AAMA 501
TEST REPORT

Report Number: C1529.01-450-44

Rendered to:

Tubelite, Inc.
Walker, Michigan

MODEL DESIGNATION: E4500
PRODUCT TYPE: Non-Thermal Storefront

This report contains in its entirety:
Cover Page: 1 page
Report Body: 10 pages
Appendix A: 2 pages
Appendix B: 6 sheets
Appendix C: 34 pages
Appendix D: 21 sheets
Appendix E: 1 page
Alteration Log: 1 page
Revision Log: 1 page

2012.10.26 14:36:50 -04'00'

Test Dates: 09/13/12
Through: 09/21/12
Report Date: 10/26/12
1.0 CLIENT IDENTIFICATION

1.1 Report Issued To: Tubelite, Inc.
3056 Walker Ridge Drive NW
Walker, Michigan 49544

1.2 Contact Person: Tram Trinh

2.0 LABORATORY IDENTIFICATION

2.1 Laboratory Location: Architectural Testing, Inc.
6655 Garden Rd
Riviera Beach, Florida 33404

2.2 Laboratory Phone Number: 561.881.0020

3.0 PROJECT SUMMARY

3.1 Introduction: Tubelite, Inc. retained Architectural Testing to conduct AAMA 501 testing on their E4500 Non-Thermal Storefront.

3.2 Summary of Test Results: Table 1 provides a summary of the test results for each test specimen. Testing commenced September 13, 2012 and was completed September 21, 2012.

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Test Method</th>
<th>Test Conditions</th>
<th>Test Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 and 2</td>
<td>Air Infiltration Test (AAMA 501-05 and ASTM E283-04)</td>
<td>75 and 300 Pa (1.57 and 6.24 psf)</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>Water Infiltration Test (AAMA 501-05 and ASTM E331-00)</td>
<td>575 Pa (12 psf)</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>Dynamic Water Infiltration Test (AAMA 501.1-05)</td>
<td>575 Pa (12 psf)</td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td>Static Load Test (AAMA 501-05 and ASTM E330-02)</td>
<td>+1436/-1436 Pa (+30/-30 psf) Design Wind Load</td>
<td>PASS</td>
</tr>
</tbody>
</table>

3.3 Test Record Retention End Date: All test records for this report will be retained until October 26, 2016.

4.0 APPLICABLE TEST METHODS, SPECIFICATIONS, AND PROTOCOLS

AAMA 501-05 – Methods of Tests for Exterior Walls
ASTM E283-04 – Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E331-00 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

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## 5.0 TEST SPECIMEN IDENTIFICATION

5.1 **Test Specimen Type:** Non-Thermal Storefront  
5.2 **Model Designation:** E4500 Series  
5.3 **Overall Size:**  
   Specimen #1: 3450 mm (136") w x 3280 (129") h  
   Specimen #2: 3850 mm (151") w x 3660 mm (144") h  
5.4 **Number of Operable Door Leaves:** None tested  
5.5 **Configuration:** 0/0-0/0-0/0  
5.6 **Drawings:** Test specimen construction was verified by Architectural Testing per the drawings located in Appendix B. Any deviations are documented herein and/or on the drawings.  
5.7 **Test Specimen Source:** Tubelite, Inc. provided the test specimens.

## 6.0 TEST SPECIMEN DESCRIPTION

### 6.1 Frame Construction  
Each frame was fabricated using the aluminum extrusions defined in Table 2.

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Frame Member</th>
<th>Part #</th>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head and jamb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Head, jamb and intermediate vertical mullions</td>
<td>E4541</td>
<td>6063-T5</td>
<td>Non-thermally broken extrusion</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Flat snap-in filler</td>
<td>P1745</td>
<td>6063-T5</td>
<td>150 mm (6&quot;) long - snap-fit to the head and jambs at each anchor location</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Sill</td>
<td>E4540</td>
<td>6063-T5</td>
<td>Non-thermally broken extrusion</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Intermediate horizontal mullion at left and right bays</td>
<td>E4552</td>
<td>6063-T5</td>
<td>Snap-fit to the intermediate horizontal mullion at left and right bays</td>
</tr>
<tr>
<td>2</td>
<td>Snap-in filler</td>
<td>E4542</td>
<td>6063-T5</td>
<td>Snap-fit to the intermediate vertical mullions</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Intermediate horizontal mullion at center bay</td>
<td>E4503</td>
<td>6063-T5</td>
<td>Non-thermally broken extrusion</td>
</tr>
<tr>
<td>1</td>
<td>Intermediate vertical mullions</td>
<td>E4552</td>
<td>6063-T5</td>
<td>Non-thermally broken extrusion</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Sill flashing</td>
<td>E14059</td>
<td>6063-T5</td>
<td>Non-thermally broken extrusion</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Glass stop</td>
<td>E4504</td>
<td>6063-T5</td>
<td>Snap-fit to the intermediate horizontal mullions and sills</td>
</tr>
</tbody>
</table>

### 6.1.1 Corner Construction  
At each frame corner the vertical frame members ran through and the horizontal frame members were square cut, butted and mechanically attached via a frame clip. The additional details of the corner construction are described in Table 3. See "4500 Series Fabrication and Installation Instructions", "FRAME INSTALLATION INSTRUCTIONS" section for joint sealant and end dam details.
6.2 **Mullion Reinforcement**

The vertical mullion members were reinforced using the parts defined in Table 4.

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Item #</th>
<th>Dimensions</th>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>P1437</td>
<td>28.58 mm x 104.8 mm x 3.18 mm (1.125&quot; x 4.125&quot; x 0.125&quot;)</td>
<td>Steel</td>
<td>3560 mm (140&quot;) long rolled steel centered in the intermediate vertical mullions - attached using a single row of #10-24 x 3/4&quot; SS FH screws spaced at 410 mm (16&quot;) on center.</td>
</tr>
</tbody>
</table>

6.3 **Glazing Details**

6.3.1 **Glazing Materials**

Glass Types C and D both consisted of 6.4 mm (1/4") thick (nominal) clear tempered glass.

6.3.2 **Glazing Method**

Each glass lite used in the test specimen was exterior glazed at both the interior and exterior sides using a 70±5 durometer EPDM gasket (Part # P2728). The gasket joints were sealed using butyl sealant. See Appendix E, "Photographs" for a depiction of this sealant.
6.3.3 Daylight Opening and Glass Bite

Table 5 provides the daylight opening and glass bite for each lite used in each test specimen.

Table 5: Daylight Opening Size and Glass Bite Details

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Quantity</th>
<th>Glazing Material Type</th>
<th>Location</th>
<th>Daylight Opening Size</th>
<th>Glass Bite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>D</td>
<td>Bottom row, center lite</td>
<td>1100 mm x 1567 mm (43” x 61-11/16”)</td>
<td>7.938 mm (5/16”) at the verticals, 14.29 mm (9/16”) at the center bay intermediate horizontal and 15.9 (5/8”) in all other areas</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>C</td>
<td>All other areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>B</td>
<td>Bottom row, center lite</td>
<td>1200 mm x 1757 mm (48” x 69-3/16”)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>A</td>
<td>All other areas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.4 Weather Stripping
No weather stripping was used.

6.5 Hardware
No hardware was used.

6.6 Drainage
Table 6 provides details of the drainage openings and accessories used in the test specimens.

Table 6: Weep Slot and Accessory Details

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Quantity</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 and 2</td>
<td>Four (4) per sub sill</td>
<td>51 mm (2”) from each end of each daylight opening and at the quarter points</td>
<td>6.4 mm x 13 mm (1/4” x 1/2”) slot with weep baffle (Part # PTB42)</td>
</tr>
<tr>
<td>1 and 2</td>
<td>Two (2) per intermediate horizontal</td>
<td>Corner of each lite</td>
<td>Water diverter (Part # P878) - see &quot;4500 Series Fabrication and Installation Instructions&quot;, &quot;FRAME INSTALLATION&quot; section, &quot;Step #6&quot;, for water diverter installation details.</td>
</tr>
</tbody>
</table>

7.0 TEST SPECIMEN INSTALLATION

Table 7 provides details of the test specimen installation into the steel opening. The rough opening allowed for a 6.4 mm (1/4”) shim space. The test specimen was sealed at the interior and exterior perimeter. Each sill was sealed to the sill flashing at the interior using a continuous bead of silicone sealant. Each anchor at the head and sill flashing was sealed and cap-sealed.
Table 7: Test Specimen Installation Details

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Location</th>
<th>Quantity</th>
<th>Anchor Description</th>
<th>Fastener Schedule/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head</td>
<td>Six (6)</td>
<td>1/4-20 x 3-3/4” Grade 5 self-drilling FH screws</td>
<td>150 mm (6”) on the side of the jambs and 150 (6”) on each side of each intermediate vertical</td>
</tr>
<tr>
<td>1</td>
<td>Sill flashing</td>
<td>Six (6)</td>
<td>1/4-20 x 1-1/2” Grade 5 self-drilling HH screws</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Jambs</td>
<td>Eight (8) per jamb</td>
<td>1/4-20 x 3-3/4” Grade 5 self-drilling FH screws</td>
<td>150 mm (6”) from the top end, 150 mm (6”) and 368 mm (14-1/2”) from the bottom end, and at 460 mm (18”) on center thereafter</td>
</tr>
<tr>
<td>2</td>
<td>Head</td>
<td>Six (6)</td>
<td>1/4-20 x 2-3/4” Grade 5 self-tapping FH screws</td>
<td>150 mm (6”) on the side of the jambs and 150 mm (6”) on each side of each intermediate vertical</td>
</tr>
<tr>
<td>2</td>
<td>Sill flashing</td>
<td>Six (6)</td>
<td>1/4-20 x 2” Grade 5 self-drilling HH screws</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Jambs</td>
<td>Nine (9) per jamb</td>
<td>1/4-20 x 2-3/4” Grade 5 self-tapping FH screws</td>
<td>150 mm (6”) from each end and at 460 mm (18”) on center thereafter</td>
</tr>
</tbody>
</table>

**8.0 TEST SEQUENCE**

Table 8 provides a summary of the test sequence for each test specimen.

<table>
<thead>
<tr>
<th>Specimen 1</th>
<th>Specimen 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Uniform Static Load Test: Positive Pre-Load</td>
<td>1. Uniform Static Load Test: Positive Pre-Load</td>
</tr>
<tr>
<td>2. Air Infiltration Test</td>
<td>2. Air Infiltration Test</td>
</tr>
<tr>
<td>3. Water Infiltration Test</td>
<td>3. Water Infiltration Test</td>
</tr>
<tr>
<td>4. Dynamic Water Infiltration Test</td>
<td>4. Dynamic Water Infiltration Test</td>
</tr>
<tr>
<td>6. Uniform Static Load Test: Negative Pre-Load</td>
<td>6. Uniform Static Load Test: Negative Pre-Load</td>
</tr>
<tr>
<td>8. Water Infiltration Test</td>
<td>8. Water Infiltration Test</td>
</tr>
<tr>
<td>10. Uniform Static Load Test: Negative Overload</td>
<td>10. Uniform Static Load Test: Negative Overload</td>
</tr>
</tbody>
</table>

**9.0 TEST RESULTS**

9.1 Air Infiltration Test

9.1.1 Results

Table 9 provides the results for the air infiltration test.

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Sequence #*</th>
<th>Test Pressure</th>
<th>Measured</th>
<th>Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>+75 Pa (1.57 psf)</td>
<td>0.00 L/s/m² (0.00 cfm/ft²)</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>+300 Pa (6.24 psf)</td>
<td>0.05 L/s/m² (0.01 cfm/ft²)</td>
<td>0.30 L/s/m² (0.06 cfm/ft²)</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>+75 Pa (1.57 psf)</td>
<td>0.00 L/s/m² (0.00 cfm/ft²)</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>+300 Pa (6.24 psf)</td>
<td>0.05 L/s/m² (0.01 cfm/ft²)</td>
<td>0.30 L/s/m² (0.06 cfm/ft²)</td>
</tr>
</tbody>
</table>

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.
Architectural Testing

9.1.2 Conclusion
Architectural Testing observed a measured air infiltration less than the allowed air infiltration through each test specimen; as such, each test specimen satisfies the requirements of AAMA 501-05 and ASTM E 283-04.

9.2 Water Infiltration Test
9.2.1 Results
Table 10 provides the results for the water infiltration test.

Table 10: Water Infiltration Test Results

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Sequence #*</th>
<th>Test Pressure</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>575 Pa (12.0 psf)</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>575 Pa (12.0 psf)</td>
<td>Pass</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>575 Pa (12.0 psf)</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>575 Pa (12.0 psf)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

*Please refer to Section 8.0, “Test Sequence” for a description of the sequence number.

9.2.2 Conclusion
Architectural Testing observed zero (0) water infiltration through the innermost plane of each test specimens; as such, each test specimen satisfies the requirements of AAMA 501-05 and ASTM E 331-00.

9.3 Dynamic Water Infiltration Test
9.3.1 Results
Table 11 provides the results for the dynamic water infiltration test.

Table 11: Water Infiltration Test Results

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Sequence #*</th>
<th>Test Pressure</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>575 Pa (12.0 psf)</td>
<td>Pass</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>575 Pa (12.0 psf)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

*Please refer to Section 8.0, “Test Sequence” for a description of the sequence number.

9.3.2 Conclusion
Architectural Testing observed zero (0) water infiltration through the innermost plane of each test specimens; as such, each test specimen satisfies the requirements of AAMA 501.1-05.

9.4 Uniform Static Load Test
9.4.1 Deflection Gage Locations
Appendix A shows the deflection gage locations for the uniform static load test.

9.4.2 Ambient Conditions
Table 12 provides the ambient conditions during the uniform static load test.
### Table 12: Ambient Conditions

<table>
<thead>
<tr>
<th>Specimen #</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26.0°C - 31.5°C (79°F - 89°F)</td>
</tr>
<tr>
<td>2</td>
<td>29.0°C - 31.0°C (84°F - 88°F)</td>
</tr>
</tbody>
</table>

#### 9.4.3 Results

Tables 13 and 14 provide the positive and negative uniform static load test results, respectively. The results are for the deflection gage locations shown in Appendix A. The deflection reported is the overall deflection between three points (longest unsupported span) which accounts for support movement.

### Table 13: Positive Uniform Static Load Test Results

<table>
<thead>
<tr>
<th>Sequence #</th>
<th>Load</th>
<th>Gage Location</th>
<th>Deflection</th>
<th>Permanent Set</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+1436 Pa (+30.00 psf)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>C</td>
<td>0.0 mm (0.000 in)</td>
<td>2.6 mm (0.103 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>1.5 mm (0.059 in)</td>
<td>6.5 mm (0.256 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td>18.7 mm (0.736 in)</td>
<td>18.7 mm (0.737 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>2.0 mm (0.079 in)</td>
<td>6.5 mm (0.256 in)</td>
</tr>
<tr>
<td>9</td>
<td>+2155 Pa (+45.00 psf)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>0.0 mm (0.000 in)</td>
<td>2.6 mm (0.103 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>1.4 mm (0.054 in)</td>
<td>7.2 mm (0.284 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td>19.4 mm (0.762 in)</td>
<td>20.9 mm (0.823 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>1.9 mm (0.073 in)</td>
<td>7.2 mm (0.284 in)</td>
</tr>
</tbody>
</table>

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.

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Table 14: Negative Uniform Static Load Test Results

<table>
<thead>
<tr>
<th>Sequence #*</th>
<th>Load</th>
<th>Gage Location</th>
<th>Deflection</th>
<th>Permanent Set</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Measured</td>
<td>Allowed</td>
</tr>
<tr>
<td>Specimen #1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>-1436 Pa</td>
<td>C</td>
<td>0.1 mm (0.004 in)</td>
<td>2.6 mm (0.103 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>1.1 mm (0.043 in)</td>
<td>6.5 mm (0.256 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td>18.1 mm (0.714 in)</td>
<td>18.7 mm (0.737 in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>0.0 mm (0.000 in)</td>
<td>6.5 mm (0.256 in)</td>
</tr>
<tr>
<td>Specimen #2</td>
<td></td>
<td></td>
<td>Measured</td>
<td>Allowed</td>
</tr>
<tr>
<td>10</td>
<td>-2155 Pa</td>
<td>C</td>
<td>0.0 mm (0.000 in)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>1.3 mm (0.052 in)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td>28.1 mm (1.105 in)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>0.0 mm (0.000 in)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.

9.4.4 Conclusion
Architectural Testing observed no signs of failure in any area of any test specimen during the uniform static load test. In addition, each test specimen met the deflection and permanent set requirements; as such, each test specimen satisfies the uniform static load test requirements of AAMA 501-05 and ASTM E 330-02.
10.0 TEST EQUIPMENT
DEFLECTION MEASURING DEVICE: Linear transducers 2” dial indicators

11.0 LABORATORY COMPLIANCE STATEMENTS
All tests performed on these test specimens were conducted in accordance with the specifications of the applicable standards and test methods listed herein. All results obtained apply only to the specimens tested.

Film was used to seal against air leakage during structural testing. In the judgment of the test engineer the film did not influence the results of the test.

Test specimen construction was verified by Architectural Testing, Inc. per the drawings located in Appendix B. Any deviations are documented herein and/or on the drawings.

Architectural Testing, Inc. will service this report for the entire test record retention period. Test records that are retained, such as detailed drawings, data sheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Architectural Testing, Inc. for the entire test record retention.

If any test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen can be made. 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 specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

12.0 APPENDICES
This test report is incomplete if not accompanied by the following Appendices:

Appendix A: Gage Locations ....................................................................................................................................... 2 Pages
Appendix B: Test Specimen Drawings .................................................................................................................. 6 Sheets
Appendix C: Installation Instructions .............................................................. 34 Pages
Appendix D: Die/Part Drawings ............................................................................................................................ 21 Sheets
Appendix E: Photographs ............................................................................................................................................... 1 Page
Alteration Log .......................................................................................................................................................... 1 Page
Revision Log .......................................................................................................................................................... 1 Page

13.0 WITNESSES

<table>
<thead>
<tr>
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<th>Title</th>
<th>Company</th>
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<tr>
<td>Tram Trinh</td>
<td>Product Applications Engineer II</td>
<td>Tubelite, Inc.</td>
</tr>
<tr>
<td>Vinu Abraham, P.E.</td>
<td>Vice President – Southeast Region</td>
<td>Architectural Testing, Inc.</td>
</tr>
<tr>
<td>Jeff McGovern</td>
<td>Director – Regional Operations</td>
<td>Architectural Testing, Inc.</td>
</tr>
<tr>
<td>Kristin Nolan</td>
<td>Lab Manager</td>
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</tr>
<tr>
<td>Martin Gibbard</td>
<td>Foreman</td>
<td>Architectural Testing, Inc.</td>
</tr>
<tr>
<td>John Spallina</td>
<td>Test Technician</td>
<td>Architectural Testing, Inc.</td>
</tr>
<tr>
<td>Veron Wickham</td>
<td>Test Technician</td>
<td>Architectural Testing, Inc.</td>
</tr>
<tr>
<td>Kris Conte</td>
<td>Test Technician</td>
<td>Architectural Testing, Inc.</td>
</tr>
</tbody>
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14.0 SIGNATURES

Angela Abramczyk and Kristin Nolan
Technical Writer and Lab Manager
(Authors)

VINU J. ABRAHAM, P.E.
Vice President – Southeast Region

This report produced from controlled document template ATI 00607, issued 06/12/12.
APPENDIX A:
Gage Locations
2 SHEETS
SPECIMEN 2
INDICATOR LOCATIONS

C E G I
APPENDIX B:
Test Specimen Drawings
6 SHEETS
E4500 Series No Steel Mock-Up #1

- Anchor location

E4500 Series No Steel Mock-Up #1

Scale: 1/2" = 1'-0"

- Glazing Material = 1/4" clear tempered glass

E4500 Series Performance Tests - No steel reinforcement

- Preload @ 50% Design Pressure (15 psf)
- Air Infiltration Per ASTM E283-04 (6.24 psf)
- Static Water Penetration Per ASTM E331-00 (12 psf)
- Water Penetration Per AAMA 501.1-05 (12 psf)
- Structural Performance Per ASTM E330-02 (30 psf)
- Structural Overload Per ASTM E330-02 (45 psf)
PERIMETER ANCHOR LOCATIONS:
Mock up #1 No steel reinforcement

-6" ON EACH SIDE OF VERTICAL MULLIONS FOR HEAD AND SUB SILL.

-CAP AND SEAL ALL ANCHORS

- Head: Use 1/4-20 x 3 3/4" Flat head screws. Grade 5, Self drilling

-Sill: Use 1/4-20 x 1 1/2" HH, Grade 5, Self drilling

Exposed Frame Clip Fastener:
Mock up #1 No steel reinforcement

-#10-18 x 3/4" self tapping screws
-Cap and seal all exposed frame clip screws.

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report # C1529 01-459 44
Date 10/12/412 Tech A4

TUBELITE INC. 8855 McKeown Trail F&B Box 190
REDD CANYON, MICHIGAN 49667 (949) 512-8606

10/2012 2 3

No steel
Jambs Anchoring:

- Use 1/4-20 x 3 3/4” Flat head screws. Grade 5, self drilling along the jambs.
- Start at 6” from head and sill and 18” O.C.

Architectural Testing

Test sample complies with these details. Deviations are noted.

Report # 01529-01-45044
Date 10/24/12  Tech AA
E4500 Series Test Mock-up #2 with Steel

Scale: 1/2" = 1'-0'

12' Frame size
12' 1/2' Frame opening

1/4' Typical

4'-4 1/2" On Center Typical

12" 3/4" Frame size
42" 7/8" Frame opening

Glass Material: 1/4' clear tempered glass

A Glass size = DLO + 5/8" = 5' - 9 13/16" or 69.8125'

B Glass size = DLO + 9/16' when using E4503 = 5' - 9 3/4' or 69.75'

E4500 Series Performance Tests

Preload @ 50% Design Pressure (15 psf)
Air Infiltration Per ASTM E283-04 (6.24 psf)
Static Water Penetration Per ASTM E331-00 (12 psf)
Water Penetration Per AAMA 501.1-05 (12 psf)
Structural Performance Per ASTM E330-02 (30 psf)
Structural Overload Per ASTM E330-02 (45 psf)

Mock up #2 - Steel Reinforced

Test sample complies with these details.
Deviations are noted.
Date: 10/24/17, Tech AA
PERIMETER ANCHOR LOCATIONS:
Mock up #2 steel reinforcement

- 6" ON EACH SIDE OF VERTICAL MULLIONS FOR HEAD AND SUB SILL.
- CAP AND SEAL ALL ANCHORS
- Use 1/4-20 x 2" Flat head screws. Grade 5, Self drilling at the sub sill
- Use SS 1/4-20 x 2 3/4" flat head screws, Grad 5, self tapping along the head.
Fabricate steel reinforcement:

- Cut P1437 steel channel 4" shorter than mullion height. Paint ends to prevent rust.

- Insert the steel into the mullion (E4541) and aligned and center steel with mullion.

- Drill 0.213" diameter through center of the deep pocket of mullion and steel at 16" O.C.

- Tap holes and steel channel only for use #10 x 3/4" SS flat head fastener. Cut flush with steel after installation.

Jambs Anchoring:

- Use SS 1/4-20 x 2 3/4" Flat head screws. Grade 5, self tapping along the jambs.

- Start at 6" from head and sill and 18" O.C.

Architectural Testing

Test sample complies with these details.

Report # C1529-01-450-44

Date 02/24/12 Tech. AA
APPENDIX C:
Installation Instructions
34 PAGES
4500 Series

Fabrication and Installation Instructions

TUBELITE®
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

E4500 Series – September, 2012
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GENERAL CONSTRUCTION NOTES

1. These instructions cover typical product application, fabrication, installation and standard conditions and are general in nature. They provide useful guidelines, but the final distribution drawings may include additional details specific to this project. Any conflict or discrepancies must be clarified prior to execution.

2. Materials stored at the job site must be kept in a safe place removed from possible damage by other trades. Stack with adequate separation so materials will not rub together, and store off the ground. Cardboard or paper wrapped materials must be kept dry. Check arriving materials for quantity and keep record of where various materials are stored.

3. All field welding must be done in accordance with AISC guidelines. All aluminum and glass should be shielded from field welding to avoid damage from weld splatter. Results will be unsightly and may be structurally unsound. Advise general contractor and other trades accordingly.

4. Coordinate protection of installed work with general contractor and/or other trades.

5. Coordinate sequence of other trades which affect framing installation with the general contractor (e.g. fire proofing, back up walls, partitions, ceiling, mechanical ducts, convector, etc.).

6. General contractor should furnish and guarantee bench marks, offset lines and opening dimensions. These items should be checked for accuracy before proceeding with erection. Make certain that all adjacent substrate construction is in accordance with the contract documents and/or approved shop drawings. If not, notify the general contractor in writing before proceeding with installation because this could constitute acceptance of adjacent substrate construction by others.

7. Isolate all aluminum to be placed directly in contact with masonry or other incompatible materials with a heavy coat of zinc chromate or bituminous paint.

8. Sealant selection is the responsibility and option of the erector, installer and/or glazing contractor and must be approved by the sealant manufacturer with regard to application and compatibility for its intended use. All sealants must be used in strict accordance with the manufacturer’s instructions and applied only by trained personnel to surfaces that have been properly prepared.

9. Sealant must be compatible with all materials with which they have contact, including other sealant surfaces. Consult sealant manufacturer for recommendations relative to shelf life, compatibility, cleaning of substrate, priming, tooling adhesion, etc.

10. Drainage gutters and weep holes must be kept clean at all times. Tubelite cannot accept responsibility for improper drainage as a result of clogged gutters and weep holes.

11. This product requires clearances at head, sill and jambs to allow for thermal expansion and contraction. Refer to final distribution drawings for joint sizes. Joints smaller than ¾” may be subject to failure. Consult your sealant supplier.

12. All materials are to be installed plumb, level and true with regard to established bench marks and column center lines established by the general contractor and checked by the erector, installer and/or glazing contractor.

13. Cleaning of exposed aluminum surfaces should be done per AAMA recommendations.

14. Due to varying perimeter conditions and job performance requirements, anchor fasteners are
not specified in these instructions. For anchor fastening, refer to the shop drawings or consult the fastener supplier.

15. Codes governing the design and use of the products vary widely. Tubelite does not control the selection of the product configurations, operating hardware, or glazing materials, and assumes no responsibility of these design considerations. It is the responsibility of the owner, specifier, architect, general contractor and the installer to make these selections in strict conformance with all applicable codes.

16. Check our website, www.tubeliteinc.com, for the latest installation manual prior to commencing work.
## EXTRUDED ALUMINUM PARTS

<table>
<thead>
<tr>
<th>Shape</th>
<th>Description</th>
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<tr>
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<td>Open Back Head, Jamb/Vertical</td>
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<td><img src="image2.png" alt="Image" /></td>
<td>Pocket Closure for Open Back Members</td>
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<td><img src="image3.png" alt="Image" /></td>
<td>Open Back Sill/Horizontal/Head</td>
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<tr>
<td><img src="image4.png" alt="Image" /></td>
<td>Sill Flashing</td>
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<td><img src="image5.png" alt="Image" /></td>
<td>Glazing Stop</td>
<td>E4504</td>
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<td><img src="image6.png" alt="Image" /></td>
<td>Open Back Door Jamb</td>
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<tr>
<td><img src="image7.png" alt="Image" /></td>
<td>Door Headset/Transom Bar</td>
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<td>Door Headset/Transom Bar</td>
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<td><img src="image9.png" alt="Image" /></td>
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<td><img src="image10.png" alt="Image" /></td>
<td>Vertical mullion</td>
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<td>4 1/2&quot; x 4 1/2&quot; Vertical mullion</td>
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<td><img src="image12.png" alt="Image" /></td>
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<td>Intermediate Horizontal</td>
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<td><img src="image18.png" alt="Image" /></td>
<td>4&quot; Sidelight Base</td>
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<td>One Pocket Corner</td>
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<td>Pocketless corner</td>
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<td>4' x 41/2&quot; Tube</td>
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<td>Head Receptor Female Half</td>
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<td>Head Receptor Male Half</td>
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<td>Center pivot member for E45248</td>
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<td>4 1/2&quot; x 41/2&quot; Tube</td>
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<td>Expansion Vertical - Male Half</td>
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<td>Expansion Vertical - Female Half</td>
<td>E4507</td>
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<td>Snap-in back with nail fin</td>
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<td>Extruded sill flashing</td>
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<td>Roll-In Glazing Gasket</td>
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<td>Improved Bulb type Gasket – use with E14129/E14130</td>
<td>P2511</td>
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<td>Wiper Gasket (use with E45116 &amp; E45248)</td>
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<td>File Weathering with vinyl fin</td>
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<td>Clip for Sidelight Base E14026</td>
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<td>End Dam for sill flashing</td>
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<td>#10 x 1 ½&quot; Type B Phillips Pan Head Screw Fastener for clip to horizontal attachment</td>
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<td>🏂️</td>
<td>#12 x ½&quot; Type B Phillips Truss Head</td>
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<td>Steel Reinforcing-Primer Painted 12'-0&quot; lengths</td>
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<td>Splice Sleeve for E45159 Sill Flashing, with tape</td>
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<tr>
<td>🏂️</td>
<td>Drill Fixture</td>
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<td>5/16&quot; - 18 threaded swivel pad thumb screw w/ delrin tip for P1139</td>
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<td>Subsill end dam</td>
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<td>Drill Fixture</td>
<td>P1139</td>
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OVERVIEW

There are two distinct methods for assembling the 4500 Series: screw spline assembly, and shear block (frame clip) assembly.

The illustration below shows the elevation view of a typical 4500 Series installation. The number in the top half of each circle is the number of a figure showing details of the associated system component; the number in the bottom half of each circle gives the page number on which that figure appears.

Elevation of a typical 4500 Series installation
Typical horizontal details
Typical vertical details
FRAME FABRICATION

Step #1: Determine frame size

Determine frame width

Check that the opening is square and plumb at both ends. Units must be installed in a true rectangle.

- Measure the width of the masonry opening at the top, middle and bottom.
- Select the smallest dimension measured. To determine the frame width to be used, subtract a minimum of 1/2” from the smallest measured width, to allow a minimum of 1/4” at each jamb for shimming and caulking. Allow a larger clearance if necessary to accommodate building tolerances, sub sill, an out-of-square opening, and/or anticipated thermal expansion within the unit.
Determine frame height

- Measure the height of the masonry opening in several places along the entire length of the opening.
- To determine the frame height to be used, select the smallest dimension measured and subtract 1 1/8" to allow a minimum of 5/8" at sill and 1/2" at head for shimming and caulking. Allow a larger clearance if necessary to accommodate building tolerances, an out-of-square opening, and/or anticipated thermal expansion within the unit.

Step #2: Cut sub sill to size

- Cut sill (E-14159) to frame width + 1/8" determined in Step #1 on page 11 (rough opening minus clearances). If the installation is to include an entrance, the sill should butt against the back of the door jamb (no clearance).
- Sill longer than 24’ in length must be spliced using part number P-1144. If sill must be spliced, allow 3/8” to 1/2” for the width of the splice. Sill splice located at the center of the day light opening between verticals
- Expansion mullion require for every 16 – 20 feet of run with corresponding sub-sill splice located at the center of the day light opening between verticals. The dimension of the expansion mullion assembly should be adjusted based on the temperature at the time of assembly and expected high and low service temperatures. For example, the sight line will be reduced slightly when installed in hot weather and increased slightly when installed in cold weather.
- Weep holes: At 2” away from each side of the vertical mullion and at the quarter points of each light, drill 7/32” diameter holes in the sill and slot 1/4”. Install a PTB42 weep baffle in the gutter of the extruded sill flashing behind each weep hole.

Step #3: Cut vertical framing members to size

- Verticals should be the frame height found in Step #1 above (rough opening height minus clearances).
- As shown in the elevation overview on page 8, vertical framing members run through.
**Step #4: Cut horizontal framing members to size**

- Cut horizontal framing members to the daylight opening (the distance between verticals).
- For easier installation, cut horizontal glazing beads 1/32" shorter than the horizontal framing member.

**Step #5 (screw spline assembly): Drill holes in vertical framing members**

In screw-spline assembly, screws are driven through holes in the vertical members, directly into screw splines on the horizontal members. These screws are what support the horizontal members and the glass. The four drawings in this section show where to drill the holes in the vertical members so that they line up with the screw splines on the horizontals.

- The screw used for screw-spline assembly is a #10-24 x 1" Type 23 Phillips hex head (S-202). To accommodate this type of screw, the holes in the vertical framing members must be .201" in diameter, corresponding to a #7 drill.
- Tubelite offers a drill fixture (P796B) to help locate the correct hole locations quickly and accurately. This fixture is designed for use on both screw-spline and shear-block projects.
Drilling an open-back vertical (E-4541) --
Screw-spline, no door or sidelight
Drilling a closure pocket (E-4542) --
Screw-spline, no door or sidelight
Drilling an open-back vertical (E-4541) -- Screw-spline
Drilling an open-back door jamb (E-4544) --
Screw-spline, next to a door
**Step #5 (shear block assembly): Drill holes in vertical framing members**

In screw-spline assembly, screws pass through holes in the vertical members, connecting them directly to the horizontal members. In shear-block assembly, the installer

- Secures frame clips (also known as shear blocks) to the vertical members with screws;
- Slides the horizontal members over the frame clips; and finally
- Secures the horizontal members to the frame clips with screws.

The screws used to secure frame clips to verticals require use of a #25 drill (.149" diameter). Tubelite recommends using a drill fixture (P796B) to facilitate quick and accurate drilling of holes in verticals for shear-block assembly projects. The following two illustrations show where to drill shear-block verticals to accommodate various types of horizontal framing members.
Drilling an intermediate vertical (E-4500)
Shear-block, no door or sidelight
Step #6 (shear-block assembly): Drill holes in horizontal framing members

Screw-spline assembly does not require drilling of horizontal framing members, because screw splines are integral to the extrusions for horizontals. The shear block assembly method, on the other hand, requires drilling of horizontals, so that they can be screwed to frame clips (shear blocks).

The illustrations in this section show the locations where holes must be drilled in the various kinds of horizontals for use in shear-block assembly. The illustrations also show the required drill sizes, because the shear-block assembly method uses screws of two different diameters to secure horizontals to frame clips.
Drilling horizontals --
Shear-block, no door or sidelight
Step #7: Steel Reinforcing

- Cut steel reinforcing channel, P1437, 4” shorter than mullion length. Paint cut ends to prevent rust.
- Insert the steel into the mullion. Align and center the steel with mullion, then drill through the assembly of the mullion and the steel at 16” O.C. Drill 0.213” diameter through holes.
- Tap #3 holes in the steel channel only, for use for #10 flat countersunk head fastener.
- Do not attach the steel channel at this time. Steel reinforcing is attached to the vertical just prior to snapping the frame portions together.

**ANCHORS N.B.T.**
Drill and clear hole for #10 x 1/4” flat head countersunk fastener at 16” O.C. Or as specified on shop drawings. Grind down the screws inside the glass pocket when installed.

*These recommendations are for general erection procedures only. For actual job conditions, see the details on the shop drawings as determined by a qualified engineer or consult the project design professional.*
FRAME INSTALLATION

If there is an entrance, you should install it first, taking care to locate the entrance frame accurately within the opening.

*Step #1 : Splice the sub sill where required per the final distribution dwgs.*
- Set splice in a bed of sealant at the predetermined splice location.
- Place the sill and anchor sill in the opening. The gap between any two pieces of flashing should be 3/8" to 1/2" wide.
- Apply silicone sealant between the two pieces of sill, spanning the splice joint.

Splicing two pieces of sub sill
Step #2: Seal and anchor the sub sill

- Apply a full bed of sealant for an end dam and press the end dam(s) into the sealant. Seal the sill to the end dam(s) as shown on page 25.

- Butt the flashing up against the back of the door jamb (if present), and seal the flashing to the back of the entrance frame. Tool sealant into glass pocket of door jamb at sill to divert any water onto the sill as shown in the illustration below.

- Drill anchor holes through the sill and into the masonry, and secure the sill with the fasteners shown in the approved shop drawings.

- Before the fastener is inserted, force sealant into the hole for the sill perimeter fastener to ensure that the hole through the sill is sealed. Cap seal the anchors with silicone sealant.

- Perimeter anchors should be located within 6" of each side of vertical mullions. THIS IS FOR GENERAL ERECTION PROCEDURES ONLY. Refer to shop drawings for appropriate fastener and hole locations as determined by a qualified engineer or consult the project design professional.
Sealing sill flashing to a door frame

Sealing sill to an end dam at a masonry wall

- Apply a bead of sealant along the back leg of the sill from end to end, straight across any splice joint. (See splicing illustration 24).

Sealing alternative sub sill E/T14055 to an end dam P1153 at a masonry wall
• At jamb conditions attach a P1153 end dam to the end of the sill 14055 with two S196 screws and seal the sill to the end dam as shown in the illustration above. Cap and seal screws.

• Fill void from the sill and end dam with sealant.

• Apply a bead of sealant along the back leg of the sill from end to end, straight across any splice joint. (See splicing illustration).

• End dam must be completely sealed on all sides. End dam must be sealed to the condition.

**Step #3 (shear block only): Seal and secure frame clips to verticals**

• Apply sealant to shear blocks (frame clips) as shown in the illustration below, and attached to the verticals with #10 x 1 3/4” Type B Phillips pan head screws (S-009).
**Step #4 (shear block only): Attach horizontals to frame clips**

- Apply sealant to the contact edge of the horizontal, as shown in the illustration below.

```
Attaching horizontals to frame clips

- Slide horizontals onto shear blocks (frame clips). Match drill tap holes in the shear blocks using holes in horizontals as guides, and secure horizontals to frame clips with #10 x 5/8" Phillips flat head screws (S-192).
- Apply sealant to the heads of the screws which secure the horizontals to the frame clips.
```

**Step #3 (screw spline only): Attach horizontals to verticals**

- Apply sealant to the contact edges of the horizontal as shown in the illustration below and above illustration.
Attaching horizontals to verticals

- Secure horizontals to vertical on one side, and to closure pocket on the other side, using #10-24 x 1" Type 23 Phillips hex head screws (S-202).

**Step #4 (screw spline only): Install assembled units**
- Apply sealant to end of horizontal as shown in the illustration below.
• Install the assembled units beginning at the entrance, and working toward the jambs. If there is no entrance, begin at one jamb and work toward the other, as in the illustration below.

![Diagram of installing assembled screw-spline units](image)

**Installing assembled screw-spline units**

• In the case of smaller units, the last two may need to be snapped together and then pivoted into position together, as in the illustration on page 29.

![Diagram of installing last two units together](image)

**Installing last two units together**

**Step #5: Attach frame to masonry**

• For shear-block assembly, set the assembled unit into the opening. (For screw-spline assembly, this was done in pieces in Step #4 above.)

• Install shims at head and jambs, as shown in the illustration below. Use a P1745 to provide back-up support for shimming.
Shimming and anchoring the head and jambs

- Attach the jambs and head to the perimeter of the opening with suitable fasteners.

- Perimeter anchors should be located within 6" of each side of vertical mullions. THIS IS FOR GENERAL ERECTION PROCEDURES ONLY. Refer to shop drawings for appropriate fastener and hole locations as determined by a qualified engineer or consult the project design professional.
Step #6: Install P878 Water Diversers

- Use MEK and a clean cloth to clean the surfaces of the horizontals where you will install water diverters. (See illustrations below.) Also clean the vertical reglets on both sides to at least 1’ above the gasket reglets on the horizontal member.

![Diagram of P878 Water Diverter]

Water diverter -- 3D view

- When the surfaces are dry, peel the paper backing off the water diverter and attach the diverter to the horizontal in the glazing pocket. Extend water diverter past glass edge below.

- Pump sealant into both vertical gasket reglets, and seal the edges of the diverter on all sides EXCEPT the edge facing the pocket. You must avoid getting sealant in this area in order to allow the system to drain.

- Seal the joint between the vertical and horizontal members from the diverter to the top of the horizontal gasket reglet.
GLAZING INSTALLATION

Glass dimensions should not exceed daylight opening (D.L.O.) plus 5/8". See illustration below.

![Diagram of glazing installation]

**NOTE:** GLASS SIZES = D.L.O. + 5/8" TYPICAL
GLASS SIZES = D.L.O. + 5/16" WHEN USNS E 4503

This formula does not take into account out-of-square openings or glass tolerances. Consult your glass manufacturer before determining final glass sizes.

When cutting gaskets, you should add 1/16" to 1/8" per foot of daylight opening for shrinkage. (An eighth of an inch per foot is approximately 1%.) Open, unsealed gasket joints are a potential source of leakage, and water damage to interior finishes.

Install gaskets on the side of frame opposite glass stop first. Always begin at the ends of the gasket and work toward the center. **DO NOT STRETCH THE GASKET OR IT WILL RETURN TO ITS ORIGINAL FORM, CREATING GAPS AT THE GASKET INTERSECTIONS.**

**Step #1: Cut and install the interior gaskets**

- Cut interior vertical gaskets to D.L.O. + 1" + shrinkage allowance (see above).
- Install the interior vertical gaskets, beginning 1/2" beyond the surfaces of the adjacent horizontal framing members.
- Apply butyl sealant to the vertical gaskets reglet for 1" from the intersection.

4500 Series – Revision August 2012

Page 33 of 34
• Cut the interior horizontal gaskets to D.L.O. + shrinkage allowance (see page 30).
• Install the interior horizontal gaskets, pressing their ends into the butyl sealant and up against the vertical gaskets.

**Step #2: Install the glass**
• Position setting blocks (P575) at points under glass at each quarter point (2 setting blocks per light) or as required.
• Position the glass in the frame.
• Lower the glass onto the setting blocks.

**Step #3: Cut and install the exterior gaskets**
• Cut the exterior vertical gaskets to D.L.O. + 1” + shrinkage allowance (see page 33).
• Install the exterior vertical gaskets. The vertical gasket should start 1/2” above the surface of the upper horizontal, and should extend 1/2” below the surface of the lower horizontal.
• Apply butyl sealant to the vertical gaskets reglet for 1” from the intersection.
• Cut the exterior horizontal gaskets to D.L.O. + shrinkage allowance (see page 33).
• Install the exterior horizontal gaskets, pressing their ends into the butyl sealant and up against the vertical gaskets.

**Step #4: Seal perimeter of installation**
• Insert backer rod into the gap between the frame and the building substrate on top, sides, and bottom of the installation.
• Apply sealant to fill the void.
• Tool the sealant smooth.
APPENDIX D:
Die/Part Drawings
21 SHEETS
Architectural Testing

Test sample complies with these details.
Deviations are noted.
Report # C1529-01-1500-44
Date 1/24/11 Tech A

NO EXPOSED SURFACES

USE WITH E4000 & E4012
FULL SIZE

Architectural Testing

Test sample complies with these details. Deviations are noted.

Report # C1529.01-450-44

Date 10/24/17 Tech AA

NO EXPOSED SURFACES

USED W/ E4503, E4519, E4523
Architectural Testing

Test sample complies with these details. Deviations are noted.
Report # C1629-01-450-44
Date 10/26/11 Tech A D
Architectural Testing

Test sample compiles with these details. Deviations are noted.
Report #: C1529.01-450-41
Date: 10/24/17 Tech [Signature]

CUT TO LENGTH FROM E4517 FOR CATALOG USE ONLY
Architectural Testing

Test sample complies with these details.
Deviations are noted.
Report # E1529-01-450-44
Date 10/26/11  Tech A-A

CUT TO LENGTH FROM E4516
CATALOG USE ONLY

FRAME CLIP TO USE WITH E4500, E4501,
E4512, E4521, E4522, AND E4524
E4500 STOREFRONT

P532
SUPPLIER - RYADON INC.
MATERIAL - EPDM 85-90 DUROMETER

ARCHITECTURAL TESTING

Test sample complies with these details. Deviations are noted.
Report # C579.01-450.44
Date 10/2/11 Tech AA

SETTING BLOCK IS 4" IN LENGTH
DOUBBLE SIDED TAPE APPLIED TO UNDER SIDE

MATERIAL: 80 DUROMETER BLACK RIGID PVC WITH DOUBLE SIDED TAPE APPLIED

ARCHITECTURAL TESTING

Test sample complies with these details. Deviations are noted.

Report #: C1579.01-450-44
Date: 10/24/12 Tech: A&B

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* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION

TUBELITE
LEADERS IN ENERGY-EFFICIENT STOREFRONTS CURTAINWALL AND ENTRANCE SYSTEMS

WATER DIVERTER
4500 SERIES STOREFRONT

DRAWN: JWC
DRAWN DATE: 10/16/09
APPROVED BY:
APPROVED DATE:
REV.

SCALE ACTUAL
PRODUCT CODE
P878
NO EXPOSED SURFACES

ARCHITECTURAL TESTING

Test sample complies with these details.
Deviations are noted.
Report # C1529.01-450.44
Date 10/26/12  Tech AA

MATERIAL - .040 ALUMINUM SHEET
PART TO HAVE MINIMUM BURR CONDITION
TO BE SOLD IN PACKAGES OF 20

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□ DENOTES CRITICAL DIMENSION

TUBELITE
DEPENDABLE
LEADERS IN ARCHITECTURE EXTERIOR CURTAINWALL AND ENTRANCE SYSTEMS

3556 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

SCREW APPL'D END DAM
14000 SERIES
USE WITH E/T14055, 14259 AND E14059

DRAWN BY CRH  Dwg #  9/9/09  APPV'D BY  DATE  APPV'D
DRG# SCALE FULL  PRODUCT CODE  140

P1153
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**OPERATION:**

1. CUT TO LENGTH FROM E-4543

Architectural Testing

Test sample complies with these details. Deviations are noted.
Report #: C1529.01-450-314
Date: 10/12/112 Tech: A-A

Snap In Anchor Support
Architectural Testing

Test sample complies with these details. Deviations are noted.
Report #C1599.05.44
Date 10/22/09

1/8" Hot Rolled Steel x 12 ft Long
Two Coats of Zinc Chromate Primer

STEEL Ixx 5.0866

SECTION PROPERTIES

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Area    | 0.783 in^2 |
Weight  | 2.694 lbs/ft |
Perim.  | 12.942 in |
Wall Thk. | 0 in |

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ALL UNSPECIFIED RAD. .015
* INDICATES AS3 RADIUS
□ DEVOTES CRITICAL DIMENSION

Steel Reinforcing for E4541 &
E4544 Mullion with E4541 Snap In
MATERIAL: EPDM RUBBER WITH ANTI-STRETCH CORD
DURAMETER: 70 +/- 5
WITH ANTI-STRETCH CORD
WITH LUBRICANT

TEN TIMES SIZE
LINE UP PART HERE ON COMPARATOR

ACCEPTABLE STRING LOCATION
ACTUAL SIZE

ROLL-IN GLAZING GASKET
14000 AND 4500 STOREFRONT SYSTEMS
Material:
Open Cell Air Baffle, 30 PPI Charcoal Protector II with Germicide

CUT TWO (2) PIECES FROM P1291

Architectural Testing
Test sample complies with these details.
Deviation are noted.
Report # C1529.01-466-44
Date 10/11/12 Tech [A]

OPEN CELL WEEP BAFFLE
1/2" X 1" X 3"
SLOPEWALL

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

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ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
□ DENOTES CRITICAL DIMENSION

REV DATE DESCRIPTION INITIAL
A 05/10/02 FORMERLY PURCHASED - ER-080205 SRD

OPEN CELL WEEP BAFFLE
1/2" X 1" X 3"
SLOPEWALL
#10-24 X 1 3/4" TYPE F

PHILLIPS PAN HEAD, SELF TAPPING

TWO TIMES SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report #: C1529.01-450-44
Date: 01/24/12 Tech: AA

MATERIAL: ZINC PLATED STEEL
FINISH: OR
REQUIREMENTS: MUST MEET ASME B18.6.4, SAE J933

FULL SIZE

4500, 14650, AND 14000 - SHEER CLIP-HDR.
14000 I/D - SHEER CLIP TO VERTICAL VERSATHERM - SHEER CLIP ATTACHMENT

DRAWN BY: JEM
REVISED DATE: 01/10/06
APPROVED DRAWNS
DATE: APPROVED

S009
UNC #10-24 X 1" TYPE 23,
#2 PHILLIPS INDENT HEX HEAD

TWO TIMES SIZE

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report # C1529.01-450-44
Date 10/26/12 Tech A.D.

REQUIREMENTS: MUST MEET ASME B18.6.4, SAE J933
MATERIAL: 1022 STEEL, ZINC PLATED - CLASS 5, CASE HARDENING.
FINISH: OR

FULL SIZE

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* INDICATES .030 RADIUS
DENOTES CRITICAL DIMENSION

4500, 14000, AND 14000 I/O SERIES
SCREW SPLINE FASTENER

TUBELITE®
4878 MACKINAW TRAIL
REED CITY, MICHIGAN 49677

DRAWN BY JEM DATE 01/11/06 APPROV. BY DATE
DRIVE SCALE FULL PRODUCT CODE S202 REV A
APPENDIX E:
Photographs
1 PAGE

Photograph #1
Sealant At Glazing Gasket Joints

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## Alteration Log

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