TILE COUNCIL OF NORTH AMERICA, INC.

PRODUCT TESTING SERVICES

100 Clemson Research Blvd. Anderson, SC 29625 Tel (864) 646-TILE Fax (864) 646-2821

March 11, 2010

Ironrock
Attn: Roy Gorton Jr.
PO Box 9240
Canton, OH 44711

Dear Mr. Gorton,

Tile Council of North America has tested the samples you submitted. Test report TCNA-447-09 is enclosed. If you have any questions or concerns, please contact us.

Best Regards,

TILE COUNCIL OF NORTH AMERICA, INC.

Katelyn Simpson
Laboratory Manager
Enclosures

TILE COUNCIL OF NORTH AMERICA, INC.

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TCNA TEST REPORT NUMBER: TCNA-447-09 **PAGE:** 1 **OF** 1

TEST REQUESTED BY:

Ironrock
Attn: Roy Gorton Jr.
PO Box 9240
Canton, OH 44711

TEST SUBJECT MATERIAL: Identified by client as: #310 Main Street, Modular 228 thin brick

TEST DATE: 12/3/09-12/4/09

TEST PROCEDURE: ASTM C650: "Resistance of Ceramic Tile to Chemical Substances"
-One specimen was tested for each test solution.
-The specimens were exposed to the test solutions for 24 hrs. at 74°F.

TEST RESULTS:

Test Solution	Visual Test (Affected?)	Pencil Test (Affected?)
Common Household and Cleaning Chemicals		
Acetic acid, 3% (v/v)	NO	NO
Acetic acid, 10% (v/v)	NO	NO
Ammonium chloride, 100 g/L	NO	NO
Citric acid solution, 30 g/L	NO	NO
Citric acid solution, 100 g/L	NO	NO
Lactic acid, 5% (v/v)	NO	NO
Phosphoric acid, 3% (v/v)	NO	NO
Phosphoric acid, 10% (v/v)	NO	NO
Sulfamic acid, 30 g/L	NO	NO
Sulfamic acid, 100 g/L	NO	NO
Swimming Pool Chemicals		
Sodium hypochlorite solution, 20 mg/L	NO	NO
Acids and Bases		
Hydrochloric acid solution, 3% (v/v)	NO	NO
Hydrochloric acid solution, 18% (v/v)	NO	NO
Potassium hydroxide, 30 g/L	NO	NO
Potassium hydroxide, 100 g/L	NO	NO

Katelyn Simpson
Laboratory Manager

12/18/09
Date

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TCNA TEST REPORT NUMBER: TCNA-447-09 **PAGE:** 1 **OF** 1

TEST REQUESTED BY: Ironrock
Attn: Roy Gorton Jr.
PO Box 9240
Canton, OH 44711

TEST SUBJECT MATERIAL: Identified by client as: #310 Main Street, Modular 228 thin brick

TEST DATE: 12/1/09

TEST PROCEDURE: ASTM C482: "Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement"
-Five specimens were tested.
-The specimens were cured for seven days before testing.

TEST RESULTS: The average bond strength of five (5) specimens was: **353** psi. All five (5) specimens exhibited *cohesive failure* within the bond coat.

The individual results of bond strength were as follows:
Specimen 1: 378 psi
Specimen 2: 411 psi
Specimen 3: 357 psi
Specimen 4: 362 psi
Specimen 5: 256 psi

[The ANSI A137.1 Specification for Quarry Tile (Unglazed) states: "the average bond strength of tile in the sample shall be **50 psi** or greater."]

Katelyn Simpson
Laboratory Manager

12/18/09
Date

THE NATIONAL BRICK RESEARCH CENTER

100 Clemson Research Blvd.
Anderson, SC 29625
(864) 656-1094
Fax: (864) 656-1095
www.brickandtile.org

NATIONAL BRICK RESEARCH CENTER

AASHTO R18 ACCREDITED LABORATORY

Results of Tests on Brick conducted in accordance with ASTM C67-08 Standard Method for Sampling and Testing Brick and Structural Clay Tile

03/11/2010

Name:	Tile Council Of North America 100 Clemson Research Blvd. Anderson, SC 29625	Plant:	North America Office
		Report Number:	
		Sampled Date:	11/18/2009
Phone:	864-646-8453	Lot:	
Fax:	864-646-2821	Product Code:	

Sample Description: **#310 Main Street, Modular 2258 Thin Brick**

							Test Date
Absorption	1	2	3	4	5	Average	
24 Hour Submersion in Cold Water (%)	2.19	1.86	1.95	1.85	1.97	1.96	11/23/2009
5 Hour Submersion in Boiling Water (%)	3.08	2.62	2.61	2.22	2.48	2.60	
Saturation Coefficient (Ratio of 24H to 5H)	0.71	0.71	0.75	0.83	0.80	0.76	
Compressive Strength	1	2	3	4	5	Average	
psi	12,464	11,633	14,005	11,630	14,178	12,782	12/09/2009
MPa	85.9	80.2	96.6	80.2	97.8	88.1	
Efflorescence	11	12	13	14	15		
	Not Effloresced	Not Effloresced	Not Effloresced	Not Effloresced	Not Effloresced		12/08/2009
Freeze-Thaw	1	2	3	4	5	Average	
Beginning Dry Wt. (g)	347.20	354.90	349.00	350.70	354.60	351.28	03/11/2010
Final Dry Wt. (g)	347.10	354.80	348.90	350.60	354.60	351.20	
Weight Loss (%)	0.03	0.03	0.03	0.03	0.00	0.02	
# of Cycles	50	50	50	50	50	50	
Pass / Fail	Passed	Passed	Passed	Passed	Passed		
These units were tested in accordance with ASTM C-67-08.							
Modulus of Rupture	1	2	3	4	5	Average	
psi	2,329	2,196	2,271	1,786	2,254	2,167	12/09/2009
MPa	16.1	15.1	15.7	12.3	15.5	15	

The brick represented by the test results shown here comply with the standards listed below:

ASTM C 1088 - 09 Standard Specification for thin Veneer brick Units Made From Clay or Shale
Grade: Exterior, Interior with absorption alternate in section 5.1

Denis Brosnan, Director

Greg Grabert, Ph.D., Associate Director of Technical Services

Lab Reference: 3024.2872

THE NATIONAL BRICK RESEARCH CENTER

100 Clemson Research Blvd
Anderson, SC 29625
(864)656-1094

AASHTO R18 ACCREDITED LABORATORY

Results of Tests on Brick conducted in accordance with ASTM C67-07 Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)

12/9/2009

COMPANY INFORMATION			
Name:	Tile Council Of North America North America Office 100 Clemson Research Blvd Anderson, SC 29625	Plant:	North America Office
Sample:	**#310 Main Street, Modular 2258 Thin Brick**	Report #:	3024/2872

TBX Dimensional Tolerance

Length									Test Date
Brick #	L1	L2	L3	L4	Average	Max. Tolerance	Min. Tolerance	Pass/Fail	
1	7.62	7.65	7.62	7.63	7 40/64	7 25/32	7 15/32	Pass	
2	7.60	7.60	7.59	7.59	7 38/64	7 25/32	7 15/32	Pass	
3	7.60	7.60	7.59	7.60	7 38/64	7 25/32	7 15/32	Pass	
4	7.61	7.61	7.61	7.62	7 39/64	7 25/32	7 15/32	Pass	
5	7.58	7.58	7.58	7.58	7 37/64	7 25/32	7 15/32	Pass	
6	7.60	7.59	7.59	7.59	7 38/64	7 25/32	7 15/32	Pass	
7	7.61	7.60	7.60	7.60	7 39/64	7 25/32	7 15/32	Pass	
8	7.61	7.64	7.61	7.60	7 39/64	7 25/32	7 15/32	Pass	
9	7 59	7.58	7.59	7.58	7 37/64	7 25/32	7 15/32	Pass	
10	7.61	7.60	7.60	7.59	7 38/64	7 25/32	7 15/32	Pass	12/9/2009
Width									
Brick #	W1	W2	W3	W4	Average	Max Tolerance	Min. Tolerance	Pass/Fail	
1	2.23	2.24	2.24	2.23	2 15/64	2 10/32	2 6/32	Pass	
2	2.25	2.27	2.26	2.27	2 17/64	2 10/32	2 6/32	Pass	
3	2.25	2.27	2.26	2.30	2 17/64	2 10/32	2 6/32	Pass	
4	2.23	2.26	2.25	2.27	2 16/64	2 10/32	2 6/32	Pass	
5	2.26	2.25	2.26	2.29	2 17/64	2 10/32	2 6/32	Pass	
6	2.26	2.25	2.26	2.27	2 17/64	2 10/32	2 6/32	Pass	
7	2.24	2.27	2.26	2.26	2 16/64	2 10/32	2 6/32	Pass	
8	2.25	2.24	2.23	2.24	2 15/64	2 10/32	2 6/32	Pass	
9	2.27	2.26	2.26	2.31	2 18/64	2 10/32	2 6/32	Pass	
10	2.27	2.26	2.27	2.27	2 17/64	2 10/32	2 6/32	Pass	12/9/2009
Height									
Brick #	H1	H2	H3	H4	Average	Max Tolerance	Min. Tolerance	Pass/Fail	
1	0.60	0.59	0.61	0.61	39/64	22/32	18/32	Pass	
2	0.60	0.61	0.62	0.63	39/64	22/32	18/32	Pass	
3	0.60	0.62	0.60	0.62	39/64	22/32	18/32	Pass	
4	0.61	0.62	0.62	0.63	40/64	22/32	18/32	Pass	
5	0.61	0.63	0.59	0.60	39/64	22/32	18/32	Pass	
6	0.61	0.62	0.60	0.60	39/64	22/32	18/32	Pass	
7	0.61	0.62	0.60	0.62	39/64	22/32	18/32	Pass	
8	0.61	0.62	0.60	0.62	39/64	22/32	18/32	Pass	
9	0.61	0.63	0.60	0.61	39/64	22/32	18/32	Pass	
10	0.60	0.61	0.62	0.62	39/64	22/32	18/32	Pass	12/9/2009

The brick represented by the test results shown here comply with the dimensional tolerance standards listed below:

ASTM C 1088 Standard Specification for Thin Veneer Brick Units Made From Clay or Shale

Type TBX

CERTIFICATION

Denis Brosnan, Director	Jim Frederic, Associate Director

THE NATIONAL BRICK RESEARCH CENTER
100 Clemson Research Blvd
Anderson, SC 29625
(864)656-1094

AASHTO R18 ACCREDITED LABORATORY

Results of Tests on Brick conducted in accordance with ASTM C67-07 Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)

12/9/2009

COMPANY INFORMATION			
Name:	Tile Council Of North America North America Office 100 Clemson Research Blvd Anderson, SC 29625	Plant:	North America Office
Sample:	**#310 Main Street, Modular 2258 Thin Brick**	Report #:	3024/2872

TBX Warpage

Brick #	Length (in.)	Width (in.)	Height (in.)	Average	Max. Tolerance	Pass/Fail			Test Date
1	0.036	0.044	0.044	3/64	2/32	Pass			
2	0.056	0.011	0.037	2/64	2/32	Pass			
3	0.008	0.012	0.010	1/64	2/32	Pass			
4	0.020	0.046	0.036	2/64	2/32	Pass			
5	0.029	0.014	0.023	1/64	2/32	Pass			
6	0.011	0.012	0.013	1/64	2/32	Pass			
7	0.003	0.009	0.006	1/64	2/32	Pass			
8	0.004	0.007	0.006	1/64	2/32	Pass			
9	0.005	0.007	0.006	1/64	2/32	Pass			
10	0.014	0.016	0.016	1/64	2/32	Pass			12/9/2009

The brick represented by the test results shown here comply with the dimensional tolerance standards listed below:

ASTM C 1088 Standard Specification for Thin Veneer Brick Units Made From Clay or Shale

Type TBX

CERTIFICATION

Denis Brosnan, Director	Jim Frederic, Associate Director

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Results of Tests on Brick conducted in accordance with ASTM C67-07 Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)

12/9/2009

COMPANY INFORMATION			
Name:	Tile Council Of North America North America Office 100 Clemson Research Blvd Anderson, SC 29625	Plant:	North America Office
Sample:	**#310 Main Street, Modular 2258 Thin Brick**	Report #:	3024/2872

Out of Square

Length									Test Date
Brick #	**Measurement 1**	**Measurement 2**	**Measurement 3**	**Measurement 4**	**Average**	**Max. Tolerance**	**Pass/Fail**		
1	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
2	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
3	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
4	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
5	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
6	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
7	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
8	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
9	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		
10	<0.03	<0.03	<0.03	<0.03	<0.03	2/32	Pass		12/9/2009