



**TEST REPORT**

Rendered to:

**COLOR GUARD, INC.**

For:

***Lincoln Aluminum Guardrail System***

**Report No.: F8799.02-119-19**

**Report Date: 09/02/16**

**Test Record Retention Date: 07/21/20**



**TEST REPORT**

F8799.02-119-19  
September 2, 2016

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## **TEST REPORT**

Rendered to:

COLOR GUARD, INC.  
320 Range Line Road  
Sheboygan Falls, Wisconsin 53085

Report No.: F8799.02-119-19

Test Dates: 07/06/16

Through: 07/21/16

Report Date: 09/02/16

Test Record Retention Date: 07/21/20

### **1.0 General Information**

#### **1.1 Product**

*Lincoln Aluminum Guardrail System*

#### **1.2 Project Description**

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted by Color Guard, Inc. to perform material and structural testing on their 6 ft by 42 in and 8 ft by 42 in *Lincoln Aluminum* guardrail systems. This report is in conjunction with Intertek-ATI Report No. F8799.03-117-38 which includes product sampling information. The purpose of the testing is code compliance evaluation in accordance with the following criteria:

ICC-ES™ AC273 (March 1, 2008 - Editorial Revised March 2016), *Acceptance Criteria for Handrails and Guards*

ICC-ES™ AC273-08 was developed by the ICC Evaluation Service, Inc. (ICC-ES™) as acceptance criteria to evaluate compliance with the following building codes:

2015 *International Building Code*®, International Code Council

2015 *International Residential Code*®, International Code Council

#### **1.3 Limitations**

All tests performed were to evaluate structural performance of the railing assembly to carry and transfer imposed loads to the supports (posts). The test specimen evaluated included the pickets, rails, rail brackets, posts, and attachment to the supporting structure. Anchorage of support posts to the supporting structure is not included in the scope of this testing and would need to be evaluated separately.

Testing is limited to satisfying the IRC - One- and Two-Family Dwellings requirements of ICC-ES™ AC273.

## 1.4 Qualifications

Intertek-ATI has demonstrated compliance with ISO/IEC International Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc. (IAS).

## 1.5 Product Description

The *Lincoln Aluminum* guardrail system is comprised of aluminum rails, pickets, and post sleeves as well as steel post mounts. Test specimens consisted of one product color: Black. Drawings are included in Appendix A to verify the overall dimensions and other pertinent information of the tested product, its components, and any constructed assemblies.

## 1.6 Product Sampling

A representative of Intertek-ATI visited the Poly Vinyl Company facility in Sheboygan Falls, Wisconsin, on 06/17/16 to select the components used for testing. All samples selected for testing were marked for identification and were the samples used for all tests reported herein. Reference Intertek-ATI report No. F8799.03-117-38 for additional product sampling information. See photograph in Appendix B for typical sampling mark.

## 1.7 Witnessing

Tad Rauber from Color Guard, Inc. and Robin McCoy from Poly Vinyl Company were present on 07/06/16 and 07/07/16 for testing conducted and reported herein.

## 1.8 Conditions of Testing

Unless otherwise indicated, all testing reported herein was conducted in a laboratory set to maintain temperature in the range of  $68 \pm 4^{\circ}\text{F}$  and humidity in the range of  $50 \pm 5\% \text{RH}$ .

## 2.0 Referenced Standards

ASTM B221-14, *Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes*

ASTM D1761-12, *Standard Test Methods for Mechanical Fasteners in Wood*

ASTM E8/E8M-15, *Standard Test Methods for Tension Testing of Metallic Materials*

### 3.0 Tensile Testing

Re: ICC-ES™ AC273 - Section 4.1

#### 3.1 General

Tensile tests were performed on major railing components (top rail) used in the railing assemblies for the purpose of verifying the material specification.

#### 3.2 Test Specimens

One set of fifteen test specimens was taken from tested top rails.

#### 3.3 Test Procedure

The specimens were tested using an Instron® Model 3369 Universal Testing Machine with SATEC "T" grips and operating at a uniform cross-head speed of 0.2 in/min. Strain was measured using a SATEC Model T1M snap-on Extensometer with a 2 in gage length. See photograph in Appendix B. Testing was conducted on 07/21/16.

#### 3.4 Test Results

##### *Lincoln Aluminum - Top Rail*

Sample ID	Width (in)	Thickness (in)	MOE (10 <sup>6</sup> psi)	Yield (10 <sup>3</sup> psi)	Tensile (10 <sup>3</sup> psi)	Elongation (%)	Max Load (lbf)
1	0.497	0.087	9.71	26.9	31.6	16.2	1368
2	0.499	0.086	10.01	27.0	31.7	16.4	1367
3	0.499	0.087	9.54	27.3	32.0	15.8	1394
4	0.499	0.087	9.96	27.4	32.2	16.6	1397
5	0.500	0.087	9.50	26.8	31.5	17.0	1368
6	0.500	0.087	9.58	27.2	31.8	16.4	1382
7	0.500	0.087	9.41	27.6	32.2	16.7	1406
8	0.502	0.087	9.87	27.7	32.3	15.2	1411
9	0.500	0.087	10.01	27.5	32.0	16.8	1388
10	0.500	0.087	9.71	27.8	32.3	16.7	1409
11	0.499	0.083	9.56	28.3	32.0	15.2	1323
12	0.498	0.087	9.85	28.2	32.1	16.8	1391
13	0.500	0.084	9.65	28.1	31.8	13.9	1328
14	0.503	0.087	9.73	28.0	31.9	14.8	1393
15	0.502	0.084	9.73	27.8	31.7	15.2	1331
<b>Minimum:</b>			9.41	26.9	31.5	13.9	1323
<b>Maximum:</b>			10.01	28.3	32.3	17.0	1411
<b>Mean:</b>			9.7	27.6	32.0	16.0	1377
<b>Standard Deviation:</b>			0.2	0.5	0.3	0.9	29.3
<b>Coefficient of Variation:</b>			1.9%	1.7%	0.8%	5.7%	2.1%

### 3.5 Analysis of Test Results

Per Color Guard, Inc., the material used in their guardrail system tested and reported herein was specified as ASTM 6063-T5.

The following criteria are listed under ASTM B 221, Table 2 - *Mechanical Property Limits*, for 6063-T5:

- Tensile strength, min, psi - 22,000
- Yield strength, min, psi - 16,000

	<b>Min. Tensile Strength (psi)</b>	<b>Min. Yield Strength (psi)</b>
6063-T5	22,000	16,000
Top Rail Samples	31,951	27,573

### 4.0 Assembly Fastener Testing

Re: ICC-ES™ AC273 - Section 4.2.7

#### 4.1 General

The purpose of this testing was to simulate a 90 degree bracket loading condition, which addresses a situation when the guardrail system is to be installed with the top rails in a corner condition.

#### 4.2 Test Specimens

Short sections of the top rail were attached in accordance with Color Guard Inc.'s installation instructions to short sections of posts. Specimens were assembled by an Intertek-ATI technician. Rail brackets were secured to the post and to the rail as described in Section 5.4 Fastening Schedule.

#### 4.3 Test Setup

The testing machine was fitted with the post sections at the top and bottom to accommodate anchorage of the rail and brackets. The top post section was attached to the test machine's crosshead with a swivel mechanism, and the bottom post section was attached rigidly to the base of the test machine. Three specimens were tested in this manner with each of the three specimens including two connections for a total of six connections. See photograph in Appendix B for test setup.

#### 4.4 Test Procedure

Testing was performed in accordance with ASTM D 1761 and by using a computer-monitored and -controlled SATEC Unidrive, Model MII 50 UD Universal Testing Machine. Tests were run at a crosshead speed of 0.05 in/min, and each specimen was tested in tension to its ultimate load capacity. Testing was conducted on 07/07/16.

#### 4.5 Test Results

Sample No.	Ultimate Load (lb)	Deviation From Average	Mode of Failure
1	552	-8.9%	Bracket failure
2	617	+1.8%	
3	650	+7.3%	
<b>Average</b>	<b>606</b>		
<b>Allowable Capacity <sup>1</sup></b>	<b>202</b>	<b>≥ 200 lb ∴ OK</b>	

<sup>1</sup> Average ultimate load divided by a factor of safety of three (3.0)

#### 4.6 Summary and Conclusions

The maximum design load rating required for guardrail systems for use in IRC - One- and Two-Family Dwellings and for rail lengths up to and including 8 ft for use in IBC - All Use Groups is 200 lb. Therefore, fasteners / connectors reported herein meet the performance requirements of ICC-ES™ AC273 for use in corner conditions.

### 5.0 Structural Performance Testing of Assembled Railing Systems

Re: ICC-ES™ AC273 - Section 4.2.1

#### 5.1 General

Railing assemblies were tested in a self-contained structural frame designed to accommodate anchorage of a rail assembly and application of the required test loads. The specimen was loaded using an electric winch mounted to a rigid steel test frame. High strength steel cables, nylon straps, and load distribution beams were used to impose test loads on the specimen. Applied load was measured using an electronic load cell located in-line with the loading system. Deflections were measured to the nearest 0.01 in using electronic linear displacement transducers.

#### 5.2 Railing Assembly Description

The *Lincoln Aluminum* guardrail systems consisted of aluminum top and bottom rails with spaced pickets between the rail members. The railing systems had an overall top rail length (inside of post to inside of post) of 72 in and 96 in with an overall rail height (top of top rail to bottom of bottom rail) of 40-1/4 in. Top and bottom rails attached to aluminum post sleeves via aluminum socket brackets. Two support blocks were equally spaced along the bottom rail for the 96 in guardrails and one support block was located at the midspan of the bottom rail for the 72 in guardrail. See Section 5.4 Fastening Schedule for connection details. See drawings in Appendix A and photographs in Appendix B for additional details.

### 5.3 Series / Model

The test specimen components were supplied by Color Guard, Inc. and were assembled by their representatives, Tad Rauber and Robin McCoy.

Top Rail: 2-1/16 in high by 2-5/16 in wide by 0.09 in wall extruded 6063-T5 aluminum "breadloaf" profile

Bottom Rail: 1-1/4 in high by 1-1/2 in wide by 0.10 in wall extruded 6063-T5 aluminum

Top Rail Brackets: 2-1/4 in high by 2-1/2 in wide by 1-1/4 in deep cast aluminum socket bracket (0.08 in wall)

Bottom Rail Brackets: 1-15/16 in high by 1-3/4 in wide by 1-1/4 in deep cast aluminum socket bracket (0.09 in wall)

Aluminum Rail Insert: 1/4 in high by 1-1/8 in wide by 0.09 in thick extruded 6063-T5 aluminum insert with routings for pickets

PVC Rail Insert: 15/16 in high by 1-5/16 in wide by 0.04 in wall vinyl insert

Pickets: 3/4 in square by 0.04 in wall extruded 6063-T5 aluminum

Post: 2 in O.D. by 0.11 in thick powder-coated steel tube post welded to nominal 3-1/2 in square, nominal 1/4 in thick base plate with four nominal 7/16 in diameter holes located approximately 1/2 in on-center in from each edge and approximately 2-1/2 in apart on-center, four 5/16 dia. holes located approximately 3/8 in on-center in from edge and approximately 0.55 in from the centerline of the tube on each side of the plate, and one 0.56 in diameter hole located in the center of the base plate - the continuous fillet weld connecting the tube to the base plate was 3/16 in - the base plate was attached to a rigid steel surface either directly to the surface (simulated concrete), or to 5/4 decking and 2x8 pressure treated lumber (surface mount wood) as described in Section 5.4 Fastening Schedule. A 3-1/2 in square by 0.12 in thick leveling plate (with hole pattern matching the base plate) was utilized for simulated concrete installation testing only.

Post Spacer: 2-11/16 in wide by 7/8 in deep by 4 in long extruded PVC – one spacer is attached on each side of the post at 3-1/2 in and 41-1/2 in from the deck surface to the center of spacer with connection details as described in Section 5.4 Fastening Schedule.

Post Sleeve: 3 in square by 0.12 in wall extruded 6063-T5 aluminum

Support Block: 3/4 in square by 0.04 in wall extruded 6063-T5 aluminum picket cut to length and secured with a PVC baluster plug to the bottom rail as described in Section 5.4 Fastening Schedule.

Baluster Plug: 5/8 in dia. by 3/4 in long vinyl plug with a 3/16 dia. hole for attached as described in Section 5.4 Fastening Schedule

See drawings in Appendix A and photographs in Appendix B for additional details.



#### 5.4 Fastening Schedule

Connection	Fastener
Rail Bracket to Post*	Two #10-16 x 1" (0.137 in minor dia.) pan-head, square-drive, self-drilling, stainless steel screws
Top Rail Bracket to Rail*	One #10 x 1 in long (0.137 in minor dia.) pan-head, square-drive, self-drilling, stainless steel screw
Bottom Rail Bracket to Rail	Slip fit - No mechanical connection
Baluster to Rail	
Rail Insert to Rail	Channel fit
Foot Block to Baluster Plug	Slip fit - No mechanical connection
Baluster Plug to Bottom Rail	One #10-16 x 1" (0.137 in minor dia.) pan-head, square-drive, self-drilling stainless steel screw
PVC Spacer to Post	One #1/4-14 x 1" (0.185 in minor dia.), pan head phillips-drive, self-drilling, galvanized steel screw
Post Mount to Wood Surface Mount	Four 3/8 in Grade 5 hex-head bolts with nut and washer with bottom of base plate set 1/8 in off leveling plate
Post Mount to Steel Channel (simulated concrete installation)	

\* 7/32 in diameter pre-drill used

#### 5.5 Test Setup

The railing assembly was installed and tested as a single railing section by directly securing (surface-mounting) the base of the post mounts to a rigid steel test frame. The railing was assembled by an Intertek-ATI technician with assistance from Color Guard, Inc. representatives, Tad Rauber and Robin McCoy. Transducers mounted to an independent reference frame were located to record movement of reference points on the railing system components (ends and mid-point) to determine net component deflections. See photographs in Appendix B for test setups.

## 5.6 Test Procedure

Testing and evaluation was performed in accordance with Section 4.2.1 of ICC-ES™ AC273. The test specimen was inspected prior to testing to verify size and general condition of the materials, assembly, and installation. No potentially compromising defects were observed. One specimen was used for all load tests which were performed in the order reported. Each design load test was performed using the following procedure:

1. Zeroed transducers and load cell at zero load;
2. Increased load to specified test load in no less than ten seconds; and
3. Held test load for no less than one minute.

## 5.7 Test Results

Unless otherwise noted, all loads and displacement measurements were normal to the rail (horizontal). The test results apply only to the railing assembly between supports and anchorage to the support.

### Key to Test Results Tables:

Load Level: Target test load

Test Load: Actual applied load at the designated load level (target). Where more than one value is reported, the test load was the range (min. - max.) that was held during the time indicated in the test.

Elapsed Time (E.T.): The amount of time into the test with zero established at the beginning of the loading procedure. Where more than one value is reported, the time was the range (start-end) that the designated load level was reached and sustained.

5.7 Test Results (Continued)

Series No. 1

96 in by 42 in *Lincoln* Railing with Structural Posts on Surface Mount Wood Installation  
Limited to Use in IRC - One- and Two-Family Dwellings / ICC-ES™ AC273

Specimen No. 1 of 3

Test No. 1 - Test Date: 07/07/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Center of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 132	00:14 - 01:23	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 2 - Test Date: 07/07/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Bottom of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 129	00:26 - 01:34	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 3 - Test Date: 07/07/16						
Design Load: 200 lb Concentrated Load at Mid-Span of Top Rail						
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)			
			End	Mid	End	Net <sup>1</sup>
200 lb (D.L.)	202	00:28	0.49	1.40	0.51	0.90
500 lb (2.50 x D.L.)	500 - 503	00:47 - 01:53	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure			

Deflection Evaluation:

Maximum rail deflection at 202 lb = 0.90 in on an 8 ft rail

Limits per AC273 <sup>2</sup>:  $\left(\frac{h}{24} + \frac{l}{96}\right) = \left(\frac{36}{24} + \frac{96}{96}\right) = 2.50" > 0.90" \therefore \text{ok}$  and  $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.90" \therefore \text{ok}$

<sup>1</sup> Each end displacement was measured at the center of the support. Net displacement was the rail displacement relative to the supports.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 1 (Continued)

Specimen No. 1 of 3 (Continued)

Test No. 4 - Test Date: 07/07/16			
Design Load: 200 lb Concentrated Load at End of Top Rail (Bracket)			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
500 lb (2.50 x D.L.)	500 - 511	00:49 - 1:52	Withstood load equal to or greater than 500 lb for one full minute without failure

Test No. 5 - 07/07/16			
Design Load: 200 lb Concentrated Load at Top of Stand-Alone <sup>1</sup> Post (42 in high)			
Load Level	Test Load (lb)	E.T. (min:sec)	Post Displacement (in)
Initial Load	40	00:00	0.00
Design Load	214	00:09	0.77
2.0x Design Load	401	00:23	2.36
Initial Load	40	02:42	0.43
82% Recovery from 2.0 x Design Load			
2.5x Design Load	499 - 506	03:16 - 04:17	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure <sup>2</sup>
<u>Deflection Evaluation</u> :			
Maximum post deflection at 214 lb = 0.77 in on a 42 in high post			
Limits per AC273 <sup>3</sup> : $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.77" \therefore ok$			

<sup>1</sup> Post was conservatively tested without a railing attached.

<sup>2</sup> The test load fell below the target load for a total of 0.5 seconds throughout the duration of the load.

<sup>3</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 1 (Continued)

Specimen No. 2 of 3

Test No. 1 - Test Date: 07/07/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Center of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 129	00:46 - 01:54	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 2 - Test Date: 0707/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Bottom of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 132	00:36 - 01:38	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 3 - Test Date: 07/07/16						
Design Load: 200 lb Concentrated Load at Mid-Span of Top Rail						
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)			
			End	Mid	End	Net <sup>1</sup>
200 lb (D.L.)	201	00:26	0.50	1.40	0.51	0.90
500 lb (2.50 x D.L.)	500 - 503	00:48 - 01:49	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure			
<b>Deflection Evaluation:</b>						
Maximum rail deflection at 201 lb = 0.90 in on an 8 ft rail						
Limits per AC273 <sup>2</sup> : $\left(\frac{h}{24} + \frac{l}{96}\right) = \left(\frac{36}{24} + \frac{96}{96}\right) = 2.50" > 0.90 \therefore \text{ok}$ and $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.90" \therefore \text{ok}$						

<sup>1</sup> Each end displacement was measured at the center of the support. Net displacement was the rail displacement relative to the supports.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 1 (Continued)

Specimen No. 2 of 3 (Continued)

Test No. 4 - Test Date: 07/07/16			
Design Load: 200 lb Concentrated Load at End of Top Rail (Bracket)			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
500 lb (2.50 x D.L.)	499 - 506	00:52 - 1:54	Withstood load equal to or greater than 500 lb for one full minute without failure <sup>1</sup>

<sup>1</sup> The test load fell below the target load for a total of 0.5 seconds throughout the duration of the load.

Test No. 5 - 07/07/16			
Design Load: 200 lb Concentrated Load at Top of Stand-Alone <sup>1</sup> Post (42 in high)			
Load Level	Test Load (lb)	E.T. (min:sec)	Post Displacement (in)
Initial Load	39	00:00	0.00
Design Load	201	00:06	0.76
2.0x Design Load	401	00:31	2.43
Initial Load	39	02:10	0.40
84% Recovery from 2.0 x Design Load			
2.5x Design Load	500 - 509	02:28 - 03:33	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure
<u>Deflection Evaluation</u> : Maximum post deflection at 201 lb = 0.76 in on a 42 in high post Limits per AC273 <sup>2</sup> : $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.76" \therefore \text{ok}$			

<sup>1</sup> Post was conservatively tested without a railing attached.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 1 (Continued)

Specimen No. 3 of 3

Test No. 1 - Test Date: 07/07/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Center of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 129	01:19 - 01:26	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 2 - Test Date: 07/07/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Bottom of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 128	00:16 - 01:22	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 3 - Test Date: 07/07/16						
Design Load: 200 lb Concentrated Load at Mid-Span of Top Rail						
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)			
			End	Mid	End	Net <sup>1</sup>
200 lb (D.L.)	200	00:34	0.52	1.39	0.46	0.90
500 lb (2.50 x D.L.)	501 - 507	00:45 - 01:53	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure			

Deflection Evaluation:

Maximum rail deflection at 200 lb = 0.90 in on an 8 ft rail

Limits per AC273 <sup>2</sup>:  $\left(\frac{h}{24} + \frac{l}{96}\right) = \left(\frac{36}{24} + \frac{96}{96}\right) = 2.5" > 0.90" \therefore \text{ok}$  and  $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.90" \therefore \text{ok}$

<sup>1</sup> Each end displacement was measured at the center of the support. Net displacement was the rail displacement relative to the supports.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 1 (Continued)

Specimen No. 3 of 3 (Continued)

Test No. 4 - Test Date: 07/07/16			
Design Load: 200 lb Concentrated Load at End of Top Rail (Bracket)			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
500 lb (2.50 x D.L.)	500 - 507	00:47 - 1:51	Withstood load equal to or greater than 500 lb for one full minute without failure

Test No. 5 - 07/07/16			
Design Load: 200 lb Concentrated Load at Top of Stand-Alone <sup>1</sup> Post (42 in high)			
Load Level	Test Load (lb)	E.T. (min:sec)	Post Displacement (in)
Initial Load	40	00:00	0.00
Design Load	207	00:08	0.74
2.0x Design Load	404	00:20	2.24
Initial Load	45	01:58	0.36
84% Recovery from 2.0 x Design Load			
2.5x Design Load	500 - 506	02:25 - 03:29	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure
<u>Deflection Evaluation:</u>			
Maximum post deflection at 207 lb = 0.74 in on a 42 in high post			
Limits per AC273 <sup>2</sup> : $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.74" \therefore \text{ok}$			

<sup>1</sup> Post was conservatively tested without a railing attached.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.



5.7 Test Results (Continued)

Series No. 2

72 in by 42 in *Lincoln* Railing with Structural Posts on Simulated Concrete Installation  
Limited to Use in IRC - One- and Two-Family Dwellings / ICC-ES™ AC273

Specimen No. 1 of 3

Test No. 1 - Test Date: 07/07/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Center of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 128	00:19 - 01:26	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 2 - Test Date: 07/07/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Bottom of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 129	00:21 - 01:29	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 3 - Test Date: 07/07/16						
Design Load: 200 lb Concentrated Load at Mid-Span of Top Rail						
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)			
			End	Mid	End	Net <sup>1</sup>
200 lb (D.L.)	200	00:31	0.46	0.85	0.48	0.38
500 lb (2.50 x D.L.)	501 - 507	00:46 - 01:53	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure			

Deflection Evaluation:

Maximum rail deflection at 200 lb = 0.38 in on a 6 ft rail

Limits per AC273 <sup>2</sup>:  $\left(\frac{h}{24} + \frac{l}{96}\right) = \left(\frac{36}{24} + \frac{72}{96}\right) = 2.25" > 0.38" \therefore \text{ok}$  and  $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.38" \therefore \text{ok}$

<sup>1</sup> Each end displacement was measured at the center of the support. Net displacement was the rail displacement relative to the supports.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements

**5.7 Test Results (Continued)**

**Series No. 2 (Continued)**

**Specimen No. 1 of 3 (Continued)**

<b>Test No. 4 - Test Date: 07/07/16</b>			
<b>Design Load: 200 lb Concentrated Load at End of Top Rail (Bracket)</b>			
<b>Load Level</b>	<b>Test Load (lb)</b>	<b>E.T. (min:sec)</b>	<b>Result</b>
500 lb (2.50 x D.L.)	499 - 505	01:00 - 02:06	Withstood load equal to or greater than 500 lb for one full minute without failure

<sup>1</sup> The test load fell below the target load for a total of 1.5 seconds throughout the duration of the load.

<b>Test No. 5- Test Date: 07/07/16</b>			
<b>Design Load: 200 lb Concentrated Load at Top of Post Mount (42 in High)</b>			
<b>Load Level</b>	<b>Test Load (lb)</b>	<b>E.T. (min:sec)</b>	<b>Displacement (in)</b>
200 lb (D.L.)	204	00:10	0.96
500 lb (2.50 x D.L.)	500 - 509	00:35 - 01:42	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure
<p><b>Deflection Evaluation:</b>            Maximum post deflection at 204 lb = 0.96 in on a 6 ft rail            Limits per AC273 <sup>1</sup>: <math>\frac{h}{12} = \frac{36}{12} = 3.00" &gt; 0.96" \therefore ok</math></p>			

<sup>1</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 2 (Continued)

Specimen No. 2 of 3

Test No. 1 - Test Date: 07/08/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Center of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 127	00:12 - 01:19	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 2 - Test Date: 07/08/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Bottom of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 128	00:20 - 01:28	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 3 - Test Date: 07/08/16						
Design Load: 200 lb Concentrated Load at Mid-Span of Top Rail						
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)			
			End	Mid	End	Net <sup>1</sup>
200 lb (D.L.)	201	00:53	0.60	1.06	0.73	0.40
500 lb (2.50 x D.L.)	499 - 504	00:18 - 02:15	Result: Withstood load equal to or greater than 500 lb for one full minute without failure <sup>2</sup>			

Deflection Evaluation:

Maximum rail deflection at 201 lb = 0.40 in on a 6 ft rail

Limits per AC273 <sup>3</sup>:  $\left(\frac{h}{24} + \frac{l}{96}\right) = \left(\frac{36}{24} + \frac{72}{96}\right) = 2.25" > 0.40" \therefore \text{ok}$  and  $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.40" \therefore \text{ok}$

<sup>1</sup> Each end displacement was measured at the center of the support. Net displacement was the rail displacement relative to the supports.

<sup>2</sup> The test load fell below the target load for a total of 1.5 seconds throughout the duration of the load.

<sup>3</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 2 (Continued)

Specimen No. 2 of 3 (Continued)

Test No. 4 - Test Date: 07/08/16			
Design Load: 200 lb Concentrated Load at End of Top Rail (Bracket)			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
500 lb (2.50 x D.L.)	500 - 507	00:47 - 01:54	Withstood load equal to or greater than 500 lb for one full minute without failure

Test No. 5 - Test Date: 07/08/16			
Design Load: 200 lb Concentrated Load at Top of Post Mount (42 in High)			
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)
200 lb (D.L.)	204	00:15	1.20
500 lb (2.50 x D.L.)	500 - 506	00:46 - 01:52	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure
<u>Deflection Evaluation:</u> Maximum post deflection at 204 lb = 1.20 in on a 42 in high post Limits per AC273 <sup>1</sup> : $\frac{h}{12} = \frac{36}{12} = 3.00" > 1.20" \therefore \text{ok}$			

<sup>1</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

5.7 Test Results (Continued)

Series No. 2 (Continued)

Specimen No. 3 of 3

Test No. 1 - Test Date: 07/08/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Center of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	125 - 131	00:16 - 01:24	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 2 - Test Date: 07/08/16			
Design Load: 50 lb / 1 Square ft of In-Fill at Bottom of Two Pickets			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
125 lb (2.50 x D.L.)	127 - 135	00:12 - 01:20	Sustained load equal to or greater than 125 lb for one full minute without failure

Test No. 3 - Test Date: 07/08/16						
Design Load: 200 lb Concentrated Load at Mid-Span of Top Rail						
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)			
			End	Mid	End	Net <sup>1</sup>
200 lb (D.L.)	201	00:22	0.53	0.97	0.59	0.41
500 lb (2.50 x D.L.)	500 - 504	00:38 - 01:46	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure			

Deflection Evaluation:

Maximum rail deflection at 201 lb = 0.41 in on a 6 ft rail

Limits per AC273 <sup>2</sup>:  $\left(\frac{h}{24} + \frac{l}{96}\right) = \left(\frac{36}{24} + \frac{72}{96}\right) = 2.25" > 0.41" \therefore \text{ok}$  and  $\frac{h}{12} = \frac{36}{12} = 3.0" > 0.41" \therefore \text{ok}$

<sup>1</sup> Each end displacement was measured at the center of the support. Net displacement was the rail displacement relative to the supports.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements

5.7 Test Results (Continued)

Series No. 2 (Continued)

Specimen No. 3 of 3 (Continued)

Test No. 4 - Test Date: 07/08/16			
Design Load: 200 lb Concentrated Load at End of Top Rail (Bracket)			
Load Level	Test Load (lb)	E.T. (min:sec)	Result
500 lb (2.50 x D.L.)	500 - 508	00:40 - 01:44	Withstood load equal to or greater than 500 lb for one full minute without failure

Test No. 5 - Test Date: 07/08/16			
Design Load: 200 lb Concentrated Load at Top of Post Mount (42 in High)			
Load Level	Test Load (lb)	E.T. (min:sec)	Displacement (in)
200 lb (D.L.)	203	00:13	1.19
500 lb (2.50 x D.L.)	499 - 508	00:49 - 01:57	<b>Result:</b> Withstood load equal to or greater than 500 lb for one full minute without failure
<p><u>Deflection Evaluation:</u>            Maximum post deflection at 203 lb = 1.19 in on a 42 in high post            Limits per AC273 <sup>2</sup>: <math>\frac{h}{12} = \frac{36}{12} = 3.00" &gt; 1.19" \therefore \text{ok}</math></p>			

<sup>1</sup> The test load fell below the target load for a total of 0.5 seconds throughout the duration of the load.

<sup>2</sup> Deflection limit calculation based on worse case 36" railing height to satisfy One- and Two-Family Dwelling requirements.

### 5.8 Summary and Conclusions

When installed between adequate supports, the railing assemblies reported herein meet the structural performance requirements of Section 4.2.1 of ICC-ES™ AC273 with guardrail details and Occupancy Classification as shown in the following table:

<b>Lincoln Aluminum Railing Systems</b>			
<b>Configuration</b>	<b>Guardrail Size</b>	<b>Post Installation</b>	<b>Code Occupancy Classification</b>
Level / In-Line	96 in x 42 in	Surface Mount Wood or Simulated Concrete	IRC – One- and Two- Family Dwellings
Level / In-Line	72 in x 42 in		

Anchorage of support posts to the supporting structure is not included in the scope of this testing and would need to be evaluated separately.

### 6.0 Closing Statement

Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period.

Results obtained are tested values and were secured 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 specimens tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

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Emily C. Riley  
Project Manager

---

V. Thomas Mickley, Jr., P.E.  
Senior Project Engineer

ECR:vtm/jas

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

Appendix A - Drawings (14)

Appendix B - Photographs (7)



### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	09/02/16	N/A	Original report issue

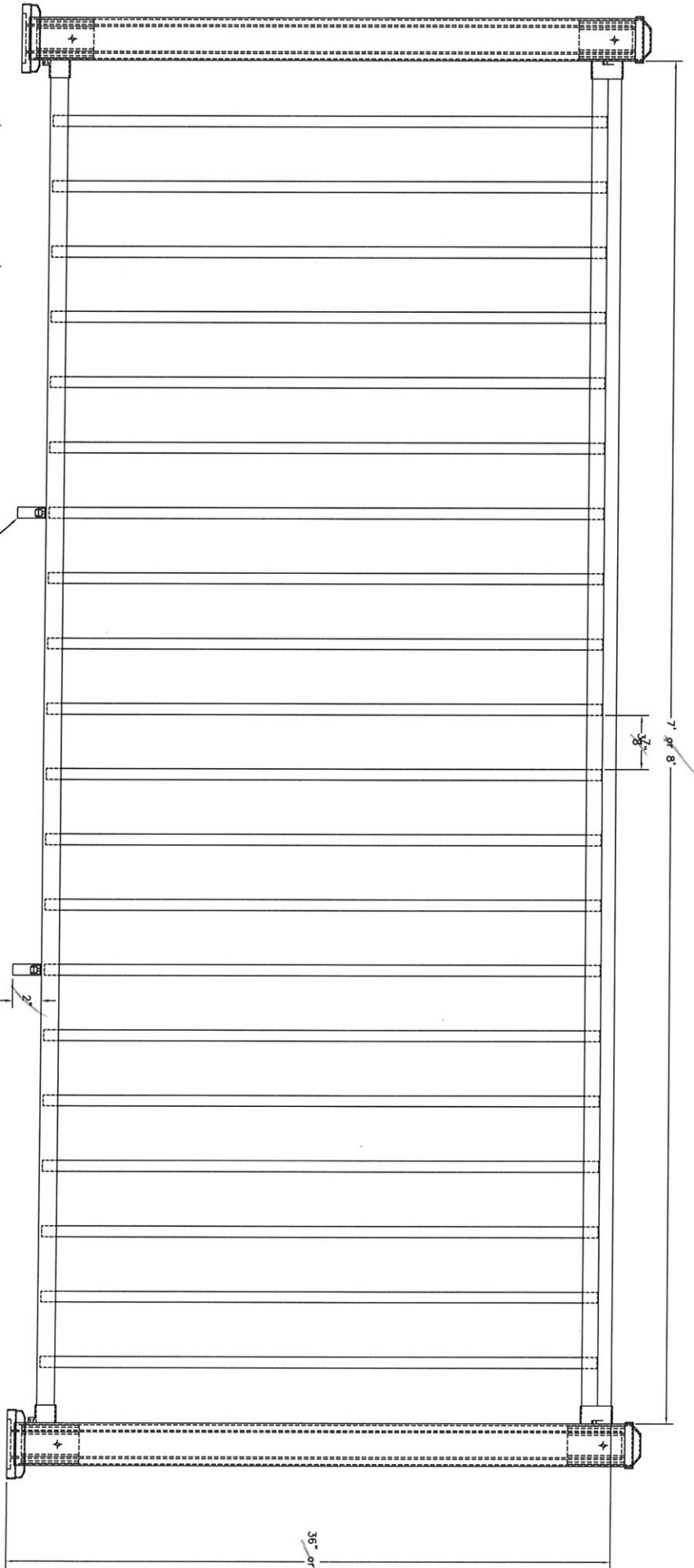
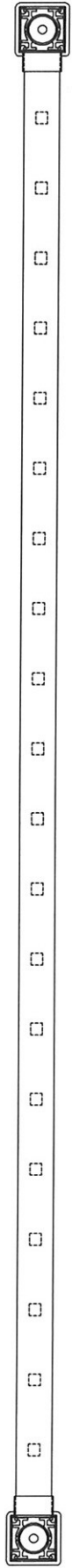




F8799.02-119-19

## **APPENDIX A**

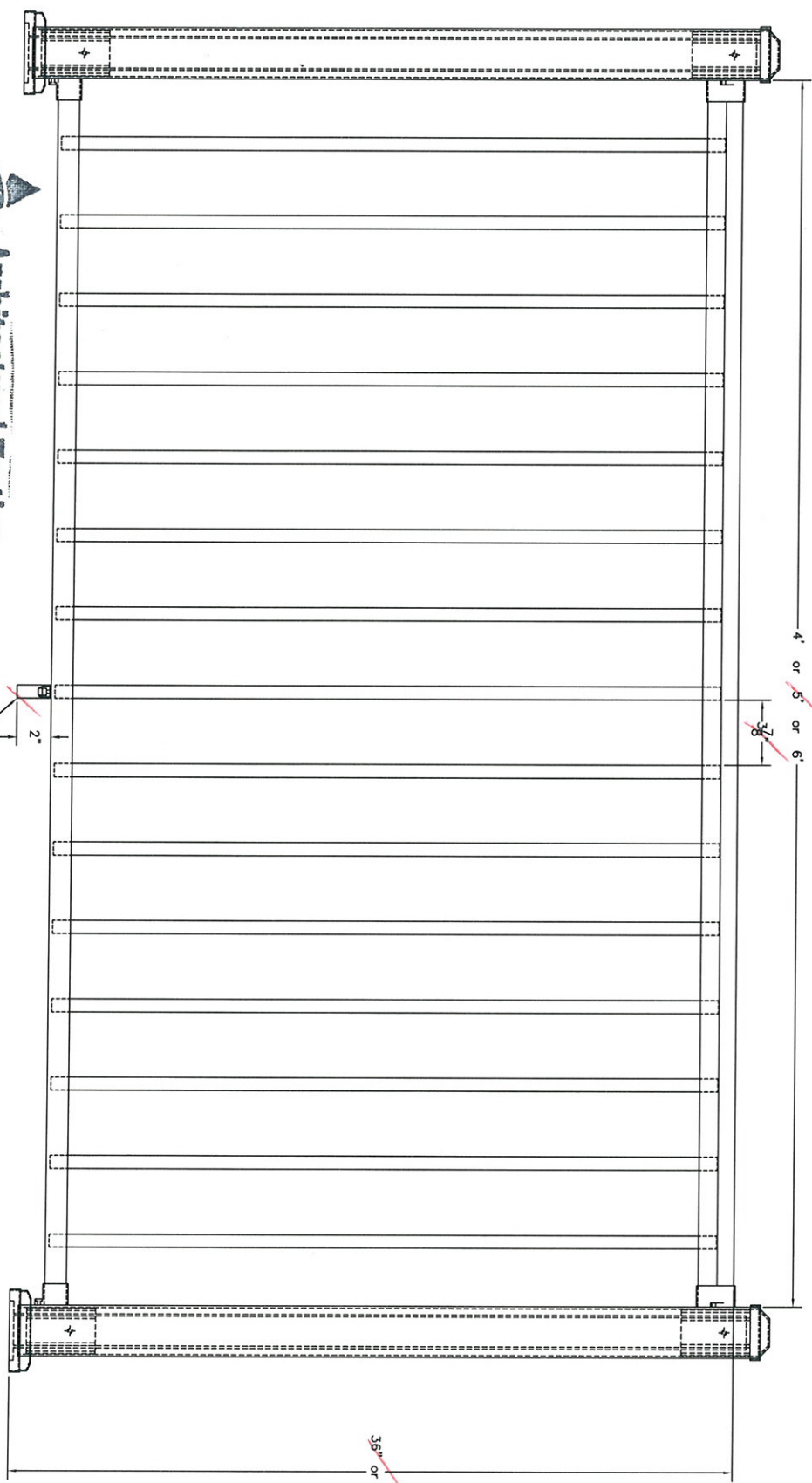
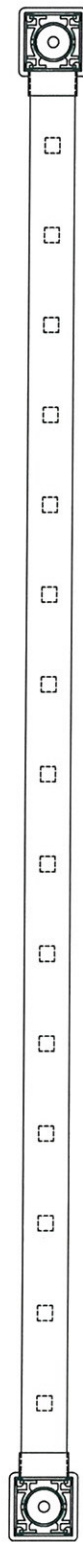
### **Drawings**



**Architectural Testing**

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02  
Date 8/11/16 Tech IWG



**Architectural Testing**

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

Date 8/1/16 Tech IMG

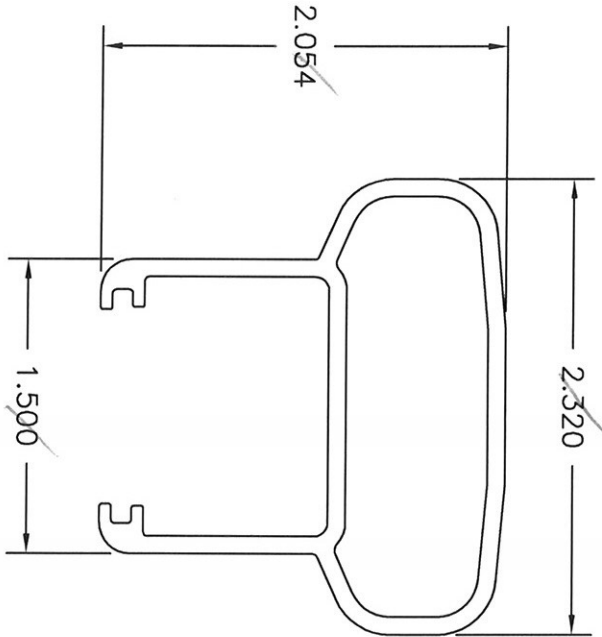


# Architectural Testings

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

Date 8/1/16 Tech FWG



MATERIAL 6063 T5 ALUMINUM

Length	No Paint	BLACK	WHITE	BRONZE	TAN	CLAY
48"	780024	790024	800024	810024	820024	830024
60"	780025	790025	800025	810025	820025	830025
72"	780026	790026	800026	810026	820026	830026
84"	780027	790027	800027	810027	820027	830027
96"	780028	790028	800028	810028	820028	830028
120"	780069	790069	800069	810069	820069	830069

## Poly Vinyl Co.

CUSTOM EXTRUSIONS  
DRAWER 300 SHERBORN FALLS, WI 53085  
PH. (920) 467-4685 FAX. (920) 467-3271

WALL

AREA-

FLEXIBLE

RIGID

TOLERANCES-

XX ±

XXX ±

ANGLES

TOP RAIL

PART NO. SEE CHART

LOG REV. DR. BY DH

SCALE FULL

DATE 1/15/14

DIE

Length	No. Spots	BLACK	WHITE	BRONZE	TAN	CLAY
48"	280018	296018	800018	810018	820018	830018
54"	280020	296020	800020	810020	820020	830020
60"	280022	296022	800022	810022	820022	830022
66"	280024	296024	800024	810024	820024	830024
72"	280026	296026	800026	810026	820026	830026
78"	280028	296028	800028	810028	820028	830028
84"	280030	296030	800030	810030	820030	830030
90"	280032	296032	800032	810032	820032	830032
96"	280034	296034	800034	810034	820034	830034
102"	280036	296036	800036	810036	820036	830036
108"	280038	296038	800038	810038	820038	830038

# STRAIGHT SECTIONS

MATERIAL 6063 T5 ALUMINUM

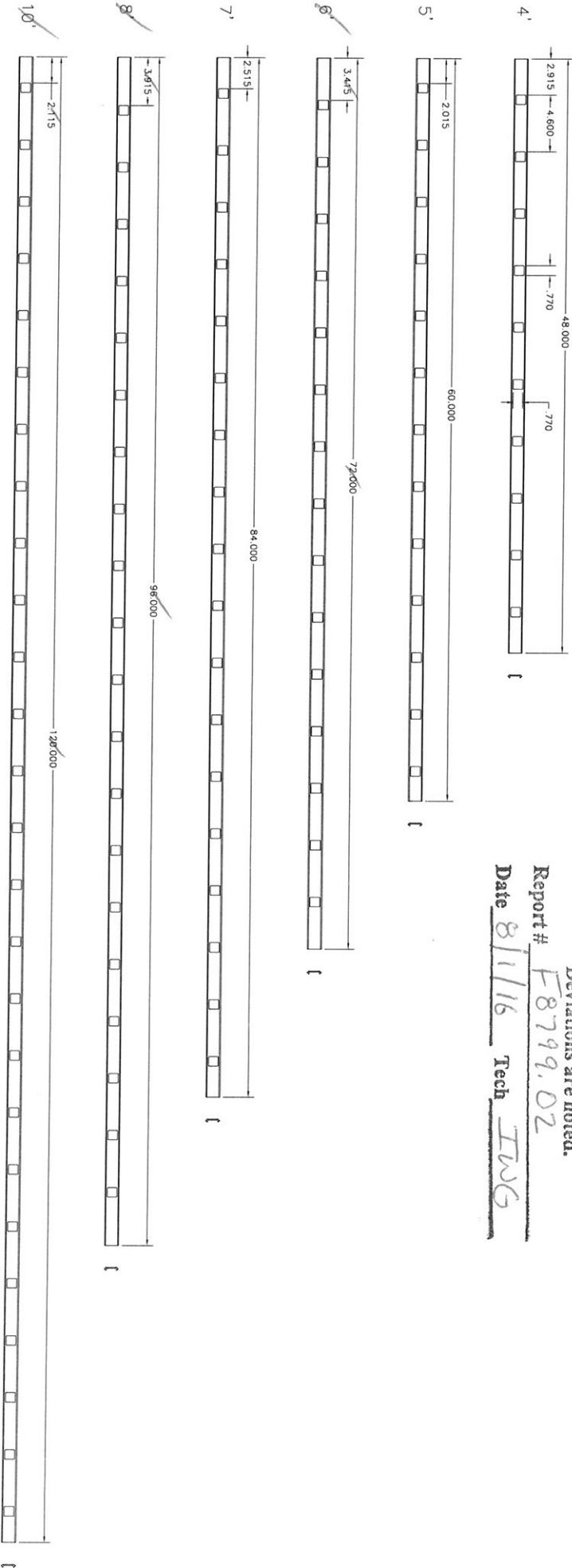


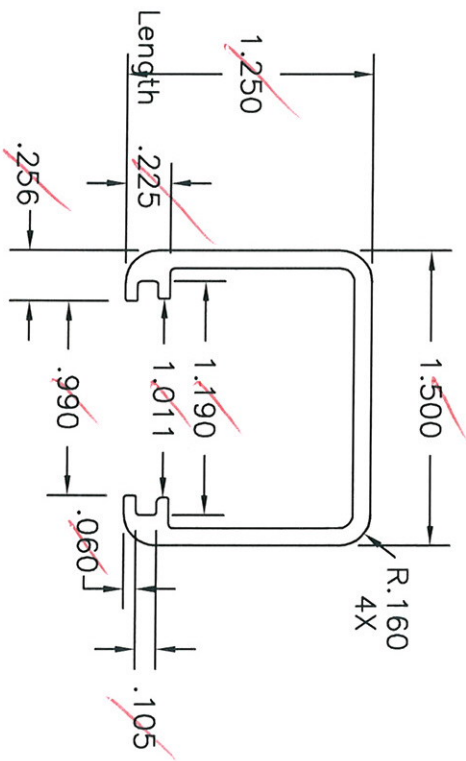
**Architectural Testing**

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

Date 8/1/16 Tech IMG





MATERIAL 6063 T5 ALUMINUM

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02  
Date 8/1/16 Tech IMG

Length	No Paint	BLACK	WHITE	BRONZE	TAN	CLAY
48"	780012	790012	800012	810012	820012	830012
60"	780013	790013	800013	810013	820013	830013
72"	780014	790014	800014	810014	820014	830014
84"	780015	790015	800015	810015	820015	830015
96"	780016	790016	800016	810016	820016	830016
120"	780068	790068	800068	810068	820068	830068

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CUSTOM EXTRUSIONS  
DRAWER 300 SHEBOGAN FALLS, WI 53085  
PH. (920) 467-4685 FAX. (920) 467-3271

WALL .090

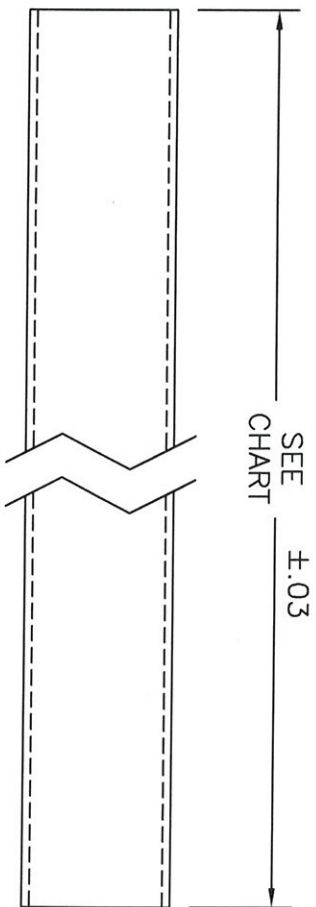
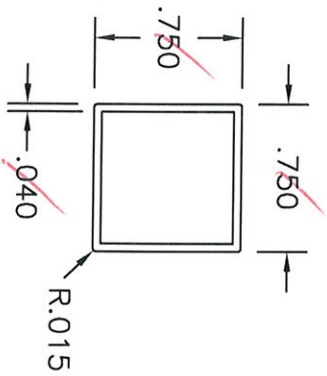
AREA-  
FLEXIBLE  
RIGID

LOG  
REV.  
DR. BY DH  
SCALE FULL  
DATE 2/3/14  
DIE

TOLERANCES-  
XX ±  
XXX ±  
ANGLES

BOTTOM RAIL

PART NO. SEE CHART



**Architectural Testing**

MATERIAL 6063 T5 ALUMINUM

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

Date 8/11/16 Tech IMG

Length	No Point	BLACK	WHITE	BRONZE	TAN	CLAY
39.00	780002	790002	800002	810002	820002	830002
33.00	780001	790001	800001	810001	820001	830001
31.00	780003	790003	800003	810003	820003	830003
14.00	780048	790048	N/A	N/A	N/A	N/A
6.50	780004	790004	800004	810004	820004	830004
2.00	780000	790000	N/A	N/A	N/A	N/A

**Poly Vinyl Co.**

CUSTOM EXTRUSIONS  
DRAWER 300 SHEBOYGAN FALLS, WI 53085  
PH. (920) 467-4685 FAX. (920) 467-3271

WALL

AREA-  
FLEXIBLE  
RIGID

LOG  
REV. DR. BY DH

TOLERANCES-  
XX ± .03  
XXX ± .015

SCALE FULL  
DATE 1/28/14  
DIE

ANGLES

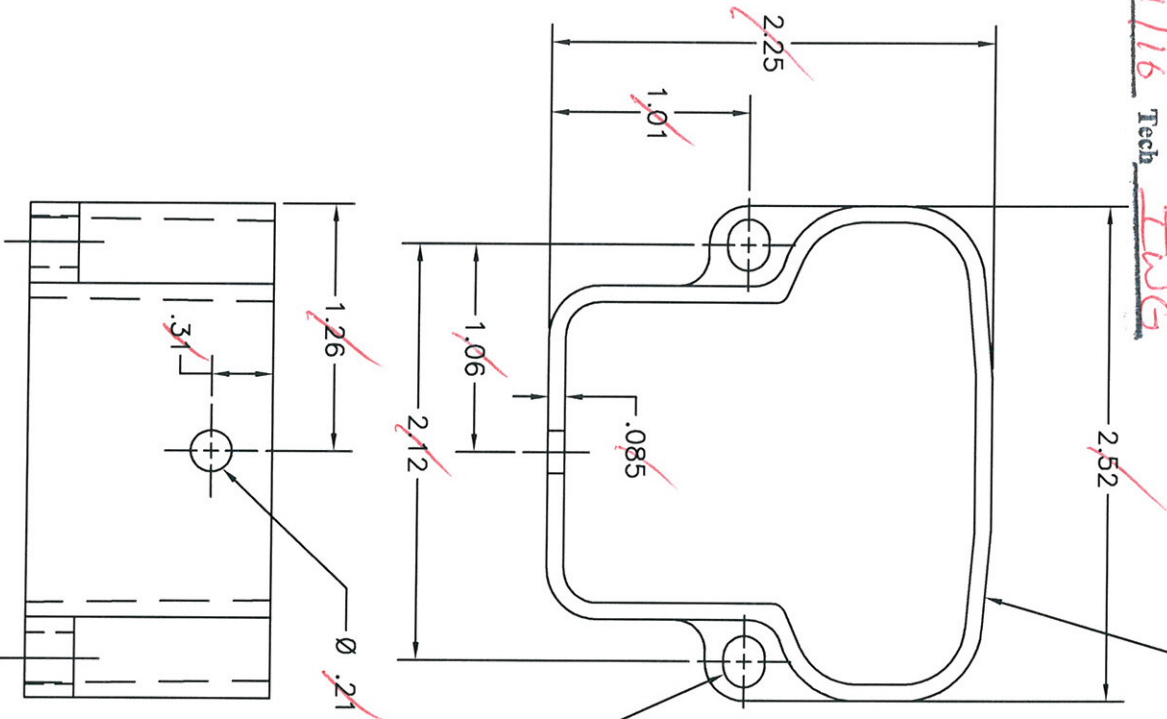
Bolsters

PART NO. SEE CHART

Test sample complies with these details.  
Deviations are noted.

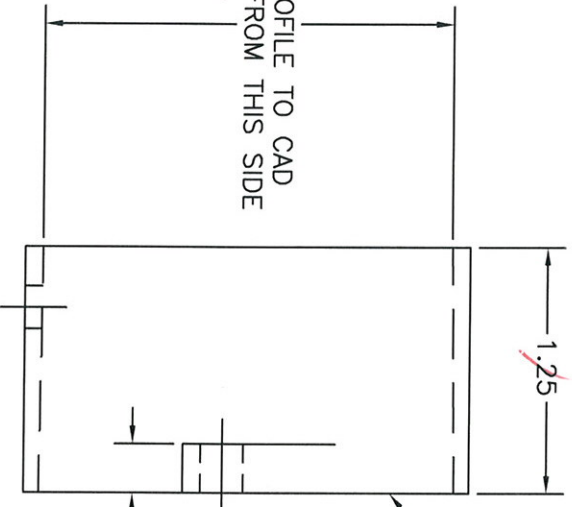
Report # F8799.02  
Date 8/11/16 Tech TWG

REFER TO CAD GEOMETRY FOR ALL MISSING DIMENSIONS



INSIDE PROFILE TO CAD GEOMETRY FROM THIS SIDE

(2) .21 x .26 SLOT



EJECTOR PIN AND GATE MARKS THIS SURFACE ONLY

MATERIAL A380 CAST ALUMINUM

- 780076 No Paint
- 790076 Black
- 800076 White
- 810076 Bronze
- 820076 Tan
- 830076 Clay

ALL DRAFT ANGLES, EJECTOR PIN MARKS and GATE LOCATIONS MUST BE APPROVED PRIOR TO TOOL BUILD

**Poly Vinyl Co.**  
CUSTOM EXTRUSIONS  
DRAWER 300 SHERBOGAN FALLS, WI 53085  
PH. (920) 467-4685 FAX. (920) 467-3271

MATERIAL A380 DIE CAST ALUMINUM

AREA-	LOG
FLEXIBLE	REV.
RIGID	DR. BY RJM
TOLERANCES-	SCALE FULL
XX ±	DATE 12/16/14
XXX ±	DIE
ANGLES	
TOP BRACKET, ONE PIECE DESIGN	
PART NO.	780076

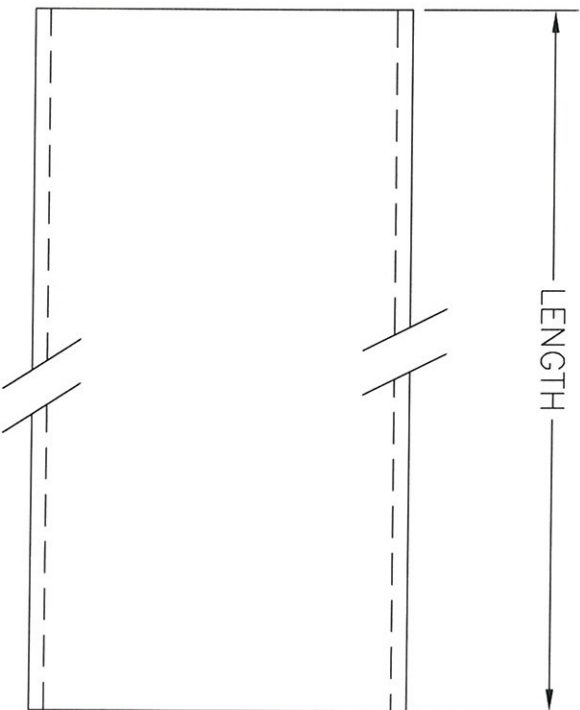
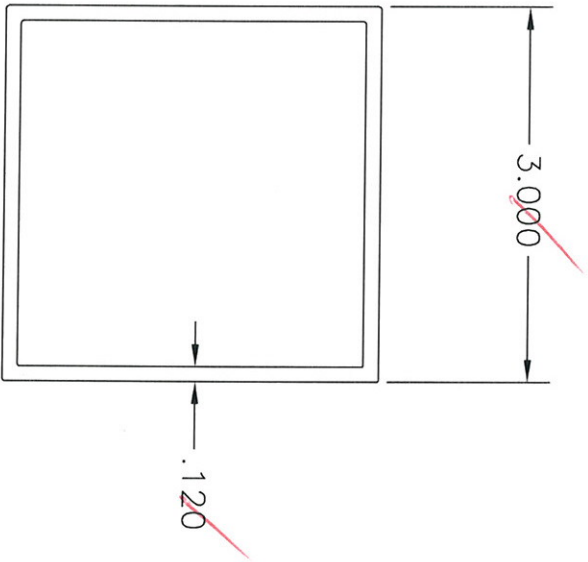




Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

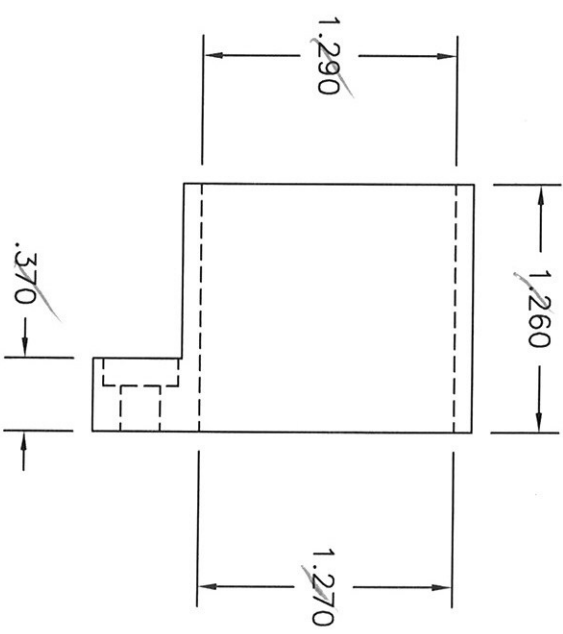
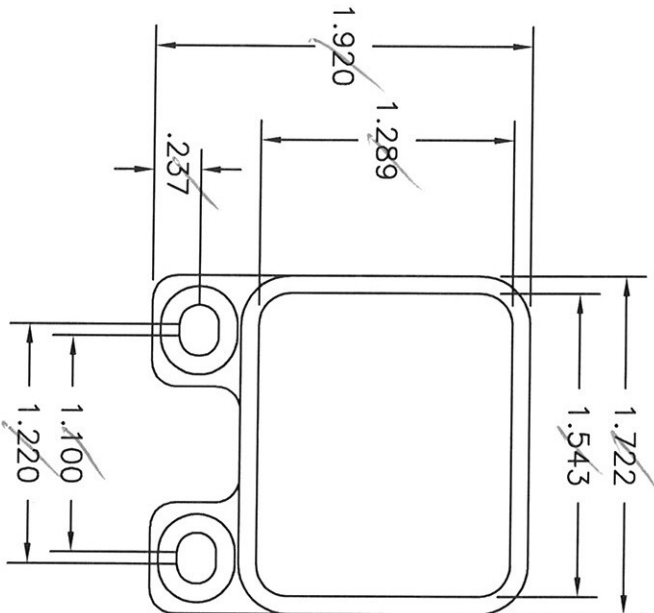
Date 8/1/16 Tech IMG



Length	No. Point	BLACK	WHITE	BRONZE	TAN	CLAY
37.25	780127	790127	800127	810127	820127	830127
43.25	780105	790105	800105	810105	820105	830105

MATERIAL 6063 T5 ALUMINUM

<b>Poly Vinyl Co.</b>	
CUSTOM EXTRUSIONS	
DRAWER 300 SHEPARD PALIS. #1 23085	
PH. (920) 467-4685 FAX. (920) 467-3271	
WALL	LOG
AREA- 0	REV.
FLEXIBLE	DR. BY
RIGID	RJM
TOLERANCES-	SCALE FULL
XX ±	DATE 2/22/16
XXX ±	DIE
ANGLES	
POST EXTRUSION, 6063 T5	
PART NO.	



MATERIAL A380 CAST ALUMINUM

- 780007 No Paint
- 790007 Black
- 800007 White
- 810007 Bronze
- 820007 Tan
- 830007 Clay



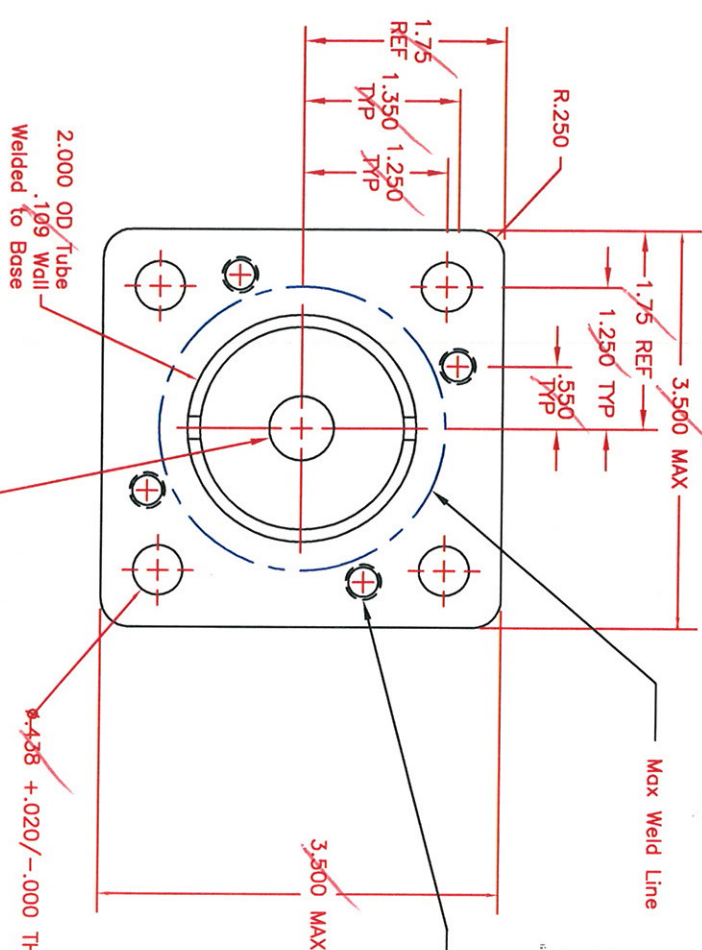
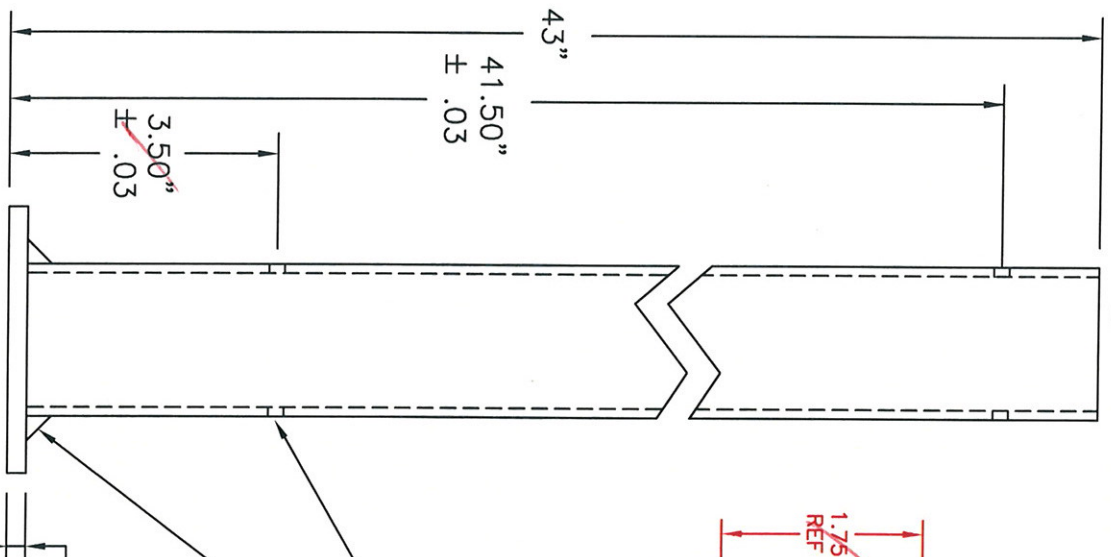
Test sample complies with these details.  
Deviations are noted.

Report # F8799.02  
Date 8/1/16 Tech IMG

<b>Poly Vinyl Co.</b>	
CUSTOM EXTRUSIONS	
DRAWER 300 SHERBOGAN FALLS, WI 53085	
PH. (920) 467-4685 FAX. (920) 467-3271	
WALL	LOG
AREA-	REV.
FLEXIBLE	DR. BY DH
RIGID	SCALE FULL
TOLERANCES-	DATE 8/28/13
XX ±	DIE
XXX ±	
ANGLES	
BOTTOM BRACKET	
PART NO. 780007	

.215 Ø HOLES CENTERED  
± .020 TO CENTERLINE

ϕ



Test sample complies with these details.  
Deviations are noted.  
Report # F8799.02  
Date 9/11/16 Tech INWG

ϕ5/16-18 Thread  
4 Places as shown -  
must be free of burrs and allow  
for the installation of a 5/16-18 bolt



MATERIAL - HRPO-LOW CARBON  
COMMERCIAL QUALITY STEEL  
12 GA

NOTES:  
1 TUBE O.D. 2.00" ± .008 PER ASTM  
A513. O.D. MAY BE OUT OF ROUND UP  
TO .050" @ PUNCHED HOLES  
2 POWDER COATED BLACK  
3 E-COATING BLACK PAINT

REV	DATE	INTL	EXPLANATION

<p><b>Poly Vinyl Co.</b> CUSTOM EXTRUSIONS DRAWER 300 SHEBOYGAN FALLS, WI 53085 PH. (920) 467-4685 FAX. (920) 467-3271</p>	
WALL	LOG .1
AREA-	REV. REL
FLEXIBLE	DR. BY RJM
RIGID	SCALE
TOLERANCES-	DATE 02/19/16
XX ± .020	DIE
XXX ± .010	
ANGLES	
PART NO.	790126

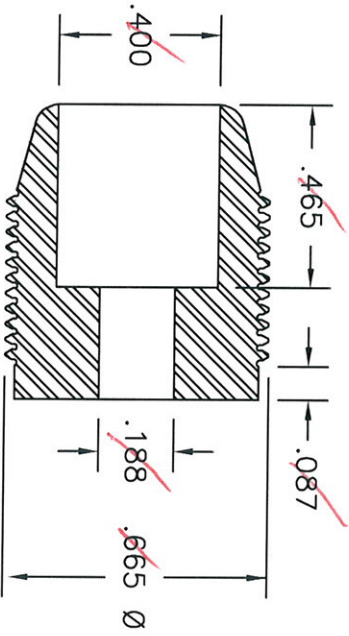
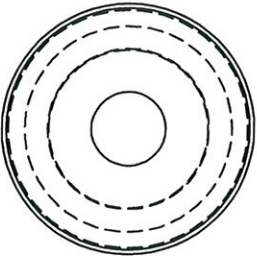
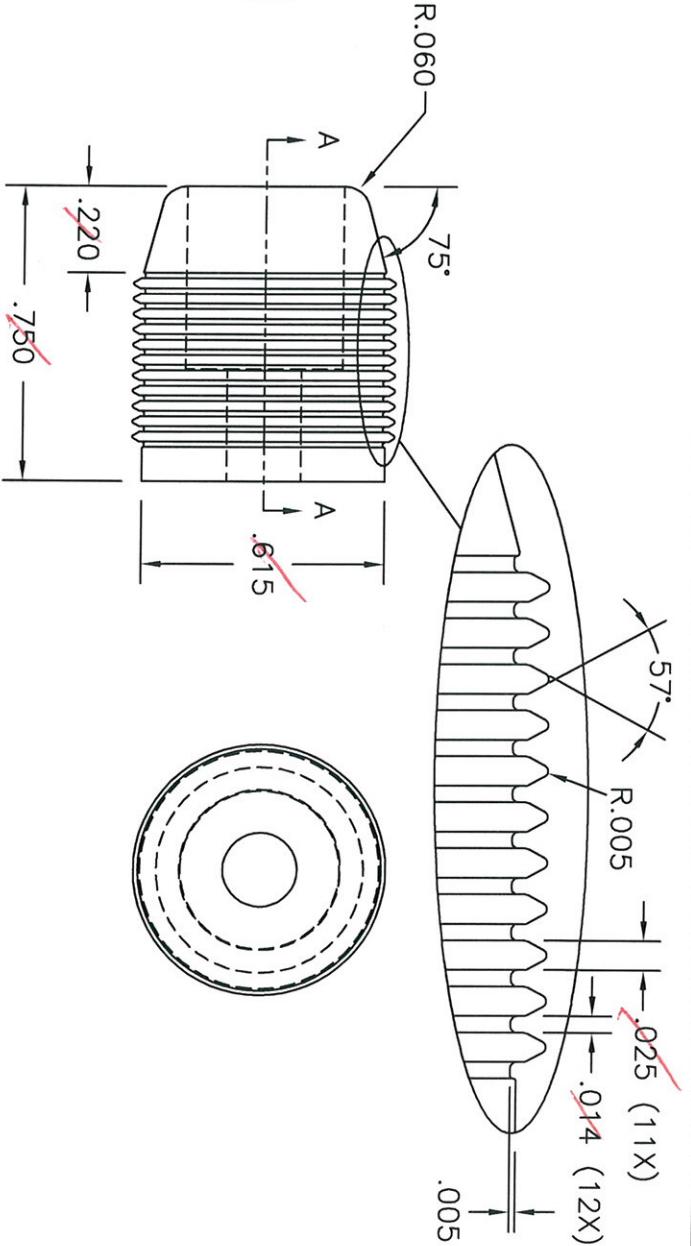
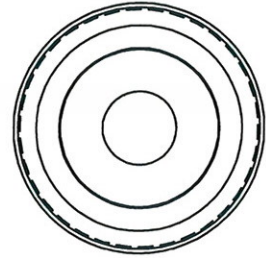


# Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

Date 8/24/16 Tech IWG



SECTION A-A

LENGTH-

NOTES:

1

FULL SCALE



**Poly Vinyl Co.**

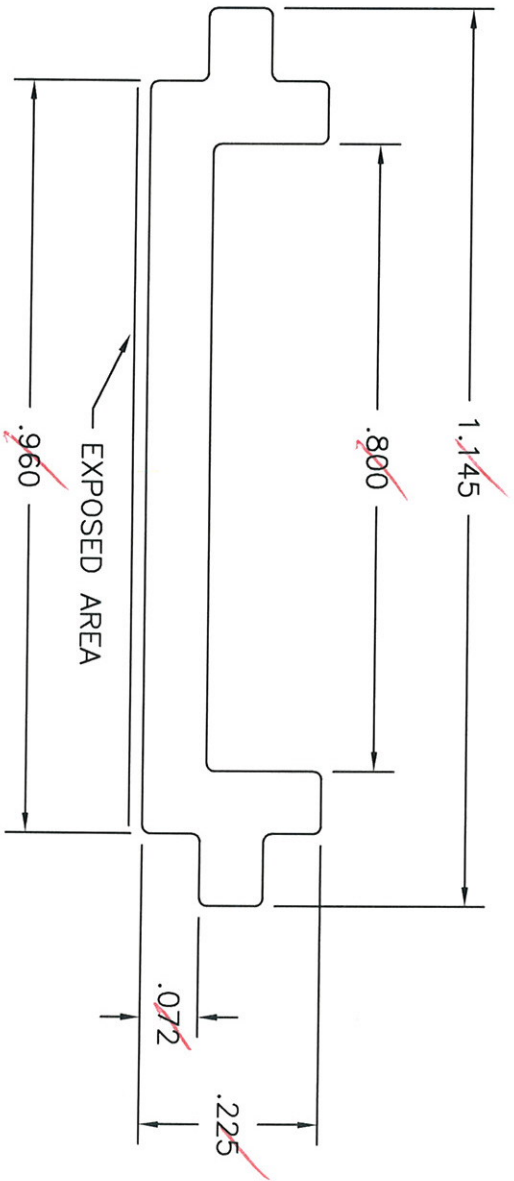
CUSTOM EXTRUSIONS  
DRAWER 300 SHERBOGAN FALLS, WI 53085  
PH. (920) 467-4685 FAX. (920) 467-3271

WALL	LOG
AREA-	REV. A
FLEXIBLE	DR. BY DH
RIGID	SCALE 2X
TOLERANCES-	DATE 11/19/13
XX ±	DIE
XXX ±	
ANGLES	
PART NO.	BALUSTER PLUG
	790050



ACTUAL SIZE

BREAK ALL CORNERS AT R.010



Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

Date 8/24/16 Tech IWG

*Poly Vinyl Co.*

CUSTOM EXTRUSIONS  
DRAWER 300 SHERBOYGAN FALLS, WI 53085  
PH. (920) 467-4685 FAX. (920) 467-5271

WALL .080

AREA- .115

FLEXIBLE

RIGID

TOLERANCES-

XX ±

XXX ±

ANGLES

LOG  
REV.

DR. BY DH

SCALE 4X

DATE 2/3/14

DIE

RAIL INSERT EXTRUSION

PART NO.

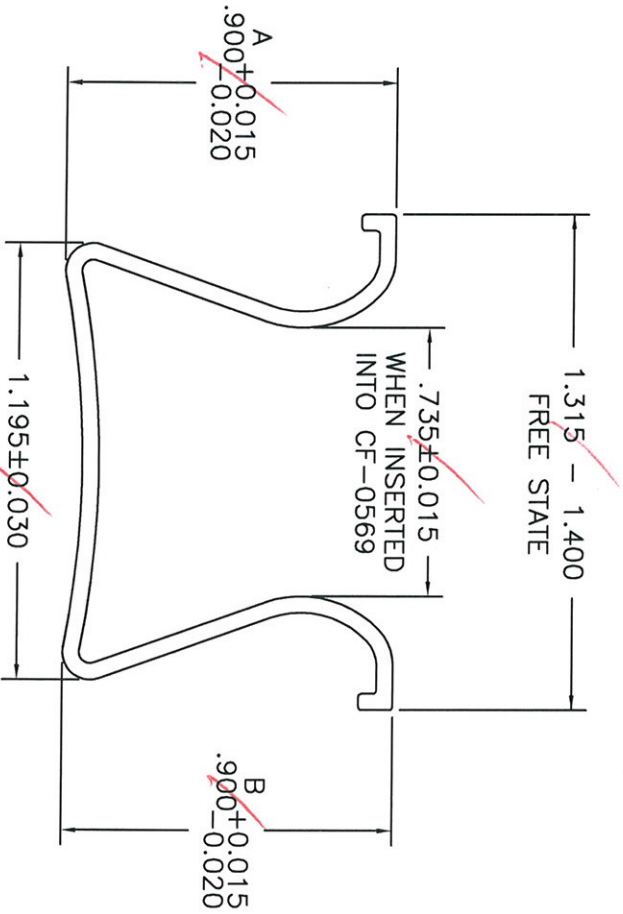


# Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report # F8799, 02

Date 8/24/16 Tech ITWG



PROCESS GUIDE

NOTES:

1

2

PART #	LENGTH ± .25
10000811	47.50
10000812	59.50
10000813	71.50
10000814	83.50
10000815	95.50
10000821	119.50
10000829	35.50

**Poly Vinyl Co.**  
 CUSTOM EXTRUSIONS  
 DRAWER 300 SHEBOYGAN FALLS, WI 53085  
 PH. (920) 467-4685 FAX. (920) 467-3271

WALL	TR	LOG
DR. BY	4/12/16	REV.
SCALE	2X	AREA-
DIE	3855	FLEXIBLE
		RIGID
		.152

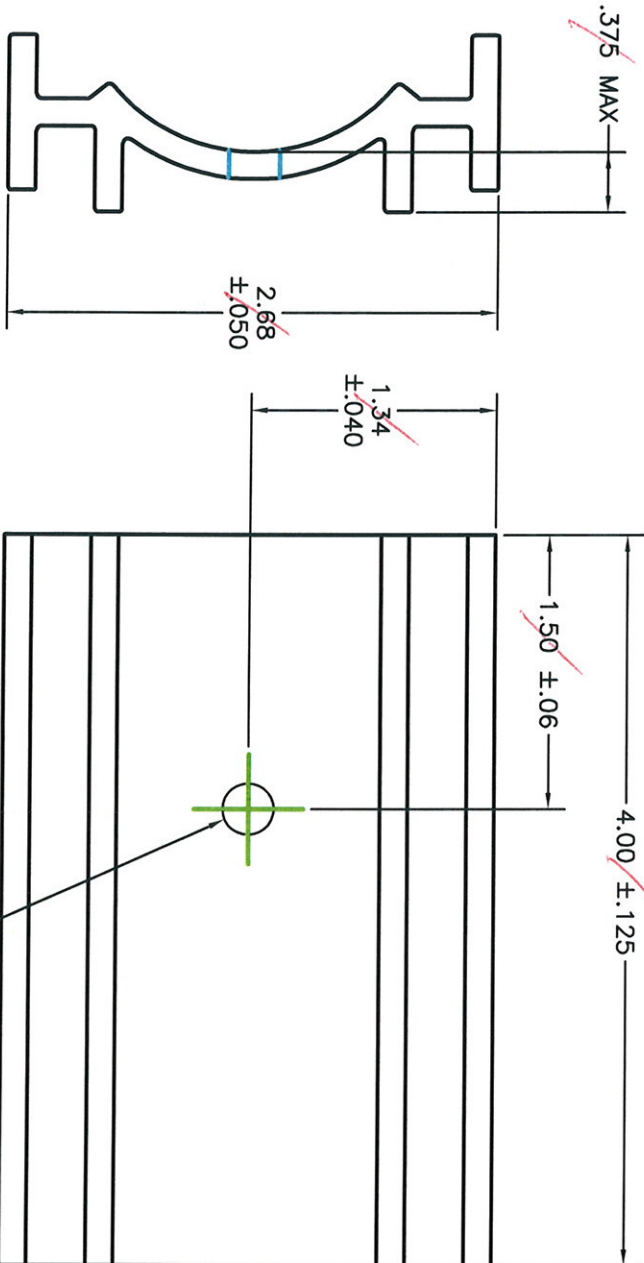


# Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report # F8799.02

Date 8/24/16 Tech IMG



## REVISIONS

NO.	DATE	CHANGE	IN.

## NOTICE

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**POLY VINYL CO. INC.**  
 CUSTOM EXTRUSIONS  
 320 RANGE LINE ROAD  
 SHEBOYGAN FALLS, WI 53085

<b>TOLERANCES UNLESS OTHERWISE SPECIFIED</b>		<b>NAME</b> Color Guard	
XXX = +\-.001 (LOCATIONS +\-.0002)		3" Post Filler	
XX = +\-.010		MATL. PVC	
X = +\-.03		DR. BY RJM	
FRACTIONS = +\-.1/16		DATE 4/20/16	
<b>DO NOT SCALE DRAWINGS</b>		QTY. 1	
		REQ'D. 1	
		PROJECT NO. <u>F8799.02-119-19</u>	
		SCALE FULL	

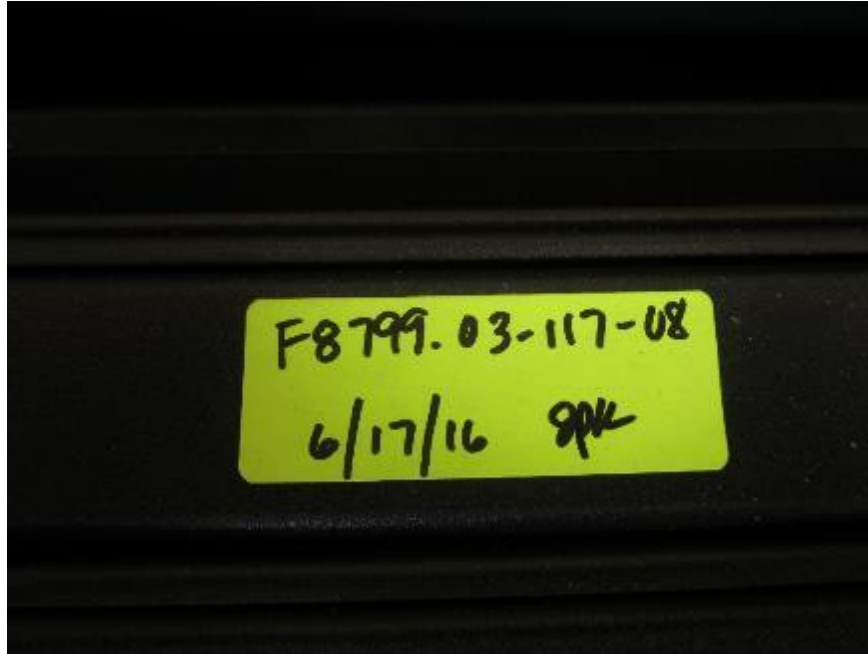


F8799.02-119-19

## **APPENDIX B**

### **Photographs**





**Photo No. 1**  
**Typical Sampling Mark**



**Photo No. 2**  
**Typical ASTM E 8 Tensile Test Setup**



**Photo No. 3**  
**Assembly Fastener Test Setup**



**Photo No. 4**  
**In-Fill Load Test at Center of Two Pickets**



**Photo No. 5**  
**In-Fill Load Test at Bottom of Two Pickets**



**Photo No. 6**  
**Concentrated Load Test at Mid-Span of Top Rail**



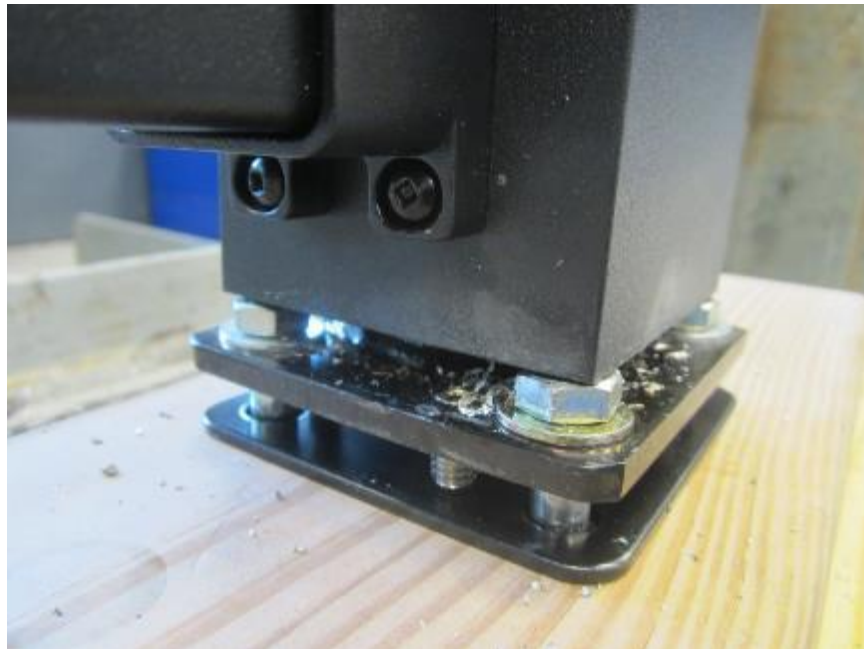
**Photo No. 7**  
**Concentrated Load Test at Rail End (Bracket)**



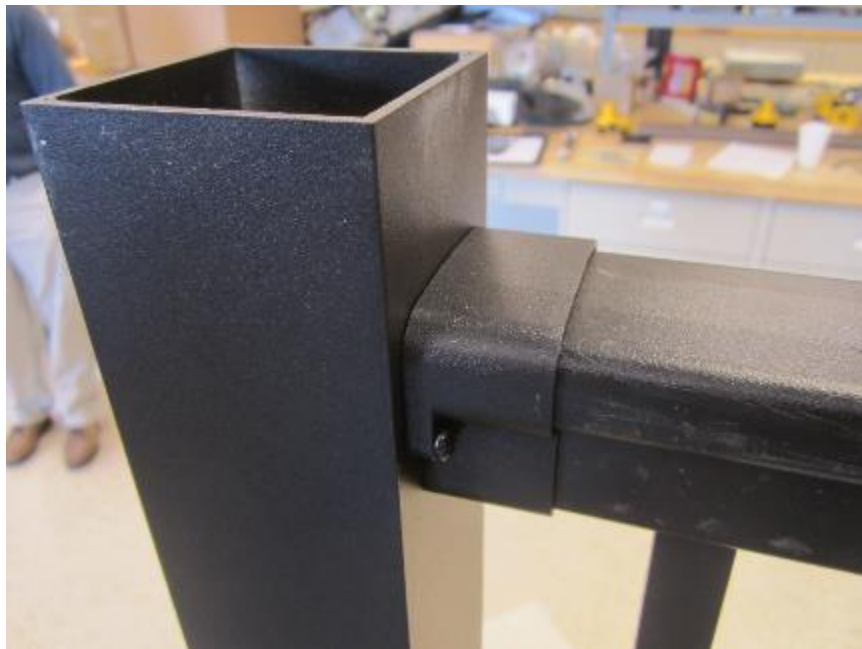
**Photo No. 8**  
**Concentrated Load Test at Top of Post Mount**  
**(Surface Mount Wood Installation)**



**Photo No. 9**  
**Concentrated Load Test at Top of Post Mount**  
**(Simulated Concrete Installation)**



**Photo No. 10**  
**Bottom Rail Bracket and Post Mount Connection**



**Photo No. 11**  
**Top Rail Bracket Connection**