

**WATER ABSORPTION AND FLEXURAL BOND  
TEST REPORT**

**Rendered to:**

**ENVIRO-BRICK, LLC**

**PRODUCT: Brick Samples**

**Report No: 64981.01-106-31**  
**Report Date: 05/25/06**  
**Expiration Date: 05/22/10**

**WATER ABSORPTION AND FLEXURAL BOND TEST REPORT**

Rendered to:

ENVIRO-BRICK, LLC  
5150 Contoura Drive  
Orlando, Florida 32810

Report No: 64981.01-106-31  
Test Date: 05/19/06  
Report Date: 05/25/06  
Expiration Date: 05/22/10

**Product:** Brick Samples

**Project Summary:** Architectural Testing, Inc. (ATI) was contracted by Enviro-Brick, LLC to perform ASTM C 76 water absorption and ASTM C 1072 masonry flexural bond strength testing on samples of two types of bricks (Standard and "F-Series") and five samples of joined brick that were prepared by Enviro-Brick, LLC. The Standard bricks, tested for water absorption, presented an average weight increase of 9.7% while the F Series bricks presented an average weight increase of 4.5%. The average flexural bond strength of the joined Standard brick samples was 166 pounds (75.5 psi).

**Test Methods:** The test specimens were evaluated in accordance with the following:

*ASTM C 76, Standard Test Method for Sampling and Testing Brick and Structural Clay Tile.*

*ASTM C 1072, Standard Test Method for Measurement of Masonry Flexural Bond Strength.*

**Test Results:** The results are reported in the following tables.

**Water Absorption by Weight**

Sample	Initial Weight (lb)	1 hour	2 hour	3 hour	4 hour	8 hour	24 hour
<b>1</b>	19.14	20.28	20.40	20.46	20.52	20.68	20.92
<b>2</b>	20.04	21.42	21.54	21.60	21.64	21.76	21.94
<b>3</b>	19.10	20.38	20.52	20.60	20.66	20.82	21.02
<b>4</b>	20.14	21.64	21.78	21.84	21.88	22.02	22.20
<b>5</b>	19.44	20.56	20.72	20.82	20.88	21.06	21.26
<b>Average</b>	<b>19.57</b>	<b>20.85</b>	<b>20.99</b>	<b>21.06</b>	<b>21.11</b>	<b>21.26</b>	<b>21.46</b>
<b>F1</b>	18.54	20.26	20.14	19.80	19.34	19.42	19.36
<b>F2</b>	17.68	19.20	18.80	18.70	19.56	18.58	18.52
<b>F3</b>	18.34	19.96	19.90	19.52	19.34	19.36	19.20
<b>F4</b>	18.36	19.98	19.48	19.24	19.22	19.12	19.08
<b>F5</b>	17.12	18.62	18.58	18.18	18.10	17.98	17.92
<b>Average</b>	<b>18.00</b>	<b>19.60</b>	<b>19.38</b>	<b>19.08</b>	<b>19.31</b>	<b>18.89</b>	<b>18.81</b>

**Water Absorption by Percentage**

Sample	1 hour	2 hour	3 hour	4 hour	8 hour	24 hour	Total
<b>1</b>	5.96%	0.63%	0.31%	0.31%	0.84%	1.25%	9.30%
<b>2</b>	6.89%	0.60%	0.30%	0.20%	0.60%	0.90%	9.48%
<b>3</b>	6.70%	0.73%	0.42%	0.31%	0.84%	1.05%	10.05%
<b>4</b>	7.45%	0.70%	0.30%	0.20%	0.70%	0.89%	10.23%
<b>5</b>	5.76%	0.82%	0.51%	0.31%	0.93%	1.03%	9.36%
<b>Average</b>	<b>6.55%</b>	<b>0.70%</b>	<b>0.37%</b>	<b>0.27%</b>	<b>0.78%</b>	<b>1.02%</b>	<b>9.68%</b>
<b>F1</b>	9.28%	-0.65%	-1.83%	-2.48%	0.43%	-0.32%	4.42%
<b>F2</b>	8.60%	-2.26%	-0.57%	4.86%	-5.54%	-0.34%	4.75%
<b>F3</b>	8.83%	-0.33%	-2.07%	-0.98%	0.11%	-0.87%	4.69%
<b>F4</b>	8.82%	-2.72%	-1.31%	-0.11%	-0.54%	-0.22%	3.92%
<b>F5</b>	8.76%	-0.23%	-2.34%	-0.47%	-0.70%	-0.35%	4.67%
<b>Average</b>	<b>8.86%</b>	<b>-1.24%</b>	<b>-1.62%</b>	<b>0.17%</b>	<b>-1.25%</b>	<b>-0.42%</b>	<b>4.49%</b>

*Note: The results for the F-Series samples are subjective numbers which represent the weight of the brick at each interval combined with the weight of brick particulate that spalled during the soaking and drying process. At the end of the soaking cycles there was also approximately 1.12 lbs of sediment at the bottom of the soaking trough which are not accounted for in the individual weight measurements of the brick samples.*

**Flexural Testing Results**

Sample	1	2	3	4	5	Average
<b>Peak Load (lbf)</b>	138	160	102	202	205	<b>166</b>
<b>Peak Flexural Stress (psi)</b>	65	75	48	94	96	<b>75.5</b>

A copy of this report will be retained by ATI for a period of four years from the original test date. This report is the exclusive property of the client so named herein and is applicable to the sample tested. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory. This report may not be reproduced, except in full, without the approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC.:

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Bernard A. Albright  
Technician - Component/Materials Testing

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Todd D. Burroughs  
Director - Component/Materials Testing

BAA: baa/nlb

Attachments (pages)

- Appendix A - Calculations (1)
- Appendix B - Photographs (3)
- Appendix C - Charts (1)

### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	05/25/06	N/A	Original report issue.

**APPENDIX A**  
**CALCULATIONS**

### Calculation of Net Flexural Bond Strength

$$F_n = \frac{PL + P_1L_1}{S} - \frac{P + P_1}{A_n}$$

Measurements	
P <sub>1</sub> (lb)	69.04
L (in)	10.375
L <sub>1</sub> (in)	0.875
r (in)	-3.125
c (in)	1.96875
b (in)	8
d (in)	3.9375
T <sub>fs</sub> (in)	1.5625
A <sub>n</sub> (in)	25
I (in <sup>4</sup> )	40.34016927
S	20.49024471

Sample	Peak Load (lb <sub>f</sub> )	Net Area Flexural Bond Strength (PSI)
<b>1</b>	138	65
<b>2</b>	160	75
<b>3</b>	102	48
<b>4</b>	202	94
<b>5</b>	205	96
<b>Average</b>	<b>166</b>	<b>75.5</b>

**APPENDIX B**

**Photographs**

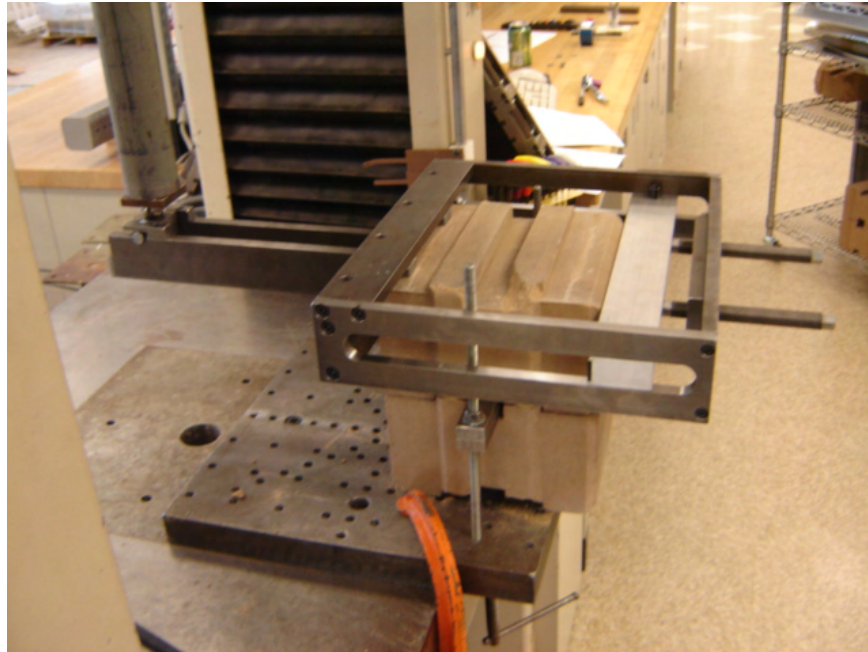




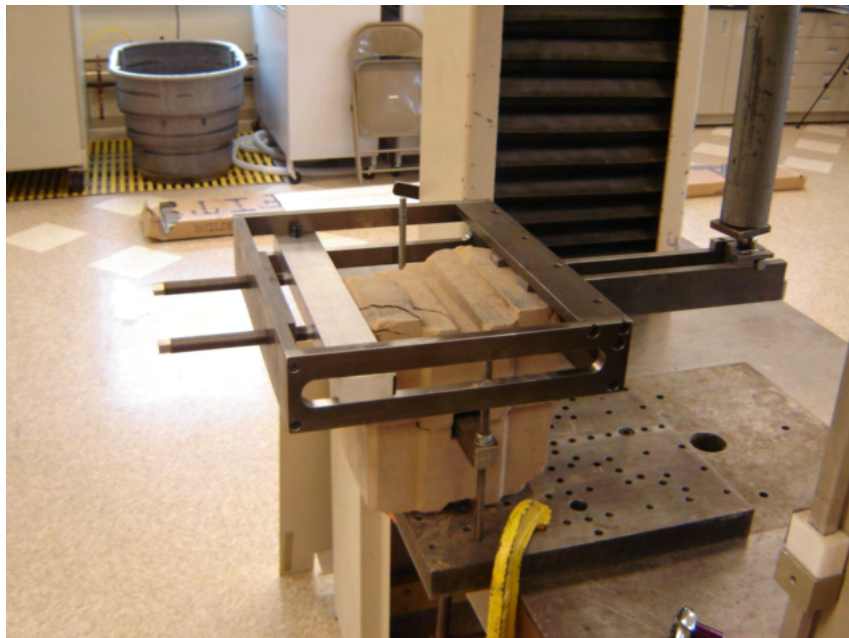
**Photo No. 1**  
**Standard Brick Water Absorption Setup**



**Photo No. 2**  
**F-Series Brick Water Absorption Setup**



**Photo No. 3**  
**Flexural Test Setup**

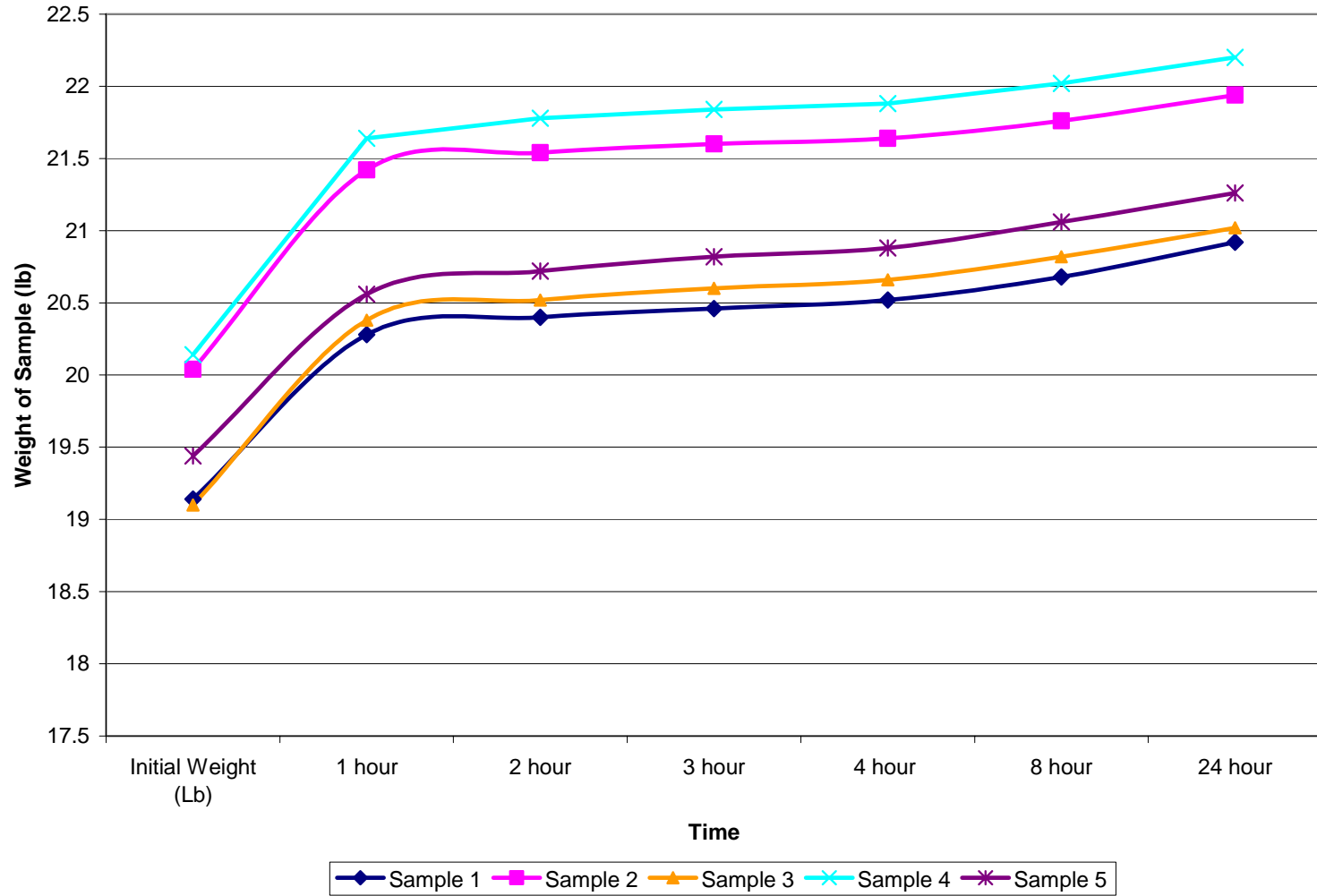


**Photo No. 4**  
**Flexural Test Sample 4 Failure**

## **APPENDIX C**

### **Charts**

### Standard Brick Samples Water Absorption



**F-Series Water Absorption by Weight**

