

**ASTM C 1363-11 THERMAL PERFORMANCE
TEST REPORT**

Rendered to:

WIRE-BOND

SERIES/MODEL: Masonry Tie Thermal Evaluations (2x6 Steel Stud Wall)

TYPE: Masonry Wall Assembly

Summary of Results	
Test Unit	R-Value of Siding Only
Test #1: Base Wall + 3/16" Sure Tie Tri-3" Brick Tie + 1" Nominal Air Gap + Common Brick	12.9
Test #2: Base Wall + No Brick Ties + 1" Nominal Air Gap + Common Brick	12.9

Reference should be made to ATI Report No. E8317.01-116-46 dated 12/09/15 for complete test specimen description and data.

ASTM C 1363-11 THERMAL PERFORMANCE TEST REPORT

Rendered to:

WIRE-BOND
400 Roundtree Road
Charlotte, North Carolina 28217

Report No: E8317.01-116-46

Test Date: 08/25/15

through

09/04/15

Report Date: 12/09/15

Test Sample Identification:

Series/Model: Thermal Performance Evaluation of Masonry Tie Thermal Evaluations
(2x6 Steel Stud Wall)

Type: Masonry Wall Assembly

Overall Size: 96" x 96"

Test Sample Submitted By: Client

Test Procedure: The thermal transmittance (U_s) and thermal resistance (R) were determined in general accordance with ASTM C 1363-11, *Standard Test Method for the Thermal Performance of Building Assemblies by Means of Hot Box Apparatus*.

Test Results Summary:

1. Average warm side ambient temperature 70.0 °F
2. Average cold side ambient temperature 0.0 °F
3. 15 mph dynamic wind applied to test specimen exterior.
4. $0.00" \pm 0.04"$ H₂O static pressure drop across specimen.

Conclusion:

The wall assemblies, as tested, performed identically in terms of U-Factor and R-Value. The limited mass of the Sure-Tie fasteners versus the overall wall, as well as the limited fastener area versus overall wall area, resulted in an insignificant change in performance of the wall system. It can be concluded that the Sure-Tie fasteners do not create any significant thermal bridging effects on this wall system.

Test Sample Description: Thermal Performance Evaluation of Masonry Tie Thermal Evaluations (2x6 Steel Stud Wall)

Overall Size: 96" x 96"

Wall Construction from Interior to Exterior:

1/2" Drywall - 1/2" National Gypsum® GridmarX was screwed with 1 inch self-tapping screws, every 12 inches vertically onto the 16 inch on-center steel studs

Steel Studs - 16 gage, 2x6 Steel Studs, 16 inch on-center were screwed onto the horizontal head and sill tracks with TEKDRWL K-LTH 8x3/4" Z screws, with no cavity insulation

5/8" DensGlass - 5/8" GP DensGlass® sheathing was screwed with 1 inch self-tapping screws, every 12 inches vertically onto the 16 inch on-center steel studs

2" Ridgid Insulation Board - 2" DOW STYROFOAM™ Brand CAVITYMATE™ Insulation, installed horizontally, and the seams and edges were sealed with 4" DOW WEATHERMATE™ Straight Flashing

1" Nominal Air Gap- There was a nominal 1 inch air gap created between the Base wall and exterior Brick façade

Wire-Bond Sure-Tie Fastener 2-1/2" Climaseal Coating barrels were screwed through the 2" ridgid insulation and 5/8" DensGlass, and into the steel studs every 16 inch on-center

Wire-Bond Sure-Tie Adjustable Triangle 3" Triangle with a 3/16" Dia. Wire HD GALV were connected to each Wire-Bond Sure-Tie Fastener 2-1/2" Climaseal Coating barrel

Exterior Façade - Common red brick (7-3/4" x 2-1/4" x 3-1/2") were assembled with HI-STRENGTH Masonry Cement for Type S Mortar, with the Wire-Bond Sure-Tie Adjustable Triangle 3" Triangle with a 3/16" Dia. Wire HD GALV installed into the mortar joints

Test #1 was built with the Wire-Bond Sure-Tie Fastener 2-1/2" Climaseal Coating barrels and Wire-Bond Sure-Tie Adjustable Triangle 3" Triangle with a 3/16" Dia. Wire HD GALV, and for **Test #2** they were removed.

**Test #1: Base Wall + 3/16" Sure Tie Tri-3" Brick Tie + 1" Nominal Air Gap
+ Common Brick
Measured Test Data**

Input

Warm Room Heat	330.677	BTU/Hr
Warm Room Fan	38.401	BTU/Hr

Loss

Mask Wall	9.364	BTU/Hr
Metering Box Area	75.110	Ft ²
Mask Wall Area	11.110	Ft ²
Mask Wall Warm Temperature	68.344	°F
Mask Wall Cold Temperature	-0.262	°F
Mask Wall Thickness	15.0	inches
Mask Wall R-Value	81.400	Hr-Ft ² -F/BTU
Wall Loss (Negative indicates a heat input)	-3.114	BTU/Hr
Warm Room EMF	0.001	mV
EMF Slope	-2087.67	BTUH/mV
EMF Y-Intercept	-0.224	BTU/Hr

Flanking

Total Heat Flow Through the Specimen	323.242	BTU/Hr
Warm Side Air Temperature	70.00	°F
Cold Side Air Temperature	0.01	°F
Specimen Area	64.000	Ft ²

Specimen Thermal Transmittance (U)	0.07	BTU/Hr-Ft ² -F
Specimen Overall Thermal Resistance (Ru)	13.9	Hr-Ft ² -F/BTU
Specimen Thermal Conductance (C)	0.08	BTU/Hr-Ft ² -F
Specimen Thermal Resistance (R)	12.9	Hr-Ft ² -F/BTU
Warm Side Surface Conductance (hh)	1.39	BTU/Hr-Ft ² -F
Warm Side Surface Resistance (Rh)	0.72	Hr-Ft ² -F/BTU
Cold Side Surface Conductance (hc)	4.99	BTU/Hr-Ft ² -F
Cold Side Surface Resistance (Rc)	0.20	Hr-Ft ² -F/BTU

Test Duration

1. The environmental systems were started at 16:14 PM on 8/25/2015 .
2. The test parameters were considered stable from 02:20 AM on 8/27/2015 to 10:20 AM on 8/27/2015 .
3. The thermal performance test results were derived from a four hour period ending at 10:20 AM on 8/27/2015 .

Test #2: Base Wall + No Brick Ties + 1" Nominal Air Gap +
Common Brick
Measured Test Data

Input

Warm Room Heat	330.396	BTU/Hr
Warm Room Fan	38.332	BTU/Hr

Loss

Mask Wall	9.287	BTU/Hr
Metering Box Area	75.110	Ft ²
Mask Wall Area	11.110	Ft ²
Mask Wall Warm Temperature	67.768	°F
Mask Wall Cold Temperature	-0.277	°F
Mask Wall Thickness	15.0	inches
Mask Wall R-Value	84.400	Hr-Ft2-F/BTU

Wall Loss (Negative indicates a heat input)

Warm Room EMF	0.002	mV
EMF Slope	-2087.670	BTUH/mV
EMF Y-Intercept	-0.224	BTU/Hr

Flanking

Total Heat Flow Through the Specimen	325.125	BTU/Hr
Warm Side Air Temperature	70.00	°F
Cold Side Air Temperature	0.00	°F
Specimen Area	64.000	Ft ²

Specimen Thermal Transmittance (U)	0.07	BTU/Hr-Ft2-F
Specimen Overall Thermal Resistance (Ru)	13.8	Hr-Ft2-F/BTU
Specimen Thermal Conductance (C)	0.08	BTU/Hr-Ft2-F
Specimen Thermal Resistance (R)	12.9	Hr-Ft2-F/BTU
Warm Side Surface Conductance (hh)	1.35	BTU/Hr-Ft2-F
Warm Side Surface Resistance (Rh)	0.74	Hr-Ft2-F/BTU
Cold Side Surface Conductance (hc)	6.36	BTU/Hr-Ft2-F
Cold Side Surface Resistance (Rc)	0.16	Hr-Ft2-F/BTU

Test Duration

1. The environmental systems were started at 15:44 PM on 9/2/2015 .
2. The test parameters were considered stable from 23:40 PM on 9/3/2015 to 7:40 AM on 9/4/2015 .
3. The thermal performance test results were derived from a four hour period ending at 7:40 AM on 9/4/2015 .

Thermocouple (TC) Locations (Interior View)

+20	+21	+22	+23	+24	25+
+16		+17	+18		+19
+11	+12	13+		+14	15+
+7		+8	+9		+10
+1	+2	+3	+4	+5	6+

Surface Temperatures (Interior View) °F
(reference Thermocouple (TC) Locations (Interior View))

	Interior		Exterior	
TC #	Test #1	Test #2	Test #1	Test #2
1	61.52	60.33	2.12	1.99
2	63.56	62.99	2.11	1.87
3	64.16	63.77	1.85	1.52
4	64.29	64.31	1.38	1.14
5	64.11	64.05	0.96	0.69
6	64.05	60.66	1.47	1.06
7	64.92	NA	1.38	1.27
8	65.73	65.88	1.67	1.55
9	65.81	65.89	0.76	0.65
10	65.56	65.64	0.56	0.49
11	65.64	65.21	1.54	1.34
12	66.59	66.67	1.92	NA
13	65.82	66.42	1.86	1.47
14	66.62	66.75	0.87	0.29
15	66.97	66.96	0.29	0.31
16	67.04	67.08	0.92	0.74
17	67.88	67.96	1.03	0.90
18	67.71	67.93	0.11	-0.09
19	67.45	67.58	-0.24	-0.49
20	68.18	68.13	0.84	1.05
21	68.80	68.78	0.62	0.96
22	69.33	69.33	-0.11	-0.52
23	69.29	69.19	-0.31	-0.70
24	69.07	69.01	-0.19	-0.35
25	68.97	69.24	2.04	2.03
AVG.	66.36	66.24	1.02	0.80

Test #1 ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 2.10%.
Test #2 ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 2.09%.

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed no evidence of condensation/frost at the conclusion of the test.

A calibration of the ATI 'thermal test chamber' in York, Pennsylvania was conducted in May 2014.

Architectural Testing, Inc. will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period. The test record retention end date for this report is 09/04/2019.

Results obtained are tested values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

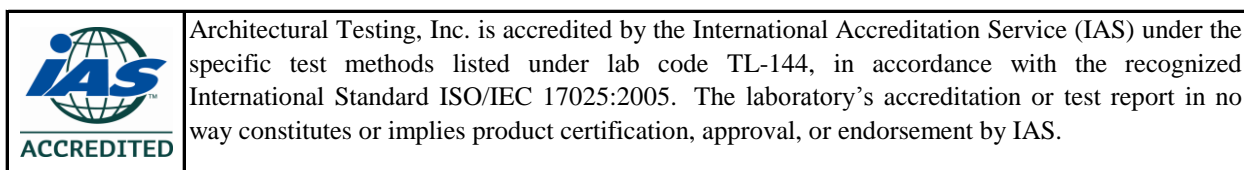
For ARCHITECTURAL TESTING, INC.

Shon W. Einsig
Senior Technician

Michael J. Thoman
Director - Simulations and Thermal Testing
Individual-In-Responsible-Charge

SWE:pam
E8317.01-116-46

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Pictures (10)



Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
.01R0	12/09/15	All	Original Report Issue. Work requested by Michael Ripley of Wire-Bond

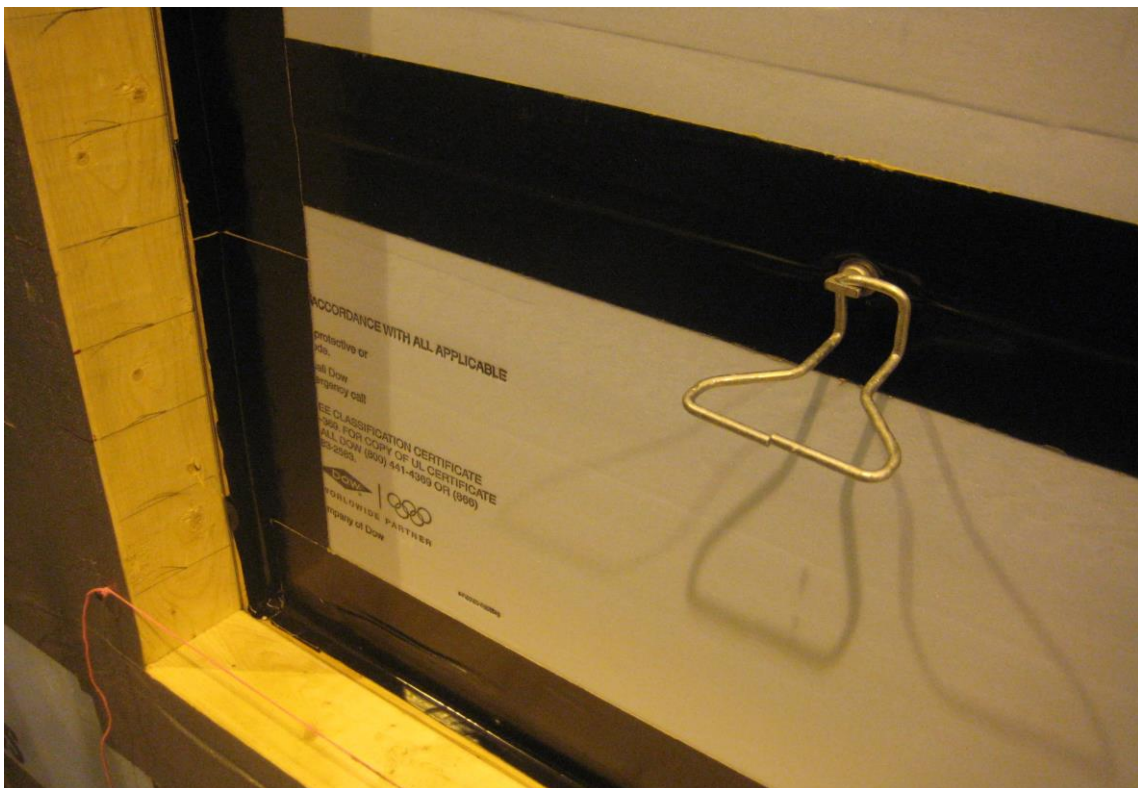
Appendix A: Pictures



(Exterior of Base Wall, Sealed Foam & Brick Ties installed)



(Brick Tie installed)



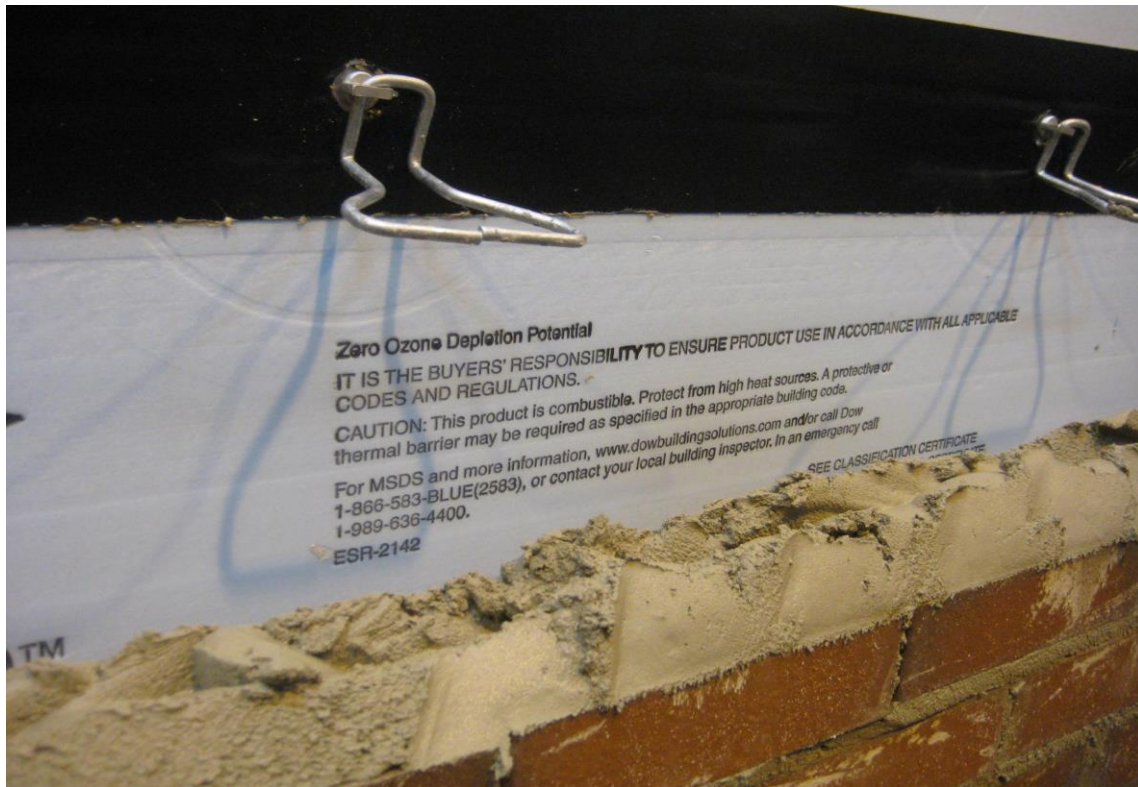
(Brick Tie installed)



(Brick Tie installed)



(Exterior of Base Wall, Bricks & Brick Ties being Installed)



(Exterior of Base Wall, Bricks & Brick Ties being Installed)



(Exterior of Base Wall, Bricks & Brick Ties being Installed)



(Exterior of Base Wall, Bricks & Brick Ties being Installed)



(Exterior of Base Wall, Bricks & Brick Ties being Installed)



(Exterior of Base Wall, Bricks & Brick Ties being Installed)



(Exterior Brick Wall Completed)



(Exterior Brick Wall Completed & Instrumented)



(Interior of Base Wall with Brick Ties Instrumented)



(Interior of Base Wall with-out Brick Ties Instrumented)