COM*check* Software Version 4.0.0

Envelope Compliance Certificate

Section 1: Project Information

Energy Code: **2009 IECC**
Project Title: Xcel Sports Complex
Project Type: New Construction

Construction Site: Owner/Agent: Designer/Contractor:

Building Location (for weather data): Milwaukee, Wisconsin
Climate Zone: 6a
Vertical Glazing / Wall Area Pct.: **33%**

Building Use: Activity Type(s)	**Floor Area**
1-Gymnasium : Nonresidential	47930

Section 2: Envelope Assemblies and Requirements Checklist

Envelope PASSES: Design 9% better than code.

Envelope Assemblies:

Component Name/Description	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Orientation: NORTH					
Exterior Wall - NORTH -0.055: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	729	---	---	0.055	0.064
Exterior Wall - NORTH -0.04: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	9577	---	---	0.040	0.064
Window- STO FRNT -0.28: Metal Frame Curtain Wall/Storefront, Perf. Specs.: Product ID THERMAL BROKEN ALUMINUM STOREFRONT - EAST WEST, SHGC 0.22, [Bldg. Use 1 - Gymnasium] (c)	1627	---	---	0.280	0.450
Orientation: EAST					
Exterior Wall - EAST -0.04: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	3223	---	---	0.040	0.064
Window - POLYCA - 0.26: Other Window, Perf. Specs.: Product ID POLYCARBONATE, SHGC 0.30, PF 0.55, [Bldg. Use 1 - Gymnasium] (c)	337	---	---	0.260	0.350
Exterior Wall - EAST -0.055: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	314	---	---	0.055	0.064
Exterior Wall - EAST -0.055: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	552	---	---	0.055	0.064
Window- STO FRNT -0.28: Metal Frame Curtain Wall/Storefront, Perf. Specs.: Product ID THERMAL BROKEN ALUMINUM STOREFRONT - EAST WEST, SHGC 0.22, PF 0.55, [Bldg. Use 1 - Gymnasium] (c)	113	---	---	0.280	0.450
Orientation: SOUTH					
Exterior Wall - SOUTH -0.055: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	7939	---	---	0.055	0.064
Window- STO FRNT -0.38: Metal Frame Curtain Wall/Storefront, Perf. Specs.: Product ID THERMAL BROKEN ALUMINUM STOREFRONT - EAST WEST, SHGC 0.22, PF 0.55, [Bldg. Use 1 - Gymnasium] (c)	1145	---	---	0.280	0.450
Window- STO FRNT -0.28: Metal Frame Curtain Wall/Storefront, Perf. Specs.: Product ID THERMAL BROKEN ALUMINUM STOREFRONT - EAST WEST, SHGC 0.22, PF 0.55, [Bldg. Use 1 - Gymnasium] (c)	4277	---	---	0.280	0.450

Exterior Wall - SOUTH -0.04: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	448	---	---	0.040	0.064
Orientation: WEST					
Exterior Wall - WEST -0.055: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	1344	---	---	0.055	0.064
Window- STO FRNT -0.28: Metal Frame Curtain Wall/Storefront, Perf. Specs.: Product ID THERMAL BROKEN ALUMINUM STOREFRONT - EAST WEST, SHGC 0.22, PF 0.55, [Bldg. Use 1 - Gymnasium] (c)	406	---	---	0.280	0.450
Exterior Wall - WEST -0.04: Other Steel Framed Wall, [Bldg. Use 1 - Gymnasium] (b)	2148	---	---	0.040	0.064
Window - POLYCA - 0.26: Other Window, Perf. Specs.: Product ID POLYCARBONATE, SHGC 0.30, PF 0.55, [Bldg. Use 1 - Gymnasium] (c)	864	---	---	0.260	0.350
Orientation: UNSPECIFIED ORIENTATION					
Roof 1: Other Insulation Above Deck, [Bldg. Use 1 - Gymnasium] (b)	49820	---	---	0.033	0.048
Floor 1: Slab-On-Grade:Unheated, Vertical 4 ft., [Bldg. Use 1 - Gymnasium]	47930	---	8.0	---	---

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.

(b) 'Other' components require supporting documentation for proposed U-factors.

(c) Fenestration product performance must be certified in accordance with NFRC and requires supporting documentation.

Air Leakage, Component Certification, and Vapor Retarder Requirements:

- ❑ 1. All joints and penetrations are caulked, gasketed or covered with a moisture vapor-permeable wrapping material installed in accordance with the manufacturer's installation instructions.
- ❑ 2. Windows, doors, and skylights certified as meeting leakage requirements.
- ❑ 3. Component R-values & U-factors labeled as certified.
- ❑ 4. No roof insulation is installed on a suspended ceiling with removable ceiling panels.
- ❑ 5. 'Other' components have supporting documentation for proposed U-Factors.
- ❑ 6. Insulation installed according to manufacturer's instructions, in substantial contact with the surface being insulated, and in a manner that achieves the rated R-value without compressing the insulation.
- ❑ 7. Stair, elevator shaft vents, and other outdoor air intake and exhaust openings in the building envelope are equipped with motorized dampers.
- ❑ 8. Cargo doors and loading dock doors are weather sealed.
- ❑ 9. Recessed lighting fixtures installed in the building envelope are Type IC rated as meeting ASTM E283, are sealed with gasket or caulk.
- ❑ 10. Building entrance doors have a vestibule equipped with self-closing devices.
  Exceptions:
  - ❑ Building entrances with revolving doors.
  - ❑ Doors not intended to be used as a building entrance.
  - ❑ Doors that open directly from a space less than 3000 sq. ft. in area.
  - ❑ Doors used primarily to facilitate vehicular movement or materials handling and adjacent personnel doors.
  - ❑ Doors opening directly from a sleeping/dwelling unit.

Section 3: Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed envelope system has been designed to meet the 2009 IECC requirements in COM*check* Version 4.0.0 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title	Signature	Date

Architectural Testing

ASTM C 1363-2011 THERMAL PERFORMANCE TEST REPORT

Rendered to:

GALLINA USA, LLC

SERIES/MODEL: ArcoPlus 547 - Opal

TYPE: Multi-Cell Panel

Summary of Results	
Standardized Thermal Transmittance (U-Factor)	0.28
Unit Size:	39-1/2" x 39-1/2"

Reference must be made to Report No. C1826.01-301-46, dated 08/21/12 for complete test specimen description and data.

2524 E. Jensen Ave
Fresno, CA 93706
phone: 559-233-8705
fax: 559-233-8360
www.archtest.com

Architectural Testing

ASTM C 1363-2011 THERMAL PERFORMANCE TEST REPORT

Rendered to:

GALLINA USA, LLC
4335 Capital Circle
Janesville, Wisconsin 53546

Report Number:	C1826.01-301-46
Test Date:	08/16/12
Report Date:	08/21/12
Test Record Retention Date:	08/16/16

Test Sample Identification:

Series/Model: ArcoPlus 547 - Opal

Type: Multi-Cell Panel

Overall Size: 39-1/2" x 39-1/2"

Test Sample Submitted by: Client

Test Procedure: The thermal transmittance (U) was determined in general accordance with ASTM C 1363-2011, *Standard Test Method for the Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.*

Test Results Summary:

Thermal Transmittance (U): 0.28 Btu/hr·ft^2·F

2524 E. Jensen Ave
Fresno, CA 93706
phone: 559-233-8705
fax: 559-233-8360
www.archtest.com

Test Sample Description:

Overall Size: 39-1/2" x 39-1/2"

Construction:*

The unit consisted of three vertically-oriented multi-cellulor extruded panels, snap fit together.

Glazing Deflection:

	N/A
Edge Gap Width	N/A
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	N/A
Center gap width at laboratory ambient conditions on day of testing	N/A
Center gap width at test conditions	N/A

**See Appendix A for Cross-Sectional Picture*
N/A Non-Applicable

Measured Test Data

Areas

1. Test Specimen Projected Area (A_s)	10.84	ft^2
2. Metering Box Opening Area (A_{mb})	36.47	ft^2
3. Metering Box Baffle Area (A_{b1})	32.13	ft^2
4. Surround Panel Interior Exposed Area (A_{sp})	25.63	ft^2

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	325.61	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	76.54	Btu/hr
3. Surround Panel Thickness	4.00	inches
4. Surround Panel Conductance	0.0450	$Btu/hr \cdot ft^2 \cdot F$
5. Metering Box Wall Heat Flow (Q_{mb})	11.59	Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0235*EMF + -1.226	
7. Flanking Loss Heat Flow (Q_{fl})	25.21	Btu/hr
8. Net Specimen Heat Loss (Q_s)	212.27	Btu/hr

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.

The test sample was installed in a vertical orientation, the exterior of the specimen was exposed to the cold side. The direction of heat transfer was from the interior (warm side) to the exterior (cold side) of the specimen.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 4.24%.

Required annual calibrations for the Architectural Testing Inc. 'thermal test chamber' (ICN 004287) in Fresno, California were last conducted in May 2011 in accordance with Architectural Testing Inc. calibration procedure. A CTS Calibration verification was performed April 2012.

Thermal Transmittance (U-factor)

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.83	F
2. Average Cold Side Air Temperature (t_c)	-0.49	F
3. Average Guard/Environmental Air Temperature	72.00	F
4. Metering Room Average Relative Humidity	14.01	%
5. Metering Room Maximum Relative Humidity	14.66	%
6. Metering Room Minimum Relative Humidity	13.39	%
7. Measured Cold Side Wind Velocity (Perpendicular Flow)	15.09	mph
8. Measured Warm Side Wind Velocity (Parallel Flow)	0.04	mph
9. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O

Results

1. Thermal Conductance	0.37	Btu/hr·ft²·F
2. Thermal Resistance	2.74	hr·ft²·F/Btu
3. Overall Thermal Resistance (R_u)	3.59	hr·ft²·F/Btu
4. Warm Side Surface Resistance (R_h)	0.68	hr·ft²·F/Btu
5. Cold Side Surface Resistance (R_c)	0.18	hr·ft²·F/Btu
6. Warm Side Surface Conductance (h_h)	1.48	Btu/hr·ft²·F
7. Cold Side Surface Conductance (h_c)	5.67	Btu/hr·ft²·F
8. Thermal Transmittance of Test Specimen (U)	0.28	Btu/hr·ft²·F

Test Duration

1. The environmental systems were started at 13:16 hours, 08/15/12.
2. The test parameters were considered stable for two consecutive four hour test periods from 22:58 hours, 08/15/12 to 06:58 hours, 08/16/12.
3. The thermal performance test results were derived from 02:58 hours, 08/16/12 to 06:58 hours, 08/16/12.

Surface Temperatures

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Individual Surface Temperature Measurements

Thermocouple	Warm Side (F)	Cold Side (F)	Thermocouple	Warm Side (F)	Cold Side (F)
1	58.62	3.47	9	56.79	2.21
2	59.08	3.99	10	57.05	2.70
3	58.71	3.41	11	57.16	2.84
4	58.39	3.55	12	56.76	2.58
5	57.58	3.29	13	51.51	1.83
6	57.96	3.78	14	51.70	1.71
7	57.71	3.50	15	54.66	2.81
8	59.36	3.34	16	52.60	2.45

1. Average Warm Side Surface Temperature 56.60 F
2. Average Cold Side Surface Temperature 2.97 F

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. 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.

Tested By:

William Simon Smeds
Technician

Reviewed By:

Kenny C. White
Laboratory Manager
Individual-In-Responsible-Charge

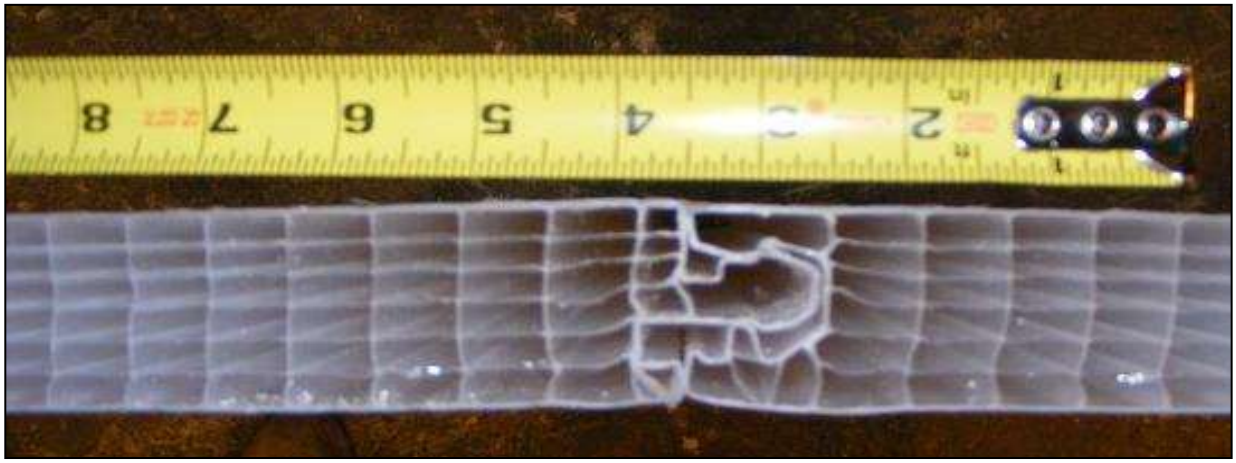
WSS:ss
C1826.01-301-46

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Photographs (1)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	08/21/12	All	Original Report Issue. Work requested by Mr. Daniel Hale of Gallina USA, LLC

Appendix A: Photographs



Architectural Testing

ASTM C 1363-2011 THERMAL PERFORMANCE TEST REPORT

Rendered to:

GALLINA USA, LLC

SERIES/MODEL: ArcoPlus 547 - Opal with IR Blocking

TYPE: Multi-Cell Panel

Summary of Results	
Standardized Thermal Transmittance (U-Factor)	0.26
Unit Size:	39-1/2" x 39-1/2"

Reference must be made to Report No. C1825.01-301-46, dated 09/05/12 for complete test specimen description and data.

2524 E. Jensen Ave
Fresno, CA 93706
phone: 559-233-8705
fax: 559-233-8360
www.archtest.com

Architectural Testing

ASTM C 1363-2011 THERMAL PERFORMANCE TEST REPORT

Rendered to:

GALLINA USA, LLC
4335 Capital Circle
Janesville, Wisconsin 53546

Report Number:	C1825.01-301-46
Test Date:	08/15/12
Report Date:	08/21/12
Revision 1 Date:	09/05/12
Test Record Retention Date:	08/15/16

Test Sample Identification:

Series/Model: ArcoPlus 547 - Opal with IR Blocking

Type: Multi-Cell Panel

Overall Size: 39-1/2" x 39-1/2"

Test Sample Submitted by: Client

Test Procedure: The thermal transmittance (U) was determined in general accordance with ASTM C 1363-2011, *Standard Test Method for the Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.*

Test Results Summary:

Thermal Transmittance (U): 0.26 Btu/hr·ft^2·F

2524 E. Jensen Ave
Fresno, CA 93706
phone: 559-233-8705
fax: 559-233-8360
www.archtest.com

Test Sample Description:

Overall Size: 39-1/2" x 39-1/2"

Construction:*

The unit consisted of three vertically-oriented multi-cellulor extruded panels, snap fit together.

Glazing Deflection:

	N/A
Edge Gap Width	N/A
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	N/A
Center gap width at laboratory ambient conditions on day of testing	N/A
Center gap width at test conditions	N/A

**See Appendix A for Cross-Sectional Picture*
N/A Non-Applicable

Measured Test Data

Areas

1. Test Specimen Projected Area (A_s)	10.84	ft^2
2. Metering Box Opening Area (A_{mb})	36.47	ft^2
3. Metering Box Baffle Area (A_{b1})	32.13	ft^2
4. Surround Panel Interior Exposed Area (A_{sp})	25.63	ft^2

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	309.43	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	76.44	Btu/hr
3. Surround Panel Thickness	4.00	inches
4. Surround Panel Conductance	0.0450	$Btu/hr \cdot ft^2 \cdot F$
5. Metering Box Wall Heat Flow (Q_{mb})	12.83	Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0235*EMF + -1.226	
7. Flanking Loss Heat Flow (Q_{fl})	25.21	Btu/hr
8. Net Specimen Heat Loss (Q_s)	194.95	Btu/hr

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.

The test sample was installed in a vertical orientation, the exterior of the specimen was exposed to the cold side. The direction of heat transfer was from the interior (warm side) to the exterior (cold side) of the specimen.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 4.57%.

Required annual calibrations for the Architectural Testing Inc. 'thermal test chamber' (ICN 004287) in Fresno, California were last conducted in May 2011 in accordance with Architectural Testing Inc. calibration procedure. A CTS Calibration verification was performed April 2012.

Thermal Transmittance (U-factor)

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.80	F
2. Average Cold Side Air Temperature (t_c)	-0.50	F
3. Average Guard/Environmental Air Temperature	72.01	F
4. Metering Room Average Relative Humidity	9.95	%
5. Metering Room Maximum Relative Humidity	10.38	%
6. Metering Room Minimum Relative Humidity	9.50	%
7. Measured Cold Side Wind Velocity (Perpendicular Flow)	15.09	mph
8. Measured Warm Side Wind Velocity (Parallel Flow)	0.04	mph
9. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O

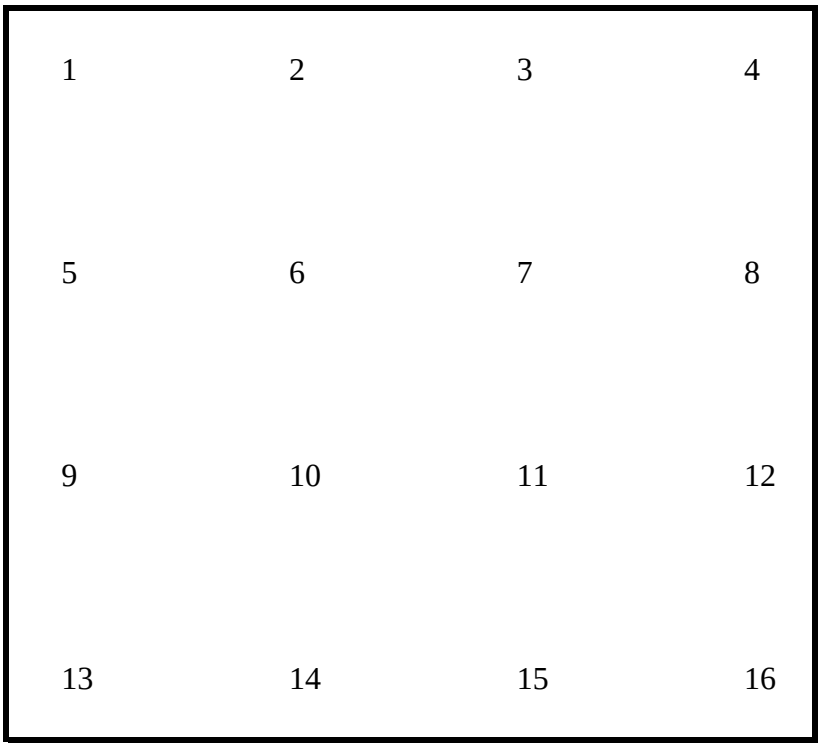
Results

1. Thermal Conductance	0.33	Btu/hr·ft²·F
2. Thermal Resistance	3.05	hr·ft²·F/Btu
3. Overall Thermal Resistance (R_u)	3.91	hr·ft²·F/Btu
4. Warm Side Surface Resistance (R_h)	0.68	hr·ft²·F/Btu
5. Cold Side Surface Resistance (R_c)	0.18	hr·ft²·F/Btu
6. Warm Side Surface Conductance (h_h)	1.47	Btu/hr·ft²·F
7. Cold Side Surface Conductance (h_c)	5.57	Btu/hr·ft²·F
8. Thermal Transmittance of Test Specimen (U)	0.26	Btu/hr·ft²·F

Test Duration

1. The environmental systems were started at 13:45 hours, 08/14/12.
2. The test parameters were considered stable for two consecutive four hour test periods from 02:31 hours, 08/15/12 to 10:31 hours, 08/15/12.
3. The thermal performance test results were derived from 06:31 hours, 08/15/12 to 10:31 hours, 08/15/12.

Surface Temperatures



Individual Surface Temperature Measurements

Thermocouple	Warm Side (F)	Cold Side (F)	Thermocouple	Warm Side (F)	Cold Side (F)
1	58.76	3.44	9	57.82	2.16
2	58.93	3.51	10	57.53	2.53
3	58.84	3.29	11	57.36	2.64
4	58.50	3.42	12	57.49	2.22
5	58.30	3.21	13	56.74	1.99
6	58.12	3.32	14	55.18	1.44
7	57.96	2.83	15	55.48	2.68
8	57.83	2.90	16	56.13	2.10

1. Average Warm Side Surface Temperature 57.56 F
2. Average Cold Side Surface Temperature 2.73 F

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. 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.

Tested By:

William Simon Smeds/ss

Digitally Signed for: William Simon Smeds by Shannon Stein

William Simon Smeds
Technician

Reviewed By:

K.C. White

Digitally Signed by:Kenny C. White

Kenny C. White
Laboratory Manager
Individual-In-Responsible-Charge

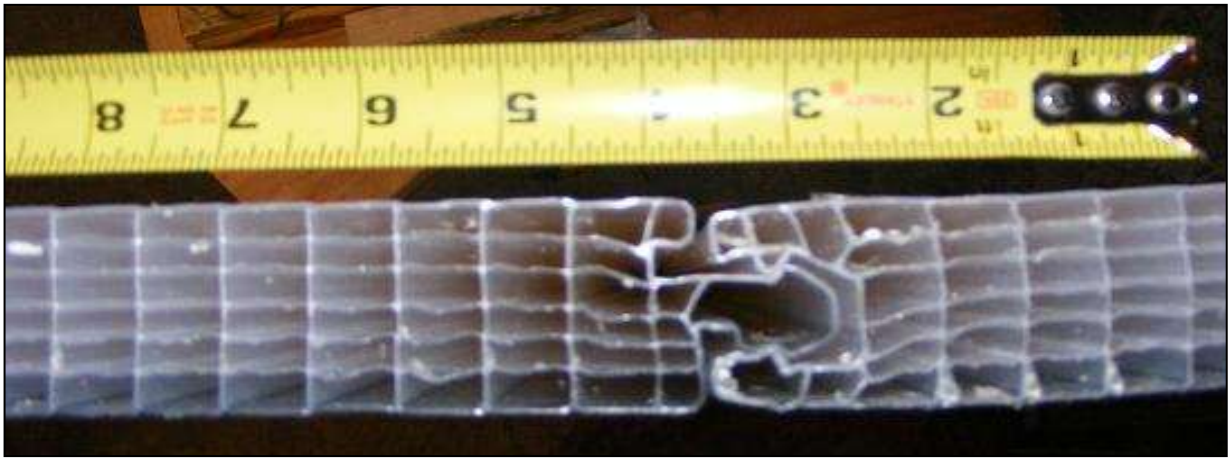
WSS:ss
C1825.01-301-46

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Photographs (1)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	08/21/12	All	Original Report Issue. Work requested by Mr. Daniel Hale of Gallina USA, LLC
1	09/05/12	Cover, 1	Correction to Series/Model.

Appendix A: Photographs



- Products

Insulation Systems

  - Simple Saver System® (http://www.thermaldesign.com/products/category/simple_saver/a_simple_choice)
  - Dispense-R™ (http://www.thermaldesign.com/products/category/dispense_r/dispense-r_overview)
  -

EnergyCraft®

  - EnergyCraft® Results (http://www.thermaldesign.com/products/category/synergy_design/energycraft_results)
  - HVAC (http://www.thermaldesign.com/products/category/hvac_appliances/overview1)
  - Lighting (http://www.thermaldesign.com/products/category/lighting/overview2)
  - Renewable Energy Systems (http://www.thermaldesign.com/products/category/renewable_energy_systems/renewables)
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  - CodeAnalysis (http://www.thermaldesign.com/techinfo/codeanalysis)
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  - About TDI (http://www.thermaldesign.com/about/about_us)
  - Join Our Team (http://www.thermaldesign.com/careers)
- Contact
  - Contact Info (http://www.thermaldesign.com/contact)
  - Information Request (http://www.thermaldesign.com/forms/information_request)
  - Login | Register (http://www.thermaldesign.com/visitor/login)

Simple Saver System®

Products

Simple Saver System®

- A Simple Choice (http://www.thermaldesign.com/products/category/simple_saver/a_simple_choice)
- Simple Saver System Performance (http://www.thermaldesign.com/products/category/simple_saver/simple_saver_system_performance)
- Benefits (http://www.thermaldesign.com/products/category/simple_saver/benefits)
- OSHA Compliant Fall Protection (http://www.thermaldesign.com/products/category/simple_saver/fall_protection)
- Building Systems (http://www.thermaldesign.com/products/category/simple_saver/building_systems)
- Components (http://www.thermaldesign.com/products/category/simple_saver/components_accessories)
- Retrofit (http://www.thermaldesign.com/products/category/simple_saver/retrofit)
- JM Formaldehyde-free™ Insulation (http://www.thermaldesign.com/products/category/simple_saver/jm_formaldehyde_free_insulation)
- Warranty (http://www.thermaldesign.com/products/category/simple_saver/warranty)

- Installation (http://www.thermaldesign.com/products/category/simple_saver/installation)
- Items To Consider (http://www.thermaldesign.com/products/category/simple_saver/items_to_consider1)
- Photo Gallery (http://www.thermaldesign.com/products/photo_gallery/photo_gallery)

Dispense-R™

EnergyCraft®

HVAC

Lighting

Renewable Energy Systems

Photo Gallery

Simple Saver System Performance

Simple Saver System® installed in an elementary school cafeteria in Wooster, AR

For over 30 years we have developed and promoted high R-value insulation systems in metal buildings.

We believed there had to be a better way to insulate without the traditional methods with so much insulation compression. We would never insulate our homes this way, so why be forced to insulate your metal building this way? The Simple Saver System® is an inexpensive and effective method to create the space needed for full specified insulation thickness in roofs and walls.

- Simple Saver Roof Performance Values
- Simple Saver Wall Performance Values
- Testing and Modeling Thermal Performance
- Design Manual & Instructions

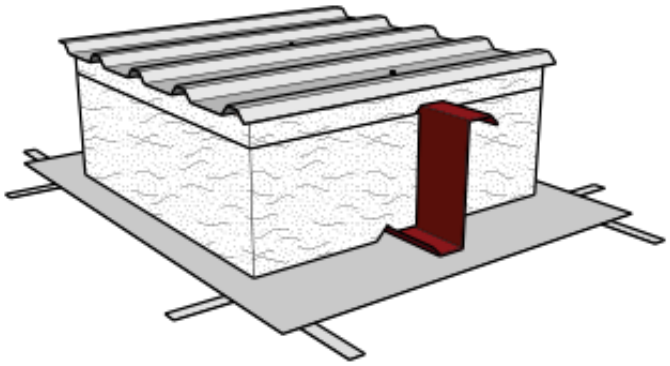
Simple Saver Roof Performance Values

The Simple Saver Roof System is a patented fabric liner insulation system that minimizes insulation compression and isolates the conductive purlins from the inside conditioned air. The Syseal® fabric liner spans the entire bay's width and length and is supported by a grid pattern of UVMAX® coated steel straps installed below the purlins. This creates the uniform depth space for full insulation thickness between the purlins. The top layer of insulation is draped over purlins and compressed when the metal roof panels are attached.

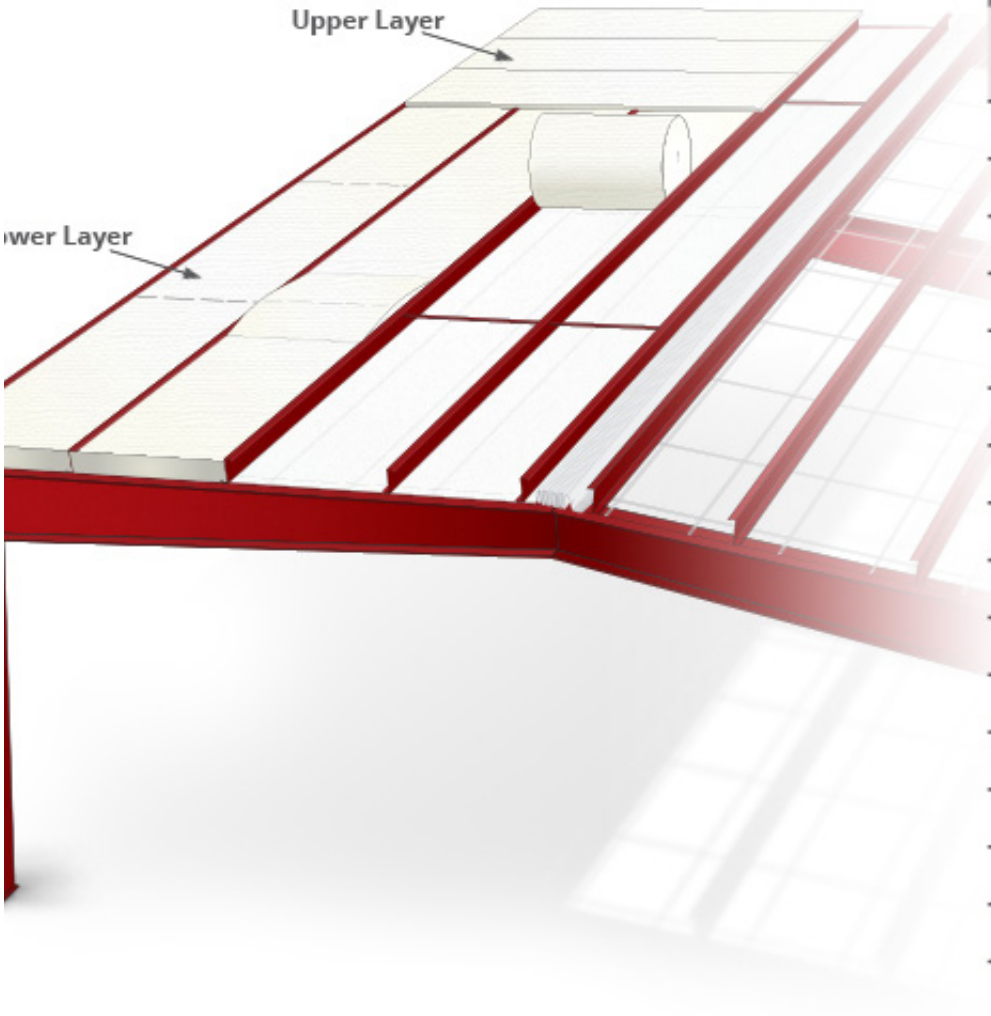
			90.1-2004 & 2007		**IECC 2009 & 90.1-2010**				**IECC 2012 & 189.1-2009**			
	Climate Zone		**1-7**	**8**	**1**	**2-5**	**6-7**	**8**	**1**	**2-5**	**6**	**7-8**
	Prescriptive U-factor		**0.065**	**0.049**	**0.065**	**0.055**	**0.049**	**0.035**	**0.044**	**0.035**	**0.031**	**0.029**
Simple Saver System	U-factor	Installed R-value	Assembly options*									
R19+R11 Screw Down (no thermal block)	U-0.044	R-22.7	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
R19+R11 Standing Seam (no thermal block)	U-0.040	R-25.0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
R19+R11 Standing Seam (with thermal block)	U-0.035	R-28.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
R25+R11 Standing Seam (with thermal block)	U-0.031	R-32.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
R30+R11 Standing Seam (with thermal block)	U-0.029	R-34.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R25+R11+R11 Standing Seam (with thermal block)	U-0.026	R38.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

R-values are listed from inside to outside and purlins spaced 5'oc.
* Additional assemblies values are available upon request.

Double Layer Roof Systems



In new construction projects, a double layer Simple Saver is



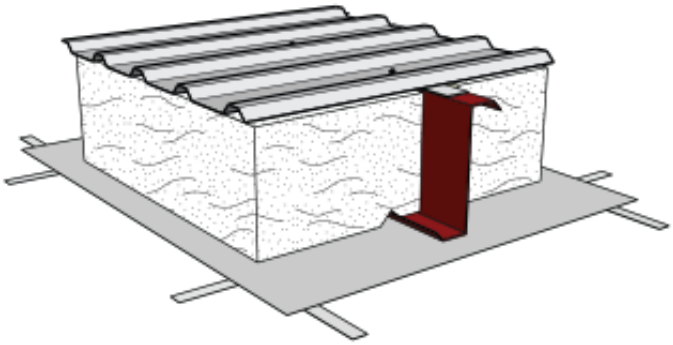
Simple Saver® Roof Systems

Pre-installed R-value	Lower Layer(s)	Upper Layer(s)
R-19	6"	-
R-25	8"	-
R-29	6"	3"
R-30	9"	-
R-30	6"	3 1/2"
R-32	6"	4"
R-35	8"	3"
R-38	8"	4"
R-43	9"	4"
R-49	9"	6"
R-49	12"	3 1/2"
R-52	12"	4"
R-57	12"	6"
R-60	9"	9"
R-68	12"	9"
R-76	12"	12"

Chart my apply to new and retrofit construction. Appropriate space is required.
Additional combinations available upon request.

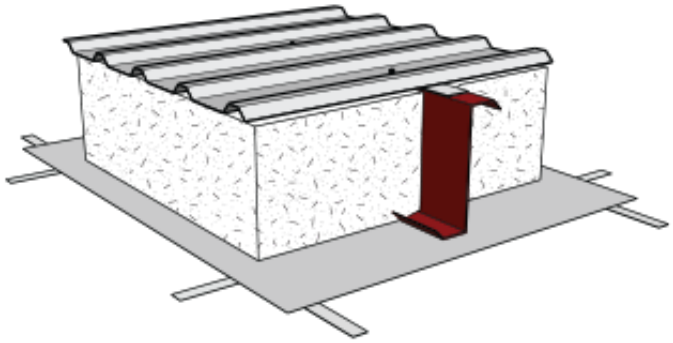
certainly the most common option specified. The bottom layer of fiberglass is installed parallel and between and purlins and the upper layer of fiberglass is installed perpendicular and atop the purlins. The upper layer of fiberglass between the roof sheets and the purlins serve as a thermal break to reduce thermal conduction, in addition to the thermal spacer block if applicable in standing seam roofs. Double layer systems are used in screw down roofs, standing seam roofs with or without thermal spacer blocks. Additional multilayer systems can also be achieved with multiple thick layers of fiberglass between the purlins (when cavity space is available) and an upper layer installed perpendicular to the purlins.

Single Layer Roof Systems



A very thick layer of fiberglass insulation can be installed parallel and between the purlins and used in a single layer Simple Saver roof as long as it adequately fills the cavity space. If a single layer system is selected for new construction, we encourage the fiberglass insulation to be in contact with the bottom of the metal roof sheet. Single layer systems are more common in screw down roofs vs. standing seam roofs which has the additional clip space above the purlin. Considering there isn't an upper layer of fiberglass, Thermal Design recommends our Quik-Stop™ thermal break foam tape between the roof sheet and the purlin to reduce thermal conduction.

Blown-in Systems



Considering the Simple Saver System is a suspended support roof system for insulation, it provides the option utilizing a range of insulation materials such as blown insulation or cellulose. Blown-in systems fill cracks and crevices within the cavity that helps reach maximum thermal performance and dramatically increases installation productivity in retrofit applications. Special equipment and installation experience may be required with blown-in systems. Considering there isn't an upper layer of fiberglass, Thermal Design recommends our Quik-Stop™ thermal break foam tape between the roof sheet and the purlin to reduce thermal conduction. Contact Thermal Design for more details on application and blower equipment rentals.

Specifications, Installation Instructions and Installation DVD available upon request. Simple Saver System Installation (http://webdev.thermaldesign.com/products/category/simple_saver/installation)

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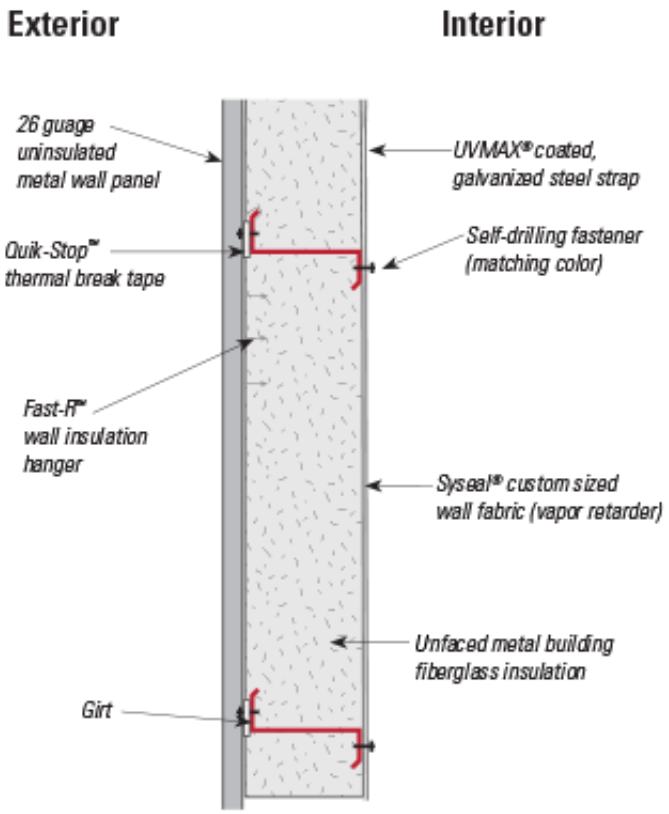
Simple Saver System Performance

Simple Saver System® installed in an elementary school cafeteria in Wooster, AR

For over 30 years we have developed and promoted high R-value insulation systems in metal buildings.

We believed there had to be a better way to insulate without the traditional methods with so much insulation compression. We would never insulate our homes this way, so why be forced to insulate your metal building this way? The Simple Saver System® is an inexpensive and effective method to create the space needed for full specified insulation thickness in roofs and walls.

- Simple Saver Roof Performance Values
- Simple Saver Wall Performance Values
- Testing and Modeling Thermal Performance
- Design Manual & Instructions



Simple Saver Wall

Performance Values

The Simple Saver Wall System is a high performance insulation system for metal building walls that maximizes the unfaced metal building fiberglass insulation in the cavity space by allowing the fiber glass to maintain full designed thickness. The Syseal® fabric liner is made up of a large custom sized piece to neatly fit each wall bay area, isolating the insulation and conductive girts from the inside conditioned space. The fabric is sealed and then mechanically fastened using UVMAX® coated steel straps with color matching self drilling fasteners around the perimeter and at intermediate girts. The Simple Saver System is typically left exposed to the interior for a bright clean finish.

*Tables below show common offerings. Solutions for higher R-values available upon request. contact us at 800.255.0776.

Simple Saver wall installation in progress at various stages of completion (optional metal liner panel shown).

			90.1-2004 & 2007		**IECC 2009 & 90.1-2010**			**IECC 2012 & 189.1-2009**	
		Climate Zone	**1-7**	**8**	**1**	**2-5**	**6-7**	**8**	**1-3**	**4-8**
		Prescriptive U-factor	**0.065**	**0.049**	**0.065**	**0.055**	**0.049**	**0.035**	**0.079**	**0.052**
Simple Saver System	U-factor	Installed R-value	Assembly options							
R-25	U-0.060	R-16.6	Yes	No	Yes	Yes	Yes	No	Yes	No
R-32.5	U-0.047	R-21.3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

R-values represent single layer fiberglass assemblies and girts spaced 7'oc.
* Additional assemblies values are available upon request.

Simple Saver System® R-25 Wall Assembly			
Pre-Installed R-value	Girt Spacing	U-Factor[1]	Installed R-value
R-25 unfaced metal building insulation	8'	U-0.057	R-17.5
	7'	U-0.060	R-16.6
	6'	U-0.064	R-15.6
	5'	U-0.068	R-14.7
	4'	U-0.073	R-13.7

Reduced wall performance values are due to stack effects, fiber orientation effects and heat flow direction.
[1] Heat flow horizontal (winter air films). 75° mean temperature

Simple Saver System® R-32.5 Wall Assembly			
Pre-Installed R-value	Girt Spacing	U-Factor[1]	Installed R-value
R-32.5 unfaced metal building insulation (R-30, NAIMA 202)	8'	U-0.045	R-22.2
	7'	U-0.047	R-21.3
	6'	U-0.049	R-20.4
	5'	U-0.052	R-19.2
	4'	U-0.055	R-18.2

Reduced wall performance values are due to stack effects, fiber orientation effects and heat flow direction.
[1] Heat flow horizontal (winter air films). 75° mean temperature

Specifications, Installation Instructions and Installation DVD available upon request. Simple Saver System Installation

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