Architectural Testing

TEST REPORT

Rendered to:

PATWIN PLASTICS, INC

For:

5/4 Cellular PVC Deck Board

Report No: B8335.01-119-19
Report Date: 01/09/13

130 Derry Court
York, PA 17406-8405
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TEST REPORT
B8335.01-119-19
January 9, 2013

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TEST REPORT

Rendered to:

PATWIN PLASTICS, INC.
2300 East Linden Avenue
Linden, New Jersey 07036

Report No:	B8335.01-119-19
Test Date:	04/09/12
Through:	09/17/12
Report Date:	01/09/13

1.0 General Information

1.1 Product

5/4 Cellular PVC Deck Board

1.2 Project Description

Architectural Testing was contracted by Patwin Plastics, Inc. to perform testing on their 5/4 cellular PVC deck board. This report is in conjunction with Architectural Testing Report No. A0086.02-119-19 which includes material test results and Southwest Research Institute (SwRI) Project No. R15209.01.139 which includes flame spread test results. The purpose of the testing was code compliance evaluation in accordance with the following criteria:

> ICC-ES™ AC174 (approved January 2012), *Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems* (*Guards and Handrails*).

AC174-12 was developed by the ICC Evaluation Service, LLC. (ICC-ES™) as acceptance criteria to evaluate compliance with the following building codes:

> 2012 *International Building Code*®, International Code Council
>
> 2012 *International Residential Code*®, International Code Council

130 Derry Court
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1.3 Qualifications

Architectural Testing has demonstrated compliance with ANS/ISO/IEC Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc. Architectural Testing is accredited to perform all testing reported herein.

1.4 Product Description

The 5/4 cellular PVC deck board is a co-extruded material composed of cellular PVC substrate with a PVC capstock. The manufactured product is intended for use as an exterior walking deck board. The mixture used in the processing of the product is extruded through a continuous feed system and is produced as a deck board measuring a nominal 1 in thick and 5-1/2 in wide with 1/4 in radius edges. The top surface has an embossed simulated wood-grain pattern. Test specimens consisted of five different colored products identified by the manufacturer as follows: Mahogany, Birch, Walnut, Driftwood, and Khaki. See photograph in Appendix B for deck board colors. Drawings are included in Appendix A to verify the overall dimensions and other pertinent information of the tested product, its components, and any constructed assemblies.

1.5 Product Sampling

A representative of Architectural Testing visited Patwin Plastics, Inc.'s facility in Linden, New Jersey on 03/29/12, to select the components used for testing. All samples selected for testing were marked for identification and were the samples used for all tests reported herein. See photographs in Appendix B for typical sampling mark.

1.6 Witnessing

There were no witnesses from Patwin Plastics, Inc. present for testing conducted and reported herein.

1.7 Conditions of Testing

Unless otherwise indicated, all testing reported herein was conducted in a laboratory set to maintain temperature in the range of 68 ± 4ºF and humidity in the range of 50 ± 5% RH. All test specimen materials were stored in the laboratory environment for no less than 40 hours prior to testing.

2.0 Reference Standards

ANSI / AF&PA NDS-2012, *National Design Specification (NDS) for Wood Construction*

ASTM D 790-07, *Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials*

ASTM D 1037-06a, *Standard Test Method for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials*

ASTM D 1761-06, *Standard Test Methods for Mechanical Fasteners in Wood*

ASTM D 2565-99 (Reapproved 2008), *Practice for Operating Xenon-Arc-Type Light-Exposure Apparatus With and Without Water for Exposure of Plastics*

ASTM D 6109-05, *Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber*

ASTM D 7031-04, *Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products*

ASTM D 7032-08, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*

3.0 Project Summary

A brief summary of results is presented in the following table. See applicable test report sections for complete details of test procedure and results.

ICC-ES™ AC174	Results
3.4 Deck Board Flexural Tests - Flexural Properties	Avg. Mu = 2856 in·lb Avg. EI = 68330 lb·in^2
3.4 Deck Board Flexural Tests - 4.1.3 Span/Load Rating with No Residential End-Use Limitation	Span/Load Rating = 16/100 16.0 in Span; 100 psf Live Load
3.4 Deck Board Flexural Tests - 4.1.3 Stair Tread with No Residential End-Use Limitation	12.0 in Max. Span (2-Span Application) 24.0 in Max. Span (2-Span Application with 2x4 Reinforcing)
3.7 UV Resistance	8% Increase / Bending Strength (Apparent MOR) 3% Reduction / Bending Stiffness (Apparent MOE)
3.11 Duration of Load	No evidence of tertiary creep and no failures
4.0 Deck Board Performance - 5.4 ASTM D 7032, Creep-Recovery	95% Average Recovery Average Total Deflection = 0.174 in Max. Unrecovered Deflection = 0.014 in
4.0 Deck Board Performance - 5.5 ASTM D 7032 / ASTM D 1761 Mechanical Fastener by Pull Through and Withdrawal Resistance	Deck Board with Two #8 x 2-1/2" *Headcote*® Stainless Steel Screw's per Joist @ 16.0 Span Allowable Capacity / Pull Through = 145 lb / screw Allowable Capacity / Withdrawal / NDS = 182 lb / screw Allowable Uplift Capacity = 459 psf

4.0 Ultraviolet (UV) Resistance

Re: ICC-ES™ AC174 - Section 3.7

4.1 General

The purpose of this testing was to evaluate the effect of weathering on the performance of the products. Material specimens were taken from manufactured products and subjected to specified exposures of artificial weathering. Flexural tests were performed on the artificially weathered specimen set and compared to identical tests performed on a match-marked set of control specimens (non-weathered).

4.2 Test Specimens

Two end-matched sets of twenty-five test specimens containing five specimens of each color were cut from production length deck boards and labeled as control (standard conditions) and artificially weathered specimens. Specimens were approximately 1 in wide by 10 in long by 1/2 in thick.

4.3 Artificial Weathering Procedure

Artificially weathered specimens were subjected to 2000 hours of Xenon-Arc exposure from 04/25/12 through 07/23/12 in an Atlas Ci5000 Xenon Weather-Ometer® in accordance with ASTM D 2565 using Test Cycle 1. Exposure conditions were as follows:

Cycle: 102 minutes light only followed by 18 minutes of light with water spray
Black Panel Temp: 63 ± 2°C
Irradiance: 0.35 ± 0.02 W/m^2 at 340 nm

4.4 Flexural Test Procedure

Flexural testing was performed on 08/06/12 using the methods described by Procedure A of ASTM D 790. Specimens were conditioned at standard laboratory conditions for a minimum of 40 hours prior to flexural testing. All specimens were individually tested in a computer-monitored and -controlled Instron Model 3369 Universal Testing Machine using a three-point loading setup. The support span was set at 8.00 in with a loading nose located at midspan. Support and loading noses were 1/4 in radius steel rods. Deflections were continuously recorded during the loading process using the crosshead movement of the test machine. A loading rate of 0.212 in/min was used to control the test speed (crosshead movement). Artificially weathered specimens were tested with the exposed surface down (in tension). See photographs in Appendix B for individual test setups.

4.5 Test Results

Stiffness properties were derived from a least square fit of load/deflection data between 10% and 40% of the maximum test load. Peak load and MOR were defined at ultimate bending strength. Reported peak loads were not limited by an outer surface strain of 0.05 in/in as referenced in Section 10.1.7 of ASTM D 790

UV Resistance - Control Set (Non-Weathered)

Product ID	Color	Width (in)	Depth (in)	Peak Load (lb)	Apparent [1]	
					MOR (psi)	MOE (psi)
1M	Mahogany	0.990	0.498	71.6	3501	140100
2M		0.994	0.498	77.6	3776	154700
3M		0.996	0.500	67.9	3272	132600
4M		0.996	0.498	75.1	3649	145000
5M		0.994	0.491	66.9	3350	135300
1B	Birch	0.994	0.496	69.4	3406	146600
2B		0.992	0.499	68.6	3332	143000
3B		0.991	0.494	64.6	3204	138700
4B		0.995	0.493	68.3	3388	149800
5B		0.990	0.497	64.9	3183	135300
1W	Walnut	0.994	0.501	66.6	3205	135100
2W		0.994	0.502	65.7	3148	132500
3W		0.994	0.509	70.8	3299	137800
4W		0.996	0.496	63.9	3130	128400
5W		0.986	0.492	69.3	3485	135400
1D	Driftwood	0.993	0.493	84.9	4221	188000
2D		0.992	0.494	77.7	3850	167700
3D		0.998	0.497	69.1	3366	143100
4D		0.994	0.494	67.4	3335	138500
5D		0.993	0.498	66.2	3225	133400
1K	Khaki	0.995	0.496	68.2	3344	139200
2K		0.994	0.503	71.6	3417	145500
3K		0.994	0.503	68.7	3276	136100
4K		0.999	0.507	72.8	3400	138000
5K		0.996	0.511	73.4	3387	141500
				Minimum:	3130	128400
				Maximum:	4221	188000
				Average:	3400	142000
				Standard Deviation:	245.4	12516
				Coefficient of Variation:	7.2%	8.8%

4.5 Test Results (Continued)

Artificially Weathered Set (2000 Hours of Xenon-Arc Exposure)

Product ID	Color	Width (in)	Depth (in)	Peak Load (lb)	Apparent [1]	
					MOR (psi)	MOE (psi)
1M	Mahogany	0.993	0.500	79.1	3824	139300
2M		0.993	0.500	79.6	3845	137500
3M		0.995	0.506	78.4	3694	134500
4M		0.995	0.494	76.8	3797	143900
5M		0.992	0.497	79.0	3867	142600
1B	Birch	0.998	0.498	68.2	3306	126800
2B		0.991	0.505	70.5	3346	128600
3B		0.994	0.491	75.3	3768	150100
4B		0.988	0.497	71.1	3497	135200
5B		0.988	0.500	76.2	3704	146500
1W	Walnut	1.000	0.510	75.0	3462	127300
2W		0.996	0.508	72.5	3382	126500
3W		0.995	0.508	79.3	3706	141500
4W		0.999	0.507	76.7	3585	132100
5W		0.996	0.505	84.0	3969	131100
1D	Driftwood	0.992	0.499	89.1	4328	160600
2D		0.996	0.501	79.0	3793	148800
3D		0.977	0.497	83.1	4133	155400
4D		0.988	0.501	76.0	3676	132900
5D		0.998	0.502	67.5	3220	117100
1K	Khaki	0.995	0.503	74.6	3557	136500
2K		0.994	0.503	76.0	3628	142100
3K		0.995	0.499	78.8	3818	148400
4K		0.994	0.497	73.6	3598	137300
5K		0.995	0.499	73.1	3540	132800
				Minimum:	3220	117100
				Maximum:	4328	160600
				Average:	3700	138000
				Standard Deviation:	252.7	9997
				Coefficient of Variation:	6.8%	7.2%

4.6 Test Summary

Match-Marked Specimen Comparison Data
Control Set vs. Artificially Weathered Set

Product ID	Color	Control MOR (psi)	Artificially Weathered MOR (psi)	Percent Difference MOR (psi)	Control MOE (psi)	Artificially Weathered MOE (psi)	Percent Difference MOE (psi)
1M	Mahogany	3501	3824	9.2%	140100	139300	-0.6%
2M		3776	3845	1.8%	154700	137500	-11.1%
3M		3272	3694	12.9%	132600	134500	1.4%
4M		3649	3797	4.1%	145000	143900	-0.8%
5M		3350	3867	15.4%	135300	142600	5.4%
1B	Birch	3406	3306	-2.9%	146600	126800	-13.5%
2B		3332	3346	0.4%	143000	128600	-10.1%
3B		3204	3768	17.6%	138700	150100	8.2%
4B		3388	3497	3.2%	149800	135200	-9.7%
5B		3183	3704	16.4%	135300	146500	8.3%
1W	Walnut	3205	3462	8.0%	135100	127300	-5.8%
2W		3148	3382	7.4%	132500	126500	-4.5%
3W		3299	3706	12.3%	137800	141500	2.7%
4W		3130	3585	14.5%	128400	132100	2.9%
5W		3485	3969	13.9%	135400	131100	-3.2%
1D	Driftwood	4221	4328	2.5%	188000	160600	-14.6%
2D		3850	3793	-1.5%	167700	148800	-11.3%
3D		3366	4133	22.8%	143100	155400	8.6%
4D		3335	3676	10.2%	138500	132900	-4.0%
5D		3225	3220	-0.2%	133400	117100	-12.2%
1K	Khaki	3344	3557	6.4%	139200	136500	-1.9%
2K		3417	3628	6.2%	145500	142100	-2.3%
3K		3276	3818	16.5%	136100	148400	9.0%
4K		3400	3598	5.8%	138000	137300	-0.5%
5K		3387	3540	4.5%	141500	132800	-6.1%
	Minimum:	3130	3220	-2.9%	128400	117100	-14.6%
	Maximum:	4221	4328	22.8%	188000	160600	9.0%
	Average:	3400	3700	**8.3%**	142000	138000	**-2.6%**

[1] *MOR and MOE are apparent values because test specimens were not homogenous.*

5.0 Deck Board End-Use Adjustments

Re: ICC-ES™ AC174 – Sections 3.6 – 3.8

5.1 General

Data from various end-use effect testing reported herein and reported in Architectural Testing Report No. A0086.02-119-19 were used for determination of applicable end-use adjustment factors.

5.2 End-Use Adjustment Factors

End-Use Factors	Comparison (% Change) with Standard (Control) Conditions		ASTM D 7032 Criteria (as referenced by AC174)	Adjustment Factors	
	Strength [2]	Stiffness [3]		Strength	Stiffness
UV	+8.3%	-2.6%	Loss ≤10%	1.00	1.00
Freeze-Thaw	-3.2%	+0.4%	Loss ≤ 10%	1.00	1.00
Greatest of: +125ºF -20ºF Moisture [4]	 -33.4% +29.2% N/A	 -28.6% +8.6% N/A	100% of Worst Effect	0.67	0.71
Overall End-Use Adjustment Factors:				0.67	0.71
Creep Recovery and Duration of Load End-Use Adjustment Factors [1]:				1.00	1.00

[1] *Based on UV and Freeze-Thaw results*
[2] *Moment or MOR (Modulus of Rupture)*
[3] *EI (the product of MOE and the Moment of Inertia) or MOE (Modulus of Elasticity)*
[4] *Product does not absorb moisture.*

6.0 Deck Board Flexural Testing

Re: ICC-ES™ AC174 - Section 3.4

6.1 General

Deck board flexural testing was performed in accordance with Section 4.4 of ASTM D 7032 to establish unadjusted flexural strength and stiffness values for span/load ratings and for comparison with future production and quality control audits.

6.2 Test Specimens

One set of twenty-eight test specimens containing all five product colors were cut to 20 in lengths from production length deck boards. Test specimens were conditioned for a minimum of 40 hours at standard laboratory conditions.

6.3 Test Procedure

Testing was performed using the methods described by ASTM D 6109 in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine with a four point loading arrangement. The specimens were supported on 5/8 in radius support noses. The loading span was one-third of the bending span and utilized 5/8 in radius loading noses. Midspan deflection was measured to an accuracy of 0.001 in with a dial indicator suspended with a yoke apparatus. See photographs in Appendix B for test setup.

6.4 Test Parameters

Overall Specimen Length: 20 in
Test Span: 16.0 in
Rate of Crosshead Motion: 0.51 in/min
Nominal Deflection at 3% strain: 1.75 in

6.5 Test Results

Stiffness properties were derived from load/deflection data recorded during the loading process using the mid span deflection and a least square fit between 10% and 40% of the maximum test load. Reported peak loads were limited by an outer surface strain of 0.03 in/in as referenced in Section 10.1.7 of ASTM D 6109. Peak load and Mu were defined at bending strength at 3% maximum strain.

6.5 Test Results (Continued)

Strength and Stiffness / Bending (Standard Lab Conditions)
Date Tested: 04/13/12

Specimen/ Prod. ID	Color	Width (in)	Depth (in)	Weight per lineal foot (lb)	Peak Load (lb)	Load at L/180 Deflection (lb)	Slope (lbf/in)	Mu (in·lb)	EI (lb·in^2)
1-1M	Mahogany	5.523	0.938	1.46	1048	84	852	2795	61960
2-2M		5.514	0.935	1.46	1019	79	803	2717	58350
3-3M		5.521	0.935	1.45	1059	87	910	2824	66170
4-4M		5.522	0.936	1.48	1060	90	869	2827	63160
5-5M		5.524	0.937	1.48	1062	106	876	2832	63670
6-1B	Birch	5.499	0.955	1.60	1153	112	1011	3075	73470
7-2B		5.501	0.951	1.57	1149	109	1060	3064	77050
8-3B		5.498	0.950	1.60	1148	117	1068	3061	77620
9-4B		5.498	0.951	1.58	1132	108	1038	3019	75440
10-5B		5.499	0.951	1.58	1138	111	1074	3035	78090
11-1W	Walnut	5.507	0.941	1.48	1028	95	911	2741	66200
12-2W		5.319	0.926	1.34	948	88	845	2528	61390
13-3W		5.509	0.941	1.49	1024	92	915	2731	66480
14-4W		5.514	0.945	1.49	1020	89	898	2720	65300
15-5W		5.523	0.906	1.51	1140	92	947	3040	68870
16-1D	Driftwood	5.487	0.927	1.70	1129	105	995	3011	72310
17-2D		5.522	0.932	1.61	1143	108	1027	3048	74650
18-3D		5.518	0.930	1.61	1115	98	1020	2973	74130
19-4D		5.522	0.931	1.61	1095	108	1004	2920	72950
20-5D		5.519	0.928	1.55	1014	100	937	2704	68120
21-1K	Khaki	5.511	0.932	1.50	1078	97	939	2875	68260
22-1K		5.513	0.927	1.50	1075	105	930	2867	67590
23-2K		5.516	0.927	1.45	1020	84	889	2720	64590
24-3K		5.512	0.927	1.45	1012	91	873	2699	63480
25-4K		5.514	0.932	1.47	1045	90	895	2787	65090
26-5K		5.511	0.928	1.47	1048	92	906	2795	65840
27-6K		5.520	0.928	1.46	1042	89	923	2779	67070
28-6K		5.521	0.929	1.48	1040	89	906	2773	65860
				Minimum:	**948**	79	803	2528	58350
				Maximum:	1153	117	1074	3075	78090
				Average:	**1071**	**97**	940	2856	68330
				Standard Deviation:	55	10	73	146	5330
				Coefficient of Variation:	5%	10%	8%	5%	8%

7.0 Stair Tread Testing

Re: ICC-ES™ AC174 Section 4.0

7.1 General

The purpose of this testing was to evaluate the requirements for stair tread applications. The design load was a 300 lb concentrated load applied to a 2 in square plate (4 square inch area) at the mid-span of the stair tread (bending). The application was limited to a continuous deck board used over two adjacent spans (three supports) measuring 9 inches on-center. Testing was also conducted on a continuous deck board used over two adjacent spans (three supports) measuring 24 inches on center.

7.2 Test Specimens

Twenty-eight full cross-section specimens were cut to 12 in lengths from production length deck boards and were conditioned for a minimum of 40 hours at standard laboratory conditions. Twenty-eight full cross-section specimens were cut to 51 in lengths from production length deck boards and were installed over two 24.0 inch spans on simulated 2x8 stair stringers with 22-1/2 in long treated 2x4 wood blocking, installed edge-wise, mid-width, under each deck board used as a stair tread. The 2x4 wood blocking was attached to the 2x8 stair stringers by an Architectural Testing technician with (2) 3-1/4 in by 0.131 in round drive framing nails at each end. An Architectural Testing technician also attached the deck board to the wood supports with two #8 x 2-1/2" *Headcote*® Stainless Steel Screws (9 TPI, 0.180 in major dia., 0.115 in minor dia., 0.131 in shank dia., 0.260 in head dia., square drive trim head, Type 17 point) per joist (stringer). The fasteners were installed approximately 1-1/2 inches from each edge of the board. Specimens were conditioned for a minimum of 40 hours at standard laboratory conditions. See photographs in Appendix B for individual test setups for additional details.

7.3 Test Procedure

Testing for the 9.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine with a three-point loading arrangement. Test specimens were supported on two 5/8 in radius steel support noses set at a 9.0 in span. Testing for the 24.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine. The 24 in span test specimen described above was supported in the test machine. The test load was applied at the leading edge of one span mid-distance between supports through a 2 in square (4 square inch area) steel plate using a test speed as indicated in the test results tables below. Load and deflection were continuously recorded by the test machine. Deflection at 300 lb (design load) and ultimate test load were recorded. See photographs in Appendix B for test setups.

7.4 Test Results

Stair Tread - Tested at 9.0 in Single Span
Rate of Crosshead Speed = 0.135 in/min
Tested Date: 08/08/12

Specimen	Specimen Color	Deflection at 300 lb (in)	Ultimate Load (lb)
1	Mahogany	0.1160	1647
2		0.1320	1640
3		0.1170	1646
4		0.1130	1638
5		0.1090	1635
6	Birch	0.0880	1834
7		0.1030	1805
8		0.1010	1803
9		0.1000	1807
10		0.0910	1810
11		0.0880	1776
12	Walnut	0.1120	1625
13		0.1000	1514
14		0.1060	1631
15		0.1140	1646
16		0.1060	1629
17	Driftwood	0.1320	1785
18		0.0900	1803
19		0.0850	1809
20		0.0820	1771
21		0.0840	1754
22		0.1010	1657
23	Khaki	0.0980	1718
24		0.1090	1626
25		0.1150	1621
26		0.1060	1679
27		0.0990	1675
28		0.1170	1679
Minimum:		0.0820	**1514**
Maximum:		0.1320	1834
Average:		**0.1041**	**1702**
Standard Deviation:		0.0132	84
Coefficient of Variation:		13%	5%

7.5 Test Results

Stair Tread - Tested at 24.0 in 2-Span with Condition w/ Reinforcing Blocking
Rate of Crosshead Movement: 0.960 in/min
Tested Date: 08/09/12

Specimen	Specimen Color	Deflection at 300 lb (in)	Ultimate Load (lb)
1	Walnut	0.0850	1351
2		0.0660	1609
3		0.1390	1381
4		0.0960	1638
5	Driftwood	0.1310	1622
6		0.1380	1171
7	Mahogany	0.0710	1472
8		0.0620	1945
9		0.0720	1181
10		0.1090	1497
11	Walnut	0.0900	1165
12		0.0680	1682
13	Birch	0.0490	1895
14		0.0680	1676
15		0.0600	1283
16		0.0590	1738
17	Driftwood	0.0700	1932
18		0.0680	1621
19	Khaki	0.0500	1570
20		0.0710	1378
21	Birch	0.0740	1450
22	Mahogany	0.0950	1253
23	Khaki	0.0660	1429
24		0.0770	1334
25		0.0850	1480
26		0.0700	1807
27		0.0600	1582
28	Driftwood	0.0700	1507
	Minimum:	0.0490	**1165**
	Maximum:	0.1390	1945
	Average:	**0.0793**	**1523**
	Standard Deviation:	0.0241	222
	Coefficient of Variation:	30%	15%

7.6 Test Summary

Reference Section 12.0 Analysis and Conclusions.

8.0 Creep Recovery Testing

Re: ICC-ES™ AC174 Section 4.0

8.1 General

The purpose of this testing was to evaluate creep-recovery in accordance with Section 5.4 of ASTM D 7032.

8.2 Test Specimens

Three full cross-section test specimens were cut to 20 in lengths from production length deck boards.

8.3 Test Setup

Each test specimen was tested with a four point loading arrangement. The specimens were supported on two 1/2 inch radius steel rods placed at a 16.0 inch span. The loading span was one-third of the bending span and utilized 1/2 inch radius loading noses. The load was applied with measured dead weights. Midspan deflection was measured with a dial indicator accurate to 0.001 in. See photograph in Appendix B for test setup.

8.4 Test Procedure

Testing was performed using the methods described by ASTM D 7032. Test load was applied to impose a bending stress equal to or greater than the stress at two-times the design load (100 psf) and increased for applicable test load adjustment factors. After holding two times the adjusted design load for 24 hours, the load was removed to check recovery.

8.5 Test Load

A conservative end-use adjustment factor of 0.70 was used for testing prior to the completion of the actual end-use adjustment factor testing.

Unadjusted design load = 100 psf

Strength end-use adjustment factor = 0.70

Adjusted design load = 100 psf ÷ 0.70 = 143 psf

8.5 Test Load (Continued)

Test load for bending stress at two-times the adjusted design load:

Uniform Load Bending Moment, $M = wL^2 \div 8$

$$M = 2 \times \frac{\left(\frac{143}{144}\right) \times (5.5 + 0.1875) \times 16.0^2}{8} = 361\ in \cdot lb$$

Test Load for Third-Point Loading (M = PL/6)

$$M = \frac{PL}{6} \therefore P = \frac{6M}{L} = \frac{6 \times 361}{16} = 135\ lb$$

The actual test loads used were 138.2 lb.

8.6 Test Results

Specimen No. 1

Test Load	Deflection (in)	Notes
Zero Load	0.000	Initial reading
2x Design Load (138.2 lb)	0.135	Initial application of load
2x Design Load (138.2 lb)	0.159	After 24 hours
Zero Load	0.014	91% recovery after 24 hours

Specimen No. 2

Test Load	Deflection (in)	Notes
Zero Load	0.000	Initial reading
2x Design Load (138.2 lb)	0.161	Initial application of load
2x Design Load (138.2 lb)	0.195	After 24 hours
Zero Load	0.006	97% recovery after 24 hours

Specimen No. 3

Test Load	Deflection (in)	Notes
Zero Load	0.000	Initial reading
2x Design Load (138.2 lb)	0.140	Initial application of load
2x Design Load (138.2 lb)	0.169	After 24 hours
Zero Load	0.005	97% recovery after 24 hours

8.7 Test Conclusion

The test specimens recovered an average 95% of the test load deflection (≥ 75%), and the average total deflection was 0.174 in.

9.0 Duration of Load Testing

Re: ICC-ES™ AC174 Section 3.11

9.1 General

The purpose of this testing was to evaluate duration of load effect in accordance with Section 3.11 of ICC-ES™ AC174 and Section 5.10.2 of ASTM D 7031. Under a constant test load, deflection was measured and graphed with respect to time (creep) for 90 days. Conditions of acceptance are no failures and no sign of tertiary creep.

9.2 Test Specimens

Fifteen full cross-section test specimens were cut to 20 in lengths from production length solid deck boards.

9.3 Test Setup

Each test specimen was tested with a four point loading arrangement. The specimens were supported on two 1/2 inch radius steel rods placed at a 16 inch span. The loading span was one-third of the bending span and utilized 1/2 inch radius loading noses. The load was applied with measured dead weights. Midspan deflection was measured with a dial indicator accurate to 0.001 in. See photographs in Appendix B for test setup.

9.4 Test Procedure

Test load was applied to impose a bending stress equal to or greater than the stress at two-times the design load (100 psf) and increased for applicable test load adjustment factors. The test load was held for 105 days from 06/04/12 through 09/17/12. Deflection measurements were recorded at regular intervals to adequately describe the creep curve for the duration of testing.

9.5 Test Load

Test load for bending stress at two-times the adjusted design load = 135 lb

Reference Section 7.0 Stair Tread Testing
Re: ICC-ES™ AC174 Section 4.0

9.6 General

The purpose of this testing was to evaluate the requirements for stair tread applications. The design load was a 300 lb concentrated load applied to a 2 in square plate (4 square inch area) at the mid-span of the stair tread (bending). The application was limited to a continuous deck board used over two adjacent spans (three supports) measuring 9 inches on-center. Testing was also conducted on a continuous deck board used over two adjacent spans (three supports) measuring 24 inches on center.

9.7 Test Specimens

Twenty-eight full cross-section specimens were cut to 12 in lengths from production length deck boards and were conditioned for a minimum of 40 hours at standard laboratory conditions. Twenty-eight full cross-section specimens were cut to 51 in lengths from production length deck boards and were installed over two 24.0 inch spans on simulated 2x8 stair stringers with 22-1/2 in long treated 2x4 wood blocking, installed edge-wise, mid-width, under each deck board used as a stair tread. The 2x4 wood blocking was attached to the 2x8 stair stringers by an Architectural Testing technician with (2) 3-1/4 in by 0.131 in round drive framing nails at each end. An Architectural Testing technician also attached the deck board to the wood supports with two #8 x 2-1/2" *Headcote*® Stainless Steel Screws (9 TPI, 0.180 in major dia., 0.115 in minor dia., 0.131 in shank dia., 0.260 in head dia., square drive trim head, Type 17 point) per joist (stringer). The fasteners were installed approximately 1-1/2 inches from each edge of the board. Specimens were conditioned for a minimum of 40 hours at standard laboratory conditions. See photographs in Appendix B for individual test setups for additional details.

9.8 Test Procedure

Testing for the 9.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine with a three-point loading arrangement. Test specimens were supported on two 5/8 in radius steel support noses set at a 9.0 in span. Testing for the 24.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine. The 24 in span test specimen described above was supported in the test machine. The test load was applied at the leading edge of one span mid-distance between supports through a 2 in square (4 square inch area) steel plate using a test speed as indicated in the test results tables below. Load and deflection were continuously recorded by the test machine. Deflection at 300 lb (design load) and ultimate test load were recorded. See photographs in Appendix B for test setups.

9.9 Test Results

Stair Tread - Tested at 9.0 in Single Span
Rate of Crosshead Speed = 0.135 in/min
Tested Date: 08/08/12

Specimen	Specimen Color	Deflection at 300 lb (in)	Ultimate Load (lb)
1	Mahogany	0.1160	1647
2		0.1320	1640
3		0.1170	1646
4		0.1130	1638
5		0.1090	1635
6	Birch	0.0880	1834
7		0.1030	1805
8		0.1010	1803
9		0.1000	1807
10		0.0910	1810
11		0.0880	1776
12	Walnut	0.1120	1625
13		0.1000	1514
14		0.1060	1631
15		0.1140	1646
16		0.1060	1629
17	Driftwood	0.1320	1785
18		0.0900	1803
19		0.0850	1809
20		0.0820	1771
21		0.0840	1754
22		0.1010	1657
23	Khaki	0.0980	1718
24		0.1090	1626
25		0.1150	1621
26		0.1060	1679
27		0.0990	1675
28		0.1170	1679
	Minimum:	0.0820	1514
	Maximum:	0.1320	1834
	Average:	0.1041	1702
	Standard Deviation:	0.0132	84
	Coefficient of Variation:	13%	5%

9.9 Test Results (Continued)

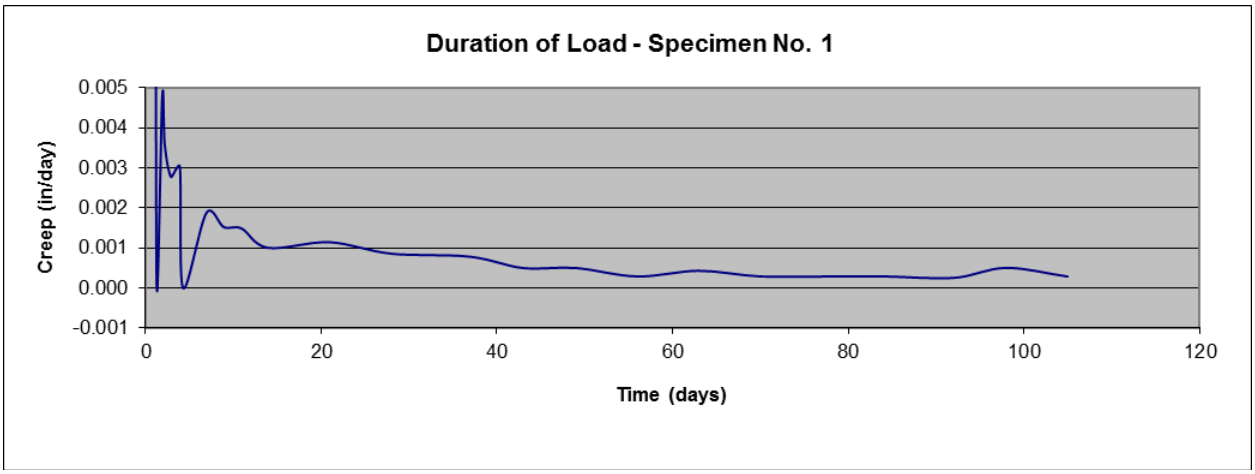
Stair Tread - Tested at 24.0 in 2-Span with Condition w/ Reinforcing Blocking
Rate of Crosshead Movement: 0.960 in/min
Tested Date: 08/09/12

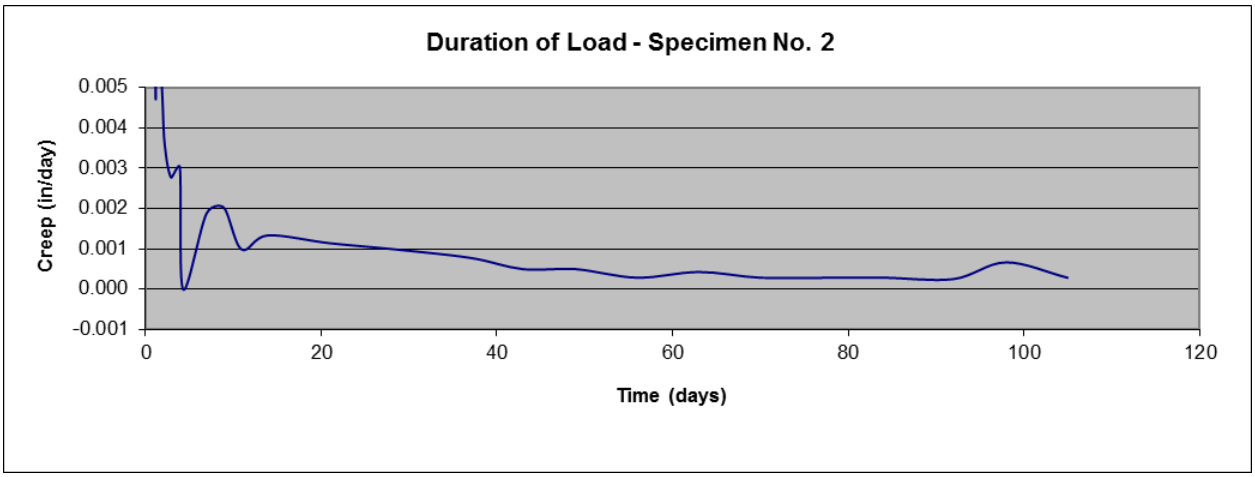
Specimen	Specimen Color	Deflection at 300 lb (in)	Ultimate Load (lb)
1	Walnut	0.0850	1351
2		0.0660	1609
3		0.1390	1381
4		0.0960	1638
5	Driftwood	0.1310	1622
6		0.1380	1171
7	Mahogany	0.0710	1472
8		0.0620	1945
9		0.0720	1181
10		0.1090	1497
11	Walnut	0.0900	1165
12		0.0680	1682
13	Birch	0.0490	1895
14		0.0680	1676
15		0.0600	1283
16		0.0590	1738
17	Driftwood	0.0700	1932
18		0.0680	1621
19	Khaki	0.0500	1570
20		0.0710	1378
21	Birch	0.0740	1450
22	Mahogany	0.0950	1253
23	Khaki	0.0660	1429
24		0.0770	1334
25		0.0850	1480
26		0.0700	1807
27		0.0600	1582
28	Driftwood	0.0700	1507
	Minimum:	0.0490	1165
	Maximum:	0.1390	1945
	Average:	0.0793	1523
	Standard Deviation:	0.0241	222
	Coefficient of Variation:	30%	15%

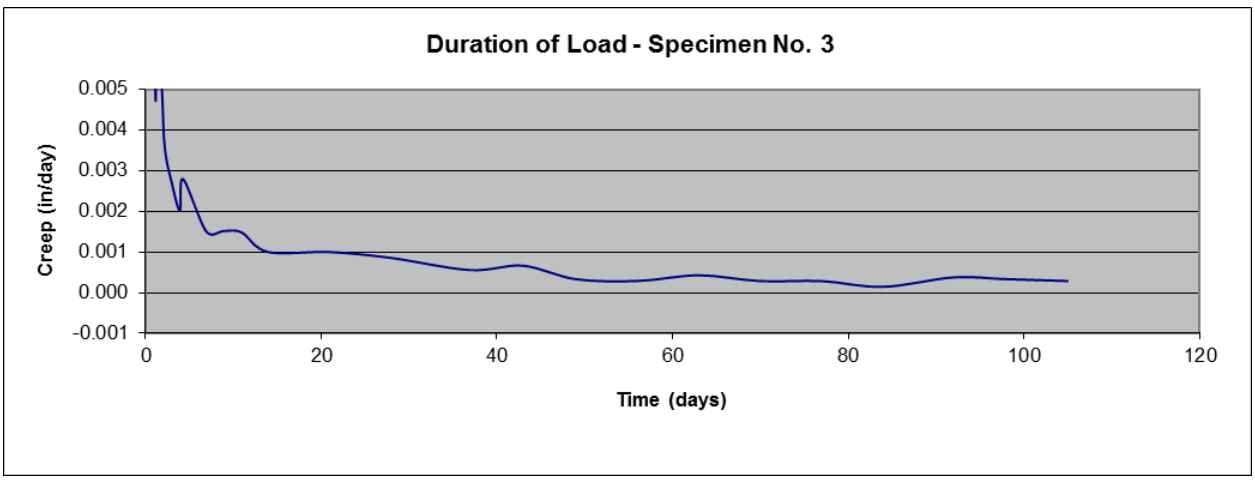
9.10 Test Summary

Reference Section 12.0 Analysis and Conclusions.
Creep Recovery Testing for derivation of test load.
Actual test loads were 138 lb.

10.0 Test Results







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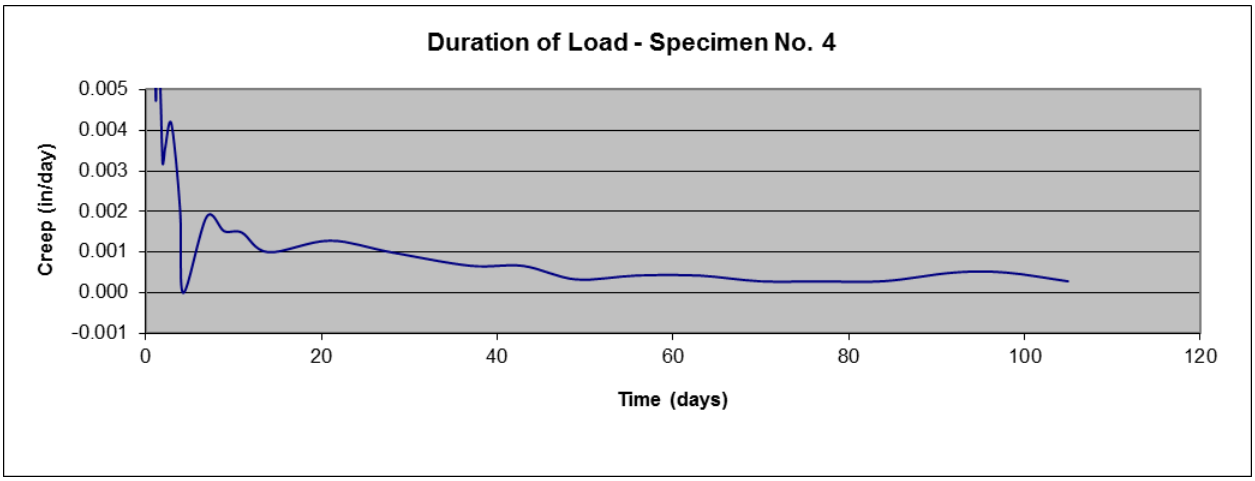

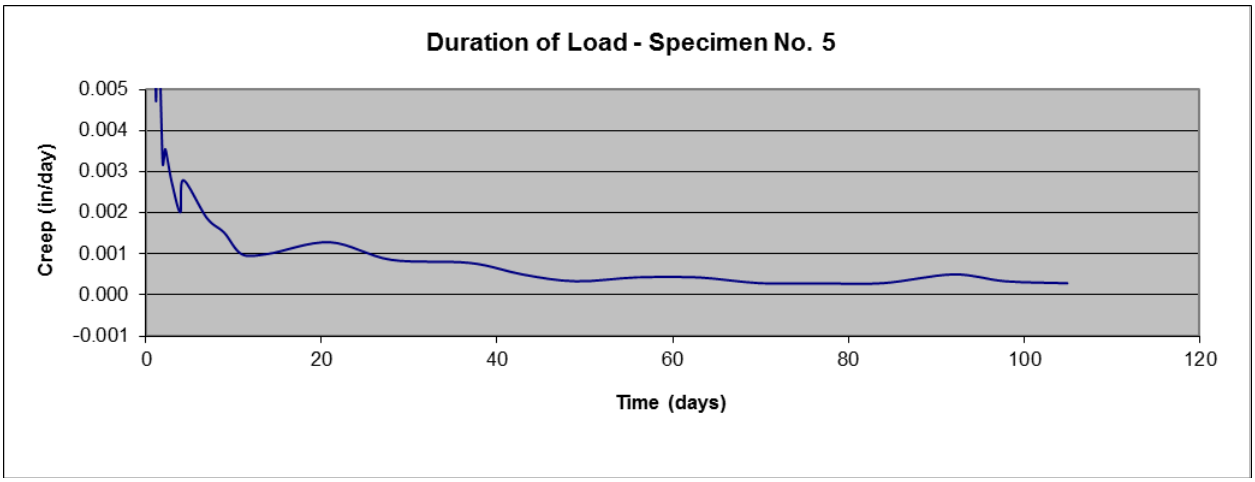

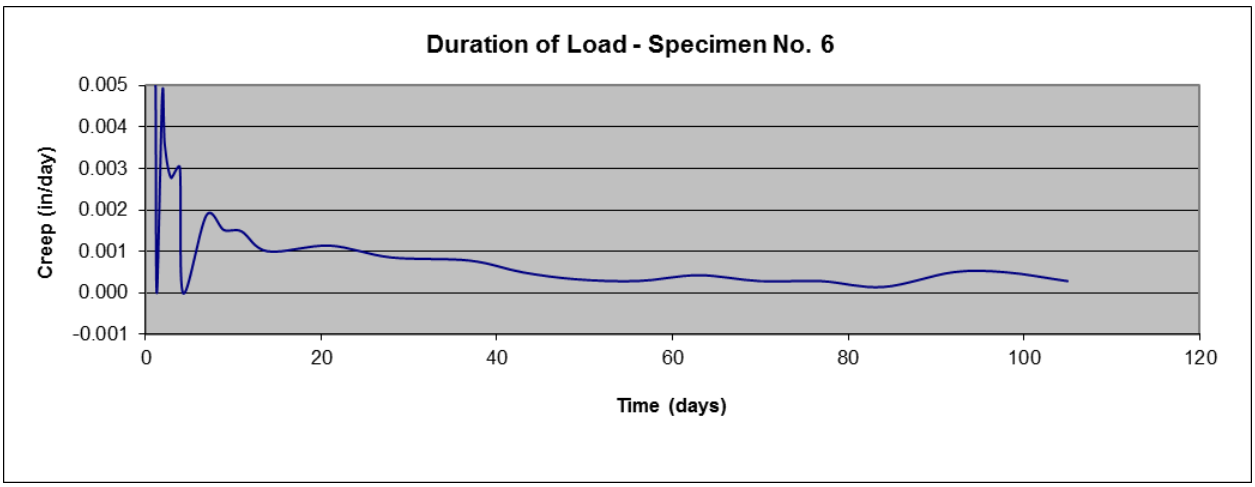

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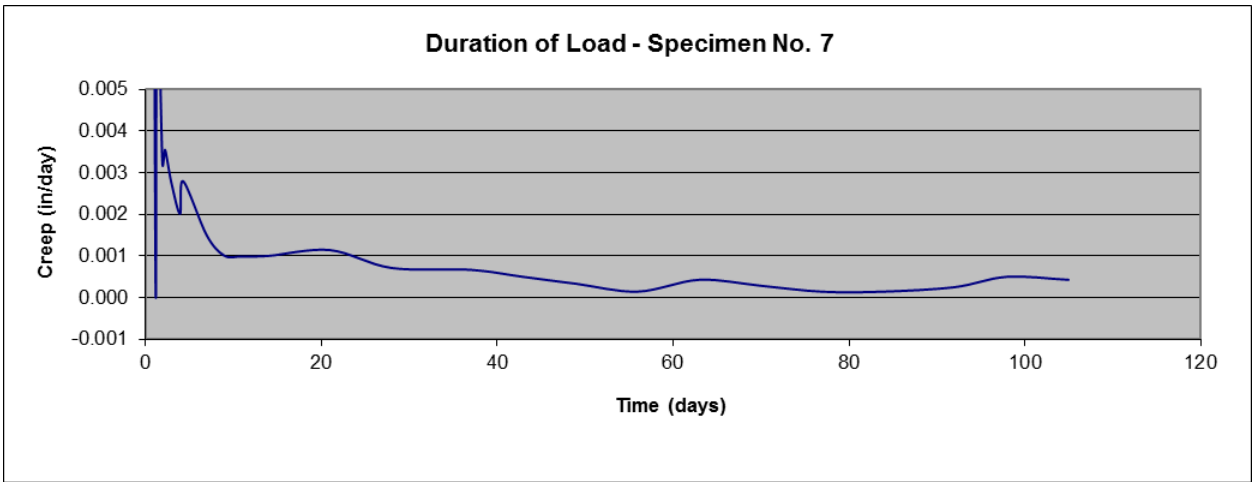

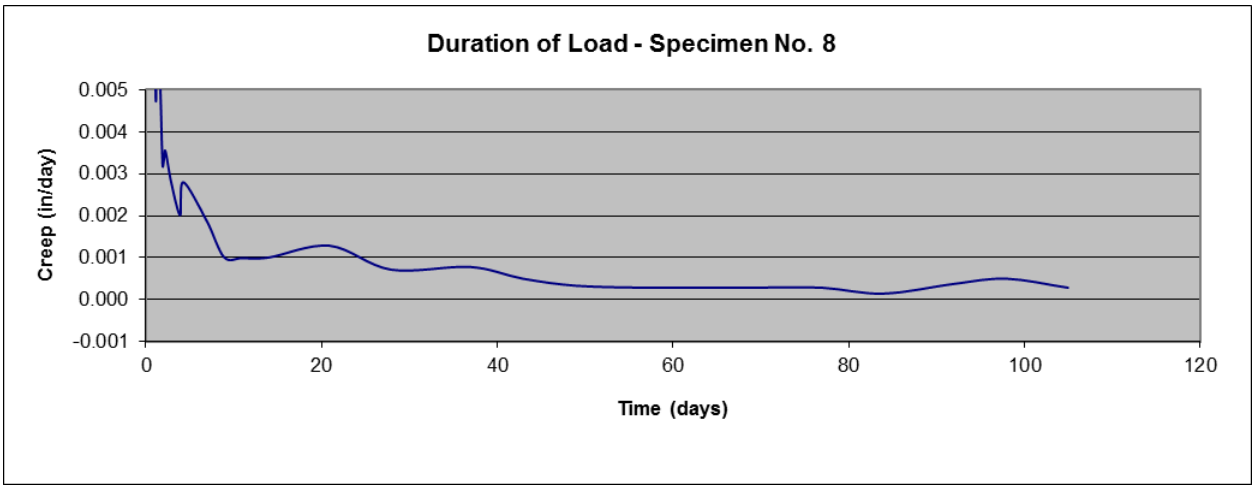

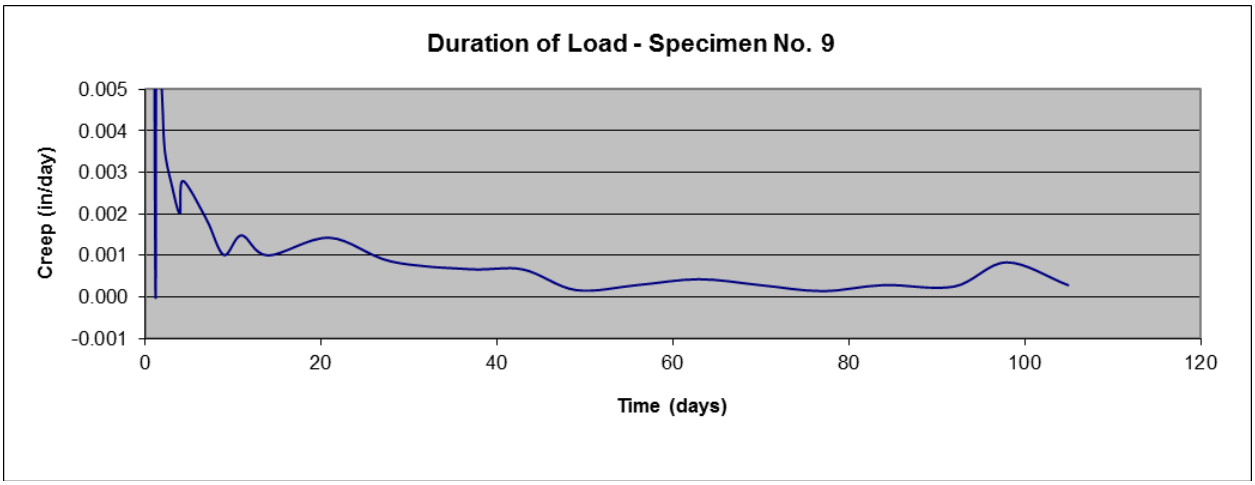

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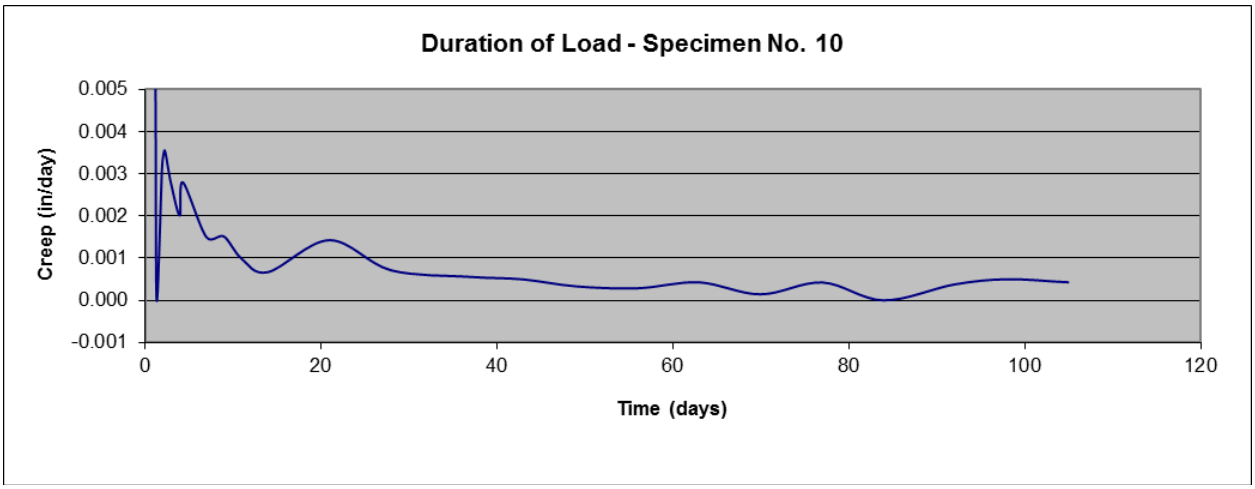

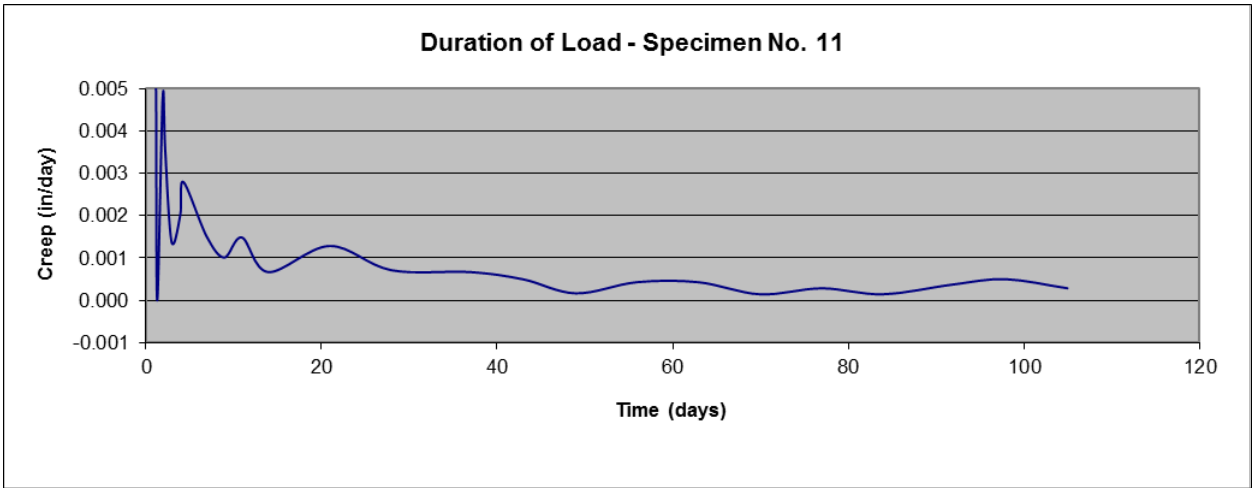

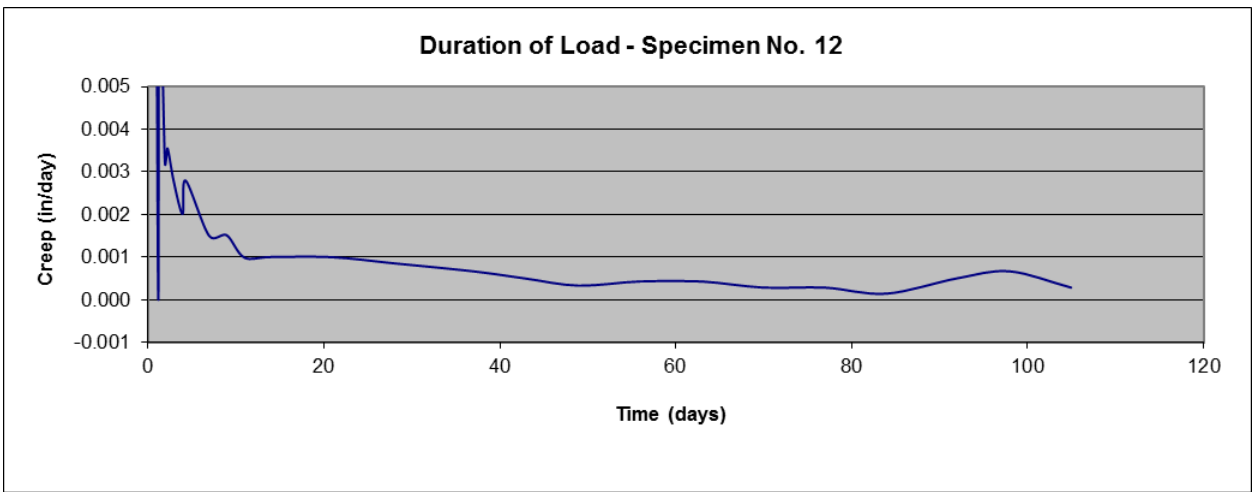

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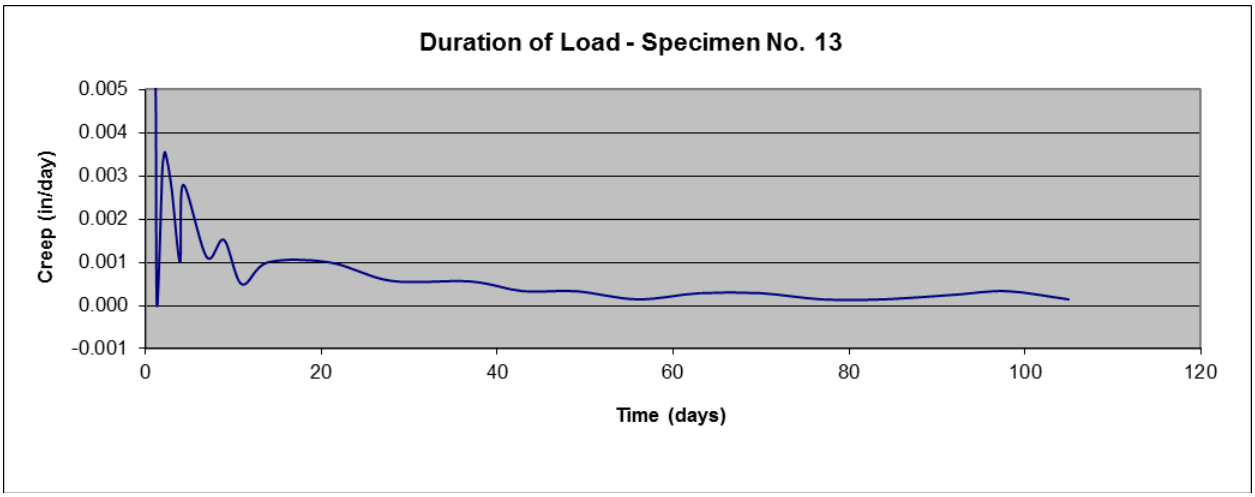

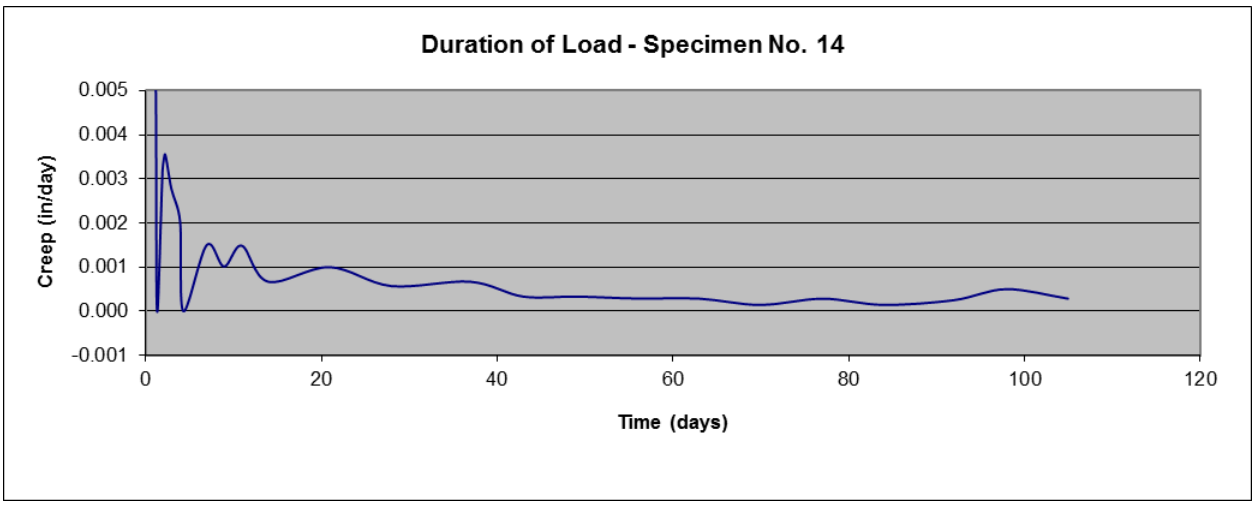

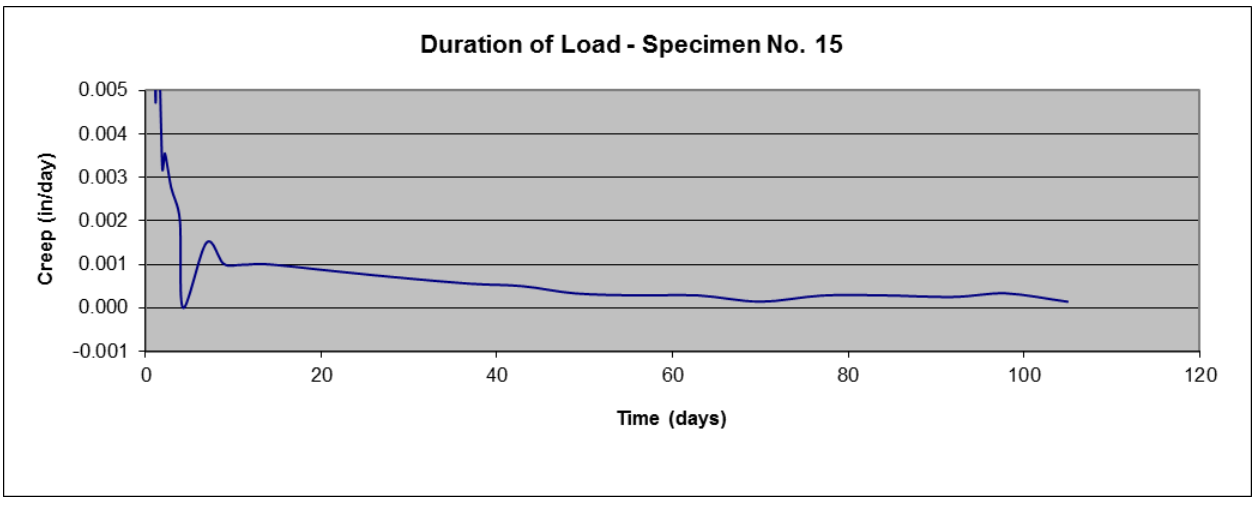

10.1 Test Conclusion

Test data does not reflect any evidence of tertiary creep (i.e. increasing creep rate), and there were no failures.

11.0 Mechanical Fastener Testing by Pull-Through Resistance

Re: ICC-ES™ AC174 Section 4.1.4

11.1 General

The purpose of this testing was to determine the product's fastener pull-through resistance, or the direct force required to pull a fastener head through the deck board. This value is used in conjunction with the fastener withdrawal value recognized for the support framing material to establish wind uplift resistance. Testing was conducted using the methods described in ASTM D 1761.

11.2 Test Specimens

Five test specimens were cut from deck boards. One #8 x 2-1/2" *Headcote*® Stainless Steel Screw (9 TPI, 0.180 in major dia., 0.115 in minor dia., 0.131 in shank dia., 0.260 in head dia., square drive trim head, Type 17 point) was placed in each test specimen, mid-width so that its head was flush with the top edge (walking surface) of the specimen.

11.3 Test Procedure

Mechanical fastener pull-through testing was performed using the methods described by ASTM D 1761. Testing was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine. Each specimen was rigidly restrained in the test machine, and the fastener was placed in tension until it pulled entirely through the specimen's depth or until the specimen no longer sustained applied load. The test speed was controlled by using a loading rate of 0.10 in/min. See photograph in Appendix B for typical test setup.

11.4 Test Results

#8 x 2-1/2" *Headcote*® Stainless Steel Screw
Date Tested: 06/13/12

Specimen	Ultimate Load (lb)	Deviation from Average	Mode of Failure
1	431	1%	Screw head pulled approximately 3/16 in average out of each board and then applied load began decreasing
2	456	5%	
3	481	11%	
4	416	4%	
5	392	10%	
Average:	**435**		

11.5 Test Summary / Conclusion

Allowable fastener pull-through capacity in accordance with Section 5.5 of ASTM D 7032:

Allowable pull-through capacity = Average ultimate load divided by a factor of 3.0.

= 435 / 3.0 = 145 lb

12.0 Wind Uplift Resistance Analysis

Re: ICC-ES™ AC174 Section 4.1.4 and ANSI / AF&PA NDS-2012

12.1 General

The purpose of this analysis was to determine the wind uplift resistance using the allowable fastener capacities in pull-through determined from test, compared to the allowable withdrawal value, calculated in accordance with the NDS.

12.2 Calculations

Based on two fasteners per deck board, per each support, the tributary deck area per fastener (A_t) is as follows:

$A_t = W_t \times S / 2$, where:

Tributary width, (W_t) = 5.5 in (deck board width) + 0.19 in (gap) = 5.69 in
Span, (S) = 16.0 in

$A_t = 5.69 \text{ in} \times 16.0 \text{ in} / 2 / 144 \text{ in}^2/\text{ft}^2 = 0.316 \text{ ft}^2$

Maximum uniform load rating based on pull-through testing, (w_{pt}) = 145 lb / 0.316 ft^2 = 459 psf

Design Load for withdrawal values cannot exceed those specified in the NDS. Below are NDS calculated withdrawal values (W) for wood screws.

$W = 2850 G^2 D$ (equation 11.2-2 of NDS), where:

Bulk Specific Gravity of Wood, (G) = 0.55 for Southern Pine from Table 11.3.2A

Major Diameter of Fastener, (D) = 0.180 in

W = 155 lb/in

Penetration Depth, (P) = $L_{fastener} - T_{board}$ = 2-1/2 in - 1 in = 1.5 in

Uniform Load, ($w_{calculated}$) = W x P / A_t = 155 lb/in x 1.5 in / 0.316 ft^2 = 736 psf

NDS Adjustment Factors from Table 10.3.1:

Load Duration (C_D) = 1.6 from 10.3.2 & Table 2.3.2, Footnote 2

Wet Surface (C_m) = 0.7 from 10.3.3 & Table 10.3.3, Footnote 2

Temperature (C_t) = 0.7 from10.3.4 & Table 10.3.3 for wet in-service conditions up to 125°F

$w_{adjusted}$ = 736 x 1.6 x 0.7 x 0.7 = 577 psf

$w_{pt} < w_{adjusted}$ $\therefore$ w_{pt} Governs **Maximum wind uplift rating = 459 psf**

Equivalent Fastener Capacity = 459 psf x 0.316 ft^2 = 145 lb

13.0 Analysis and Conclusions

Re: ICC-ES™ AC174 Section 4.0

13.1 Deck Board Uniform Load Rating

The following analysis using the test results substantiates a 16/100, span/load rating in accordance with ICC-ES™ AC174. The strength and stiffness values are those from the solid product which in all cases represented the worse-case of the product. See Section 6.5 Test Results for deck board strength and stiffness test data.

Average Ultimate Test Load = 1071 lb

1071 / 2.5 = 428 lb

5% Nonparametric Ultimate Load = 948 lb

948 / 2.1 = 451 lb > 428 lb $\therefore$ Average governs

Equivalent Uniform Load Using Equivalent Bending Moments:

For: P = total test load (lb) and W = total load, uniformly distributed load (lb)

$$M(unif.) = \frac{Wl}{8},\ M(3rd-pt.) = \frac{Pl}{6}$$

$$\frac{Wl}{8} = \frac{Pl}{6} \therefore W = \frac{4P}{3}$$

$$W(unadjusted) = \frac{4P}{3} = \frac{4(428)}{3} = 571\ lb$$

Strength Adjustment Factor = 0.67 (See 5.2 End-Use Adjustment Factors)

$$W(adjusted) = 571 \times 0.67 = 383\ lb$$

Test Load at L/180 Deflection:

16.0/180 = 0.089 in

Average Test Load at 0.089 in Deflection = 97 lb

13.1 Deck Board Uniform Load Rating (Continued)

Equivalent Uniform Load Using Equivalent Deflections:
For: P = total test load (lb) and W = total load, uniformly distributed load (lb)

$$\Delta(unif) = \frac{5Wl^3}{384EI} \ , \ \Delta(3rd-pt) = \frac{23Pl^3}{1296EI}$$

$$\frac{5Wl^3}{384EI} = \frac{23Pl^3}{1296EI} \therefore W = \frac{184P}{135}$$

$$W(unadjusted) = \frac{184P}{135} = \frac{184(97)}{135} = 132 \ lb$$

Stiffness Adjustment Factor = 0.71 (See 5.2 End-Use Adjustment Factors)

$$W(adjusted) = 132 \times 0.71 = 94 \ lb < 383 \ lb \ \therefore \text{deflection governs}$$

Convert to lb/ft^2 (psf):

For W = total load (lb) and w = uniform load (psf),

w = W / Tributary Area / one deck board

Tributary Area = (5.5 + 0.19) x 16.0 ÷144 = 0.63 ft^2

Maximum uniform load rating for 16.0 in span, $w = \frac{94 \ lb}{0.63 \ ft^2} = 149 \ psf$

13.2 Deck Board Stair Tread Rating

The following analysis using the test results evaluates a 300 lb stair tread design load for a solid deck board installed over two or more continuous spans of 9.0 in or less. See Section 7.4 The purpose of this testing was to evaluate the requirements for stair tread applications. The design load was a 300 lb concentrated load applied to a 2 in square plate (4 square inch area) at the mid-span of the stair tread (bending). The application was limited to a continuous deck board used over two adjacent spans (three supports) measuring 9 inches on-center. Testing was also conducted on a continuous deck board used over two adjacent spans (three supports) measuring 24 inches on center.

13.3 Test Specimens

Twenty-eight full cross-section specimens were cut to 12 in lengths from production length deck boards and were conditioned for a minimum of 40 hours at standard laboratory conditions. Twenty-eight full cross-section specimens were cut to 51 in lengths from production length deck boards and were installed over two 24.0 inch spans on simulated 2x8 stair stringers with 22-1/2 in long treated 2x4 wood blocking, installed edge-wise, mid-width, under each deck board used as a stair tread. The 2x4 wood blocking was attached to the 2x8 stair stringers by an Architectural Testing technician with (2) 3-1/4 in by 0.131 in round drive framing nails at each end. An Architectural Testing technician also attached the deck board to the wood supports with two #8 x 2-1/2" *Headcote*® Stainless Steel Screws (9 TPI, 0.180 in major dia., 0.115 in minor dia., 0.131 in shank dia., 0.260 in head dia., square drive trim head, Type 17 point) per joist (stringer). The fasteners were installed approximately 1-1/2 inches from each edge of the board. Specimens were conditioned for a minimum of 40 hours at standard laboratory conditions. See photographs in Appendix B for individual test setups for additional details.

13.4 Test Procedure

Testing for the 9.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine with a three-point loading arrangement. Test specimens were supported on two 5/8 in radius steel support noses set at a 9.0 in span. Testing for the 24.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine. The 24 in span test specimen described above was supported in the test machine. The test load was applied at the leading edge of one span mid-distance between supports through a 2 in square (4 square inch area) steel plate using a test speed as indicated in the test results tables below. Load and deflection were continuously recorded by the test machine. Deflection at 300 lb (design load) and ultimate test load were recorded. See photographs in Appendix B for test setups.

Test Results for test loads.

Average Ultimate Test Load = 1702 lb

1702 / 2.5 = 681 lb

5% Nonparametric Ultimate Load = 1514 lb

1514 / 2.1 = 721 lb > 681 lb $\therefore$ Average governs

P (unadjusted) = 681 lb

Strength Adjustment Factor = 0.67 (See 5.2 End-Use Adjustment Factors)

ICC-ES™ AC174 specifies a 23% increase in allowable strength if a single span was tested.

P (adjusted) = 0.67 x 681 x 1.23 = 561 lb $\geq$ 300 lb $\therefore$ ok

Average Deflection at 300 lb = 0.104 in

Stiffness Adjustment Factor = 0.71 (See 5.2 End-Use Adjustment Factors)

ICC-ES™ AC174 specifies a 39% stiffness adjustment if a single span was tested

Adjusted deflection = 0.104 in / 0.71 / 1.39 = 0.105 in

Allowable deflection = 0.125 in $\geq$ 0.105 in $\therefore$ ok

The following analysis using the test results evaluates a 300 lb stair tread design load for a deck board installed over two or more continuous spans of 24.0 in or less utilizing reinforcing blocking under the deck board used as a stair tread. See Section 7.4 The purpose of this testing was to evaluate the requirements for stair tread applications. The design load was a 300 lb concentrated load applied to a 2 in square plate (4 square inch area) at the mid-span of the stair tread (bending). The application was limited to a continuous deck board used over two adjacent spans (three supports) measuring 9 inches on-center. Testing was also conducted on a continuous deck board used over two adjacent spans (three supports) measuring 24 inches on center.

13.5 Test Specimens

Twenty-eight full cross-section specimens were cut to 12 in lengths from production length deck boards and were conditioned for a minimum of 40 hours at standard laboratory conditions. Twenty-eight full cross-section specimens were cut to 51 in lengths from production length deck boards and were installed over two 24.0 inch spans on simulated 2x8 stair stringers with 22-1/2 in long treated 2x4 wood blocking, installed edge-wise, mid-width, under each deck board used as a stair tread. The 2x4 wood blocking was attached to the 2x8 stair stringers by an Architectural Testing technician with (2) 3-1/4 in by 0.131 in rounddrive framing nails at each end. An Architectural Testing technician also attached the deck board to the wood supports with two #8 x 2-1/2" *Headcote*® Stainless Steel Screws (9 TPI, 0.180 in major dia., 0.115 in minor dia., 0.131 in shank dia., 0.260 in head dia., square drive trim head, Type 17 point) per joist (stringer). The fasteners were installed approximately 1-1/2 inches from each edge of the board. Specimens were conditioned for a minimum of 40 hours at standard laboratory conditions. See photographs in Appendix B for individual test setups for additional details.

13.6 Test Procedure

Testing for the 9.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine with a three-point loading arrangement. Test specimens were supported on two 5/8 in radius steel support noses set at a 9.0 in span. Testing for the 24.0 in span was performed in a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine. The 24 in span test specimen described above was supported in the test machine. The test load was applied at the leading edge of one span mid-distance between supports through a 2 in square (4 square inch area) steel plate using a test speed as indicated in the test results tables below. Load and deflection were continuously recorded by the test machine. Deflection at 300 lb (design load) and ultimate test load were recorded. See photographs in Appendix B for test setups.

Test Results for test loads.

Average Ultimate Test Load = 1523 lb

1523/ 2.5 = 609 lb

5% Nonparametric Ultimate Load = 1165 lb

1165 / 2.1 = 555 lb < 609 lb $\therefore$ 5% Nonparametric governs

P (unadjusted) = 555 lb

Strength Adjustment Factor = 0.67 (See 5.2 End-Use Adjustment Factors)

P (adjusted) = 0.67 x 555 = 372 lb $\geq$ 300 lb $\therefore$ ok

Average Deflection at 300 lb = 0.079 in

Stiffness Adjustment Factor = 0.71 (See 5.2 End-Use Adjustment Factors)

Adjusted deflection = 0.079 in / 0.71 = 0.111 in

Allowable deflection = 0.125 in $\geq$ 0.111 in $\therefore$ ok

13.7 Conclusions

Testing substantiates the following span rating for solid deck boards:

16 / 100 (16.0 in span and 100 psf) for deck boards – no residential use limitation.

Testing substantiates the following span for solid deck boards used as stair treads:

9.0 in stair tread span
(Minimum 2-span condition) – No residential use limitation.

24.0 in stair tread span - 2x4 reinforced
(Minimum 2-span condition) - No residential use limitation

14.0 Closing Statement

Architectural Testing will service this report for the entire test record retention period. The report retention will be four years from the report date. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period. Results obtained are tested values and were secured using the designated test methods. This report neither constitutes certification of this product nor expresses an opinion or endorsement by this laboratory; it is the exclusive property of the client so named herein and relates only to the tested specimens. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING:

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John D. Miller III
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Structural Systems Testing

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Virgal T. Mickley, Jr., P.E.
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JDM:vtm/drm

Attachments (pages):
Appendix A - Drawings (2)
Appendix B - Photographs (5)

This report is complete only when all attachments listed are included.

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	07/26/12	N/A	Original report issue
1	01/09/13	N/A	Original report issue

APPENDIX A

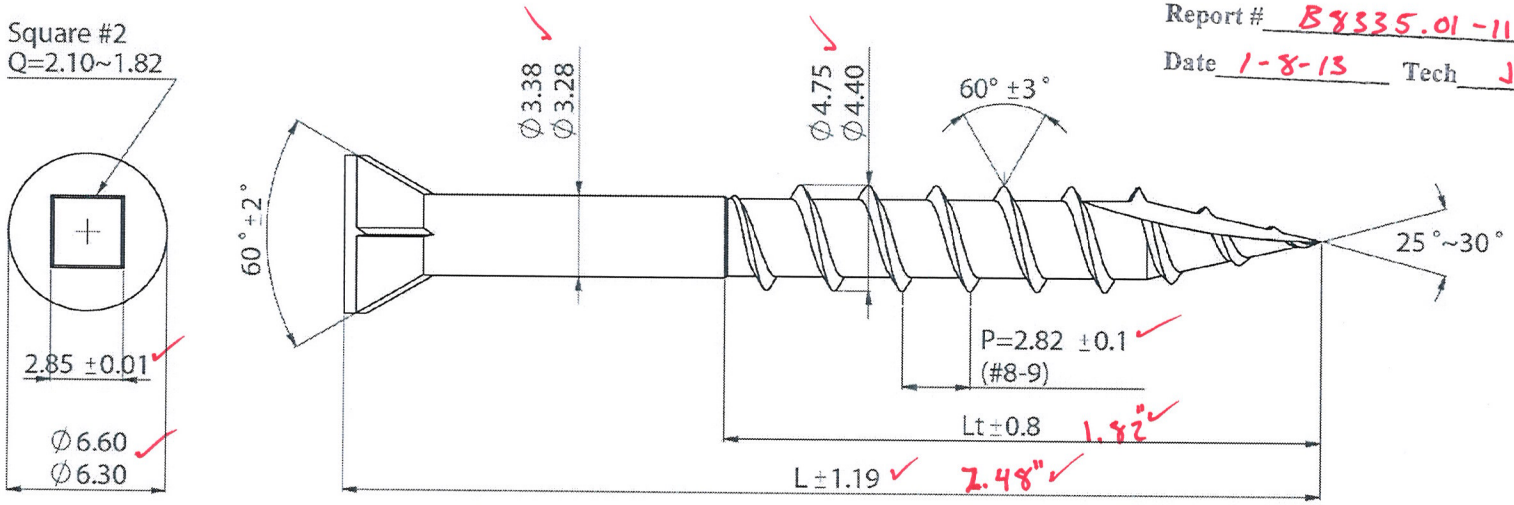
Drawings

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # B8335.01-119-19

Date 1-8-13 Tech JDM



L	Lt
~~1-1/4"~~	~~2/3L~~
~~1-5/8"~~	~~2/3L~~
~~2"~~	~~2/3L~~
2-1/2"	2/3L

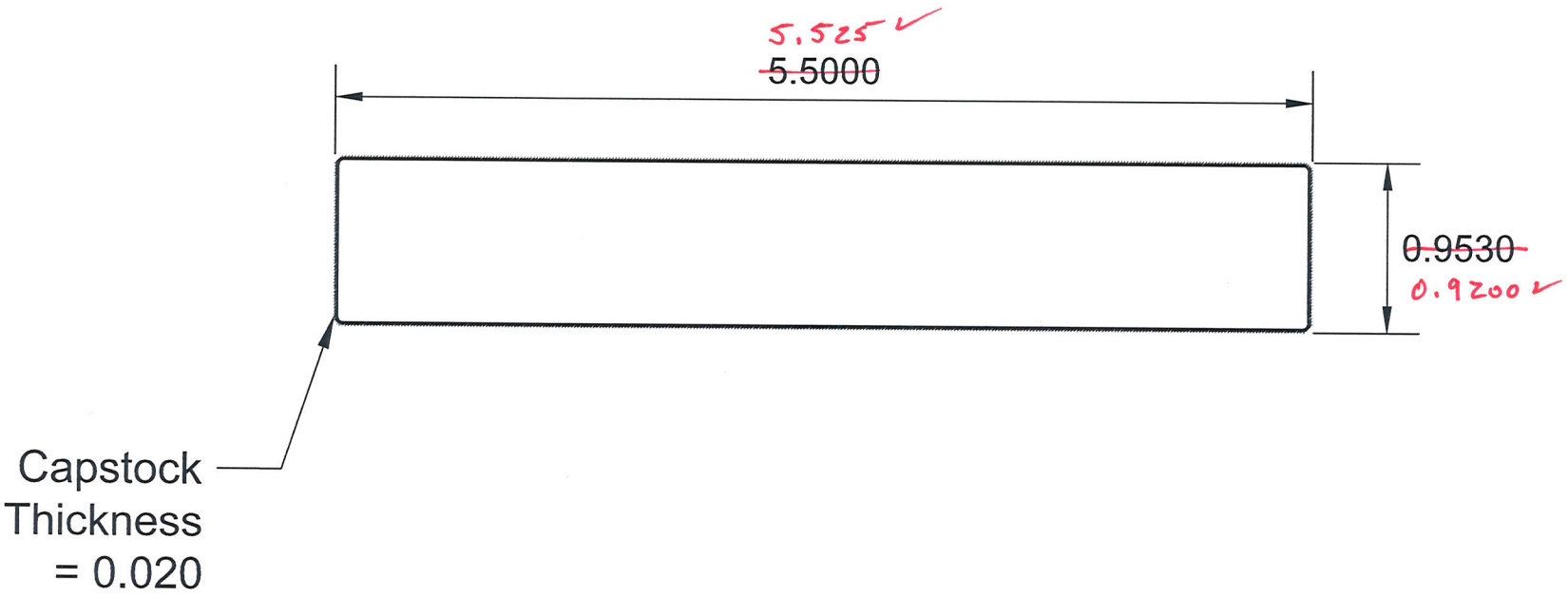
STARBORN INDUSTRIES
HEADCOTE SS 305 8 x 2-1/2"
Units: mm

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # B8335.01-119-19

Date 1-8-13 Tech JDM



CAD FILE LOCATION

PART	Deck Board		PATWIN PLASTICS INC. 2300 E. LINDEN AVE. LINDEN, NJ 07036
MATERIAL	MATERIAL DESCRIPTION		
SCALE		TOLERANCE UNLESS SPECIFIED: DECIMALS +/- .005 ANGLES +/- 0 FRACTIONS +/- 1/64 AREA:	
DATE			
DRAWN BY	TH		

APPENDIX B

Photographs

Photo No. 1
Typical Sampling Mark

Photo No. 2
Deck Board Colors
(From Left to Right: Walnut, Birch, Mahogany, Driftwood, and Khaki)

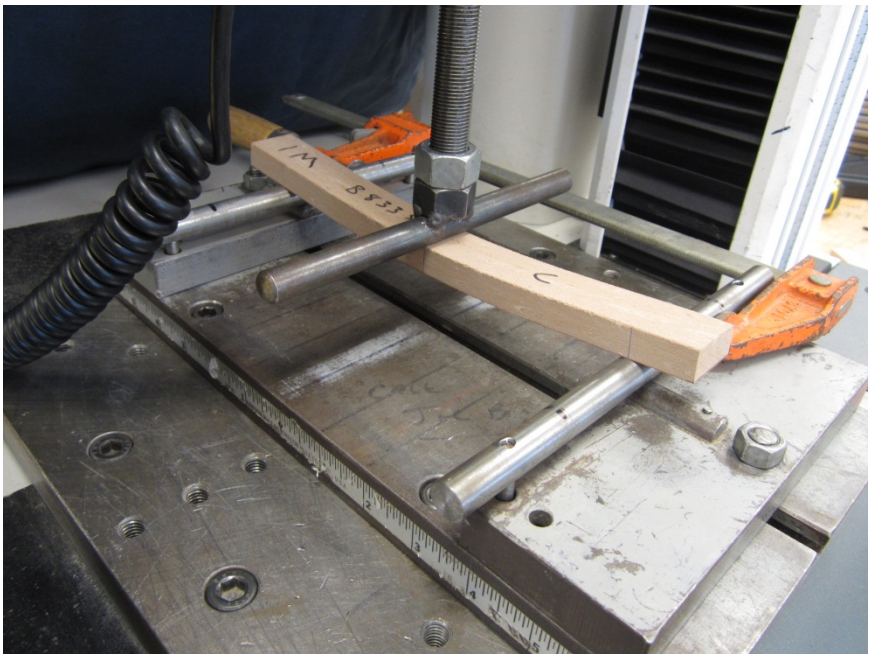


Photo No. 3
U.V. Flexural Testing – ASTM D 790

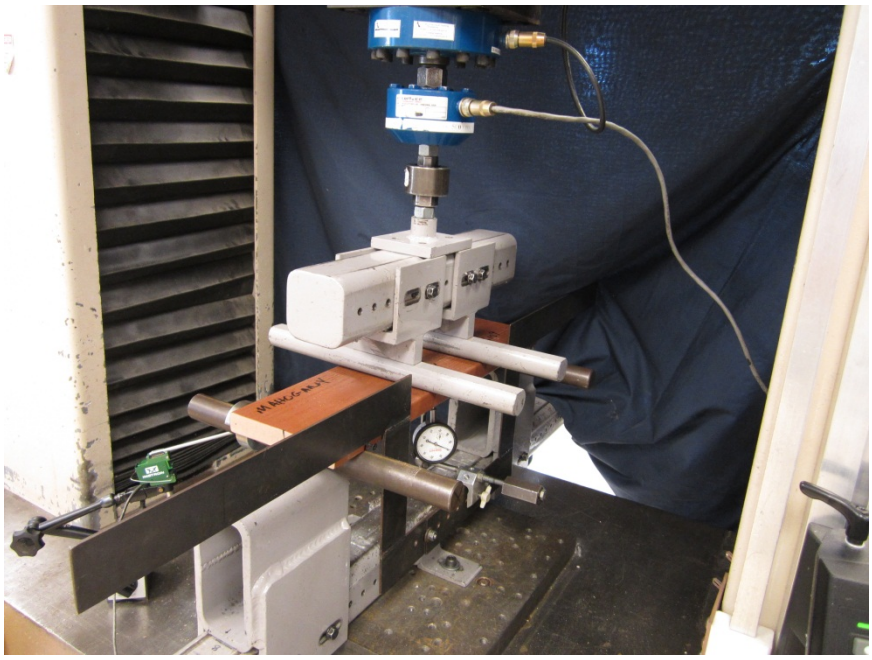


Photo No. 4
Deck Board Flexural Testing (Standard Conditions) – ASTM D 6109

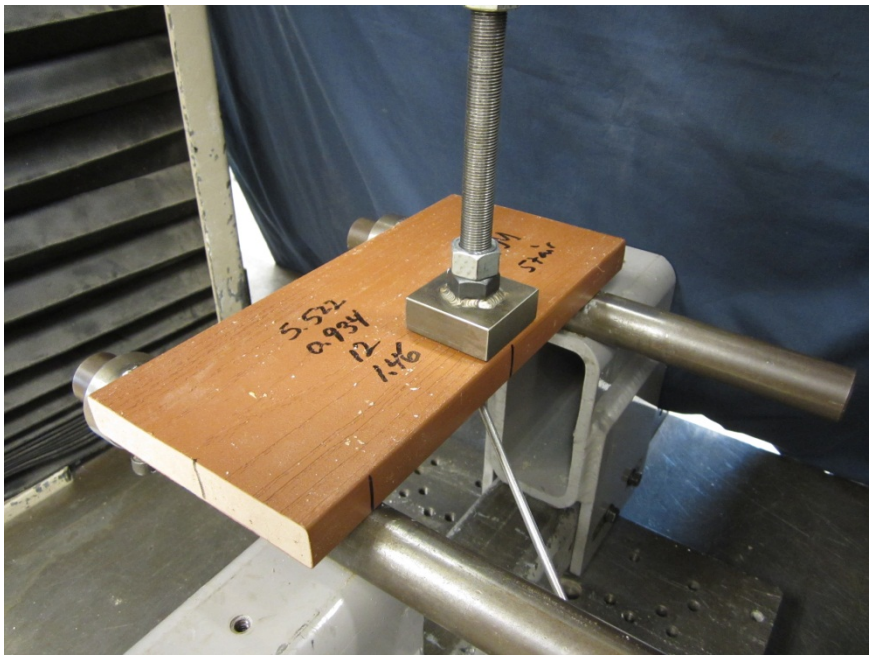


Photo No. 5
Stair Tread Testing at a 9.0 in Single Span Condition – ASTM D 7032

Photo No. 6
Stair Tread Testing at a 24.0 in 2-Span Condition – ASTM D 7032

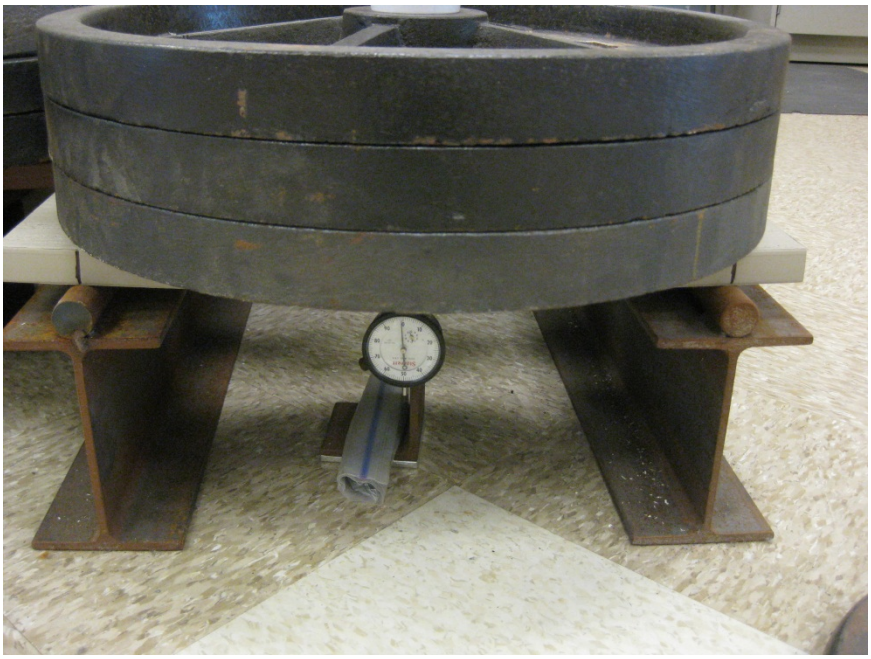


Photo No. 7
Creep Recovery Test Setup

Photo No. 8
Durational Load Test Setup

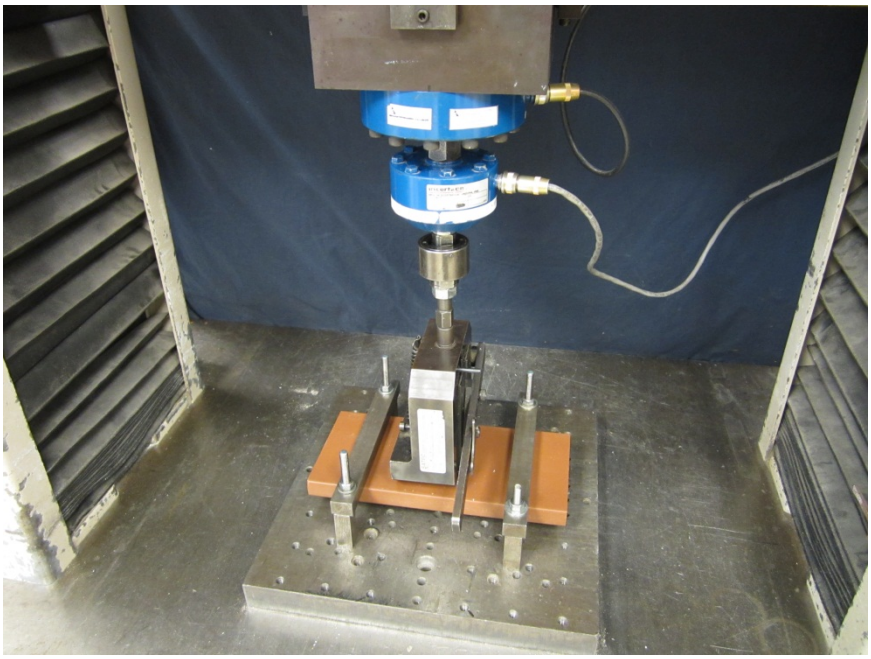


Photo No. 9
Mechanical Fastener by Pull-Through Resistance Test Setup