

May 12, 2010

Dr. Julie Rapoport  
CalStar Products  
6851 Mowry Ave.  
Newark, CA 94560

email: [jrapoport@calstarproducts.com](mailto:jrapoport@calstarproducts.com)

**Test Results for CalStar Bricks  
CTLGroup Project No. 391014**

Dear Dr. Rapoport:

Attached are test results for the referenced samples. You submitted and identified full-sized brick samples that arrived at CTLGroup on April 26, 2010. For testing purposes, CTLGroup saw cut samples into half bricks for the appropriate tests.

As requested, the following tests were performed in accordance with ASTM C 67 – 08, “Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.”

<u>Test Requested</u>	<u>Number and Type of Samples Tested</u>
Section 7. Compressive Strength	Five half bricks
Section 8. 24 Hr Absorption followed by 5 Hr Boiling Test	Five half bricks
Section 10. Initial Rate of Absorption (Suction) (Laboratory Test)	Five full bricks
Section 11. Efflorescence	Ten full bricks

Results indicate the samples meet the requirements of ASTM C 216 – 07a, “Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale.”

We appreciate this opportunity to conduct specialized testing for you. Should you have any questions, please contact us.

Sincerely,



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Attachments

Client: Calstar Products  
Project: Calstar Bricks  
Contact: Dr. Julie Rapoport  
Submitter: Dr. Julie Rapoport

CTLGroup Proj. No: 391014  
CTLGroup Proj. Mgr.: J. L. Jones  
Technician: J. Pyc  
Approved: W. Morrison  
Date: 5/7/2010

**ASTM C 67**  
**Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile**

**Compression Specimens**

<u>Specimen Identification</u>	<u>Avg. Width (in.)</u>	<u>Avg. Height (in.)</u>	<u>Avg. Length (in.)</u>	<u>Avg. Gross Area (in<sup>2</sup>)</u>
CAL12_01	3.6	2.3	3.8	13.6
CAL12_03	3.6	2.3	3.8	13.7
CAL12_04	3.6	2.3	3.7	13.6
CAL12_05	3.6	2.3	3.8	13.6
CAL12_07	3.6	2.3	3.7	13.6

<u>Specimen Identification</u>	<u>Maximum Load (lb)</u>	<u>Gross Area Compressive Strength (psi)</u>	<u>ASTM C 216-07a Requirements for Gross Area Compressive Strength</u>	
			<u>Grade SW (psi)</u>	<u>Grade MW (psi)</u>
CAL12_01	104,400	7,680	Min. 2,500	Min. 2,200
CAL12_03	115,600	8,440	Min. 2,500	Min. 2,200
CAL12_04	86,200	6,360	Min. 2,500	Min. 2,200
CAL12_05	114,600	8,440	Min. 2,500	Min. 2,200
CAL12_07	111,000	8,160	Min. 2,500	Min. 2,200
<b>Average</b>	<b>106,360</b>	<b>7,820</b>	<b>Min. 3,000</b>	<b>Min. 2,500</b>

Notes:

1. As required by ASTM C 67, half brick samples were tested.
2. This report may not be reproduced except in its entirety.

Client: Calstar Products  
Project: Calstar Bricks  
Contact: Dr. Julie Rapoport  
Submitter: Dr. Julie Rapoport

CTLGroup Proj. No: 391014  
CTLGroup Proj. Mgr.: J. L. Jones  
Technician: A. Wallace  
Approved: W. Morrison  
Date: May 7, 2010

**ASTM C 67**  
**Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile**

**Absorption Specimens - 24-hr Cold Water and 5-hr Boiling Water Test**

<u>Specimen Identification</u>	<u>Oven Dry Weight (g)</u>	<u>24-hr. Cold Water Saturated Weight (g)</u>	<u>5-hr. Boiling Water Saturated Weight (g)</u>
CAL12_02	875.0	895.9	934.2
CAL12_03	899.2	922.0	949.0
CAL12_04	892.1	915.9	949.8
CAL12_05	886.5	909.6	942.3
CAL12_07	903.6	922.2	953.3

<u>Specimen Identification</u>	<u>5-hr. Boiling Water Absorption (%)</u>	ASTM C 216-07a Requirements for 5-hr. Boiling Water Absorption	
		<u>Grade SW (%)</u>	<u>Grade MW (%)</u>
CAL12_02	6.8%	Max. 20.0%	Max. 25.0%
CAL12_03	5.5%	Max. 20.0%	Max. 25.0%
CAL12_04	6.5%	Max. 20.0%	Max. 25.0%
CAL12_05	6.3%	Max. 20.0%	Max. 25.0%
CAL12_07	5.5%	Max. 20.0%	Max. 25.0%
<b>Average</b>	<b>6.1%</b>	<b>Max. 17.0%</b>	<b>Max. 22.0%</b>

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Technician: A. Wallace  
Approved: W. Morrison  
Date: May 7, 2010

**ASTM C 67**  
**Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile**

**Absorption Specimens - 24-hr Cold Water and 5-hr Boiling Water Test**

Specimen Identification	24-hr. Cold Water Absorption (%)	ASTM C 216-07a Requirements for 24-hr.		ASTM C 216-07a Requirements for Saturation Coefficient	
		Cold Water Absorption (%)	Saturation Coefficient	Grade SW	Grade MW
CAL12_02	2.4%	8.0%	0.35	Max. 0.80	Max. 0.90
CAL12_03	2.5%	8.0%	0.46	Max. 0.80	Max. 0.90
CAL12_04	2.7%	8.0%	0.41	Max. 0.80	Max. 0.90
CAL12_05	2.6%	8.0%	0.41	Max. 0.80	Max. 0.90
CAL12_07	2.1%	8.0%	0.37	Max. 0.80	Max. 0.90
<b>Average</b>	<b>2.5%</b>		<b>0.40</b>	<b>Max. 0.78</b>	<b>Max. 0.88</b>

- Notes:
- As required by ASTM C 67, half brick samples were tested.
  - Per ASTM C 216-07a, "Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) the saturation coefficient requirement does not apply, provided the 24-hr cold water absorption of each unit of a representative sample of five bricks does not exceed 8.0%.
  - The saturation coefficient is the ratio of absorption by 24-hr submersion in cold water to that after 5-hr submersion in boiling water.
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CTLGroup Proj. No: 391014  
CTLGroup Proj. Mgr.: J. L. Jones  
Technician: A. Wallace  
Approved: W. Morrison  
Date Tested: 5/7/2010

**ASTM C 67**  
**Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile**

**Initial Rate of Absorption (Suction) (Laboratory Test)**

<u>Specimen Identification</u>	<u>Oven Dry Weight (g)</u>	<u>Weight after 1 min of Water Contact, g</u>	<u>Actual Weight Gain (g/min)</u>	<u>Corrected Weight Gain (g/min/30 in<sup>2</sup>)</u>
CAL12_09	1683.5	1684.9	1.4	2.4
CAL12_10	1867.6	1868.4	0.8	1.4
CAL12_11	1742.8	1744.0	1.2	2.1
CAL12_12	1789.9	1790.8	0.9	1.6
CAL12_13	1897.2	1897.9	0.7	1.2

Average Initial Rate of Absorption, g/min/30 in<sup>2</sup>: 1.7

Notes:

1. The initial rate of absorption was determined based on the oven-dried weight.
2. As required by ASTM C 67, full brick samples were tested.
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Client: Calstar Products  
Project: Calstar Bricks  
Contact: Dr. Julie Rapoport  
Submitter: Dr. Julie Rapoport

CTLGroup Proj. No: 390930  
CTLGroup Proj. Mgr.: J. L. Jones  
Technician: J. Pyc  
Approved: W. Morrison  
Date: 5/12/2010

**ASTM C 67 Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile**  
**Section 11. Efflorescence**

<u>Sample ID</u>	<u>Area of Finished Face, ft<sup>2</sup></u>	<u>Area of Back Face, ft<sup>2</sup></u>	<u>Dry Weight, lbs</u>	<u>Weight per Unit Area, lbs/ft<sup>2</sup></u>
CAL12_14	17.47	17.50	4.1	0.2
CAL12_15	17.16	17.12	4.0	0.2
CAL12_16	17.25	17.24	3.9	0.2
CAL12_17	17.31	17.30	3.9	0.2
CAL12_18	17.36	17.40	4.1	0.2
CAL12_19	17.28	17.33	3.8	0.2
CAL12_20	17.19	17.24	4.0	0.2
CAL12_21	17.19	17.22	4.0	0.2
CAL12_22	17.53	17.58	4.1	0.2
CAL12_23	17.20	17.24	4.0	0.2
<b>Average</b>	<b>17.29</b>	<b>17.32</b>	<b>4.0</b>	<b>0.2</b>

Notes:

1. Samples CAL12\_19 through CAL12\_23 were placed in laboratory air in 50±5% RH and 73±3°F for 7 days.
2. Samples CAL12\_14 through CAL12\_18 were partially immersed in distilled water to a depth of approximately 1 inch in laboratory air in 50±5% RH and 73±3°F.
3. All samples are rated as "not effloresced."
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