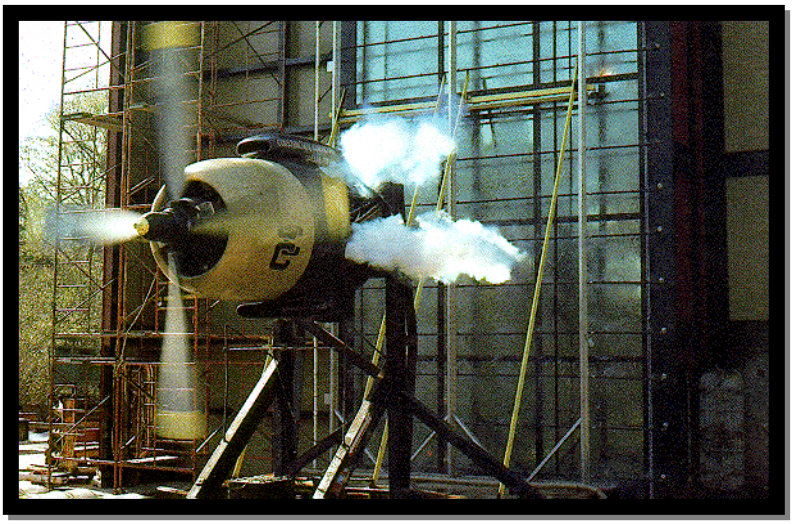
CONSTRUCTION CONSULTING LABORATORY, *INTERNATIONAL*



TEST REPORT:

AAMA 501-15 Performance Test Report

Atlas Architectural Metals, Inc.

Series: 2000

Product/Type: 2.00" x 4.5" Flush Glazed Storefront

REPORT #CCLI-17-176

Report Date: November 22, 2017

Prepared for:

ATLAS
ARCHITECTURAL METALS, INC.
9210 Emmot Rd
Houston, Texas 77040
Phone: 713-869-9551

S-UNITED, INC.
A Quality Control Company

AAMA 501-15 PERFORMANCE TEST REPORT
ATLAS ARCHITECTURAL METALS, INC.
SERIES 2000 FLUSH GLAZED 2.00" X 4.5" STOREFRONT
REPORT #CCLI-17-176

November 22, 2017

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APPENDIXES

Refer to drawings in **Appendix A**, this report is not complete unless these drawings are stamped and initialed by **CCLI** as illustrated below.

Sheet	Details	Date	Stamped as illustrated
1	Elevation & Sections	Not dated	Construction Consulting Laboratory International 1601 Luna Road Carrollton, Texas 75006 (972) 242-0556

AAMA 501-15 PERFORMANCE TEST REPORT
ATLAS ARCHITECTURAL METALS, INC.
SERIES 2000 FLUSH GLAZED 2.00" X 4.5" STOREFRONT
REPORT #CCLI-17-176

November 22, 2017

1. PROJECT DATA

1.1. **REPORT ISSUED:** Atlas Architectural Metals, Inc.

1.2. **TEST LABORATORY:** Construction Consulting Laboratory, International **(CCLI)**

2. PROJECT SUMMARY

2.1. **PRODUCT TYPE:** Aluminum Flush Glazed Storefront

2.2. **SERIES / MODEL:** 2000

2.3. **COMPLIANCE STATEMENT:** Results obtained are tested values and were secured by using the designated test methods listed in Section 3.

2.4. **TESTS COMPLETED: August 29, 2017**

2.5. **TEST SAMPLE SOURCE:** The specimens were manufactured and installed under the direction of Atlas Architectural Metals, Inc. at **CCLI**.

2.6. **RECORD RENTENTION**: Test records shall be maintained at **CCLI** for a minimum period of four (4) years from the reported test date.

2.7. **Drawing Reference:** Specimen drawings have been reviewed by **CCLI** and are representative of the specimen installed and tested. If observed, deviations shall be listed on the appended drawings.

2.8. **Observers:**

Witnessed by	**(Representative)**	
Atlas Architectural Metals, Inc.	Cesar Hernandez	
CCLI	Edsson Alarcon	Wesley Wilson

3. TEST SPECIFICATIONS / METHODS

- **AAMA 501-15 "Methods of Test for Exterior Walls"**
- **ASTM E283** "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen"
- **ASTM E 330** "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference"
- **AAMA 501.1** "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls using Dynamic Pressure".
- **ASTM E 330** "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference"

4. MOCK-UP DESCRIPTION

Product Type:	Aluminum Flush Glazed Thermal Storefront **Product Drawings, Appendix A**.			
Series Model:	2000			
Test Method:	AAMA 501-15 "Methods of Test for Exterior Walls"			
System Details	**Design Psf**	**Width**	**Height**	**Ft²**
	+/- 40.0	14'-11 ½" (179.5")	10'-6 ½" (108")	157.69

GLASS: Sealed Insulating Glass (SIG) Two (2) pieces ¼" Tempered with ½" airspacer .

WEEP ARRANGEMENT: Vertical horizontals shimmed an 1/8" up from the part# 1011 sill starter/flashing to provide a continuous weep between the starter and part# 2003 frame sill.

GLAZING: All glass is exterior set and supported with 4" long silicone setting blocks spaced 9" from each end of glass DLO. EPDM flush glaze glazing gasket part# 347-02-0 at the interior and exterior of glass sealed at gasket corners and at gasket frame reglets approximately 2" in each direction with DC-795 silicone. Exterior snap in glass stop part# 1004 at the exterior bottom edge of glass.

SEALANT: Specimens perimeter sealed with foam backer rod and silicone sealant. Horizontal-to-vertical connections within the glass pocket at the sill sealed and tooled with DC-795 silicone sealant. Aluminum bent plate 2.25" overall length x ½" wide x .040" thickness field bent at the ¾" marks set in and sealed over with DC-795 silicone to the top side and at each end of each intermediate horizontal. Anchor bolts penetrating starter sill cap sealed with DC-795 silicone. The interior face of the frame sill part# 2003 set in DC-795 silicone at the inside edge of the starter and a cap bead is applied across the interior face between the starter and frame sill. Aluminum sill end dam part# FG 4019 M4.5 set in silicone and attached to starter with two (2) #14 x 1" screws.

REINFORCEMENT: None

INSTALLATION: Sub sill and frame head filler positioned at the top of jambs and centered over the mullions are attached to 3/8" thickness chamber tube steel with a 5/16"-24 x 2" Grade 5 hex head anchor bolts spaced approximately 1½" and 4½" from jambs and each side of vertical mullions.

OTHER FEATURES: Frame horizontal members, (intermediate, head, and sill) attached to vertical jamb mullions and/or intermediate vertical mullion pocket filler with two (2) #14 x 1 ¼" per connection.

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5. TEST EQUIPMENT

5.1. Pressure differentials were created with reversible pumps for positive/negative loading.

5.2. Pressure differentials measured with manometers.

5.3. Structural variations measured with Chicago Dial gauges and/or Mitutoyo digital gauges.

5.4. Water applied from swirl-type nozzles spaced on 24" centers vertical and horizontal directions adjusted to deliver a minimum of 5gph/ft².

5.5. Dynamic Winds generated from a Continental 150 in-line 6-cylinder aircraft engine with a 2-blade 5'-0" diameter blade.

6. TESTING SEQUENCE / PROCEDURES / ALLOWABLE

6.1. ASTM E 330 DESIGN PRE-LOAD DEFLECTIONS: There shall be no system failure at 50% of design load:

Procedure: The specimen shall be pre-loaded to 20Psf (50%) of the positive DP and maintained for 10 seconds, the pressure shall be released and the system inspected for any damage.

6.2. ASTM E 283 AIR INFILTRATION: Total amount of air infiltration shall not exceed **.06 Cfm/ ft²** of the mock-up area tested. Strip Curtain Wall, and slab perimeter sealants are included in the total mock-up test area. Overall tested dimension is 14'-11 ½" wide x 10'-6 ½" tall = 157.69Ft² x .06 CFM = 9.46 CFM

Infiltration Procedure: The specimen shall be covered with 4-mil plastic sheet material and sealed with spray adhesive, duct tape, and sealant to the chamber perimeter, thus allowing no movement of air through the specimen. The specimen shall be subjected to a positive pressure differential of **6.24** psf to obtain a leakage rate for the test chamber. The plastic bag shall then be removed and the chamber again pressurized to a positive **6.24** psf to measure total air infiltration. The chamber infiltration shall be subtracted from the total air infiltration resulting in the infiltration rate of the test specimen, **Photograph 1, Appendix B**.

6.3. ASTM E 331 STATIC WATER PENETRATION: Per project specifications, there shall be no water penetration during or at the conclusion of this test at the static pressure of **6.24 psf**.

Procedure: Water shall be applied to the specimen at a minimum rate of **5 Gph/Ft²**, in such a way as to completely cover the exterior face of the specimen. Simultaneously, a specified positive static pressure shall be applied for a minimum period of fifteen (15) minutes, **Photograph 2, Appendix B**.

6.4. AAMA 501.1 DYNAMIC WATER PENETRATION: Per project specifications, there shall be no water penetration during or at the conclusion of this test at a dynamic wind speed of **50 mph**.

Procedure: Water shall be applied to the specimen at a minimum rate of **5 Gph/Ft²**, in such a way as to completely cover the exterior face of the specimen. Simultaneously, winds generated from a Continental 150 Aircraft engine equipped two (2)-blade propeller with a 5'-0" diameter shall be adjusted to deliver a specified slipstream velocity in Mph (equivalent to the static test pressure), **Photograph 3, Appendix B**.

Note: "Uncontrolled water" is defined as any water that appears on any normally exposed interior surfaces that is not contained or drained back to the exterior, or that can cause damage to adjacent materials or finishes. Water contained within drained flashings, gutters, and sills is not considered water leakage. The collection of up to one half (½) ounce of water (14.8 cc) in a fifteen (15) minute test period on top of any interior stop or stool integral with the wall system shall not be considered water leakage.

6.5. ASTM E 330 DESIGN LOAD DEFLECTIONS: There shall be no system failure and deflection of aluminum members at 100% of design load and shall not exceed the following:

Procedure: The specimen shall be pre-loaded to 50% of the positive or negative DP. Once set, the indicators shall be set to zero. Positive and or Negative loading, a pressure equal to 50% of the DP shall be applied and maintained for 10 seconds, the pressure shall be released and the indicators read and deflection recorded. A pressure equal to 100% of the DP shall be applied and maintained for 10 seconds, the pressure shall be released and the indicators read and deflection recorded

TEST SPECIMEN DESIGN CRITERIA Positive 40 psf / Negative 40 psf (10-Second Duration All Loads)
Glazing Vertical Span (L): 126.5" L /175 = Allowable = 0.723 inches
Glazing Horizontal Span (L): 57.5" / L/175: Allowable = 0.329 inches

6.6. REPEAT ASTM E 283 AIR INFILTRATION: Total amount of air infiltration shall not exceed **35.24** CFM based on an allowable of **.06 Cfm/ ft²** of the mock-up area tested.

6.7. REPEAT ASTM E 331 STATIC WATER PENETRATION: Per project specifications, there shall be no water penetration during or at the conclusion of this test at the static pressure of **12 psf**.

Allowable: No Water Penetration

6.8. ASTM E 330 PROOF LOAD RESIDUAL: The permanent deformation of the aluminum members shall not exceed 0.02% of span at 150% of design load.

Procedure: Preload to 50% of the positive or negative DP. Once set, indicators are set to zero. Positive and or Negative loading, a pressure equal to 150% of the DP shall be applied and maintained for 10 seconds, the pressure shall be released and the indicators read and permanent sets recorded.

TEST SPECIMEN PROOF LOAD **Positive 60 Psf / Negative 60 Psf (10-Second Duration All Loads)**
Glazing Vertical Span (L): 126.5" L /500 = Allowable = 0.253 inches
Glazing Horizontal Span (L): 57.5" / L/500: Allowable = 0.115 inches

7. TEST RESULTS

Title of Test	Test Method	Measured	Allowed
Pre-Uniform Load	**ASTM E 330**	+/-20.0 Psf	No Damage
Air Infiltration @ 300 Pa (6.24 psf)	**ASTM E 283**	0.25 L/s•m2 (.05 cfm/ft2)	.30 L/s•m2 (0.06 cfm/ft2)
Water Resistance @ 300 Pa (6.24 psf)	**ASTM E 331**	No Leakage	No Leakage
Dynamic Water Resistance @ 50Mph (equivalent to 6.24 psf)	**AAMA 501.1**	No Leakage	No Leakage
Uniform Load **Deflection**	**ASTM E 330**		
-Positive @ 1920 Pa (40.10 psf)		**No Damage**	**No Damage**
Net Deflection @ intermediate mullion		15.62 mm (.615")	18.36mm (.723")
Net Deflection @ intermediate horizontal		1.52 mm (.06")	8.36mm (.329")
-Negative @ 1920 Pa (40.10 psf)		**No Damage**	**No Damage**
Net Deflection @ intermediate mullion		15.37mm (.605")	18.36mm (.723")
Net Deflection @ intermediate horizontal		0.51mm (.02")	8.36mm (.329")
Uniform Proof Load	**ASTM E 330**		
-Positive @ 2880 Pa (60.15 psf)		**No Damage**	**No Damage**
Permanent Set @ intermediate mullion		0.51 mm (.02")	5.49mm (.204")
Permanent Set @ intermediate horizontal		0.0 mm (.00")	5.49mm (.204")
-Negative @ 2880 Pa (60.15 psf)		**No Damage**	**No Damage**
Permanent Set @ intermediate mullion		1.27 mm (.05")	5.49mm (.204")
Permanent Set @ intermediate horizontal		0.0 mm (.00")	5.49mm (.204")

8. DISCLAIMER

This report does not constitute certification of this product. The results contained within this document apply only to the tested specimen.

Respectfully submitted,

CONSTRUCTION CONSULTING LABORATORY, *INTERNATIONAL*

WESLEY WILSON
LABORATORY MANAGER
SIGNED ELECTRONICALLY

EDSSON ALARCON
QUALITY CONTROL & TEST TECHNICIAN
SIGNED ELECTRONICALLY

APPENDIX A

ATLAS ARCHITECTURAL SERIES 2000 STOREFRONT

Sheet	Details	Date	Stamped as illustrated
1	Elevation &Section	Not Dated	Construction Consulting Laboratory International 1601 Luna Road Carrollton, Texas 75006 (972) 242-0556

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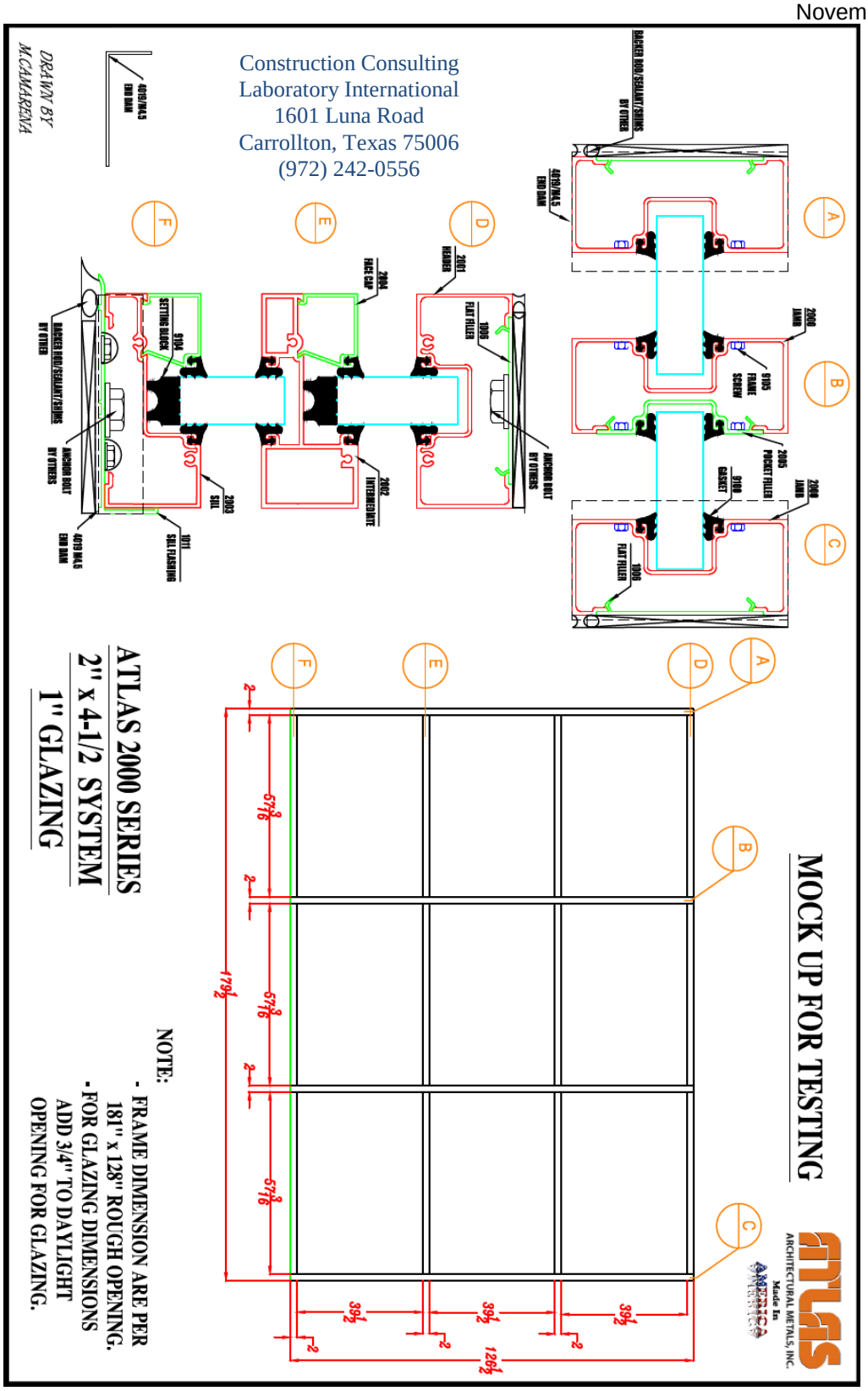

APPENDIX B

PHOTOGRAPHS

AAMA 501-15 PERFORMANCE TEST REPORT
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PHOTOGRAPH 1

ASTM E 283 AIR INFILTRATION: Total amount of air infiltration shall not exceed **.06 Cfm/ ft²** of the mock-up area tested. Strip Curtain Wall, and slab perimeter sealants are included in the total mock-up test area. Overall tested dimension is 14'-11 ½" wide x 10'-6 ½" tall = 157.69Ft² x .06 CFM = 9.46 CFM

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PHOTOGRAPH 2

ASTM E 331 STATIC WATER PENETRATION: Per project specifications, there shall be no water penetration during or at the conclusion of this test at the static pressure of **6.24 psf**.

Procedure: Water shall be applied to the specimen at a minimum rate of **5 Gph/Ft²**, in such a way as to completely cover the exterior face of the specimen. Simultaneously, a specified positive static pressure shall be applied for a minimum period of fifteen (15) minutes.

PHOTOGRAPH 3

AAMA 501.1 DYNAMIC WATER PENETRATION: Per project specifications, there shall be no water penetration during or at the conclusion of this test at a dynamic wind speed of **50 mph**.

Procedure: Water shall be applied to the specimen at a minimum rate of **5 Gph/Ft²**, in such a way as to completely cover the exterior face of the specimen. Simultaneously, winds generated from a Continental 150 Aircraft engine equipped two (2)-blade propeller with a 5'-0" diameter shall be adjusted to deliver a specified slipstream velocity in Mph (equivalent to the static test pressure).

-END OF REPORT -