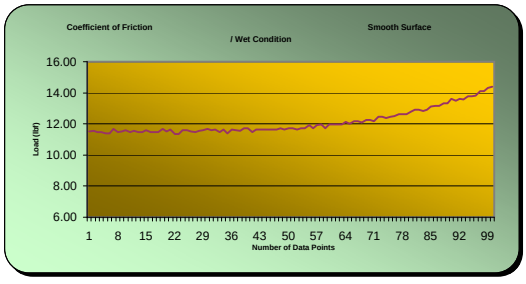
STATIC Coefficient of Friction	
Sample Number	**Smooth-Dry**
Initial Load (lbf)	17.02
Friction Coefficient	**0.681**
Dynamic Coefficient of Friction	
Maximum Load (lbf)	15.50
Minimum Load (lbf)	9.63
Average Load (lbf)	11.16
Friction Coefficient	**0.446**



STATIC Coefficient of Friction	
Sample Number	**Ridged-Dry**
Initial Load (lbf)	15.86
Friction Coefficient	**0.634**
Dynamic Coefficient of Friction	
Maximum Load (lbf)	12.13
Minimum Load (lbf)	7.10
Average Load (lbf)	9.52
Friction Coefficient	**0.381**



STATIC Coefficient of Friction	
Sample Number	**Smooth-Wet**
Initial Load (lbf)	17.41
Friction Coefficient	**0.696**
Dynamic Coefficient of Friction	
Maximum Load (lbf)	14.40
Minimum Load (lbf)	11.36
Average Load (lbf)	12.12
Friction Coefficient	**0.485**



STATIC Coefficient of Friction	
Sample Number	**Ridged-Wet**
Initial Load (lbf)	16.32
Friction Coefficient	**0.653**
Dynamic Coefficient of Friction	
Maximum Load (lbf)	11.23
Minimum Load (lbf)	8.26
Average Load (lbf)	9.62
Friction Coefficient	**0.385**