

**CLIENT:** US Architectural Products  
1117 Douglas Ave.  
North Providence, RI 02904

Attn: Mark Kubian

<b>Test Report No: 169065</b>	<b>Date: October 27, 2004</b>
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**The following sample was submitted by the Client as: Versaroc**

**SAMPLE DESCRIPTION:** ½" Fire Resistant Cement Board

**DATE OF RECEIPT:** October 5, 2004

**TESTING PERIOD:** October 5-27, 2004

**AUTHORIZATION:** Client Letter

**TESTS REQUESTED:** Outlined on Page 2

**TEST RESULTS:** Continued on the following pages

**PREPARED BY:**

**SIGNED FOR AND ON BEHALF OF  
SGS U.S. TESTING COMPANY INC.**

**Julian Arencibia, Technician  
Engineering Physical Properties**

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Materials Evaluation**

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**RESULTS:**

**TESTS REQUESTED:**The submitted sample was tested in accordance with the procedures outlined for the following properties:

ASTM D1037-99 Tensile Strength (Parallel and Perpendicular)  
ASTM D1037-99 Compressive Strength  
ASTM D1037-99 Static Bending (Wet and Dry)  
ASTM D732-02 Shear Strength  
ASTM D256-03 Impact Resistance  
ASTM D1037-99 Nail Head Resistance  
ASTM D1037-99 Lateral Nail Resistance (Wet and Dry)  
ASTM D1037-99 Screw Head Resistance  
ASTM D1037-99 Moisture Content  
ASTM D1037-99 Linear Variation with Moisture Content  
ASTM D1037-99 Thickness Swelling  
ASTM D696-03 Coefficient of Linear Thermal Expansion  
ASTM C518-02 Thermal Conductivity  
ASTM E96-00 Water Vapor Transmission  
ASTM D1037-99 Density

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RESULTS:

Tensile Strength Parallel to the Surface

<u>Specimen</u>	<u>Tensile Load</u> <u>lb</u>	<u>Tensile Strength</u> <u>psi</u>
1	576.2	830.9
2	461.4	674.7
3	424.7	633.7
4	452.0	632.0
5	414.5	567.2
Avg.		667.7

**Note:** Machine Direction  
Crosshead speed 0.15 in/min.-Span 2.00 in.

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RESULTS:

**Tensile Strength Parallel to the Surface**

<b><u>Specimen</u></b>	<b><u>Tensile Load</u></b> <b><u>lb</u></b>	<b><u>Tensile Strength</u></b> <b><u>psi</u></b>
1	367.3	550.2
2	494.6	739.1
3	397.7	572.5
4	511.2	733.4
5	428.7	582.3
Avg.		635.5

**Note:** Cross Machine Direction  
Crosshead speed 0.15 in/min.-Span 2.00 in.

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RESULTS:

**Tensile Strength Perpendicular to the Surface**

<b><u>Specimen</u></b>	<b><u>Tensile Load</u></b> <b><u>lb</u></b>	<b><u>Tensile Strength</u></b> <b><u>psi</u></b>
1	437.5	116.3
2	448.4	117.3
3	437.0	115.6
4	437.4	116.3
5	403.6	106.2
Avg.		114.3

**Note:** Crosshead speed 0.15 in/min.  
Sample Size 2"x2"x0.5"

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RESULTS:

**Compressive Strength**

<u>Specimen</u>	<u>Compressive Load lb</u>	<u>Compressive Strength psi</u>
1	19564	4891
2	19217	4804
3	19059	4765
4	19636	4909
5	19561	4890
Avg.		4852

**Note:** Crosshead speed 0.05 in/min.  
Sample Size 2"x2"x2"

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RESULTS:

Static Bend (Dry)

<u>Specimen</u>	<u>Flexural Load</u> <u>lb</u>	<u>Modulus of</u> <u>Rupture psi</u>	<u>Modulus of</u> <u>Elasticity</u> <u>ksi</u>
1	50.3	1530	687.4
2	47.1	1387	580.2
3	68.0	1756	825.4
4	62.5	1782	743.5
5	63.4	1729	752.3
Avg.			717.8

**Note:** Crosshead speed 0.25 in/min.  
Machine Direction

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RESULTS:

Static Bend (Wet)

<u>Specimen</u>	<u>Flexural Load</u> <u>lb</u>	<u>Modulus of</u> <u>Rupture psi</u>	<u>Modulus of</u> <u>Elasticity</u> <u>ksi</u>
1	43.3	1105	613.0
2	42.6	1086	618.5
3	42.8	1116	580.0
4	44.2	1123	652.2
5	39.8	1032	593.8
Avg.			611.5

**Note:** Crosshead speed 0.25 in/min.  
Machine Direction



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**RESULTS:**

**Shear Strength**

<b><u>Specimen</u></b>	<b><u>Maximum Load</u></b> <b><u>lb</u></b>	<b><u>Shear Strength</u></b> <b><u>psi</u></b>
1	2122.3	1459.1
2	1888.7	1298.5
3	2221.4	1504.5
4	2162.9	1474.2
5	2052.5	1384.2
Avg.		1424.1

**Note:** Crosshead speed 0.05 in/min.  
1 inch Diameter Punch  
Machine Direction

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**RESULTS:**

**Izod Impact Resistance**

<b><u>Specimen</u></b>	<b><u>Impact Force</u></b>	<b><u>Impact Strength</u></b>	<b><u>Type of Break</u></b>
	<b>ft-lbs</b>	<b>ft-lbs/in</b>	
1	0.2432	0.5045	Complete
2	0.2650	0.5077	Complete
3	0.2889	0.5095	Complete
4	0.1756	0.3681	Complete
5	0.2090	0.4139	Complete
Avg.		0.4607	

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**RESULTS:**

**Nail Head Pull Through**

<b><u>Specimen</u></b>	<b><u>Maximum Load</u></b>
	<b>lb</b>
1	485.7
2	411.9
3	417.2
4	417.3
5	407.6
Avg.	427.9

**Note:** Crosshead Speed 0.06 in/min

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**RESULTS:**

**Screw Head Pull Through**

<b><u>Specimen</u></b>	<b><u>Maximum Load</u></b>
	<b>lb</b>
1	304.6
2	272.5
3	290.8
4	304.2
5	301.6
Avg.	294.7

**Note:** Crosshead Speed 0.06 in/min

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**RESULTS:**

**Lateral Nail Resistance (Dry)**

<b><u>Specimen</u></b>	<b><u>Maximum Load</u></b>
	<b>lb</b>
1	391.4
2	620.2
3	395.7
4	378.9
5	524.6
Avg.	462.2

**Note:** Crosshead Speed 0.25 in/min

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**RESULTS:**

**Lateral Nail Resistance (Wet)**

<b><u>Specimen</u></b>	<b><u>Maximum Load</u></b>
	<b>lb</b>
1	388.4
2	220.4
3	238.7
4	232.7
5	243.8
Avg.	264.8

**Note:** Crosshead Speed 0.25 in/min

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**RESULTS:**

**Moisture Content**

<b><u>Specimen</u></b>	<b><u>Initial Weight</u></b>	<b><u>Final Weight</u></b>	<b><u>Moisture Content</u></b>
	<b>g</b>	<b>g</b>	<b>%</b>
1	36.3643	34.0523	6.8
2	39.2201	36.7335	6.8
3	36.0212	33.7190	6.8
Avg.			6.8

**Note:** Specimens Oven Dried at 217°F

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RESULTS:

**Linear Variation with Moisture Content**

<b><u>Specimen</u></b>	<b><u>Initial Length</u></b>	<b><u>Final Length</u></b>	<b><u>Linear Variation</u></b>
	<b>in</b>	<b>in</b>	<b>%</b>
1	12.007	12.014	0.06
2	11.939	11.946	0.06
3	11.911	11.919	0.07
4	11.912	11.920	0.07
5	11.911	11.916	0.05
Avg.			0.06

**Note:** Machine Direction  
Initial Condition 23°C 50% RH  
Final Condition 23°C 90%RH



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RESULTS:

**Linear Variation with Moisture Content**

<b><u>Specimen</u></b>	<b><u>Initial Length</u></b>	<b><u>Final Length</u></b>	<b><u>Linear Variation</u></b>
	<b>in</b>	<b>in</b>	<b>%</b>
1	11.945	11.954	0.08
2	11.946	11.954	0.07
3	12.063	12.071	0.07
4	11.993	12.008	0.13
5	11.959	11.968	0.08
Avg.			0.09

**Note:** Cross Machine Direction  
Initial Condition 23°C 50% RH  
Final Condition 23°C 90%RH

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RESULTS:

Density

<u>Specimen</u>	<u>Length</u>	<u>Width</u>	<u>Depth</u>	<u>Weight</u>	<u>Density</u>
	in	in	in	lbs	lbs/ft <sup>3</sup>
1	11.87	11.81	0.465	3.004	79.63
2	11.94	11.93	0.466	2.870	74.71
3	11.99	11.92	0.458	2.875	75.90
4	11.98	11.95	0.458	2.966	78.17
5	11.86	11.98	0.461	2.849	75.16
Avg.					76.71

Note: Measured at 23°C 50% RH

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RESULTS:

Thickness Swelling

<u>Specimen</u>	<u>Initial Thickness</u>	<u>Final Thickness</u>	<u>Percent Swell</u>
	in	in	%
1	0.468	0.470	0.43
2	0.473	0.474	0.21
3	0.464	0.467	0.65
4	0.472	0.474	0.42
5	0.463	0.467	0.86
Avg.			0.51

Note: 24 hrs Immersion

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**RESULTS:**

**Thermal Conductivity**

<b>Sample Thickness at Test, inches:</b>	0.471
<b>Hot Face Temperature, ° F:</b>	77.84
<b>Cold Face Temperature, ° F:</b>	52.20
<b>Average Sample Temperature, ° F:</b>	65.02
<b>Thermal Conductivity, k, Btu-in/hr-ft<sup>2</sup> - ° F :</b>	1.054
<b>Resistance/inch, Hr-ft<sup>2</sup>-° F/Btu-in:</b>	0.447

**Note:** Density 76.71 lbs/ft<sup>3</sup>

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**RESULTS:**

**Water Vapor Transmission**

	<b><u>#1</u></b>	<b><u>#2</u></b>	<b><u>#3</u></b>	<b><u>Average</u></b>
Slope	0.089	0.140	0.126	0.118
g/hr/Sq m	1.373	2.171	1.959	1.834
Grains/Hr/Sq ft	1.968	3.113	2.809	2.630
Permeance, US Perms	4.746	7.506	6.774	6.342
Permeability, Perm-Inches	2.216	3.528	3.265	3.003

**Note:** 10"x10" Tray

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**RESULTS:**

**Coefficient of Linear Thermal Expansion**

Specimen	Coefficient of Linear Thermal Expansion	Coefficient of Linear Thermal Expansion
	/°C	/°F

1	$1.06 \times 10^{-5}$	$0.589 \times 10^{-5}$
2	$1.06 \times 10^{-5}$	$0.589 \times 10^{-5}$

Avg.	$1.06 \times 10^{-5}$	$0.589 \times 10^{-5}$
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**End of Report**