



PRI Construction Materials Technologies LLC

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Laboratory Test Report

Report for: Ed Davis
Empire West Inc.
9270 Graton Road
Graton, CA 95444

Product Name(s): Ceilume Stratford / Ceilume Cambridge / Competitor

Project No.: 2113T0001

Dates Tested: July 8th – 31st, 2019

Test Methods: ASTM C 367

Results Summary: See Data Tables

Purpose: Evaluate the hardness, friability, sag, and transverse strength of Empire West Inc.'s Thermo-formed acoustic ceiling panels, along with a competitor product in accordance with ASTM C 367-16 Standard Test Methods for Strength Properties of Prefabricated Architectural Acoustical Tile or Lay-In Ceiling Panels.

Test Methods: Testing was completed as described in ASTM C 367-16 Standard Test Methods for Strength Properties of Prefabricated Architectural Acoustical Tile or Lay-In Ceiling Panels.

Sampling: The test specimens were randomly sampled from production stock at Empire West Inc.'s California facility by Quality Control Associates on March 28th, 2019. Samples were verified by signatures on the material, and it is the judgement of PRI-CMT that the material received for testing was the material sampled by Quality Control Associates. The competitor product was procured by Quality Control Associates on July 8th, 2019 thru local distribution. The following materials were received by PRI-CMT.

<u>Product</u>	<u>Source</u>	<u>Date Received</u>	<u>Sampling</u>
Ceilume Stratford 2'x4' (Vinyl)	Graton, CA	June 10 th , 2019	Quality Control Associates
Ceilume Cambridge 2'x4' (Vinyl)			
Ceilume Stratford 2'x2' (Vinyl)			
Ceilume Cambridge 2'x2' (Vinyl)			
Armstrong Cirrus Competitor Tile (Mineral Fiber)	Tampa, FL	July 8 th , 2019	

Testing Location: Testing was conducted at PRI-CMT located in Tampa, FL. Calibration of testing instrumentation was performed by either an ISO accredited calibration laboratory or by a PRI-CMT representative in compliance with PRI-CMT In-House quality control program governed by ISO/IEC 17025-05.

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Test Results: Conditions at beginning of testing 22°C (73°F) with 50% Rh.

TABLE 1: ASTM C 367

Physical Properties	Test Method	Results							Requirement ¹
Thickness (in) 5 specimens; 4" x 4"; Avg 3 locations Cond. 24hr @ 73±2°F & 50±2% RH	ASTM C367 Sec. 8	1	2	3	4	5	Avg.	St. Dev.	
Stratford (Vinyl)		0.015	0.015	0.015	0.015	0.015	0.015	<0.01	Report
Cambridge (Vinyl)		0.031	0.031	0.031	0.031	0.031	0.031	<0.01	Report
Competitor (Mineral Fiber)		0.576	0.577	0.575	0.576	0.573	0.575	<0.01	Report
Hardness (lbf) 5 specimens; 4" x 4" x 0.57"; Cond. 24hr @ 73±2°F & 50±2% RH Test 2" ø penetrator impressed 1/4"	ASTM C367 Sec. 8	1	2	3	4	5	Avg.	St. Dev.	
Stratford (Vinyl)		9707	10289	7894	7787	8437	8823	1120	Report ¹
Cambridge (Vinyl)		12306	11841	9739	12165	12209	11652	1084	Report ¹
Competitor (Mineral Fiber)		119	142	137	133	131	132	8	Report
Friability (% mass loss) 12 specimens; 1" x 1" x Thickness; Cond. 24hr @ 73±2°F & 50±2% RH Test 60 rev/min w/ Twenty-Four 3/4" x 3/4" x 3/4" red oak cubes	ASTM C367 Sec. 14	After 10 min			After 20 min				
Stratford (Vinyl)		0			0				Report
Cambridge (Vinyl)		0			0				Report
Competitor (Mineral Fiber)		8.7			13.5				Report
Sag (in) 2 specimens; 2' x 4' x Thickness; Cond. 24hr @ 73±2°F & 50±2% RH Expose 17hr @ 90±3°F & 90±2% RH Recover 6hr @ 73±2°F & 50±2% RH	ASTM C367 Sec. 21	Humidity induced Sag			Recovery (Permanent Sag)				
Stratford (Vinyl)	Sample 1	0.091			0.100				Report
	Sample 2	0.086			0.092				Report
Cambridge (Vinyl)	Sample 1	0.035			0.039				Report
	Sample 2	0.041			0.044				Report
Competitor (Mineral Fiber)	Sample 1	0.713			0.766				Report
	Sample 2	0.666			0.761				Report
Sag (in) 2 specimens; 2' x 2' x Thickness; Cond. 24hr @ 73±2°F & 50±2% RH Expose 17hr @ 90±3°F & 90±2% RH Recover 6hr @ 73±2°F & 50±2% RH	ASTM C367 Sec. 21	Humidity induced Sag			Recovery (Permanent Sag)				
Stratford (Vinyl)	Sample 1	0.072			0.072				Report
	Sample 2	0.069			0.071				Report
Cambridge (Vinyl)	Sample 1	0.033			0.033				Report
	Sample 2	0.030			0.031				Report
Competitor (Mineral Fiber)	Sample 1	0.267			0.259				Report
	Sample 2	0.305			0.365				Report

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Physical Properties	Test Method	Results							Requirement ¹
Transverse Strength 5 specimens; 16:1 span ratio Cond. 24hr @ 73±2°F & 50±2% RH Rate: 1in/min	ASTM C367 Sec. 28	1	2	3	4	5	Avg.	St. Dev.	
Stratford (Vinyl)									
Modulus of Rupture; (psi)		1150.6	1101.4	1124.3	1558.2	1554.9	1297.9	236.7	Report ^{1,2}
Break Load; (lbf)		NA	NA	NA	NA	NA	NA	NA	Report ³
Cambridge (Vinyl)									
Modulus of Rupture; (psi)		1514.0	1742.4	1737.7	1694.5	1710.7	1679.8	94.8	Report ^{1,2}
Break Load; (lbf)		NA	NA	NA	NA	NA	NA	NA	Report ³
Competitor (Mineral Fiber)									
Modulus of Rupture; (psi)	MD	78.7	81.1	78.6	74.0	76.2	77.7	2.7	Report
	XMD	105.1	115.4	119.8	112.4	116.2	113.7	5.5	
Break Load; (lbf)	MD	5.7	5.9	5.7	5.3	5.5	5.6	0.2	Report
	XMD	7.6	8.3	8.7	8.1	8.4	8.2	0.4	

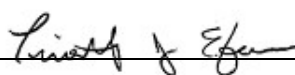
Note(s): - 1 – Individual specimens were stacked to create thickness

2 – Samples are isotropic. Calculated value is at yield.

3 – Samples did not break.

Statement of Attestation:

The hardness, friability, sag, and transverse strength were determined in accordance with ASTM C 367-16 Standard Test Methods for Strength Properties of Prefabricated Architectural Acoustical Tile or Lay-In Ceiling Panels. The laboratory test results presented in this report are representative of the materials supplied. This report does not constitute certification of the materials, which may only be granted by the certification program administrator.

Signed: 

Timothy Efaw
Manager

Signed: 

Daniel Arents
Technician

Date: August 2nd, 2019

Date: August 2nd, 2019

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	08/02/2019	10	

Appendix Follows

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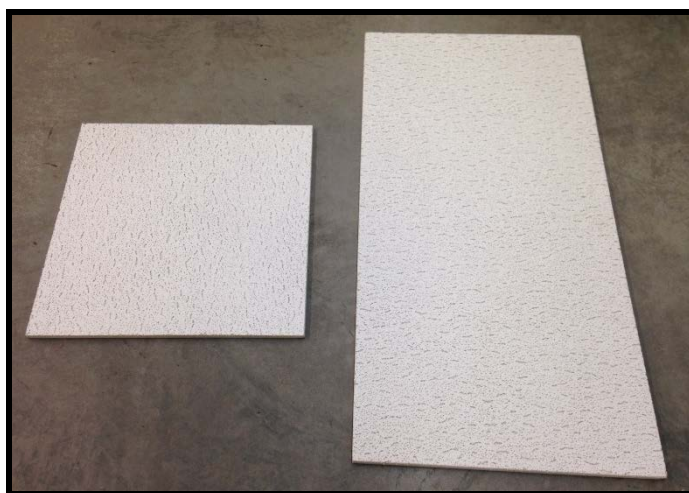
Photographs



Statford



Cambridge



Competitor (Mineral Fiber)

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Hardness



Competitor (Mineral Fiber)



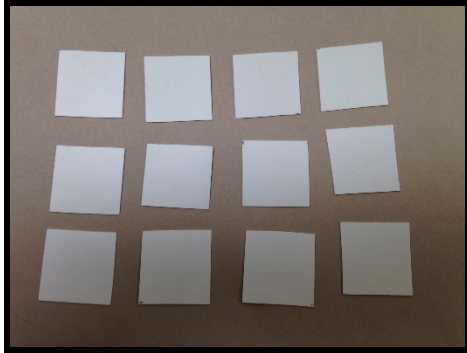
Stratford / Cambridge (Typical)

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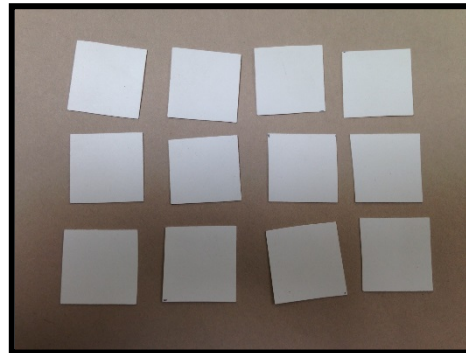
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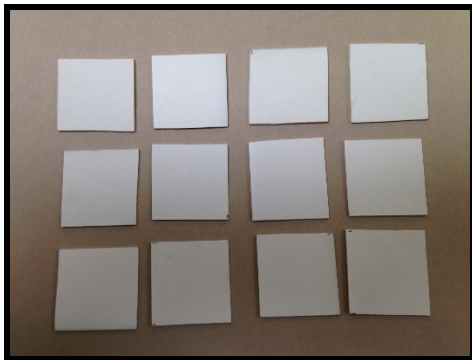
Friability



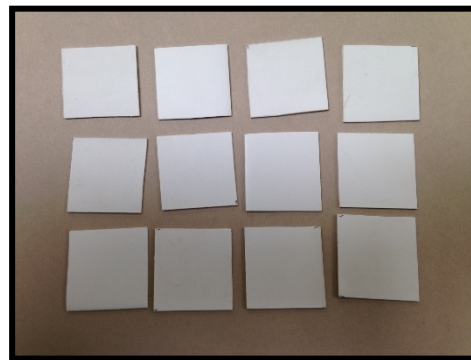
Stratford – Before



Stratford - After



Cambridge – Before



Cambridge - After



Competitor (Mineral Fiber) – Before



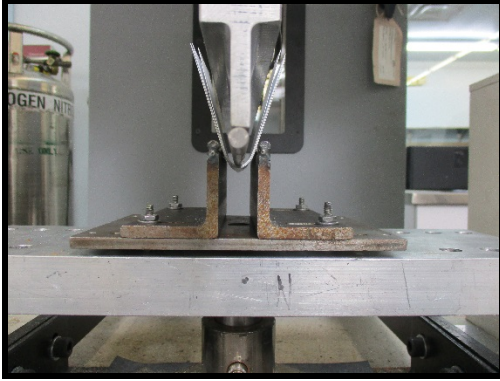
Competitor (Mineral Fiber) - After

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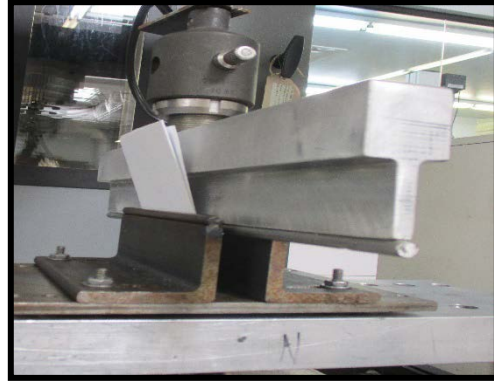
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Transverse Strength – Span Distance Calculated by a 16:1 Ratio of Sample Thickness



Stratford



Cambridge



Competitor (Mineral Fiber)

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SAG



Stratford - Before



Stratford - After

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SAG – Continued...



Cambridge - Before



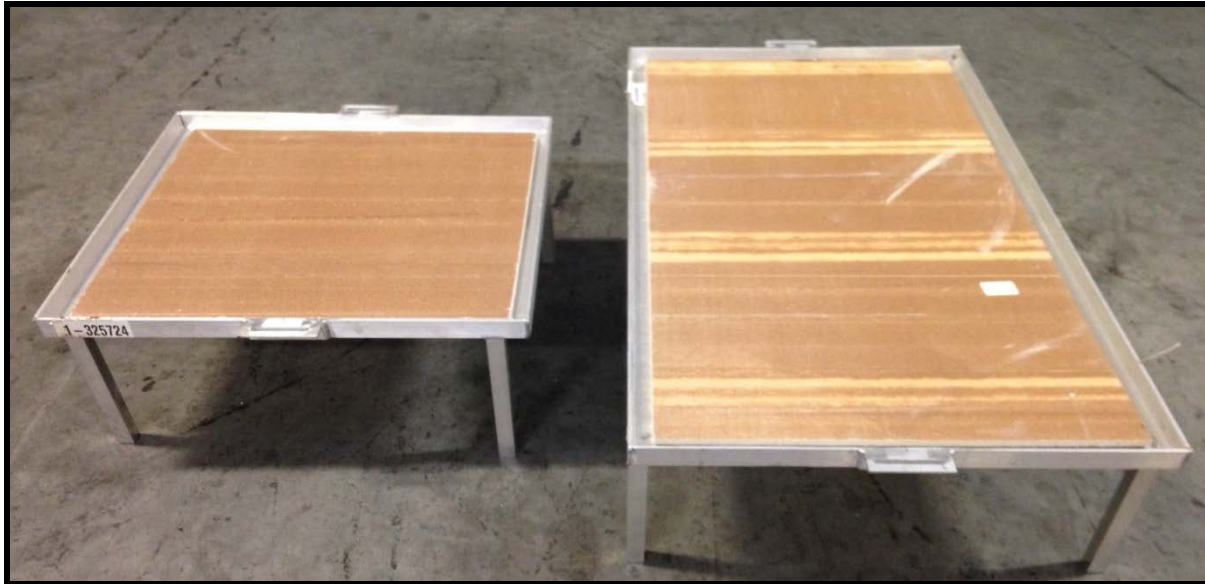
Cambridge - After

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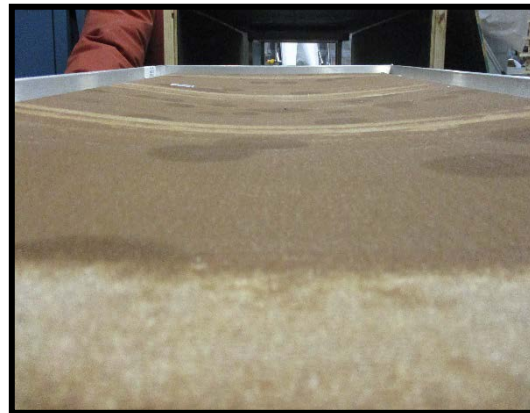
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SAG – Continued...



Competitor (Mineral Fiber) - Before



Competitor (Mineral Fiber) - After

End of Report

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