



American Test Lab, Inc.
1656 Calvert Road, Brevard, N. C. 28712
Phone (828) 884-3700 Fax (828) 884-3710
Web www.atlnc.com E-Mail atli@citcom.net

ATLNC # 0522.01-12

Report Date: 6/21/12

Test Date: 05/22/12

ATLNC Certification # 08-0227.14

FL Organizational # TST 1555

Test Requested By: Metal Roofing Systems
7687 Mikron Drive
Stanley, NC 28164
Phone 704-820-3110

Test Standards: ASTM E 1592-05

Test Conditions: 70-80 degrees F

Description of product tested:

Specimen A, 24 gauge (.026") Galvalume Metal Roof Panels over 3-1/2" x 8" x 16 ga. (.061") Z purlins as shown in MRS System 2500 dwg 1 - 4. Seams were mechanically crimped together. The edge and the ends of the panels were attached to the purlins with self drilling screws.

Specimen B, 24 gauge (.026") Galvalume Metal Roof Panels over 3-1/2" x 8" x .061" Z purlins as shown in MRS System 2500 dwg 1 - 4. Seams were mechanically crimped together. The edge and the ends of the panels were attached to the purlins with self drilling screws.

Configuration: Specimens Mounted vertically in steel test chamber
Specimen A, (2) 5' purlin spans, 4 panels wide
Specimen B, (4) 1' purlin spans, 4.5 panels wide

Description of Units:

Specimens A, B

Panel Construction- 24 ga (.026") Galvalume steel roof panels 16" wide x 138" long with 2" single lock with 92 degree standing seams per MRS System 2500 dwg 1 - 4. Specimen A -138" long, Specimen B - 72" long

Purlin Construction- 3-1/2" x 8" x 16 ga (.061") Z purlins

Purlin Spacing- Specimen A 2 spans 60" OC with 12" overhang.
Specimen B 4 Spans 12" OC with 12" over hang.

Screws and Method of Attachment-

Purlins- 3" wide x 2" high x 22 ga fixed clips as shown in drawing attached to purlins with 2 self drilling screws.

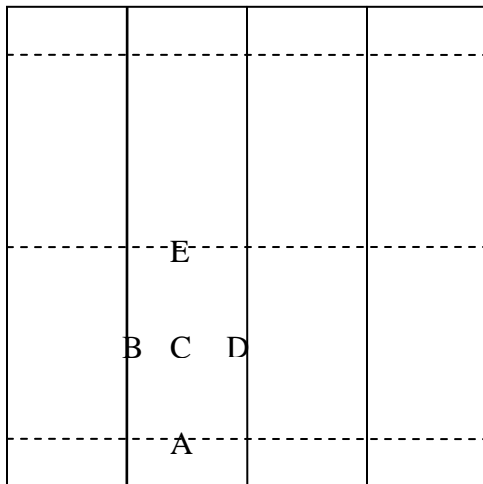
Panel Standing Seams- Overlaps were 15-7/8" OC and panels were joined with 22 ga fixed clips at each purlin as shown in drawing.

Purlin Attachment- Each purlin was attached the chamber.

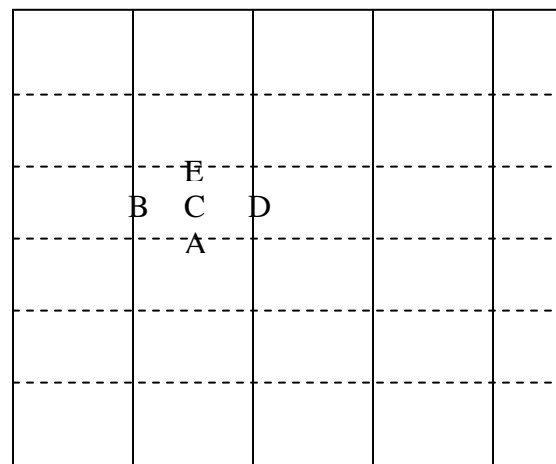
Test Specimens

Indicator Locations

Specimen A



Specimen B



*Drawings not to scale.

Specimen A

Deflections in inches

| Pressure Increments psf Positive | Time (sec) | End Purlin Between Ribs (A) | Perm. Set | Mid-Span (B) | Perm. Set | Mid-Span (C) | Perm. Set |
|----------------------------------|------------|-----------------------------|-----------|--------------|-----------|--------------|-----------|
| RZ 5.6 | 60 | | | | | | |
| 7 | 60 | .02 | 0.0 | .02 | 0 | .13 | .00 |
| 14 | 60 | .03 | .01 | .03 | 0 | .23 | .00 |
| 21 | 60 | .04 | .00 | .04 | 0 | .27 | .01 |
| 28 | 60 | .05 | .00 | .05 | 0 | .32 | .01 |
| 35 | 60 | .06 | .01 | .06 | 0 | .37 | .01 |
| 42 | 60 | .06 | .00 | .07 | 0 | .41 | .01 |

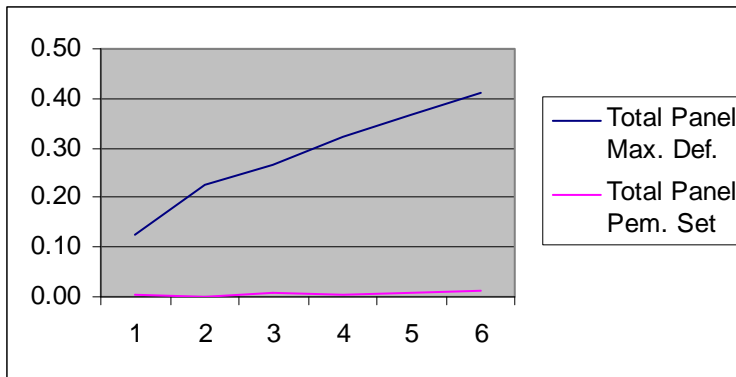
Deflections in inches

| Pressure Increments | Time (sec) | Mid Span (D) | Perm Set | End Span Purlin mid panel (E) | Perm. Set | Total Panel Deflection | Total Panel Perm. Set |
|---------------------|------------|--------------|----------|-------------------------------|-----------|------------------------|-----------------------|
| RZ 5.6 | 60 | | | | | | |
| 7 | 60 | .02 | .0 | .02 | .0 | .13 | .00 |
| 14 | 60 | .04 | .0 | .03 | .0 | .23 | .00 |
| 21 | 60 | .04 | 0 | .04 | .1 | .27 | .01 |
| 28 | 60 | .05 | 0 | .05 | 0 | .32 | .01 |
| 35 | 60 | .06 | 0 | .07 | .0 | .37 | .01 |
| 42 | 60 | .07 | 0 | .10 | .02 | .41 | .01 |

***Note:** RZ (Reference Zero pressure) is to compensate for vertical test position.

Note: C indicator reading is used as Total Panel Deflection and Permanent Set.

Positive Side Graph



Observations: Deflections increased as pressure increased. No fastener failure occurred.

Deflections in inches

| Pressure Increments psf Negative | Time (sec) | End Purlin Between Ribs (A) | Perm. Set | Mid-Span (B) | Perm. Set | Mid-Span (C) | Perm. Set |
|----------------------------------|------------|-----------------------------|-----------|--------------|-----------|--------------|-----------|
| *RZ 5.6 | 60 | 0 | | | | | |
| 7 | 60 | .01 | 0.0 | .08 | .05 | .34 | .10 |
| 14 | 60 | .01 | .00 | .17 | .07 | .68 | .13 |
| 21 | 60 | .01 | .01 | .25 | .10 | .88 | .19 |
| 28 | 60 | .04 | .03 | .32 | .14 | 1.08 | .22 |
| 35 | 60 | .06 | .04 | .40 | .17 | 1.2 | .23 |

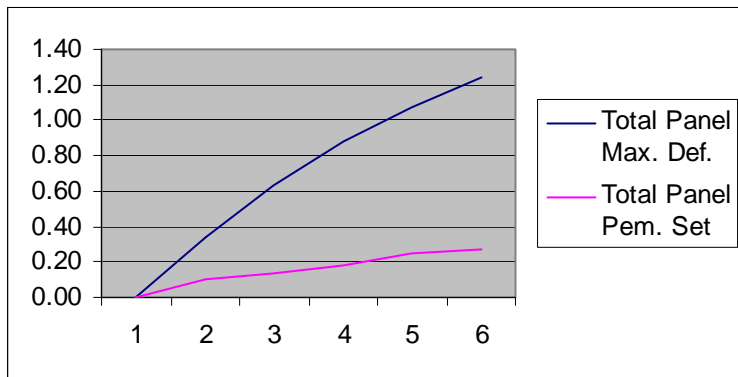
Deflections in inches

| Pressure Increments psf Negative Pressure Increments | Time (sec) | Mid Span (D) | Perm Set | End Span Purlin mid panel (E) | Perm. Set | Total Panel Deflection | Total Panel Perm. Set |
|---|------------|--------------|----------|-------------------------------|-----------|------------------------|-----------------------|
| *RZ 5.6 | 60 | 0.0" | 0.0" | 0.0" | 0.0" | 0.0" | 0.0" |
| 7 | 60 | .10" | .04" | .40" | .10" | .34 | .10" |
| 14 | 60 | .21" | .02" | .82" | .26" | .68 | .13" |
| 21 | 60 | .31" | .12" | 1.10 | .32" | .88 | .19" |
| 28 | 60 | .40" | .16" | 1.34" | .39" | 1.08 | .22" |
| 35 | 60 | .47" | .14" | 1.52" | .42" | 1.2 | .23" |

*Note: RZ (Reference Zero pressure) is to compensate for vertical test position.

Note: C indicator reading is used as Total Panel Deflection and Permanent Set.

Negative Side Graph



Observations- Deflections increased as pressure increased. The panels failed while starting to raise pressure to 42 psf. The panels separated from the clips and the screws along the edge of the specimen pulled through the panel.

Specimen B

Deflections in inches

| Pressure Increments psf Positive | Time (sec) | Purlin Mid Panel (A) | Perm. Set | Mid-Span (B) | Perm. Set | Mid-Span (C) | Perm. Set |
|-------------------------------------|------------|----------------------|-----------|--------------|-----------|--------------|-----------|
| *RZ 5.6 | 60 | | | | | | |
| 12 | 60 | .04 | .02 | .01 | .01 | .05 | .02 |
| 24 | 60 | .05 | .02 | .02 | .01 | .07 | .02 |
| 36 | 60 | .05 | .01 | .02 | .01 | .09 | .02 |
| 48 | 60 | .06 | .02 | .03 | .01 | .10 | .02 |
| 60 | 60 | .07 | .01 | .03 | .01 | .11 | .02 |
| 72 | 60 | .07 | .01 | .04 | .01 | .13 | .02 |

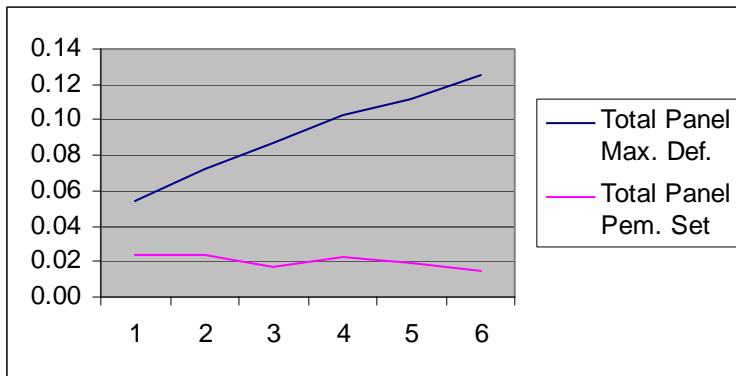
Deflections in inches

| Pressure Increments psf Positive | Time (sec) | Mid Span (D) | Perm Set | Purlin Mid Panel (E) | Perm. Set | Total Panel Deflection | Total Panel Perm. Set |
|----------------------------------|------------|--------------|----------|----------------------|-----------|------------------------|-----------------------|
| *RZ 5.6 | 60 | | | | | | |
| 12 | 60 | .00 | .00 | .07 | .04 | .05 | .02 |
| 24 | 60 | .01 | .00 | .10 | .04 | .07 | .02 |
| 36 | 60 | .01 | .00 | .11 | .04 | .09 | .02 |
| 48 | 60 | .02 | .00 | .12 | .05 | .10 | .02 |
| 60 | 60 | .02 | .00 | .13 | .05 | .11 | .02 |
| 72 | 60 | .03 | .00 | .13 | .04 | .13 | .02 |

*Note: RZ (Reference Zero pressure) is to compensate for vertical test position.

Note: C indicator reading is used as Total Panel Deflection and Permanent Set.

Positive Side Graph



Deflections in inches

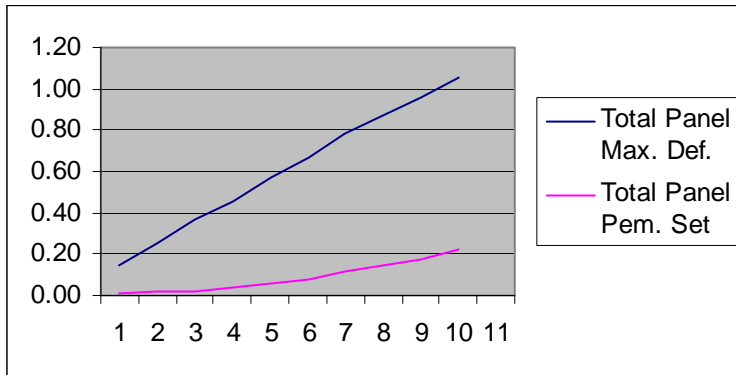
| Pressure Increments psf Negative | Time (sec) | Purlin Mid Panel (A) | Perm. Set | Mid-Span (B) | Perm. Set | Mid-Span (C) | Perm. Set |
|----------------------------------|------------|----------------------|-----------|--------------|-----------|--------------|-----------|
| *RZ 5.6 | 60 | | | | | | |
| 21 | 60 | .16" | .04" | .02" | .02" | .14" | .01" |
| 42 | 60 | .28" | .06" | .04" | .02" | .26" | .02" |
| 63 | 60 | .40" | .08" | .08" | .02" | .37" | .03" |
| 84 | 60 | .49" | .10" | .12" | .04" | .46" | .04" |
| 105 | 60 | .60" | .11" | .16" | .05" | .57" | .06" |
| 126 | 60 | .69" | .13" | .20" | .06" | .67" | .08" |
| 147 | 60 | .81" | .17" | .24" | .08" | .78" | .12" |
| 168 | 60 | .89" | .20" | .28" | .09" | .87" | .15" |
| 189 | 60 | .97" | .21" | .32" | .10" | .96" | .17" |
| 210 | 60 | 1.07" | .25" | .37" | .12" | 1.06" | .22" |

Deflections in inches

| Pressure Increments psf Negative | Time (sec) | Mid Span (D) | Perm Set | Purlin Mid Panel (E) | Perm. Set | Total Panel Deflection | Total Panel Perm. Set |
|----------------------------------|------------|--------------|----------|----------------------|-----------|------------------------|-----------------------|
| *RZ 5.6 | 60 | | | | | | |
| 21 | 60 | .02" | .01" | .13" | .01 | .14" | .01" |
| 42 | 60 | .06" | .02" | .24" | .02" | .26" | .02" |
| 63 | 60 | .16" | .03" | .34" | .03" | .37" | .03" |
| 84 | 60 | .17" | .05" | .42" | .05" | .46" | .04" |
| 105 | 60 | .24 | .09" | .53" | .07" | .57" | .06" |
| 126 | 60 | .34" | .11" | .63" | .08" | .67" | .08" |
| 147 | 60 | .40" | .14" | .74" | .12" | .78" | .12" |
| 168 | 60 | .44" | .15" | .83" | .15" | .87" | .15" |
| 189 | 60 | .48" | .17" | .90" | .18" | .96" | .17" |
| 210 | 60 | .53" | .19" | 1.00" | .22" | 1.07" | .22" |

***Note:** RZ (Reference Zero pressure) is to compensate for vertical test position.
Note: C indicator reading is used as Total Panel Deflection and Permanent Set.

Negative Side Graph



Observations- Deflections increased as pressure increased. No fastener failure occurred.

Note: 2 mil polyethylene film was used for the ASTM 1592 test, it is the opinion of the undersigned that it had no influence on the results of the test.

Observers-

Keith Owen / ATL
Eddie Lance, Josh Thomas / ATL
Jeremiah Buecher / Metal Roofing Systems
Andy Sigmon / Metal Roofing Systems
Brian Thompson / Metal Roofing Systems
David W. Johnson, P.E

Keith Owen, Lab Manager
American Test Lab, Inc.

Keith Owen
6/21/12

All Tests Witnessed and Certified by:

David Johnson P. E.
1656 Calvert Rd.
Brevard, NC 28712
Florida P.E. # 00061915

Engineer Seal And Signature

David Wesley Johnson
4/21/12



Certificate of Independence: The witnessing engineer has no equity interest in American Test Lab of North Carolina, Metal Roofing or their parts vendors. Witnessing engineer is in complete compliance of Florida Statue 9B-72, Section 72.110

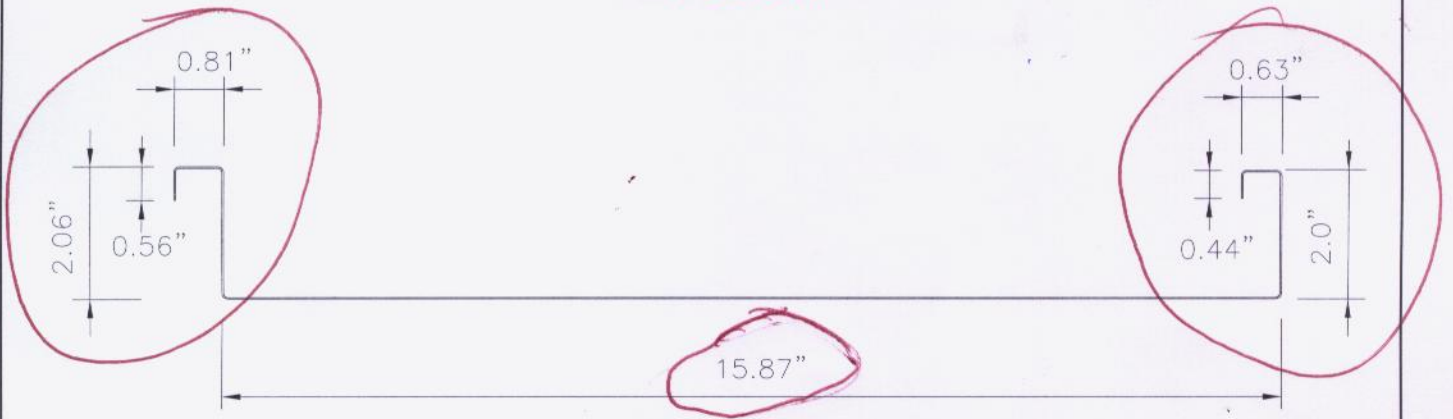
Disclaimer:

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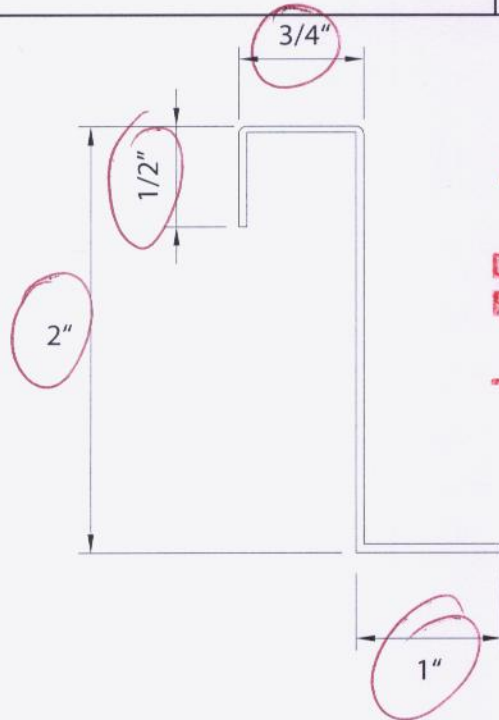
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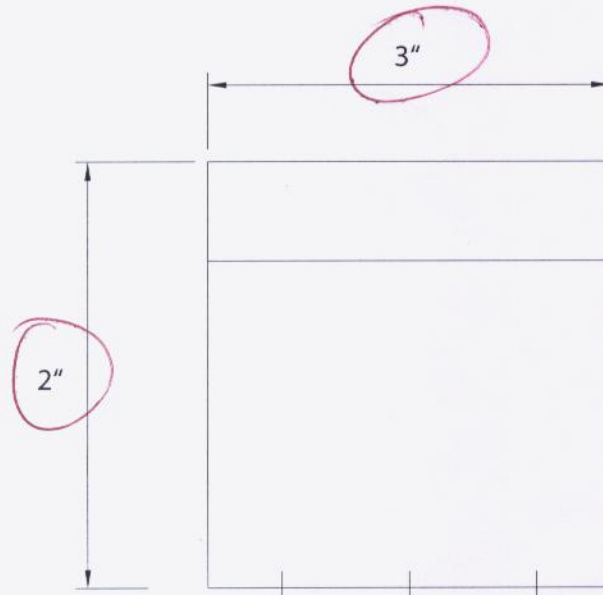
Kurt Owen
ATL INSPECTOR



24 GA. SYSTEM 2500 SSMR PANEL



CLIP, SIDE VIEW



FASTENER HOLES

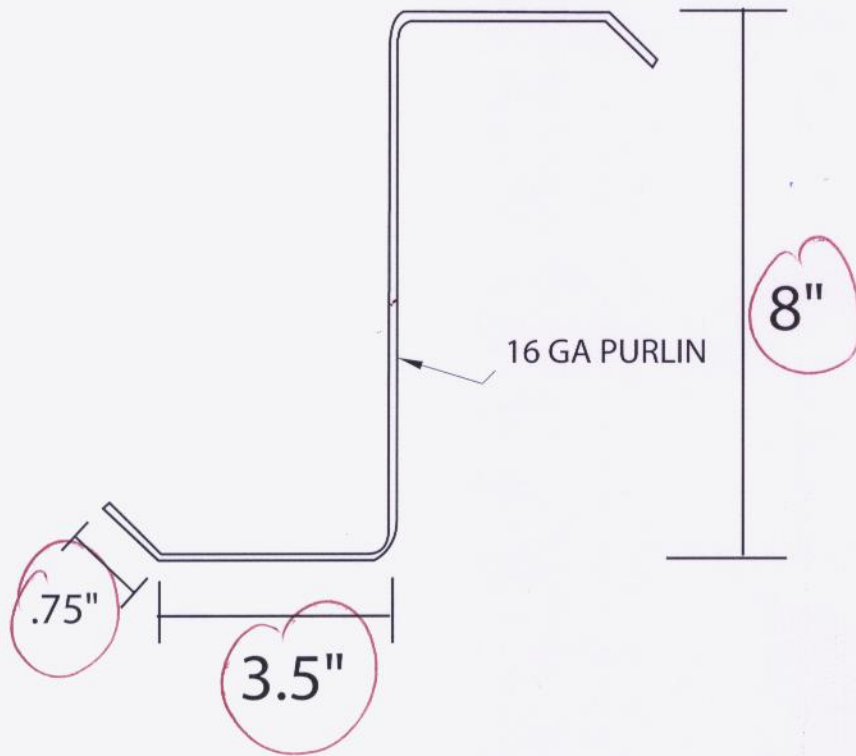
CLIP FRONT VIEW

SYSTEM 2500 CLIP

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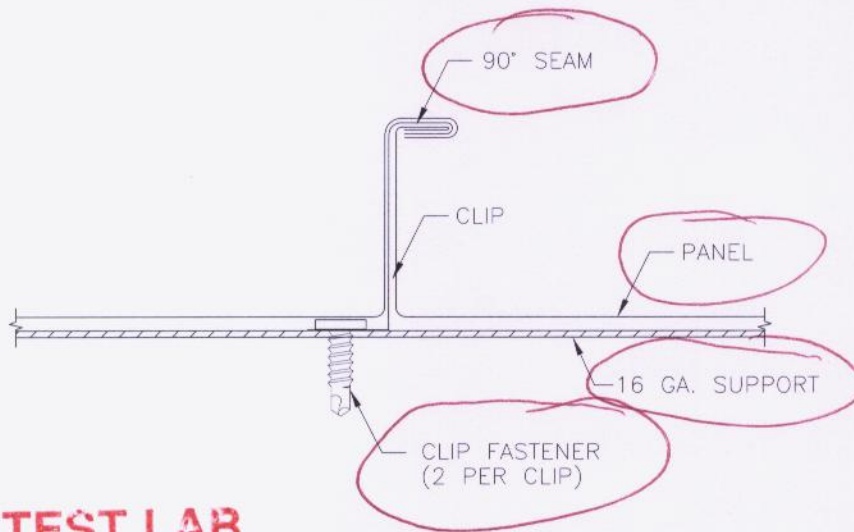
Keith Owen
ATL INSPECTOR



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REPORT NO. ATLINC 0522.01-12

Kurt Owen
ATL INSPECTOR



AMERICAN TEST LAB

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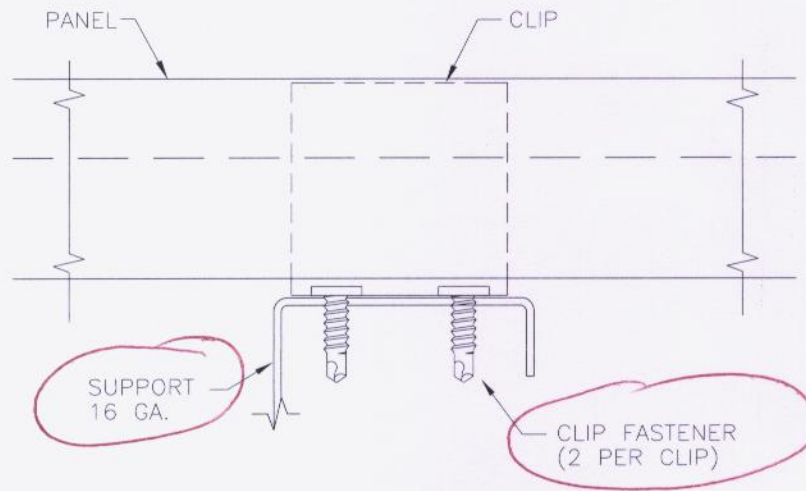
DATE 6/21/12

CLIP SECTION VIEW

REPORT NO. ATLNC 0522.01-12

Keith Owen

ATL INSPECTOR



CLIP SIDE VIEW