

FORTRESS BUILDING PRODUCTS TEST REPORT

SCOPE OF WORK

STRUCTURAL PERFORMANCE TESTING ON THE *AL13 HOME* GUARDRAIL SYSTEM WITH *TWO ACCENT TOP RAILS* AND THREE INFILL OPTIONS

REPORT NUMBER

L0294.01-119-19 R1

TEST DATES

06/15/20 - 09/04/20

ISSUE DATE

09/17/20

REVISED DATE

09/25/20

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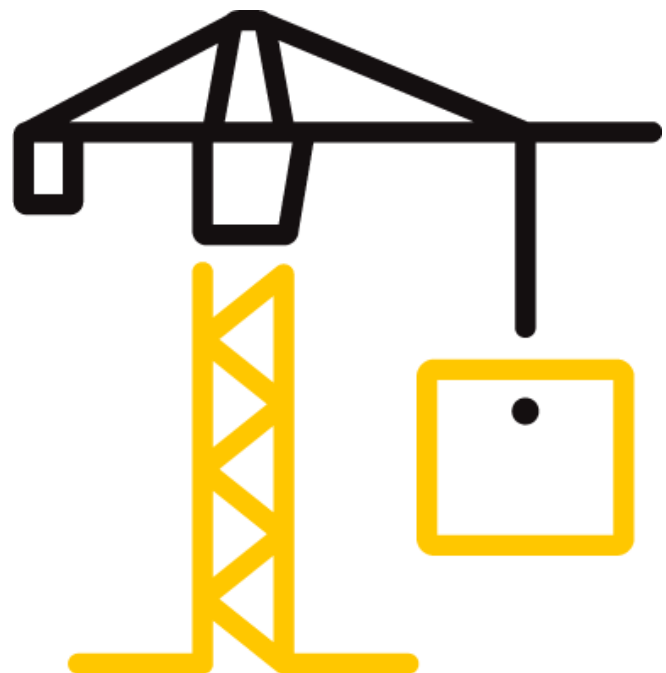
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TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

REPORT ISSUED TO

FORTRESS BUILDING PRODUCTS

1720 North First Street

Suite B

Garland, Texas 75040

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Fortress Building Products to perform structural performance testing in accordance with the 2018 IRC on the *A/13 Home* guardrail system with two accent top rails and three infill options. This report is in conjunction with Intertek Report No. I6590.01-119-19 which includes structural performance testing of the 2 in and 3 in *A/13 Home* post mounts. All tests performed were to evaluate structural performance of the guardrail assembly to carry and transfer imposed loads to the supporting structure. The test specimens evaluated included the infill, rails, rail brackets, and support posts. Anchorage of support posts to the supporting structure is not included in the scope of this testing and would need to be evaluated separately.

Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at Intertek test facility in York, PA. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

SECTION 2

SUMMARY OF TEST RESULTS

The specimens met the 2018 IRC design load performance requirements.

For INTERTEK B&C:

| | |
|----------------------|-----------------|
| COMPLETED BY: | Adam J. Schrum |
| TITLE: | Project Manager |
| SIGNATURE: | |
| DATE: | 09/25/20 |

| | |
|---------------------|------------------------------|
| REVIEWED BY: | V. Thomas Mickley, Jr., P.E. |
| TITLE: | Senior Staff Engineer |
| SIGNATURE: | |
| DATE: | 09/25/20 |

AJS:vtm/aas

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SECTION 3

TEST METHOD(S)

The specimens were evaluated in accordance with the following:

2018, *International Residential Code*[®], International Code Council

Structural tests were performed according to Chapter 17 (Structural Tests and Special Inspections) of the 2018 *International Building Code*[®], International Code Council.

Limitations

Section 2407 of the 2018 *International Building Code*[®] requires glass in guardrails to be laminated glass. Tempered glass conforming to ANSI Z97.1 Class A, may be used if there is no walking surface below the guardrail or the walking surface is permanently protected from the risk of falling glass. The guardrail system tested herein utilized tempered glass therefore its use is limited to the conditions noted above.

SECTION 4

MATERIAL SOURCE/INSTALLATION

Test samples were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek B&C for a minimum of four years from the test completion date.

The guardrail assemblies were installed and tested as a single railing section by surface mounting the posts to steel channels (simulated concrete) for the level guardrails and by directly securing the posts to a rigid steel test fixture, which rigidly restrained the posts from deflecting for the stair guardrails. Transducers mounted to an independent reference frame were located to record movement of reference points on the guardrail system components (ends and mid-point) to determine net component deflections. See photographs in Section 11 for individual test setups.

SECTION 5

EQUIPMENT

The guardrails were tested in a self-contained structural frame designed to accommodate anchorage of the guardrail assembly and application of the required test loads. The specimens were loaded using either an electric winch mounted to a rigid steel test frame or by using a hydraulic cylinder mounted on a forklift. High strength steel cables, nylon straps, and load distribution beams were used to impose test loads on the specimens. Applied load was measured using an electronic load cell located in-line with the loading system. Electronic linear motion transducers were used to measure deflections.

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LIST OF OFFICIAL OBSERVERS

| NAME | COMPANY |
|-----------------------|--------------|
| Kevin J. Eichelberger | Intertek B&C |

SECTION 7

TEST PROCEDURE

Each 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 prior to testing.

An initial load, not exceeding 50% of design load, was applied and transducers were zeroed. Load was then applied at a steady uniform rate until reaching 2.0 times design load in no less than 10 seconds. After reaching 2.0 times design load, the load was released. After allowing a minimum period of one minute for stabilization, load was reapplied to the initial load level used at the start of the loading procedure, and deflections were recorded and used to analyze recovery. Load was then increased at a steady uniform rate until reaching 2.5 times design load or until failure occurred. The testing time was continually recorded from the application of initial test load until the ultimate test load was reached.

The test load adjustment factor was 2.5 x design load for loads applied to the rail and posts and 4.0 x design load for loads applied to or transferred through the glass infill.

Deflection and permanent set were component deflections relative to their end-points; they were not overall system displacements. All loads and displacement measurements were horizontal, unless noted otherwise.

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TEST SPECIMEN DESCRIPTION

Test specimens were assembled by an Intertek technician. Fortress Railing Products provided the test components with the following details:

| | |
|--|---|
| PRODUCT | <i>AL13 Home guardrail system with two Accent Top Rails</i> |
| MATERIAL | Extruded Aluminum (unspecified alloy) |
| COLORS | - Black - White |
| RAIL LENGTH | - 69, 69-1/2 in or 94 in (inside of post to inside of post) (level) - 78 in or 96 in (inside of post to inside of post) (stair) |
| RAIL HEIGHT | - 40-7/8 - 41 in (top of top rail to bottom of bottom rail) (level) - 40 in or 41 in (top of top rail to bottom of bottom rail; measured parallel to the baluster) (stair) - 42 in (nominal) |
| TOP RAIL CAP | - Flat: 1-5/8 in high by 2-3/8 in wide by 0.070 in thick aluminum extrusion - Round: 2-1/16 in high by 2-3/8 in wide by 0.070 in thick contoured aluminum extrusion |
| TOP RAIL SPACER | - 1-7/16 in high by 2-3/16 in wide by 0.070/0.060 in thick aluminum extrusion (continuous) (used in guardrail system with the Flat top rail) - 1-7/16 in high by 2-3/16 in wide by 1-3/4 in long by 0.070/0.060 in thick aluminum extrusion (spaced 2 in from each end and 15 in on center) (used in guardrail systems with the Round top rail) |
| TOP RAIL SUBRAIL/ BOTTOM RAIL | - Vertical Cable System (Level): 1-1/4 in high by 1-1/4 in wide by 0.100 in thick "closed box" aluminum extrusion - Vertical Cable System (Stair): 1-1/4 in high by 1-1/4 in wide by 0.100 in thick "open box" aluminum extrusion - Glass Picket System: 1-1/4 in high by 1-1/4 in wide by 0.110/0.140 in thick aluminum extrusion with slotted holes for picket grommets - Glass Panel System: 1-1/4 in high by 1-1/4 in wide by 0.075/0.085 in thick aluminum extrusion with 9/32 in wide slot for glass panel and rubber gasket |

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| | |
|----------------------|---|
| IN-FILL | <ul style="list-style-type: none"> - 1/8 in diameter, 1x19, stainless steel vertical cables (twenty-one (level) and fifteen (stair) equally spaced in groups of three) with six equally spaced 5/8 in diameter by 0.125 in thick vertical intermediate support balusters - 39-3/8 in high by 3-3/4 in wide by 5/16 in thick tempered glass pickets - 39 in high by 61-1/4 in wide by 1/4 in thick tempered glass full view panel |
| RAIL BRACKETS | <ul style="list-style-type: none"> - Level: 1-1/2 in high by 1-5/8 in wide by 1 in deep (0.160/0.150 in wall) cast aluminum brackets - Stair: Two piece, cast aluminum hinged bracket |
| POST | <p>2 in square by 0.120 in extruded aluminum tube with an integral screw chase at each corner, connected to a 4-9/16 in square by 0.30 in thick steel base plate with four M8 by 70 mm long flat head machine screws (one in each screw chase); the base plate included four 1/2 in diameter holes, four 5/16 in diameter holes, and one 3/4 in diameter hole</p> |
| SUPPORT FOOT | <p>5/8 in square by 2 in high cast aluminum tube with cap plate</p> |

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Fastening Schedule

| CONNECTION | FASTENER |
|--|---|
| Rail Bracket to Post | Two 1/4-14 by 1" (0.157 in minor diameter) Torx drive, flat-head, self-drilling screws |
| Rail Bracket to Rail | One 1/4-14 by 1" (0.157 in minor diameter) Torx drive, flat-head, self-drilling screw on the protected side of the rail |
| Hinged Bracket Connection | Two-piece fastener consisting of one, 1-1/2 in long pan head smooth outside shank female threaded pin and one, #8-32 by 1/4" pan head screw |
| Rail Spacer to Rail | #10-16 by 1/2" (0.127 in minor diameter) hex head, self-drilling screws(two per piece, one protected side and one exterior side when spacer is non-continuous; 2 in from each end and 18 in on center staggered (protected side/exterior side) when spacer is continuous) |
| Intermediate Support Baluster to Top/Bottom Rail | One, 1/4-24 by 1-1/8", allen drive, pan-head, stainless steel machine screw with washer |
| Cable Infill to Top Rail | Level: Stainless steel swage connector with 5/16 in threaded end, nylon lock nut and washer Stair: Stainless steel swage connector with 5/16 in threaded end, nut and cast aluminum angled washer |
| Cable Infill to Bottom Rail | Level: Stainless steel swage connector with snap ring Stair: Stainless steel swage connector with snap ring and cast aluminum washer |
| Glass Panel or Picket to Top/Bottom Rail | Slip Fit - No mechanical connections |
| Top Rail Cap to Top Rail Spacer | Snap Fit - No mechanical connections |
| Support Block to Bottom Rail | Channel fit - no mechanical connection to rail |
| Steel Post Mount to Substructure | Four 3/8 in Grade 5 hex-head bolts with nut and washer |

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SECTION 9

TEST RESULTS

Key to Test Results Tables:

Load Level: Target test load

Test Load: Actual applied load at the designated load level (target).

Elapsed Time (E.T.): The amount of time into the test with zero established at the beginning of the loading procedure.

Test Series No. 1

8 ft (94 in) by 42 in A/13 Home Level Guardrail with Vertical Cable Infill and Round Accent Top Rail Cap

Test No. 1 - 06/30/20

Design Load: 50 lb / 1 square ft at Center of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 105 | 00:18 | -- | 0.88 | -- | -- |
| Initial Load | 25 | 02:07 | -- | 0.09 | -- | -- |
| 90% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 129 | 02:20 | Achieved Load without Failure | | | |

Test No. 2 - 06/30/20

Design Load: 50 lb / 1 square ft at Bottom of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:16 | -- | 0.74 | -- | -- |
| Initial Load | 25 | 01:47 | -- | 0.06 | -- | -- |
| 92% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 125 | 02:04 | Achieved Load without Failure | | | |

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Test No. 3 - 06/30/20

Design Load: 50 lb / 1 square ft at Center of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 103 | 00:12 | -- | 0.71 | -- | -- |
| Initial Load | 25 | 01:44 | -- | 0.03 | -- | -- |
| 96% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 130 | 01:59 | Achieved Load without Failure | | | |

Test No. 4 - 06/30/20

Design Load: 50 lb / 1 square ft at Bottom of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 104 | 00:13 | -- | 0.63 | -- | -- |
| Initial Load | 25 | 01:48 | -- | 0.02 | -- | -- |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 131 | 01:57 | Achieved Load without Failure | | | |

Test No. 5 - 06/30/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 403 | 00:46 | 1.11 | 2.56 | 1.33 | 1.34 |
| Initial Load | 50 | 02:31 | 0.05 | 0.22 | 0.12 | 0.14 |
| 90% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 502 | 03:13 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

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Test No. 6 - 06/30/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 801 | 01:15 | 3.02 | 3.53 |
| Initial Load | 80 | 03:09 | 0.43 | 0.79 |
| 86% Recovery (Rail End #1) and 78% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1003 | 04:34 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

Test Series No. 2

8 ft (94 in) by 42 in A13 Home Level Guardrail with Vertical Cable Infill and Flat Accent Top Rail Cap

Test No. 1 - 06/30/20

Design Load: 50 lb / 1 square ft at Center of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 104 | 00:11 | -- | 0.81 | -- | -- |
| Initial Load | 25 | 01:43 | -- | 0.04 | -- | -- |
| 95% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 129 | 02:00 | Achieved Load without Failure | | | |

Test No. 2 - 06/30/20

Design Load: 50 lb / 1 square ft at Bottom of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 102 | 00:18 | -- | 0.77 | -- | -- |
| Initial Load | 25 | 01:51 | -- | 0.03 | -- | -- |
| 96% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 131 | 02:05 | Achieved Load without Failure | | | |

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Test No. 3 - 06/30/20

Design Load: 50 lb / 1 square ft at Center of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 102 | 00:12 | -- | 0.66 | -- | -- |
| Initial Load | 25 | 01:37 | -- | 0.04 | -- | -- |
| 94% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 130 | 01:49 | Achieved Load without Failure | | | |

Test No. 4 - 06/30/20

Design Load: 50 lb / 1 square ft at Bottom of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 104 | 00:14 | -- | 0.58 | -- | -- |
| Initial Load | 25 | 01:35 | -- | 0.02 | -- | -- |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 128 | 01:49 | Achieved Load without Failure | | | |

Test No. 5 - 06/30/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 403 | 00:45 | 1.18 | 2.37 | 1.29 | 1.14 |
| Initial Load | 50 | 02:37 | 0.06 | 0.14 | 0.09 | 0.07 |
| 94% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 502 | 03:37 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

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Test No. 6 - 06/30/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 801 | 01:07 | 3.20 | 3.23 |
| Initial Load | 80 | 02:58 | 0.59 | 0.56 |
| 82% Recovery (Rail End #1) and 83% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1000 | 04:11 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

Test Series No. 3

6 ft (69-1/2 in) by 42 in A113 Home Level Guardrail with PureView Glass Balusters and Round Top Rail Cap

Test No. 1 - 06/15/20

Design Load: 50 lb / 1 square ft at Center of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:10 | -- | 0.55 | -- | -- |
| Initial Load | 25 | 01:37 | -- | 0.02 | -- | -- |
| 96% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 203 | 01:52 | Achieved Load without Failure | | | |

Test No. 2 - 06/15/20

Design Load: 50 lb / 1 square ft at Bottom of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 108 | 00:10 | -- | 0.33 | -- | -- |
| Initial Load | 25 | 01:45 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 211 | 02:07 | Achieved Load without Failure | | | |

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Test No. 3 - 06/15/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 407 | 00:50 | 1.15 | 1.82 | 1.30 | 0.60 |
| Initial Load | 50 | 02:26 | 0.02 | 0.04 | 0.04 | 0.01 |
| 98% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 505 | 02:53 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

Test No. 4 - 06/15/20

Design Load: 200 lb Vertical Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 50 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 412 | 00:16 | -- | 0.10 | -- | -- |
| Initial Load | 50 | 01:44 | -- | 0.03 | -- | -- |
| 70% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 801 | 02:07 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

Test No. 5 - 06/15/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 803 | 00:58 | 3.43 | 3.22 |
| Initial Load | 80 | 02:40 | 0.71 | 0.59 |
| 79% Recovery (Rail End #1) and 82% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1001 | 03:54 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test Series No. 4

6 ft (69-1/2 in) by 42 in A13 Home Level Guardrail with PureView Glass Balusters and Flat Top Rail Cap

Test No. 1 - 06/30/20

Design Load: 50 lb / 1 square ft at Center of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:15 | -- | 0.53 | -- | -- |
| Initial Load | 25 | 01:49 | -- | 0.02 | -- | -- |
| 96% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 205 | 02:09 | Achieved Load without Failure | | | |

Test No. 2 - 06/30/20

Design Load: 50 lb / 1 square ft at Bottom of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 105 | 00:10 | -- | 0.33 | -- | -- |
| Initial Load | 25 | 01:39 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 206 | 02:00 | Achieved Load without Failure | | | |

Test No. 3 - 06/30/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 403 | 00:55 | 1.66 | 2.20 | 1.69 | 0.53 |
| Initial Load | 50 | 02:35 | 0.22 | 0.23 | 0.22 | 0.01 |
| 98% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 504 | 03:13 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 4 - 06/30/20

Design Load: 200 lb Vertical Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 50 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 406 | 00:14 | -- | 0.08 | -- | -- |
| Initial Load | 50 | 01:47 | -- | 0.03 | -- | -- |
| 63% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 805 | 02:20 | Achieved Load without Failure | | | |

Test No. 5 - 06/30/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) |
|-------------------------------------|----------------|----------------|-------------------------------|
| Initial Load | 40 | 00:00 | 0.00 |
| 2.0x Design Load | 403 | 00:42 | 3.45 |
| Initial Load | 40 | 02:15 | 0.78 |
| 77% Recovery from 2.0 x Design Load | | | |
| 2.5x Design Load | 505 | 02:47 | Achieved Load without Failure |

Test Series No. 5

6 ft (69 in) by 42 in A13 Home Level Guardrail with PureView Full Glass Panel and Round Top Rail Cap

Test No. 1 - 06/18/20

Design Load: 50 lb / 1 square ft at Center of Full Glass Panel In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:51 | -- | 0.31 | -- | -- |
| Initial Load | 25 | 04:14 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 202 | 05:13 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 2 - 06/18/20

Design Load: 50 lb / 1 square ft at Bottom of Full Glass Panel In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:31 | -- | 0.26 | -- | -- |
| Initial Load | 25 | 03:31 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 200 | 04:28 | Achieved Load without Failure | | | |

Test No. 3 - 06/18/20

Design Load: 50 lb / 1 square ft at Middle Edge of Full Glass Panel In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:35 | -- | 0.38 | -- | -- |
| Initial Load | 25 | 02:47 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 200 | 03:46 | Achieved Load without Failure | | | |

Test No. 4 - 06/18/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 400 | 01:37 | 1.31 | 1.84 | 1.36 | 0.51 |
| Initial Load | 50 | 04:36 | 0.15 | 0.17 | 0.14 | 0.03 |
| 94% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 501 | 06:35 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 5 - 09/04/20

Design Load: 200 lb Vertical Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 50 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 415 | 00:19 | -- | 0.20 | -- | -- |
| Initial Load | 50 | 01:52 | -- | 0.03 | -- | -- |
| 85% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 801 | 02:21 | Achieved Load without Failure | | | |

Test No. 6 - 06/18/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 801 | 01:06 | 3.53 | 3.30 |
| Initial Load | 80 | 03:04 | 0.83 | 0.65 |
| 76% Recovery (Rail End #1) and 80% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1000 | 04:38 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

Test Series No. 6

6 ft (69 in) by 42 in A13 Home Level Guardrail with PureView Full Glass Panel and Flat Top Rail Cap

Test No. 1 - 06/18/20

Design Load: 50 lb / 1 square ft at Center of Full Glass Panel In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:37 | -- | 0.28 | -- | -- |
| Initial Load | 25 | 03:10 | -- | 0.01 | -- | -- |
| 96% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 202 | 03:54 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 2 - 06/18/20

Design Load: 50 lb / 1 square ft at Bottom of Full Glass Panel In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:36 | -- | 0.24 | -- | -- |
| Initial Load | 25 | 04:23 | -- | 0.02 | -- | -- |
| 92% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 201 | 05:11 | Achieved Load without Failure | | | |

Test No. 3 - 06/18/20

Design Load: 50 lb / 1 square ft at Middle Edge of Full Glass Panel In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:36 | -- | 0.38 | -- | -- |
| Initial Load | 25 | 03:04 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 201 | 05:17 | Achieved Load without Failure | | | |

Test No. 4 - 06/18/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 405 | 01:19 | 1.36 | 1.82 | 1.29 | 0.50 |
| Initial Load | 50 | 05:29 | 0.10 | 0.33 | 0.11 | 0.23 |
| 54% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 501 | 07:36 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 5 - 09/04/20

Design Load: 200 lb Vertical Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 50 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 402 | 00:25 | -- | 0.15 | -- | -- |
| Initial Load | 50 | 02:13 | -- | 0.05 | -- | -- |
| 75% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 803 | 03:00 | Achieved Load without Failure | | | |

Test No. 6 - 06/18/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 803 | 01:02 | 3.72 | 3.56 |
| Initial Load | 80 | 02:46 | 1.03 | 0.83 |
| 72% Recovery (Rail End #1) and 77% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1001 | 04:16 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

Test Series No. 7

8 ft (96 in) by 42 in by 35° A113 Home Stair Guardrail with Vertical Cable Infill and Round Top Rail Cap

Test No. 1 - 06/19/20

Design Load: 50 lb / 1 square ft at Center of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:13 | -- | 0.94 | -- | -- |
| Initial Load | 25 | 01:41 | -- | 0.05 | -- | -- |
| 95% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 130 | 01:51 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 2 - 06/19/20

Design Load: 50 lb / 1 square ft at Bottom of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:10 | -- | 0.94 | -- | -- |
| Initial Load | 25 | 01:36 | -- | 0.03 | -- | -- |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 130 | 01:50 | Achieved Load without Failure | | | |

Test No. 3 - 06/19/20

Design Load: 50 lb / 1 square ft at Center of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:10 | -- | 0.71 | -- | -- |
| Initial Load | 25 | 01:43 | -- | 0.02 | -- | -- |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 131 | 01:56 | Achieved Load without Failure | | | |

Test No. 4 - 06/19/20

Design Load: 50 lb / 1 square ft at Bottom of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:12 | -- | 1.01 | -- | -- |
| Initial Load | 25 | 01:46 | -- | 0.02 | -- | -- |
| 98% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 130 | 01:59 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 5 - 06/19/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 402 | 00:28 | 0.21 | 1.69 | 0.07 | 1.55 |
| Initial Load | 50 | 02:18 | 0.00 | 0.08 | 0.00 | 0.08 |
| 95% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 503 | 03:00 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

Test No. 6 - 06/19/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 806 | 00:57 | 0.69 | 0.52 |
| Initial Load | 80 | 02:35 | 0.09 | 0.06 |
| 87% Recovery (Rail End #1) and 88% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1009 | 03:08 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

Test Series No. 8

8 ft (96 in) by 42 in by 35° A113 Home Stair Guardrail with Vertical Cable Infill and Flat Top Rail Cap

Test No. 1 - 06/19/20

Design Load: 50 lb / 1 square ft at Center of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:16 | -- | 0.82 | -- | -- |
| Initial Load | 25 | 01:42 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 133 | 02:02 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 2 - 06/19/20

Design Load: 50 lb / 1 square ft at Bottom of Cable In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|--------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:13 | -- | 0.90 | -- | -- |
| Initial Load | 25 | 01:37 | -- | 0.00 | -- | -- |
| 100% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 126 | 01:52 | Achieved Load without Failure | | | |

Test NO. 3 - 06/19/20

Design Load: 50 lb / 1 square ft at Center of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:14 | -- | 0.67 | -- | -- |
| Initial Load | 25 | 04:13 | -- | 0.02 | -- | -- |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 131 | 04:31 | Achieved Load without Failure | | | |

Test No. 4 - 06/19/20

Design Load: 50 lb / 1 square ft at Bottom of Support Baluster

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 103 | 00:20 | -- | 0.98 | -- | -- |
| Initial Load | 25 | 01:56 | -- | 0.02 | -- | -- |
| 98% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 129 | 02:12 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 5 - 06/19/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 402 | 00:28 | 0.22 | 1.40 | 0.07 | 1.26 |
| Initial Load | 50 | 02:19 | 0.00 | 0.06 | 0.00 | 0.06 |
| 95% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 504 | 03:04 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

Test No. 6 - 06/19/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 806 | 00:46 | 0.76 | 0.48 |
| Initial Load | 80 | 02:59 | 0.11 | 0.07 |
| 86% Recovery (Rail End #1) and 85% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1008 | 03:57 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

Test Series No. 9

6 ft (78 in) by 42 in by 35° A113 Home Stair Guardrail with PureView Glass Balusters and Round Top Rail Cap

Test No. 1 - 06/25/20

Design Load: 50 lb / 1 square ft at Center of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 104 | 00:14 | -- | 0.48 | -- | -- |
| Initial Load | 25 | 02:05 | -- | 0.05 | -- | -- |
| 90% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 201 | 02:47 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 2 - 06/25/20

Design Load: 50 lb / 1 square ft at Bottom of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 101 | 00:14 | -- | 0.46 | -- | -- |
| Initial Load | 25 | 01:24 | -- | 0.02 | -- | -- |
| 96% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 207 | 01:53 | Achieved Load without Failure | | | |

Test No. 3 - 06/25/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 428 | 00:18 | 0.11 | 1.04 | 0.20 | 0.89 |
| Initial Load | 50 | 03:24 | 0.02 | 0.04 | 0.01 | 0.03 |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 506 | 03:52 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

Test No. 4 - 06/25/20

Design Load: 200 lb Vertical Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 50 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 413 | 00:23 | -- | 0.39 | -- | -- |
| Initial Load | 50 | 01:56 | -- | 0.12 | -- | -- |
| 69% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 814 | 02:20 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 5 - 06/25/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 806 | 00:27 | 0.49 | 0.58 |
| Initial Load | 80 | 02:15 | 0.08 | 0.06 |
| 84% Recovery (Rail End #1) and 90% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1004 | 02:48 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

Test Series No. 10

6 ft (78 in) by 42 in by 35° A113 Home Stair Guardrail with PureView Glass Balusters and Flat Top Rail Cap

Test No. 1 - 06/25/20

Design Load: 50 lb / 1 square ft at Center of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 102 | 00:10 | -- | 0.42 | -- | -- |
| Initial Load | 25 | 01:39 | -- | 0.04 | -- | -- |
| 90% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 205 | 01:53 | Achieved Load without Failure | | | |

Test No. 2 - 06/25/20

Design Load: 50 lb / 1 square ft at Bottom of Glass Balustrade In-fill

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 25 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 100 | 00:10 | -- | 0.39 | -- | -- |
| Initial Load | 25 | 01:37 | -- | 0.01 | -- | -- |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 203 | 01:52 | Achieved Load without Failure | | | |

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

Test No. 3 - 06/25/20

Design Load: 200 lb Horizontal Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|------|------------------|
| | | | END | MID | END | NET ¹ |
| Initial Load | 50 | 00:00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.0x Design Load | 400 | 00:26 | 0.10 | 0.82 | 0.17 | 0.69 |
| Initial Load | 50 | 02:15 | 0.02 | 0.03 | 0.00 | 0.02 |
| 97% Recovery from 2.0 x Design Load | | | | | | |
| 2.5x Design Load | 504 | 02:44 | Achieved Load without Failure | | | |

¹ Net displacement was mid-rail displacement relative to the rail at the support posts.

Test No. 4 - 06/25/20

Design Load: 200 lb Vertical Concentrated Load at Midspan of Top Rail

| LOAD LEVEL | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | | | |
|-------------------------------------|----------------|----------------|-------------------------------|------|-----|-----|
| | | | END | MID | END | NET |
| Initial Load | 50 | 00:00 | -- | 0.00 | -- | -- |
| 2.0x Design Load | 419 | 00:15 | -- | 0.37 | -- | -- |
| Initial Load | 50 | 02:16 | -- | 0.07 | -- | -- |
| 81% Recovery from 2.0 x Design Load | | | | | | |
| 4.0x Design Load | 801 | 02:52 | Achieved Load without Failure | | | |

Test No. 5 - 06/25/20

Design Load: 200 lb Horizontal Concentrated Load at Ends of Top Rail (Brackets)

| LOAD LEVEL ¹ | TEST LOAD (lb) | E.T. (min:sec) | RAIL DISPLACEMENT (in) | |
|--|----------------|----------------|-------------------------------|-------------|
| | | | RAIL END #1 | RAIL END #2 |
| Initial Load | 80 | 00:00 | 0.00 | 0.00 |
| (2.0x Design Load) x 2 | 807 | 00:44 | 0.34 | 0.51 |
| Initial Load | 80 | 02:23 | 0.04 | 0.03 |
| 88% Recovery (Rail End #1) and 94% Recovery (Rail End #2) from 2.0 x Design Load | | | | |
| (2.5x Design Load) x 2 | 1011 | 02:59 | Achieved Load without Failure | |

¹ A spreader beam was used to impose loads on both ends of the railing system; therefore, loads were doubled.

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

**SECTION 10
CONCLUSION**

Using performance criteria of withstanding an ultimate load of 2.5 and 4.0 (loads applied to or transferred through the glass infill) times design load, the test results substantiate compliance with the design load requirements of the referenced building codes for the guardrails detailed in the following table:

| AL13 HOME ALUMINUM GUARDRAIL SYSTEM | GUARDRAIL TYPE | BALUSTER | ACCENT TOP RAIL CAP | SUPPORT POST ¹ | CODE OCCUPANCY CLASSIFICATION |
|-------------------------------------|----------------------------------|---------------------------------|---------------------|--|-------------------------------------|
| 8 ft (94 in) by 42 in | Level / In-Line Application | Vertical Cable Infill | Round | 2 in Square <i>Al13 Home</i> Post Mount or 3 in Square <i>Al13 Home</i> Post Mount | IRC - One- and Two-Family Dwellings |
| 6 ft (69-1/2 in) by 42 in | | | Top | | |
| 6 ft (69 in) by 42 in | | <i>PureView</i> Glass Balusters | Round | | |
| | <i>PureView</i> Full Glass Panel | Top | | | |
| 8 ft (96 in) by 42 in by 35° | Stair | Vertical Cable Infill | Round | | |
| 6 ft (78 in) by 42 in by 35° | | | Top | | |
| | | <i>PureView</i> Glass Balusters | Round | | |
| | | | Top | | |

¹ Structural performance testing conducted herein utilized the 2 in *Al13 Home* post mount which was deemed worst-case when compared to the 3 in *Al13 Home* post mount. Reference Intertek report No. I6590.01-119-19 for structural performance testing of both post mounts. Testing reported herein qualifies the use of both the 2 in and 3 in *Al13 Home* post mounts for use with the configurations noted.

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

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

SECTION 11

PHOTOGRAPHS



Photo No. 1
In-Fill Load Test at Center of Cable Infill



Photo No. 2
In-Fill Load Test at Bottom of Glass Baluster Infill

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20



Photo No. 3
In-Fill Load Test at Center of Glass Panel



Photo No. 4
In-Fill Load Test at Bottom of Glass Panel

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20



Photo No. 5
In-Fill Load Test at Edge of Glass Panel



Photo No. 6
Horizontal Concentrated Load Test at Midspan of Top Rail (Cable Infill and Glass Balusters)

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20



Photo No. 7

Horizontal Concentrated Load Test at Midspan of Top Rail (Glass Panel Guardrail)



Photo No. 8

Vertical Concentrated Load Test at Mid Span of Top Rail

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20



Photo No. 9
Concentrated Load Test at Ends of Top Rail (Brackets)



Photo No. 10
Stair Rail Bracket

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20



Photo No. 11
Level Rail Bracket



Photo No. 12
Intermittent Spacers

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20



Photo No. 13
Continuous Spacers



Photo No. 14
Glass Panel Stamp

TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20



Photo No. 15
Glass Picket Stamp

SECTION 12 **DRAWINGS**

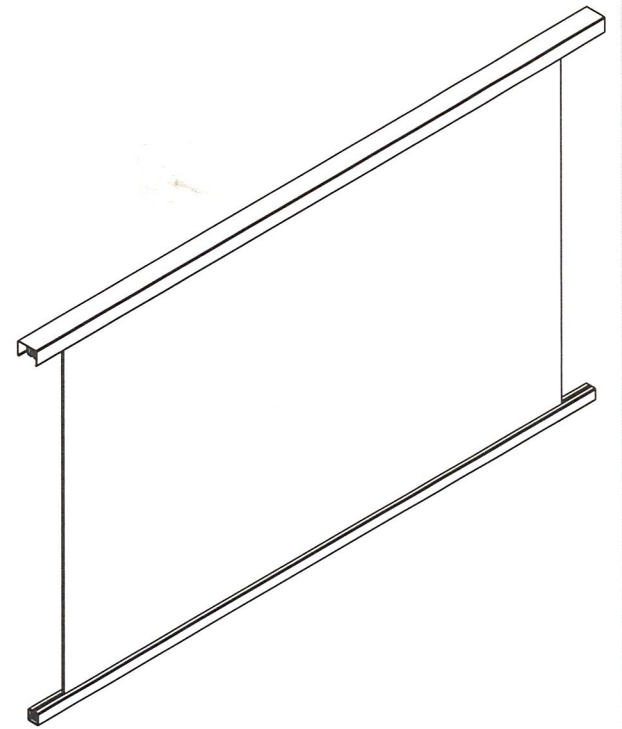
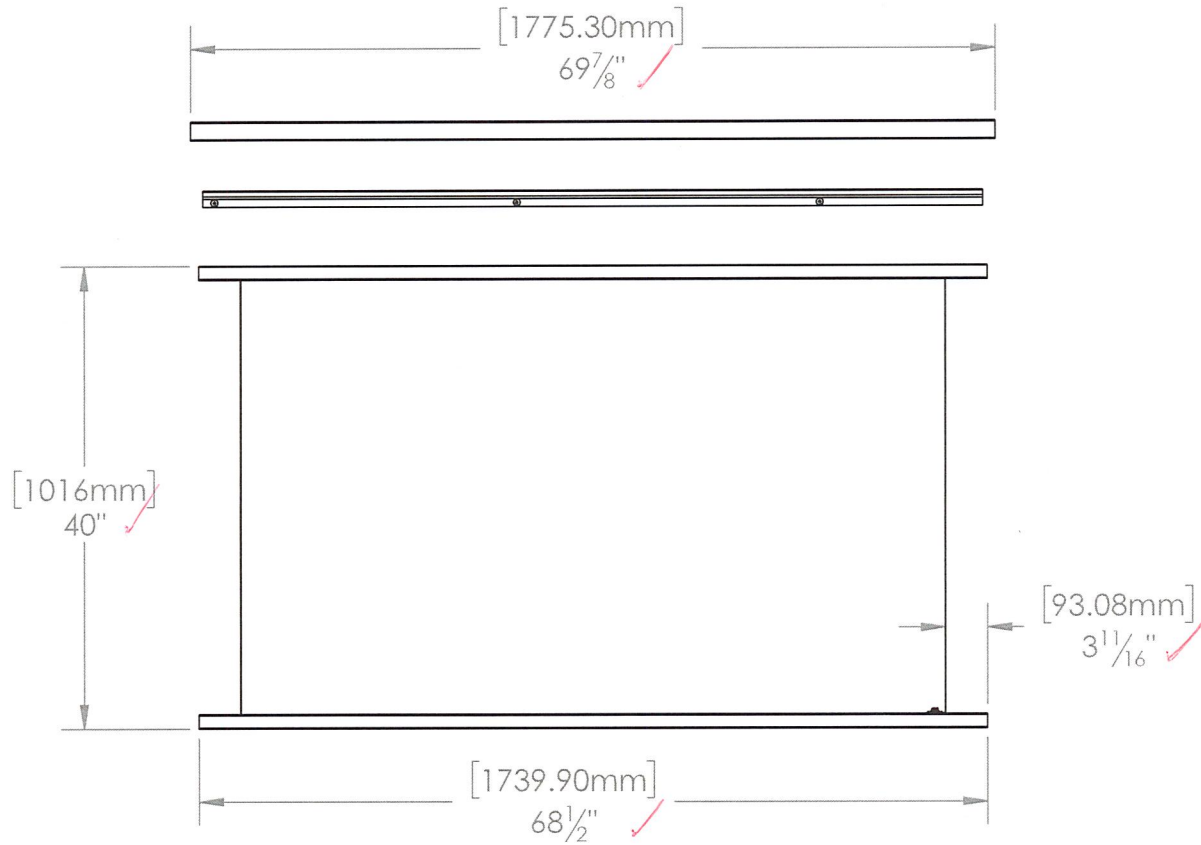
The "As-Built" drawings for the *A/13 Home* guardrail systems which follow have been reviewed by Intertek B&C and are representative of the project reported herein. Project construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.

intertek

Test sample complies with these details.
Deviations are noted.

Report # L0294-01-119-18

Date 7/13/20 Tech AJS



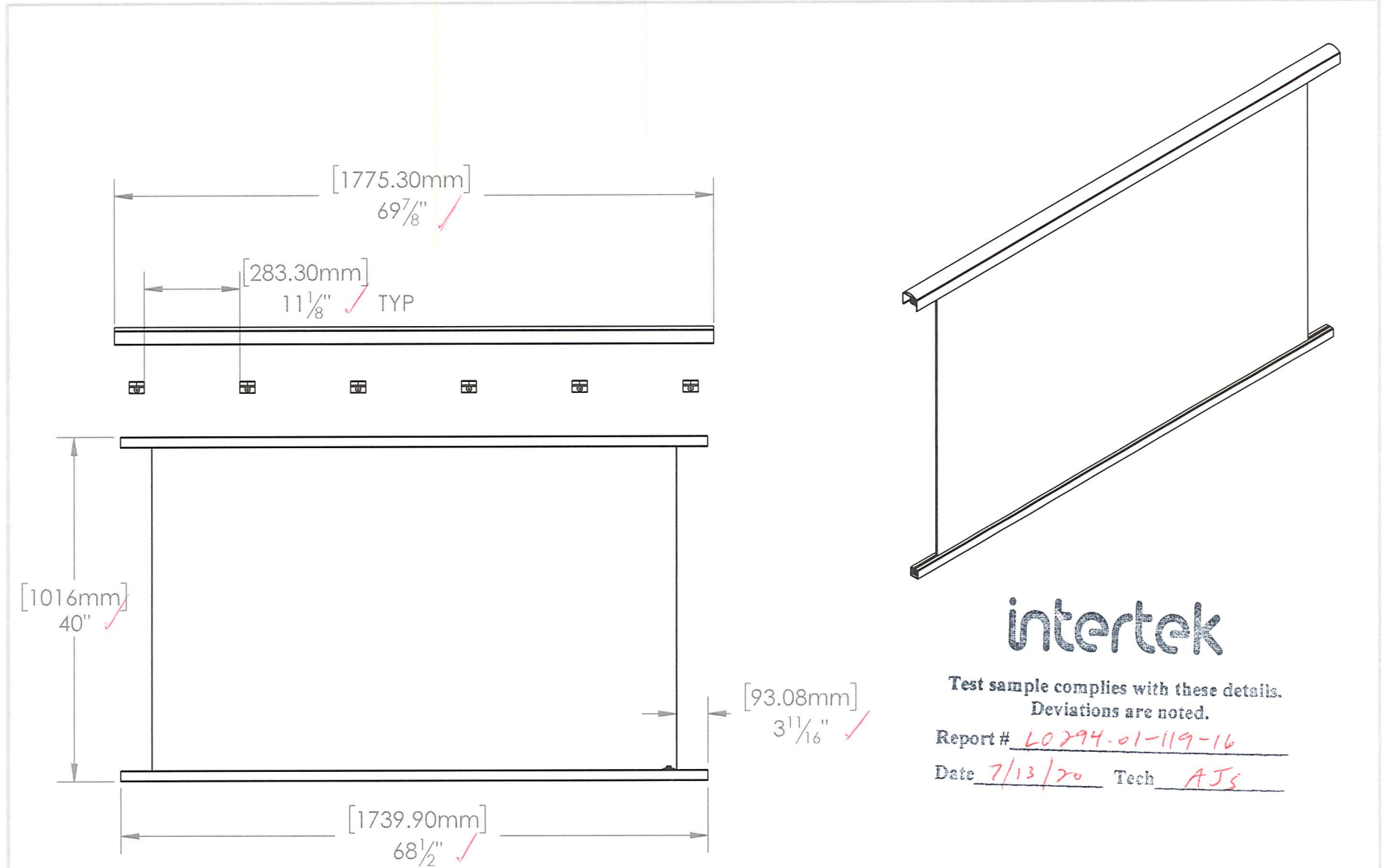
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Fortress Railing
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Sheet: 1 OF 1

| | | |
|------------------|------------------------------|-----------------|
| 02/06/20 | TF | Initial Drawing |
| REV | DATE | BY |
| DESCRIPTION: | | DESCRIPTION |
| DRAWN BY: TylerF | | SCALE: 1:16 |
| DATE: 02/06/2020 | DIVISION: Fortress Rail | |
| ITEM #: | FILE NAME/PART #: | REV: |
| | AL13 HOME PV 40 X 6 FLA I | |



intertek

Test sample complies with these details.
Deviations are noted.

Report # L0294.01-119-16

Date 7/13/20 Tech AJS

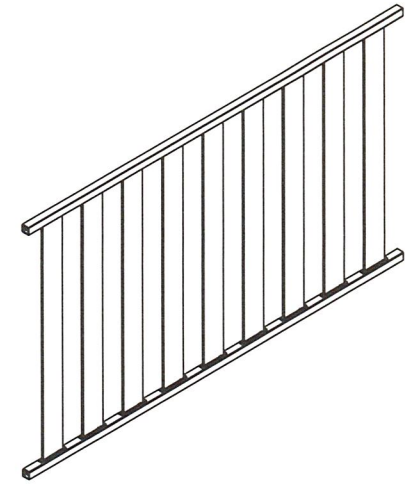
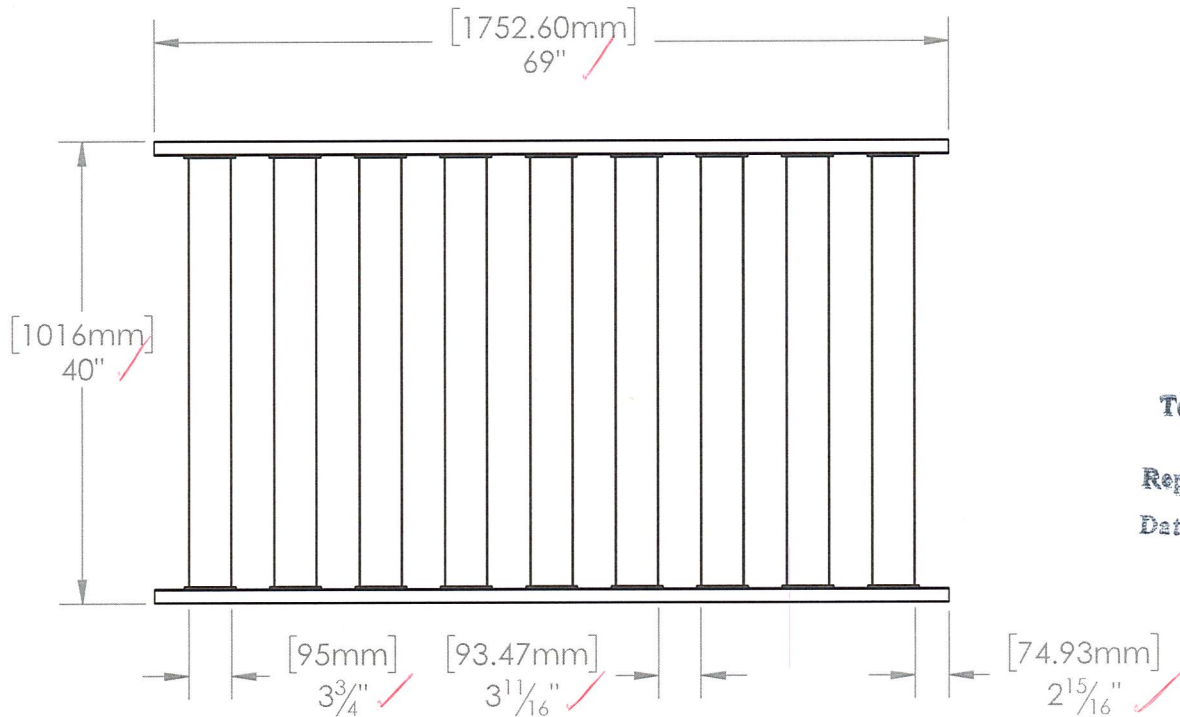
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Sheet: 1 OF 1

| 02/06/20 | TF | Initial Drawing | |
|--|---------------------|-------------------------|-------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: AL 13 Home PV 40" X 6' PANEL | | | |
| DRAWN BY: TylerF | | SCALE: 1:16 | |
| DATE: 02/05/2016 | | DIVISION: Fortress Rail | |
| ITEM #: | FILE NAME/PART #: | | REV: |
| | AL13 HOME PV 40 X 6 | | |
| | ROUND | | |



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Test sample complies with these details.
Deviations are noted.

Report # L0794.01-119-16

Date 7/13/20 Tech AJS

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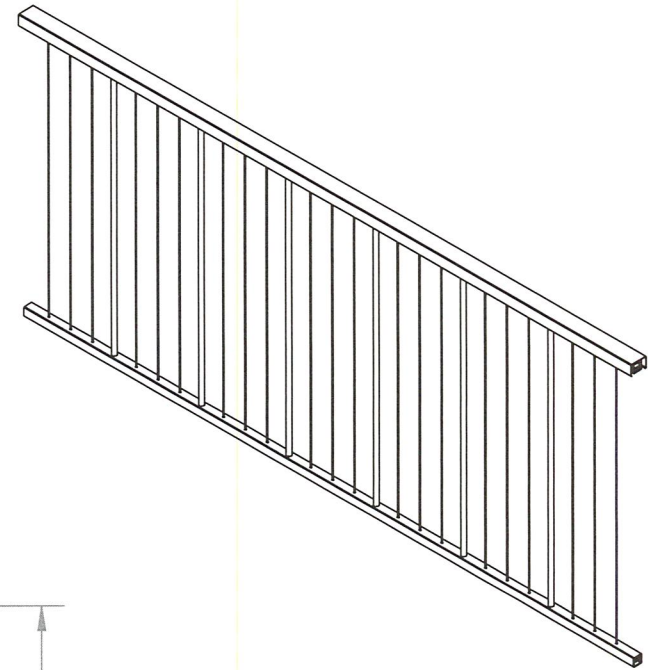
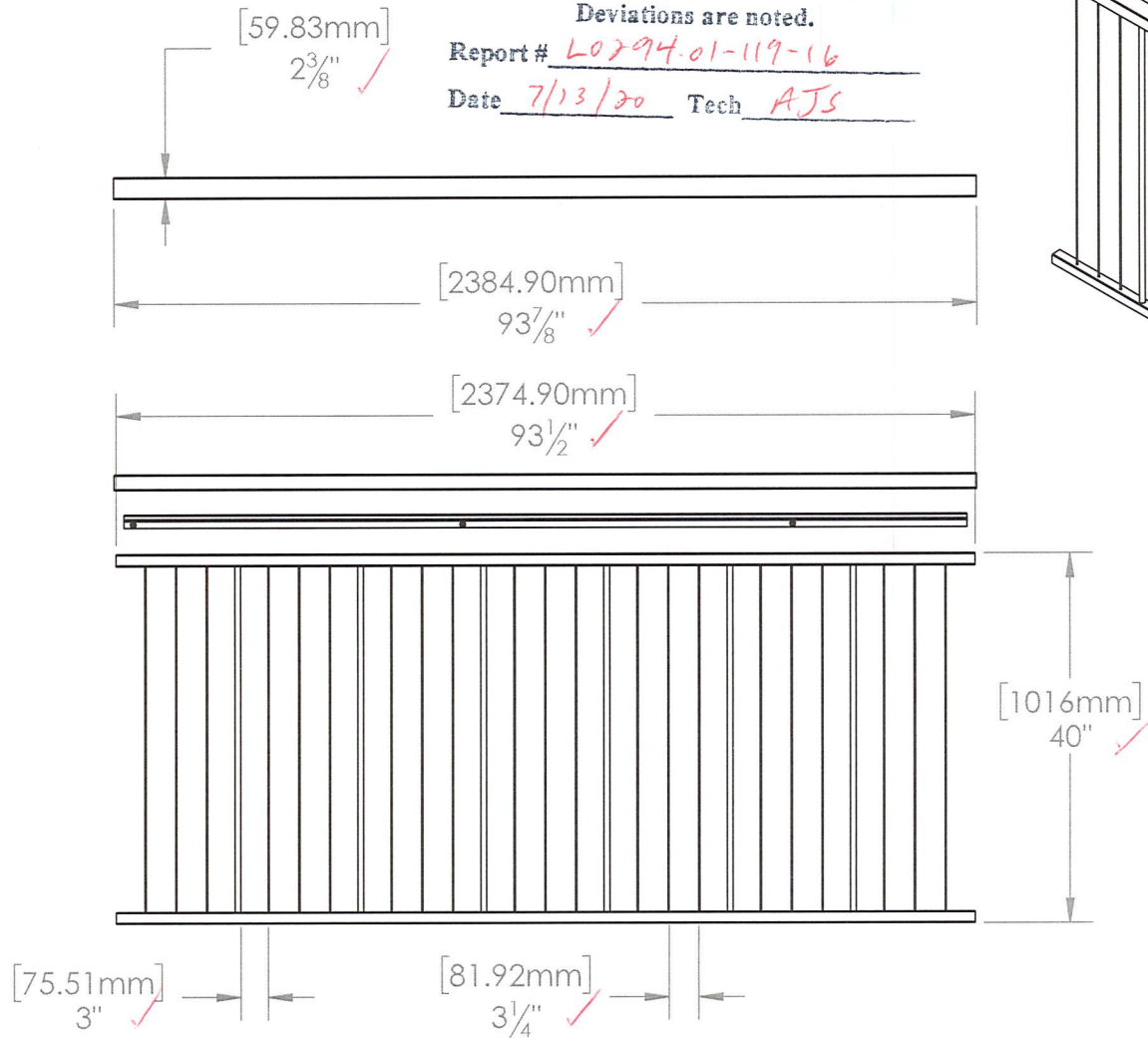
Sheet: 1 OF 1

| | | |
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| 04/28/2020 | TF | Initial Drawing |
| REV | DATE | BY |
| | | DESCRIPTION |
| DESCRIPTION: | | |
| AL13 HOME PV 40" x 6' TRADITIONAL | | |
| DRAWN BY: | TylerF | SCALE: |
| DATE: | 04/28/2020 | DIVISION: RAILING |
| | | AS SHOWN |
| ITEM #: | FILE NAME/PART #: | REV: |
| | AL13 HOME PV 40 X 6 | |
| | Traditional | |

intertek

Test sample complies with these details.
Deviations are noted.

Report # L0294-01-119-16
Date 7/13/20 Tech AJS



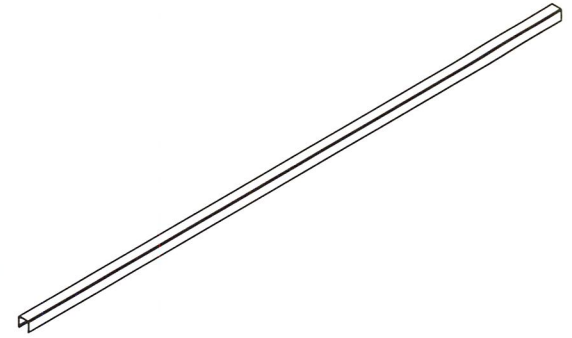
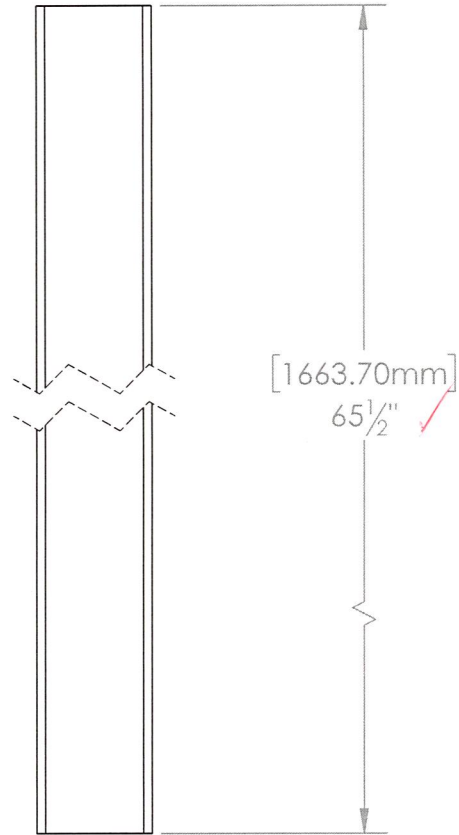
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Sheet: 1 OF 1

| 6 | 02/06/20 | TF | Initial Drawing |
|------------------|--------------------------------|-------------------------|---|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: | | | AL13 HOME VERTICAL CABLE TRADITIONAL 40" X 8' |
| DRAWN BY: TylerF | | SCALE: 1:20 | |
| DATE: 02/06/2020 | | DIVISION: Fortress Rail | |
| ITEM #: | FILE NAME/PART #: | REV: | |
| 5974093X | AL13 HOME VERTICAL CABLE FLA I | 6 | |

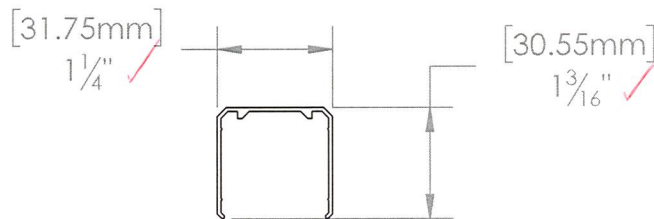


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Report # L0294.01-119-16

Date 7/13/20 Tech AJS



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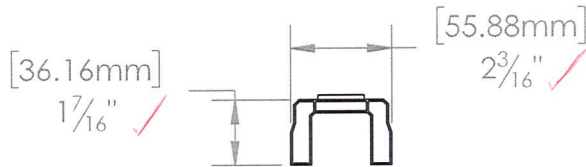
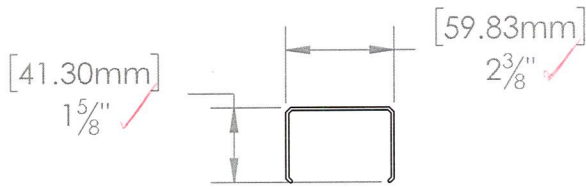
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|----------------------------|------------|-------------------|-----------------|
| D | 07/10/2020 | TF | Initial Drawing |
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: | | | |
| AL13 HOME TOP CAP | | | |
| DRAWN BY: KevinF | | SCALE: | |
| DATE: 07/10/2020 | | AS SHOWN | |
| DIVISION: Fortress Railing | | FILE NAME/PART #: | |
| ITEM #: | | R3931-06236A | |
| Sheet: 1 OF 1 | | | REV: D |

intertek

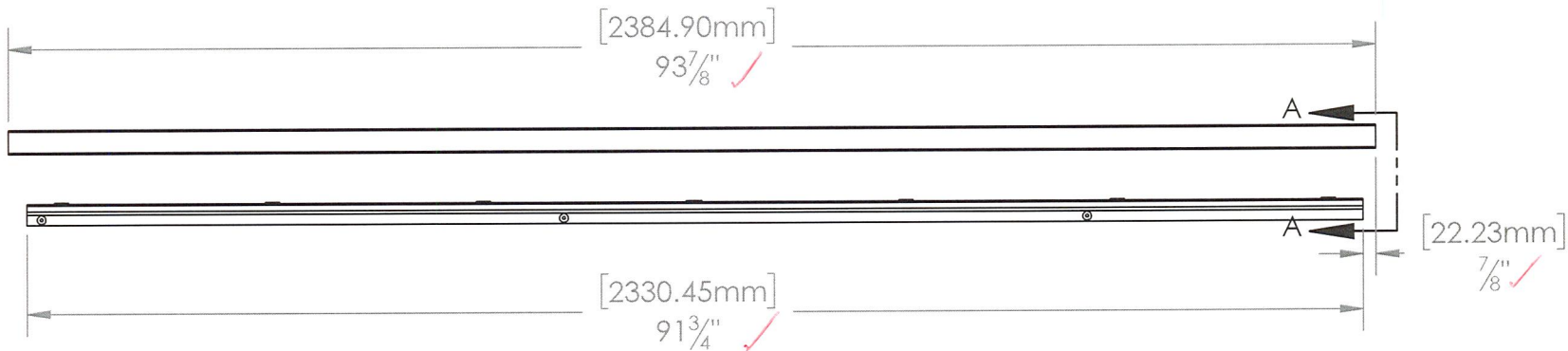
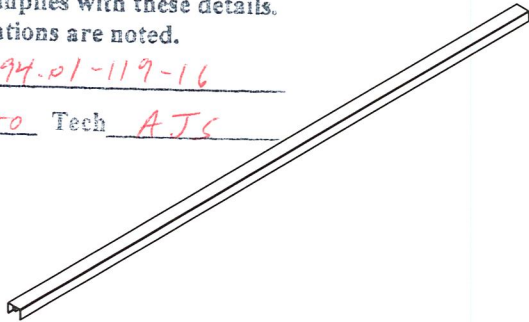
Test sample complies with these details.
Deviations are noted.

Report # L0794.01-119-16

Date 7/13/20 Tech AJS



SECTION A-A
SCALE 1 : 4



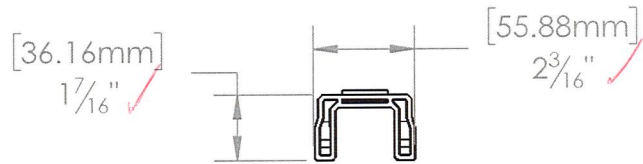
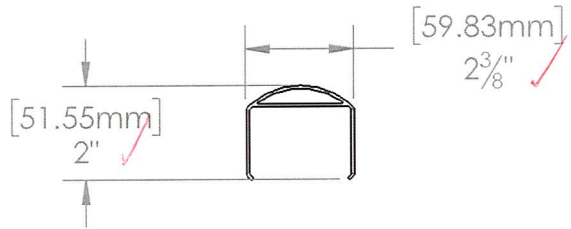
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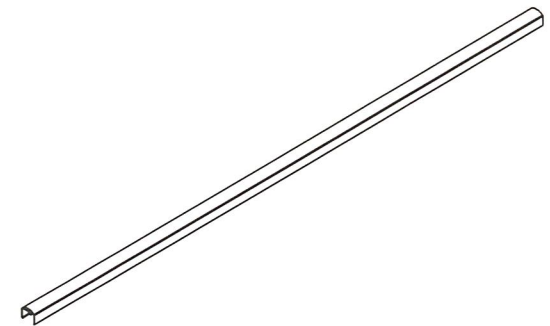
Fortress Railing
1720 N 1st Street
Garland, Tx 75040

Sheet: 1 OF 1

| | | | | |
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| REV | DATE | BY | DESCRIPTION | SCALE: |
| A | 02/06/20 | TF | Initial Drawing | 1:12 |
| DESCRIPTION: | | | | |
| A113 HOME 93.89" - 8' FLAT ATR KIT | | | | |
| DRAWN BY: TylerF | | DIVISION: Fortress Rail | | SCALE: 1:12 |
| DATE: 02/06/2020 | | DIVISION: Fortress Rail | | REV: A |
| ITEM #: | FILE NAME/PART #: | | | REV: |
| | FLAT ATR KIT WITH FULL LENGTH SPACER | | | A |



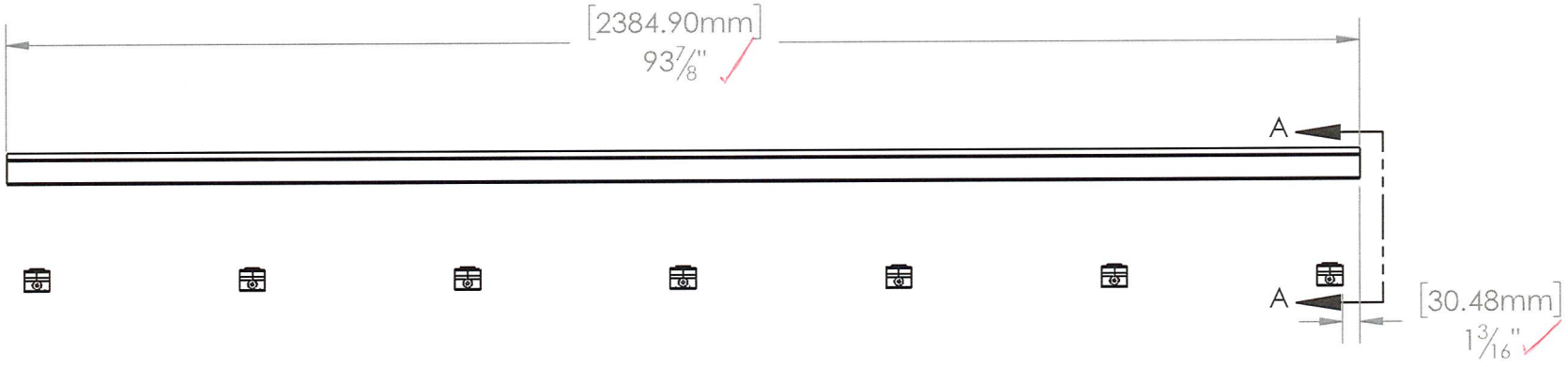
SECTION A-A
SCALE 1 : 4



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Test sample complies with these details.
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Report # L0294.0)-119-16
Date 7/13/20 Tech AJS



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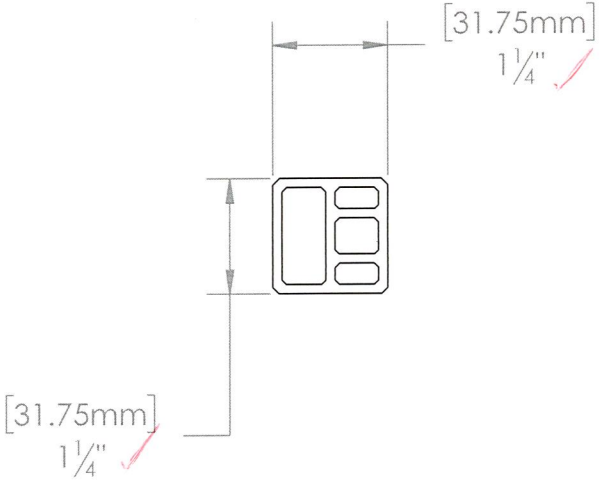
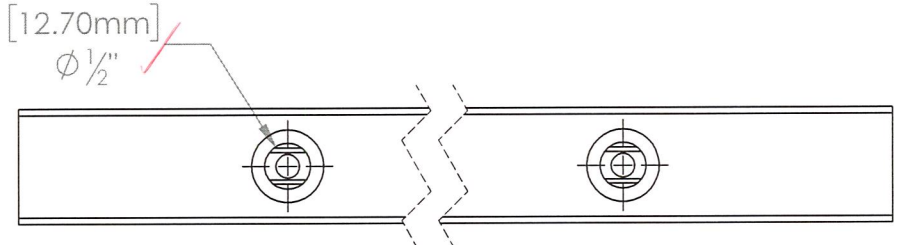
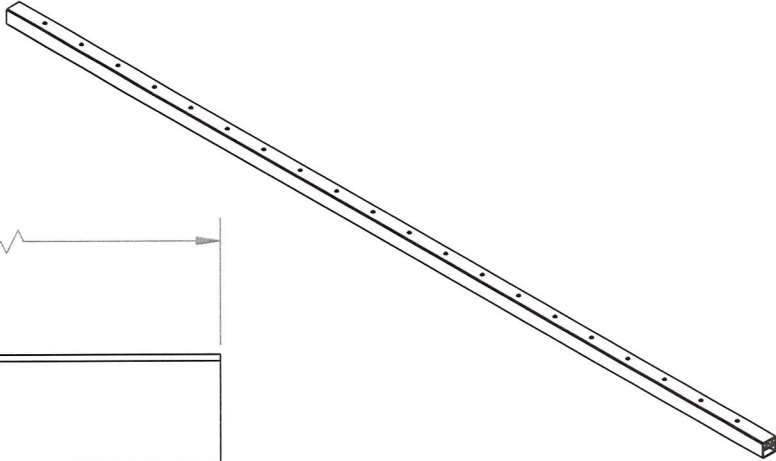
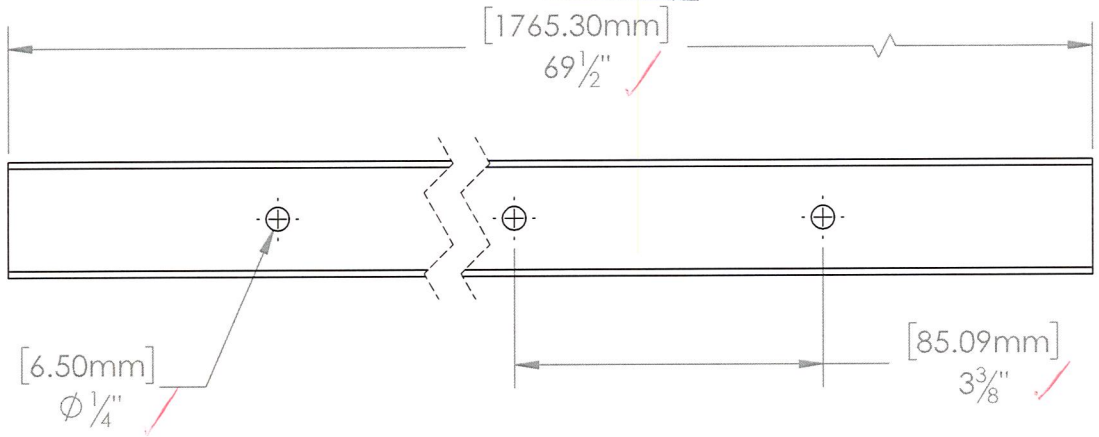
Fortress Railing
1720 N 1st Street
Garland, Tx 75040

Sheet: 1 OF 1

| | | | | |
|-------------------------------------|----------|-------------------------|-----------------|--------|
| REV | DATE | BY | DESCRIPTION | SCALE: |
| A | 02/06/20 | TF | Initial Drawing | 1:12 |
| DESCRIPTION: | | | | |
| A113 HOME 93.89" - 8' ROUND ATR KIT | | | | |
| DRAWN BY: TylerF | | SCALE: | | |
| DATE: 02/06/2020 | | DIVISION: Fortress Rail | | |
| ITEM #: FILE NAME/PART #: | | | | REV: |
| ROUND ATR KIT WITH SHORT SPACERS | | | | A |

Test sample complies with these details.
Deviations are noted.

Report # 60294.01-119-16
Date 7/13/20 Tech AJS



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Sheet: 1 OF 1

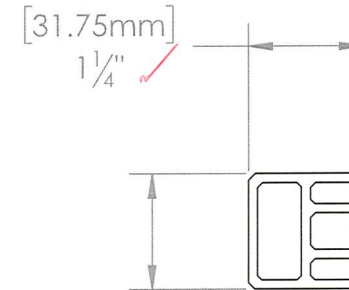
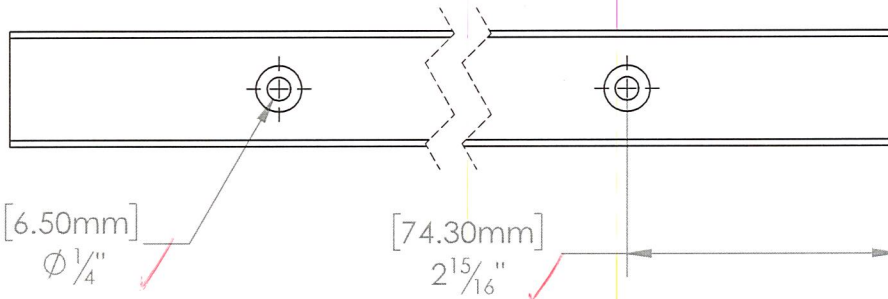
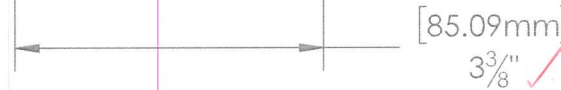
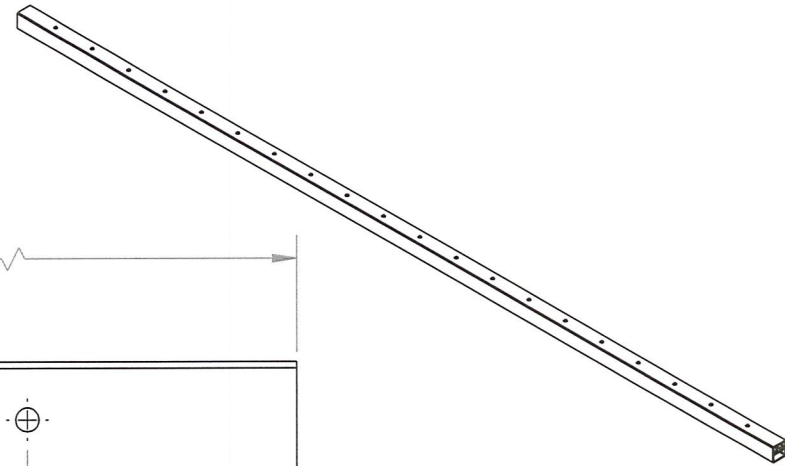
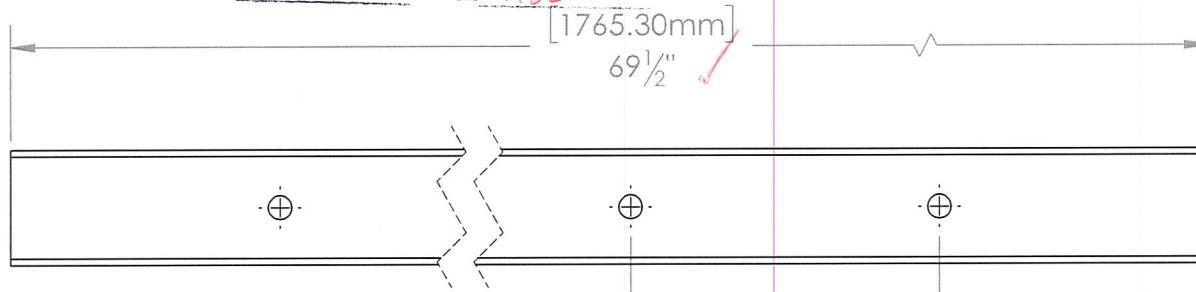
| 3 | 07/10/2020 | TF | Initial Drawing |
|--|-------------------|-------------------------|-----------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: AL13 HOME VERTICAL CABLE TOP RAIL 6' | | | |
| DRAWN BY: KevinF | | SCALE: AS SHOWN | |
| DATE: 07/10/2020 | | DIVISION: Fortress Rail | |
| ITEM #: | FILE NAME/PART #: | | REV: |
| | R3931-10331A | | 3 |

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Test sample complies with these details.
Deviations are noted.

Report # L0294.01-119-16

Date 7/13/20 Test AJS



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Fortress Railing
1720 N 1st Street
Garland, Tx 75040

Sheet: 1 OF 1

| 4 | 07/10/2020 | TF | Initial Drawing |
|-----|------------|----|-----------------|
| REV | DATE | BY | DESCRIPTION |

DESCRIPTION:
AL13 HOME VERTICAL CABLE BOTTOM RAIL 6'

DRAWN BY: KevinF
DATE: 07/10/2020 DIVISION: Fortress Rail

SCALE:
AS SHOWN

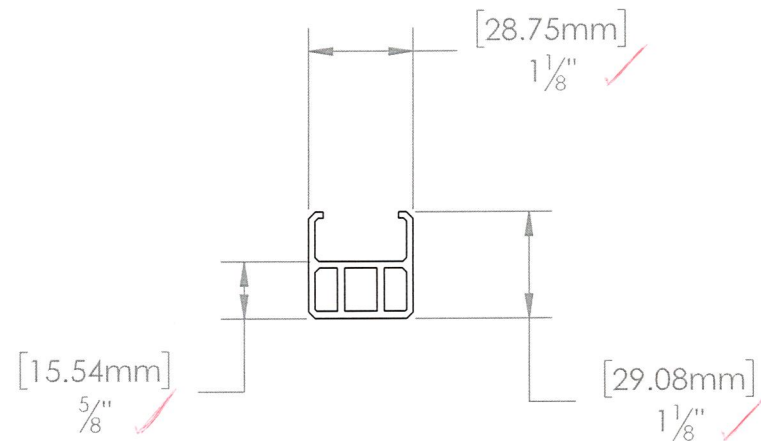
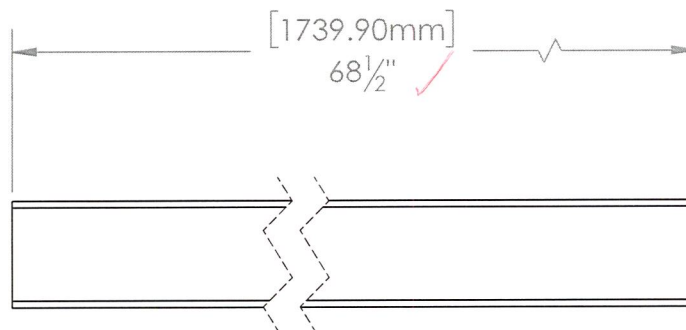
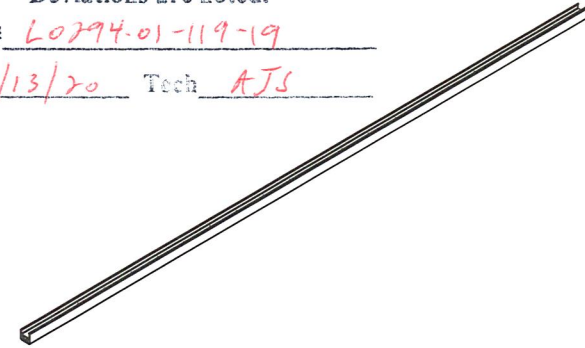
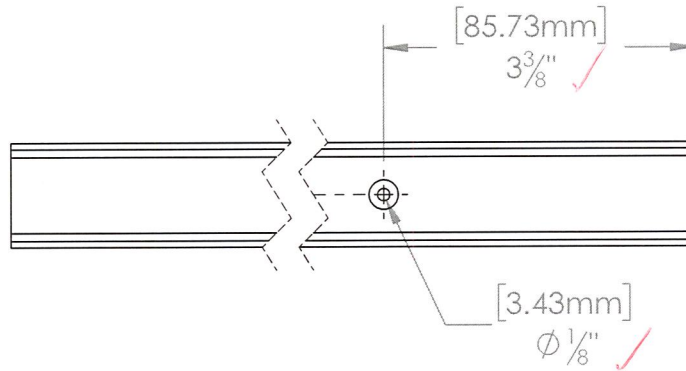
ITEM #: FILE NAME/PART #:
R3931-10332A

REV:
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Test sample complies with these details.
Deviations are noted.

Report # L0294-01-119-19

Date 7/13/20 Tech AJS



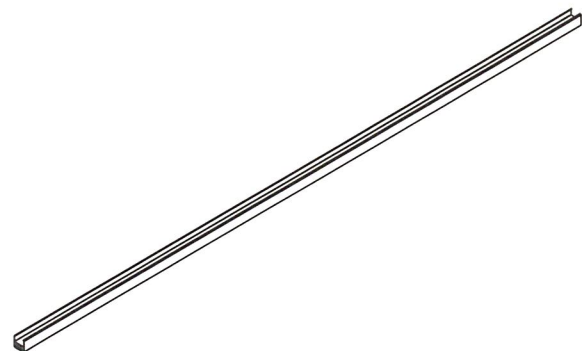
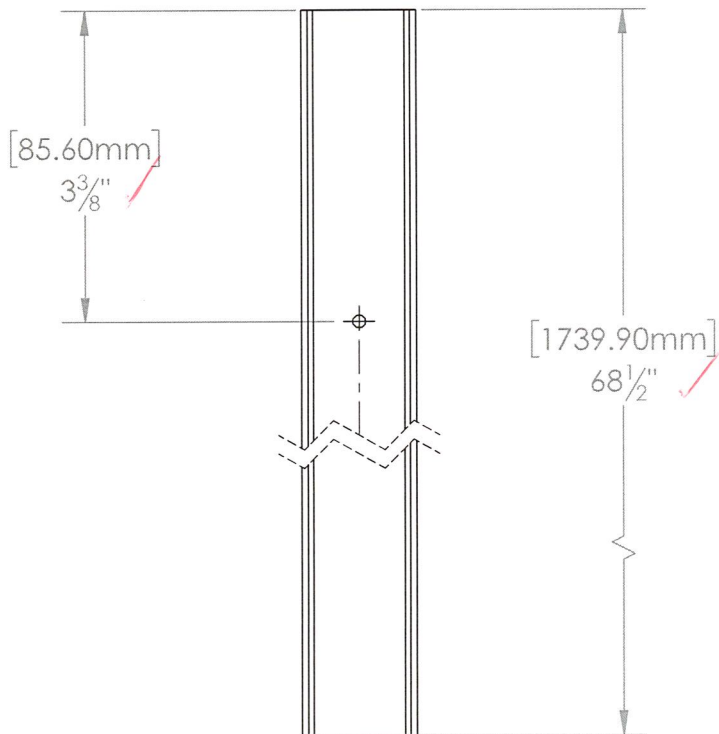
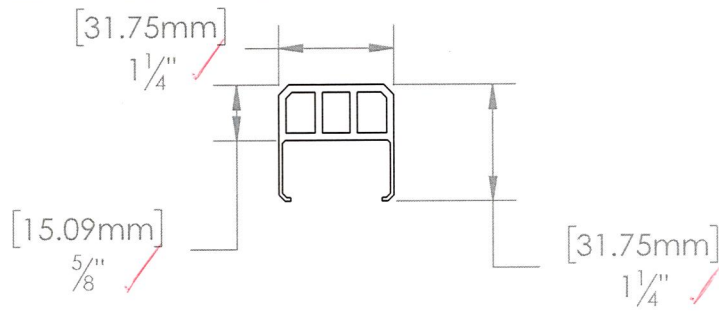
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Fortress Railing
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Garland, Tx 75040

Sheet: 1 OF 1

| 1 | 7/10/2020 | TF | Initial Drawing |
|---|-------------------|--------------------|-----------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: AL13 HOME CABLE INFILL PANEL TOP RAIL | | | |
| DRAWN BY: TylerF | | SCALE: AS SHOWN | |
| DATE: 07/10/2020 | | DIVISION: | |
| ITEM #: | FILE NAME/PART #: | REV: | |
| | R3931-07875A | 1 | |



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Test sample complies with these details.
Deviations are noted.

Report # L0794.01-119-16
Date 7/13/20 Tech AJS

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Garland, Tx 75040

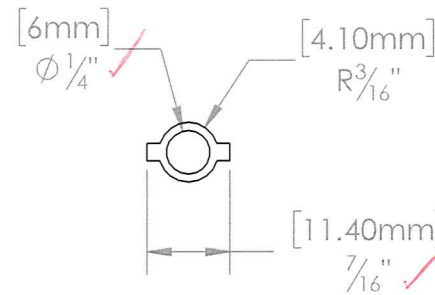
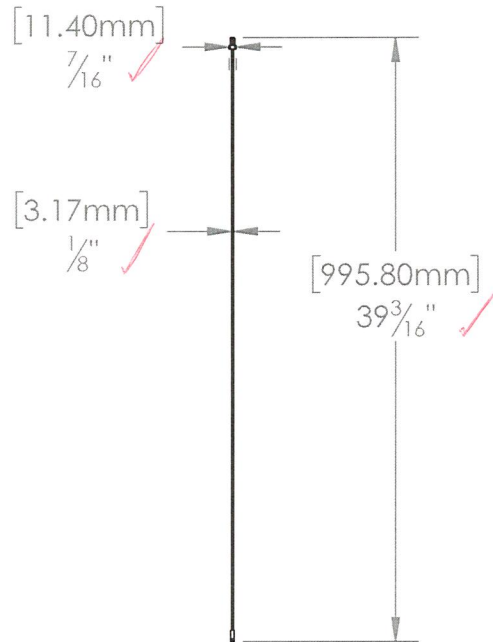
Sheet: 1 OF 1

| 1 | 7/10/2020 | TF | Initial Drawing |
|--|-------------------|--------------------|-----------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: AL13 HOME CABLE INFILL PANEL BOTTOM RAIL | | | |
| DRAWN BY: TylerF | | SCALE: AS SHOWN | |
| DATE: 07/10/2020 | | DIVISION: | |
| ITEM #: | FILE NAME/PART #: | | REV: |
| | R3931-07876A | | 1 |

intertek

Test sample complies with these details.
Deviations are noted.

Report # 20294-01-119-16
Date 7/13/20 Tech AJS



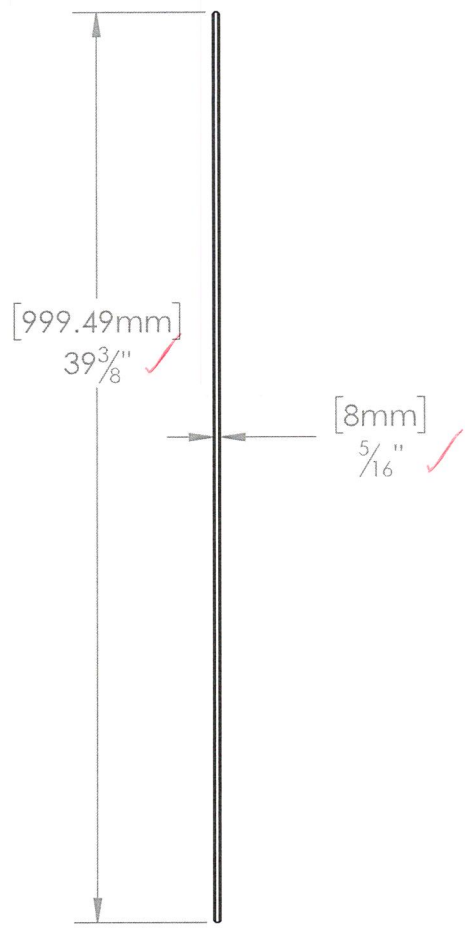
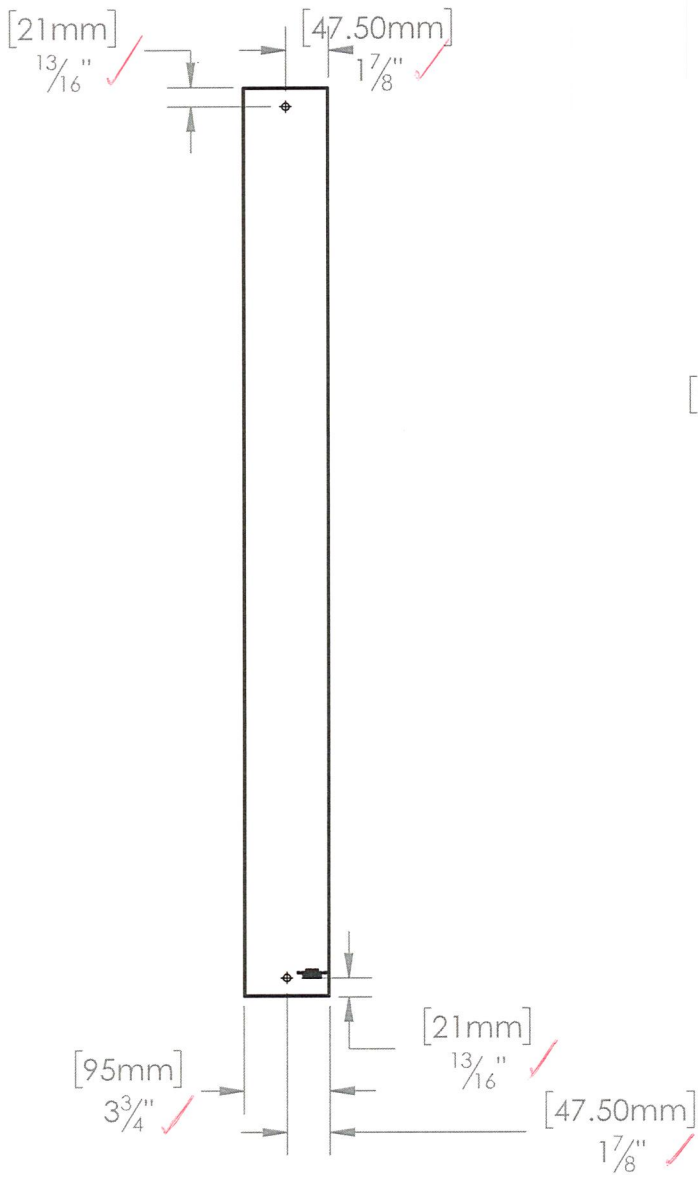
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Fortress Railing
1720 N 1st Street
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Sheet: 1 OF 1

| 5 | 04/28/2020 | TF | Initial Drawing |
|---|-------------------------------|-------------------------|-----------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: AL13 HOME VERTICAL CABLE SWAGE ASSEMBLY 40" | | | |
| DRAWN BY: TylerF | | SCALE: AS SHOWN | |
| DATE: 04/28/2020 | | DIVISION: Fortress Rail | |
| ITEM #: | FILE NAME/PART #: | REV: | |
| | AL13 HOME Vertical Cable 40in | 5 | |



intertek

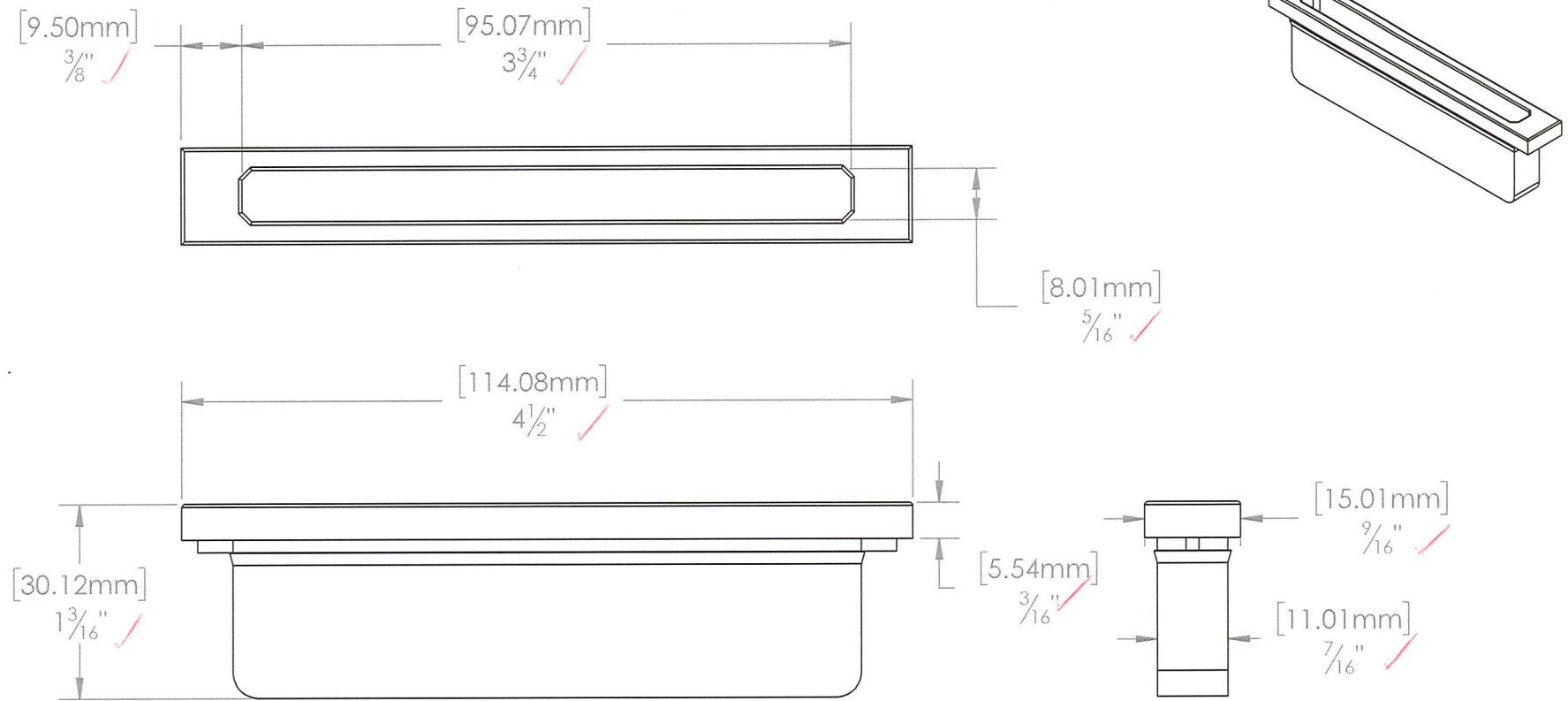
Test sample complies with these details.
 Deviations are noted.
 Report # LO294-01-119-16
 Date 7/13/20 Tech AJS

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| | | | | |
|------------------|---------------------|----|----------------------------|----------|
| REV | DATE | BY | DESCRIPTION | SCALE: |
| A | 04/28/2020 | TF | Initial Drawing | AS SHOWN |
| DESCRIPTION: | | | | |
| PV-PLA-39.35" | | | | |
| DRAWN BY: TylerF | | | DIVISION: Fortress Railing | |
| DATE: 04/28/2020 | | | DIVISION: Fortress Railing | |
| ITEM #: | FILE NAME/PART #: | | | REV: |
| Sheet: 1 OF 1 | PV Baluster 39.35in | | | A |



intertek

**Test sample complies with these details.
Deviations are noted.**

Report # L0294.01-119-16

Date 7/13/20 Tech AJS

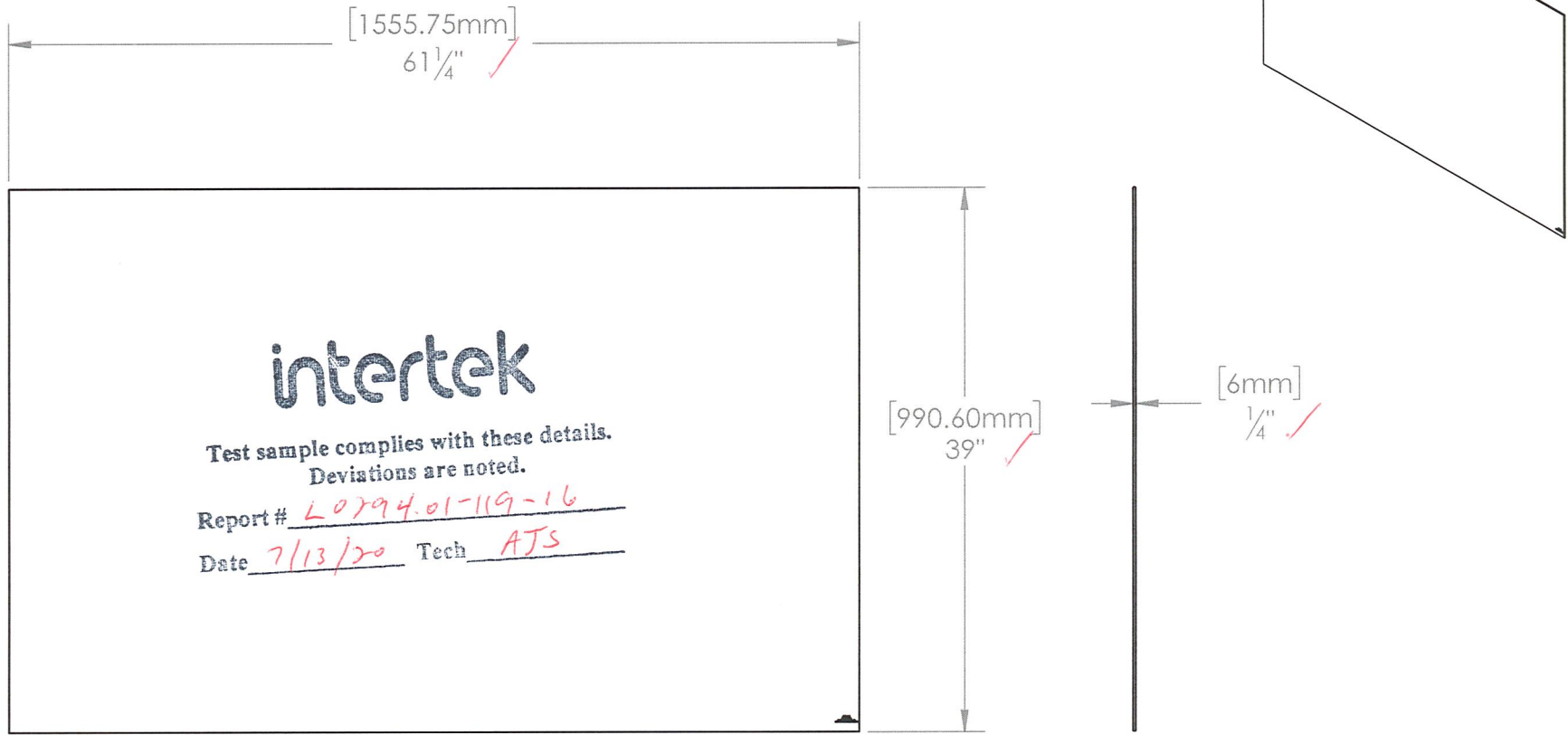
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Fortress Railing
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Sheet: 1 OF 1

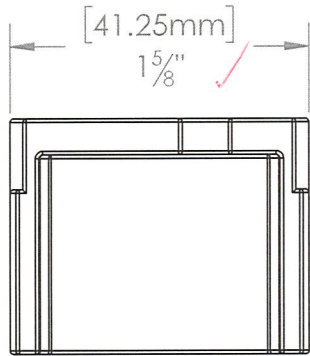
| 3 | 04/28/2020 | TF | Initial Drawing |
|---|-------------------|----------------------------|-----------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: PV AL13 HOME GROMMET STRAIGHT | | | |
| DRAWN BY: TylerF | | SCALE: AS SHOWN | |
| DATE: 04/28/2020 | | DIVISION: Fortress Railing | |
| ITEM #: | FILE NAME/PART #: | REV: | |
| | PV A113 HOME | 3 | |
| GROMMET STRAIGHT | | | |



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| C | 04/28/2020 | TF | Initial Drawing |
|-------------------------------------|------------|--|-----------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: PV-FGP 39" X 61.25" | | | |
| DRAWN BY: TylerF | | SCALE: AS SHOWN | |
| DATE: 04/28/2020 | | DIVISION: | |
| Sheet: 1 OF 1 | ITEM #: | FILE NAME/PART #: PV Full Glass Pane 39in x 61.25in | REV: C |

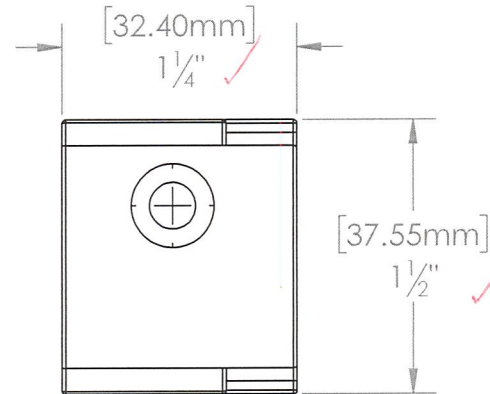
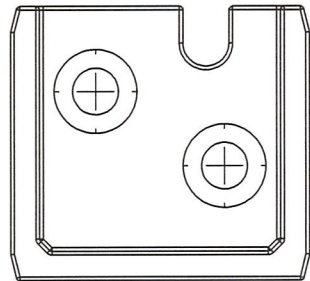
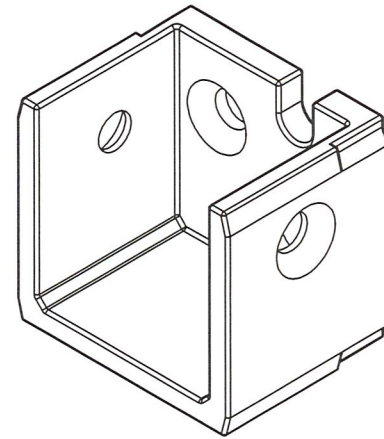


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Test sample complies with these details.
Deviations are noted.

Report # L0794.01-119-16

Date 7/13/20 Tech AJS



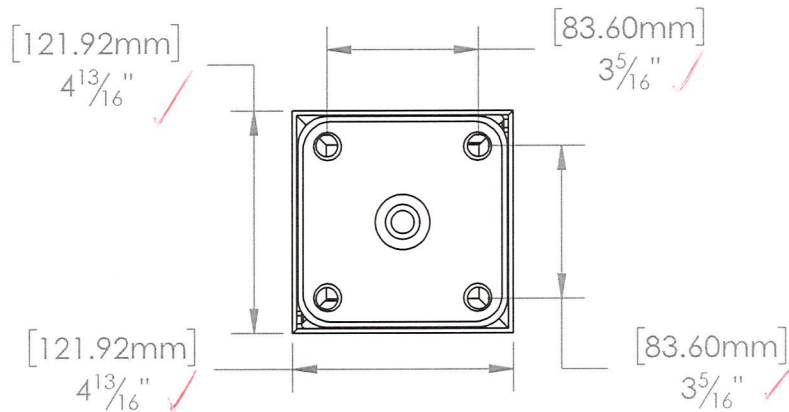
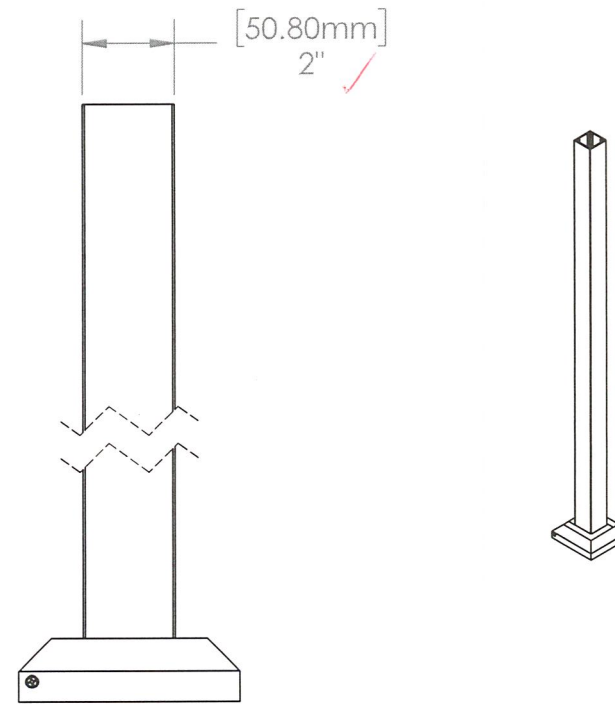
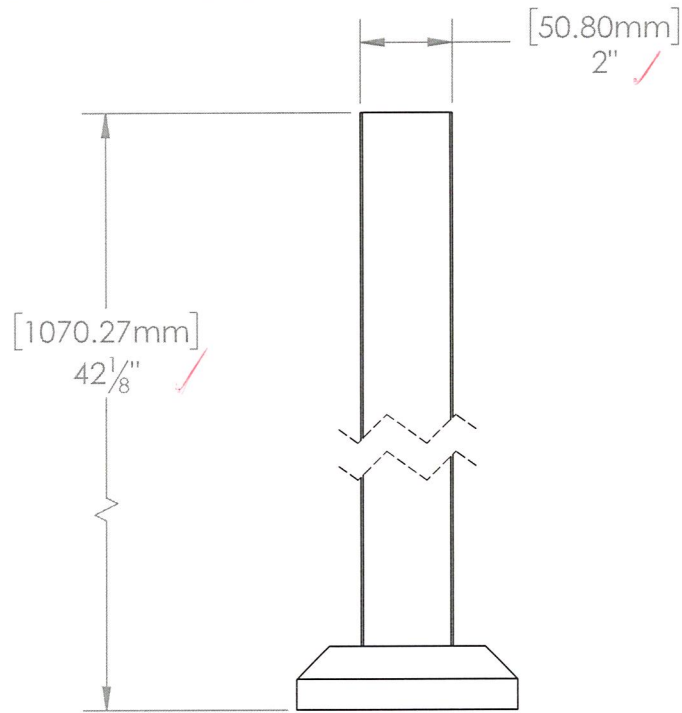
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Fortress Railing
1720 N 1st Street
Garland, Tx 75040

Sheet: 1 OF 1

| | | | |
|-----------------------|-------------------|-----------|-----------------|
| DB | 1/3/19 | GL | Initial Drawing |
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: | | | |
| AL13 HOME BRACKET CUP | | | |
| DRAWN BY: | KevinF | SCALE: | 1:1 |
| DATE: | 01/03/2019 | DIVISION: | RAILING |
| ITEM #: | FILE NAME/PART #: | REV: | D |
| | R3934-03618A | | |



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Report # 20294-01-119-16
Date 7/13/20 Tech AJS

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Fortress Railing
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Sheet: 1 OF 1

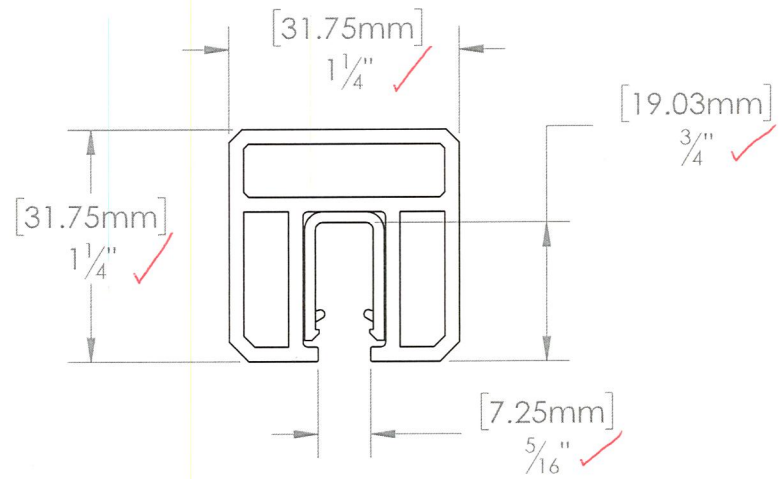
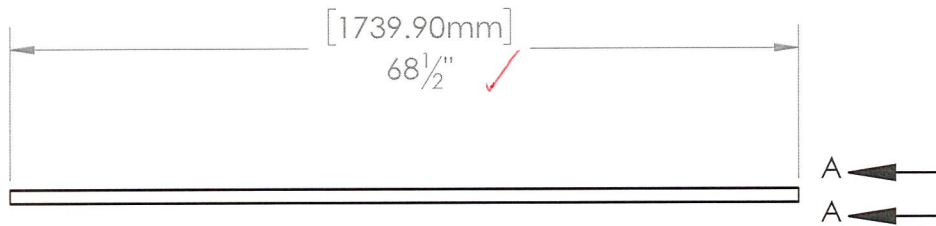
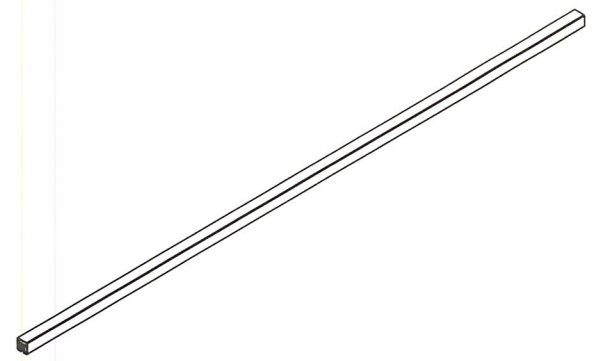
| | | | | |
|---|------------|-------------------|----------------------------|----------|
| REV | DATE | BY | DESCRIPTION | SCALE: |
| B | 07/10/2020 | TF | Initial Drawing | AS SHOWN |
| DESCRIPTION: AL13 HOME POST 2" X 42" BLANK w/ BASE CVR | | | | |
| DRAWN BY: KevinF | | | DIVISION: Fortress Railing | |
| DATE: 07/10/2020 | | ITEM #: | | REV: |
| | | 5934202X | | B |
| | | FILE NAME/PART #: | | |
| | | R3935-06292A | | |

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Test sample complies with these details.
Deviations are noted.

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SECTION A-A
SCALE 1 : 1

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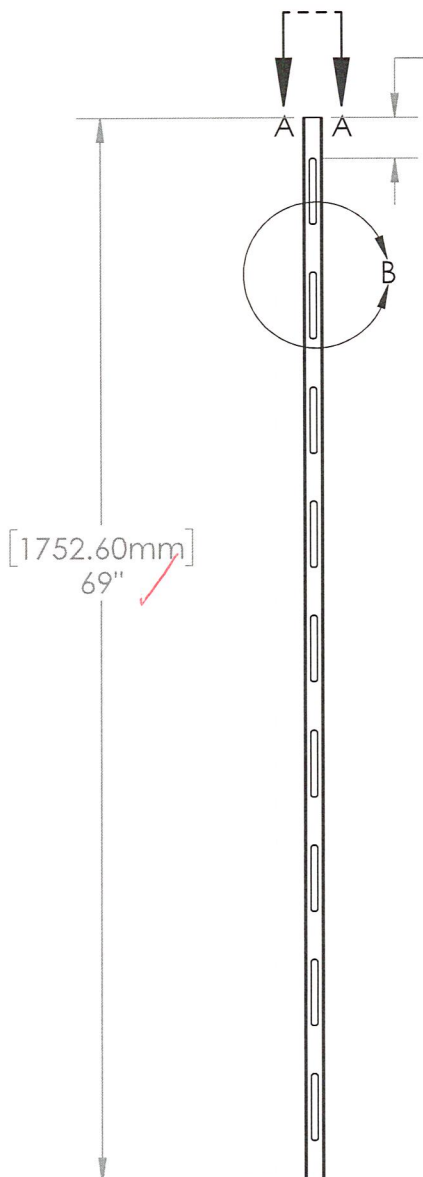


Fortress Railing

1720 N 1st Street
Garland, Tx 75040

Sheet: 1 OF 1

| 1 | 09/08/2020 | TF | Initial Drawing | |
|-----------------------|------------|-------------------|----------------------------|----------|
| REV | DATE | BY | DESCRIPTION | SCALE: |
| | | | | AS SHOWN |
| DESCRIPTION: | | | | |
| AL13 HOME FGP RAIL-6' | | | | |
| DRAWN BY: TylerF | | | DIVISION: Fortress Railing | |
| DATE: | | FILE NAME/PART #: | | REV: |
| | | R3931-10484A | | 1 |



[67.89mm]
2 1/16" ✓

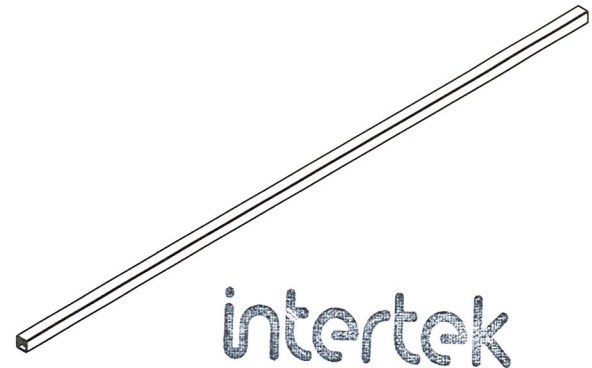
[11mm] 7/16" ✓

[10.38mm] 7/16" ✓

[109.07mm] 4 5/16" ✓

[79.39mm] 3 1/8" ✓

DETAIL B
SCALE 1 : 6

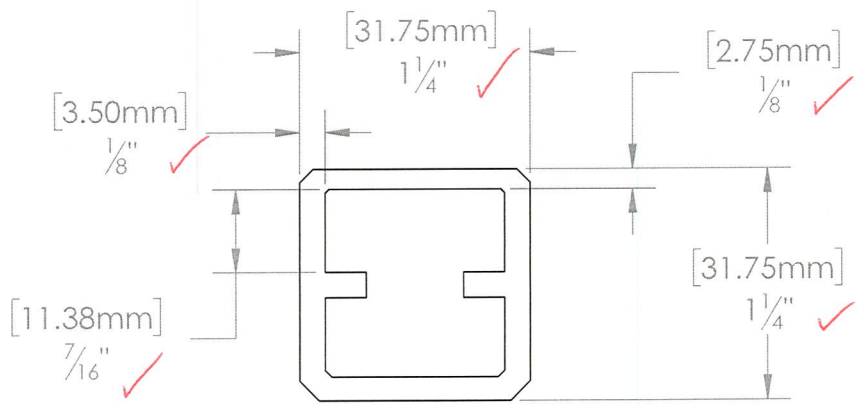


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Report # L0294-01-119-19

Date 9/9/20 Tech AJS



SECTION A-A
SCALE 1 : 1

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Fortress Railing
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Sheet: 1 OF 1

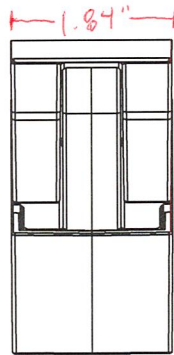
| | | | |
|-----|------------|----|-----------------|
| REV | DATE | BY | DESCRIPTION |
| A | 09/08/2020 | TF | Initial Drawing |

DESCRIPTION:
AL13 HOME PV RAIL

DRAWN BY: TylerF
DATE: 09/08/2020 DIVISION: Fortress Railing

ITEM #: FILE NAME/PART #:
R3931-09839A

SCALE:
AS SHOWN
REV:
A

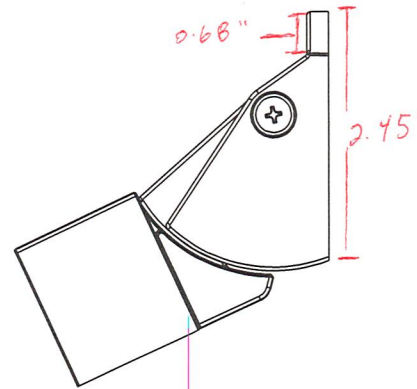
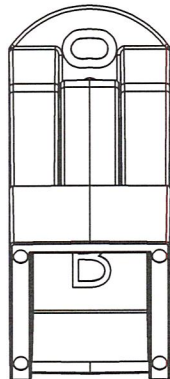
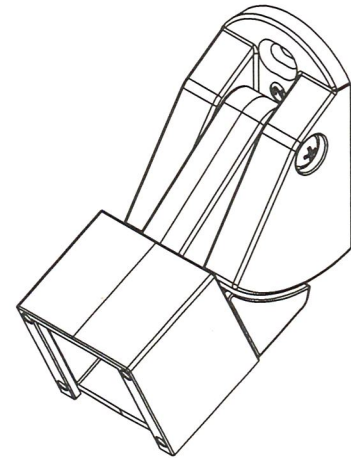


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Date 9/9/20 Tech AJS



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| | | | | |
|---------------------------------|---------|--------------------------------|-----------------|------------|
| 6 | 1/14/19 | GL | Initial Drawing | |
| REV | DATE | BY | DESCRIPTION | |
| DESCRIPTION: | | | | |
| SIMPLIFIED STAIR BRACKET SSB-05 | | | | |
| DRAWN BY: KevinF | | DIVISION: Fortress Railing | | SCALE: 1:2 |
| DATE: 01/14/2019 | | FILE NAME/PART #: R3734-05746A | | REV: 6 |

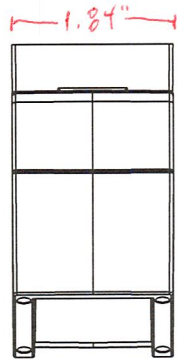


Fortress Railing
1720 N 1st Street
Garland, Tx 75040

Sheet: 4 OF 4

ITEM #: 5350506X

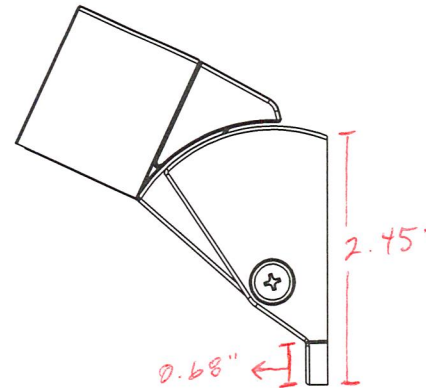
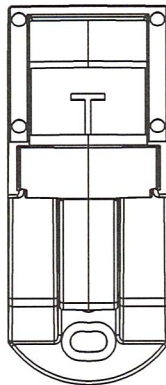
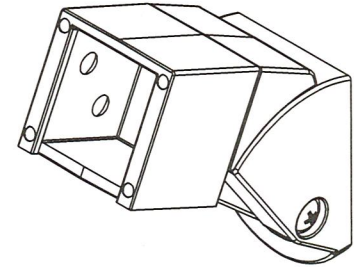
FILE NAME/PART #: R3734-05746A



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Test sample complies with these details.
Deviations are noted.

Report # L0294.01-119-19
Date 9/9/20 Tech AJS



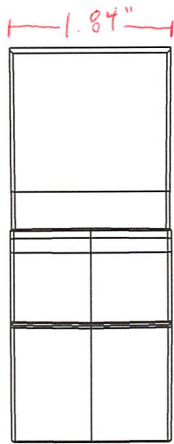
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Fortress Railing
1720 N 1st Street
Garland, Tx 75040

Sheet: 2 OF 4

| 6 | 1/14/19 | GL | Initial Drawing |
|---------------------------------|-------------------|----------------------------|-----------------|
| REV | DATE | BY | DESCRIPTION |
| DESCRIPTION: | | | |
| SIMPLIFIED STAIR BRACKET SSB-05 | | | |
| DRAWN BY: KevinF | | SCALE: 1:2 | |
| DATE: 01/14/2019 | | DIVISION: Fortress Railing | |
| ITEM #: | FILE NAME/PART #: | REV: | |
| 5350506X | R3734-05746A | 6 | |

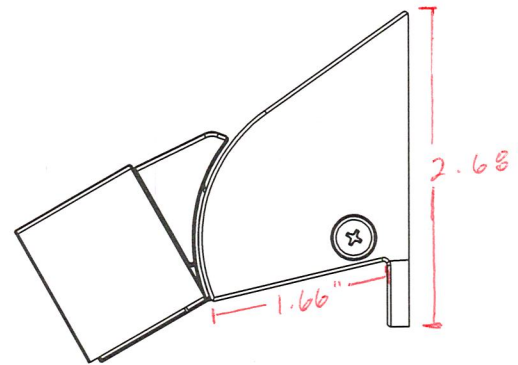
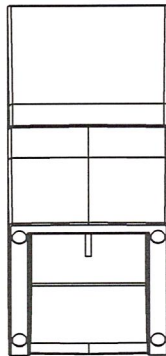
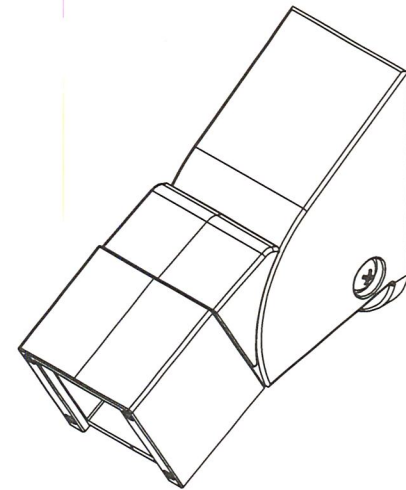


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Deviations are noted.

Report # LO294-01-119-19

Date 9/9/20 Tech AJS

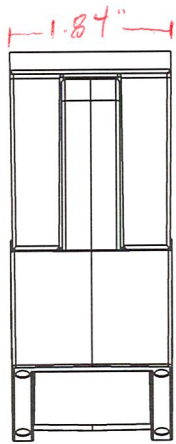


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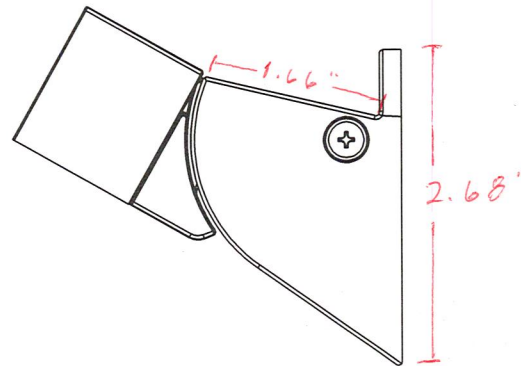
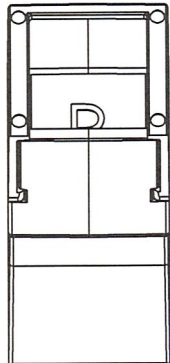
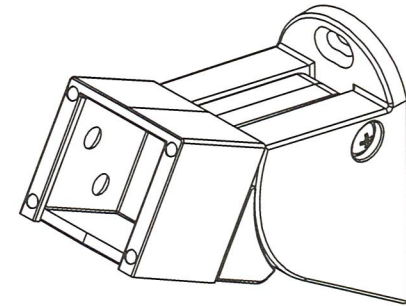
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|---------------------------------|---------|--------------------------------|-----------------|------------|
| 6 | 1/14/19 | GL | Initial Drawing | |
| REV | DATE | BY | DESCRIPTION | |
| DESCRIPTION: | | | | |
| SIMPLIFIED STAIR BRACKET SSB-05 | | | | |
| DRAWN BY: KevinF | | DIVISION: Fortress Railing | | SCALE: 1:2 |
| DATE: 01/14/2019 | | FILE NAME/PART #: R3734-05746A | | REV: 6 |
| Sheet: 1 OF 4 | | ITEM #: 5350506X | | |



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Date 9/9/20 Tech AJS



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Sheet: 3 OF 4

| 6 | 1/14/19 | GL | Initial Drawing | |
|---------------------------------|-------------------|----------------------------|-----------------|--------|
| REV | DATE | BY | DESCRIPTION | |
| DESCRIPTION: | | | | |
| SIMPLIFIED STAIR BRACKET SSB-05 | | | | |
| DRAWN BY: KevinF | | | | SCALE: |
| DATE: 01/14/2019 | | DIVISION: Fortress Railing | | 1:2 |
| ITEM #: | FILE NAME/PART #: | | REV: | |
| 5350506X | R3734-05746A | | 6 | |



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TEST REPORT FOR FORTRESS BUILDING PRODUCTS

Report No.: L0294.01-119-19 R1

Date: 09/17/20

SECTION 13

REVISION LOG

| REVISION # | DATE | PAGES | REVISION |
|------------|----------|-------|---|
| 0 | 09/17/20 | N/A | Original Report Issue |
| 1 | 09/25/20 | 2, 27 | Changed <i>AL13</i> Post to <i>AL13 Home</i> Post |