



TEST REPORT

Rendered to:

KEYLINK FENCING & RAILING, INC.

For:

PRODUCT: *Post Side Mount Bracket*

Report No: C6604.01-119-19
Report Date: 07/03/13

TEST REPORT

C6604.01-119-19
July 3, 2013

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TEST REPORT

Rendered to:

KEYLINK FENCING & RAILING, INC.
150 Orlan Road
New Holland, PA 17557

Report No.: C6604.01-119-19
Test Date: 04/11/13
Report Date: 07/03/13

1.0 General Information

1.1 Product

Post Side Mount Bracket

1.2 Project Description

Architectural Testing was contracted by Keylink Fencing & Railings, Inc. to conduct structural performance tests on the *Post Side Mount Bracket* system. The system was evaluated for the design load requirements of the following building codes:

2012 *International Building Code*[®], International Code Council

2012 *International Residential Code*[®], International Code Council

Structural tests were performed according to Chapter 17 (Structural Tests and Special Inspections) of IBC 2012.

Exception: *The test load of two times the design load was not held for 24-hours. The rationale is that guardrail systems are not subject to long term sustained loads such as snow loads and floor live loads.*

1.3 Limitations

All tests performed were to evaluate structural performance of the *Post Side Mount Bracket* assembly to carry and transfer imposed loads to the supporting structure. Anchorage of the support post to the supporting structure is not included in the scope of this testing and would need to be evaluated separately.

1.4 Qualifications

Architectural Testing in York, Pennsylvania has demonstrated compliance with ANS/ISO/IEC Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc.

1.5 Product Description

Keylink Fencing & Railing, Inc. provided the post mount components with the following details:

Bottom Support — 4 in tall by 4-1/2 in wide by 2-1/2 in deep by 0.06 in thick bent 304 stainless steel "Hat" section with four 0.3 in diameter holes for attachment to structure and two 0.2 in diameter holes for attachment to post. A 2-1/2 in by 2-1/4 in by 0.06 in thick 304 stainless steel plate was spot welded at four locations to the "Hat" section to support the bottom of the post.

Top Strap Support — 1-1/2 in tall by 4-1/2 in wide by 2-1/2 in deep by 0.06 in thick bent 304 stainless steel "Hat" section with two 0.3 in diameter holes for attachment to structure

— Two 1-1/2 in tall by 15/16 in wide by 0.19 in thick support washers

Post - 2-1/2 in square (0.125 in wall) hollow recessed 6063-T6 aluminum extrusion

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

1.6 Witnessing

A representative of Keylink Fencing & Railing, Inc. was present on 04/11/13, to witness the structural performance testing of the *Post Side Mount Bracket* system.

1.7 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 $50 \pm 5\%$ RH.

2.0 Structural Performance Testing of Assembled Railing Systems

2.1 Test Equipment

The post mounts were tested in a self-contained structural frame designed to accommodate anchorage of the post mount assembly and application of the required test loads. The specimens were loaded using an electric winch mounted to a rigid steel test frame. High strength steel cables and nylon straps 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.

2.2 Test Setup

The structural post mounts were directly secured into the surface of a rigid steel member (to simulate anchorage into concrete) using six 5/16 in Grade 8 bolts. A transducer was mounted to an independent reference frame and was located to record movement of a reference point on the post mount to determine the post deflection. See photographs in Appendix B for individual test setups.

2.3 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.

2.4 Test Results

The following tests were performed on the structural post mount assemblies for the design load requirements of the codes referenced. Deflection and permanent set were component deflections relative to the top of the post; they were not overall system displacements. All loads and displacement measurements were horizontal, unless noted otherwise.

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.

2.4 Test Results (Continued)

Test No. 2 – 04/11/13 Design Load ¹: 300 lb Concentrated Load at Top of a Single Post ² at a Height of 42 in Above the Deck Surface			
Load Level	Test Load (lb)	E.T. (min:sec)	Post Displacement (in)
Initial Load	60	00:00	0.00
2.0x Design Load	603	00:46	2.59
Initial Load	60	02:22	0.52
80% Recovery from 2.0 x Design Load			
2.5x Design Load	751	04:05	Achieved Load without Failure

¹ Calculated based on a tributary load on 6 ft rail length (6 ft x 50 plf).

² Post was conservatively tested without a railing attached.

2.5 Summary and Conclusions

Using performance criteria of 75% deflection recovery from 2.0 times design load and withstanding an ultimate load of 2.5 times design load, the test results substantiate compliance with the design load requirements of the referenced building codes for the *Post Side Mount Bracket* assembly reported herein. The *Post Side Mount Bracket* is therefore qualified for use in supporting 42 in high guardrails with lengths less than or equal to 6 ft for IBC - All Use Groups applications as well as guardrails used in IRC - One- and Two-Family Dwellings applications.

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

3.0 Closing Statement

Detailed drawings, data sheets, representative samples of test specimens, a copy of this test report, and all other supporting evidence will be retained by Architectural Testing for a period of four years from the original test date. At the end of this retention period, said materials shall be discarded without notice, and the service life of this report by Architectural Testing shall expire. Results obtained are tested values and were secured using the designated test methods. This report neither constitutes certification of this product nor expresses an opinion or endorsement by this laboratory; it is the exclusive property of the client so named herein and relates only to the tested specimens. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING:

Adam J. Schrum
Technician I
Structural Systems Testing

V. Thomas Mickley, Jr., P.E.
Senior Project Engineer
Structural Systems Testing

AJS:vtm/drm

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

Appendix A - Drawings (2)

Appendix B - Photographs (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	07/03/13	N/A	Original report issue

APPENDIX A

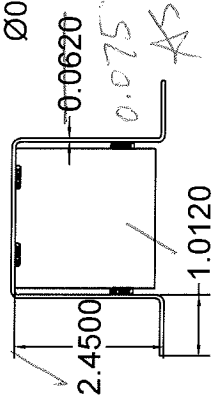
Drawings

Post Side Mounting Bracket

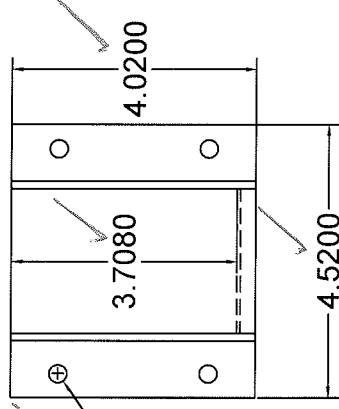
All Parts #304 Stainless Steel & Power Coated

Bottom Support

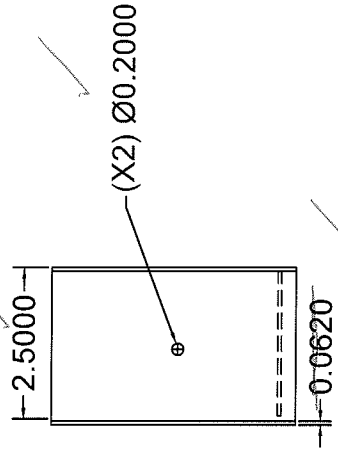
Bottom View



Front View

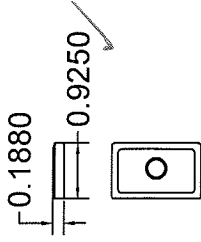


Side View

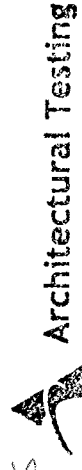
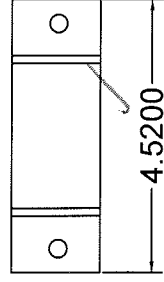
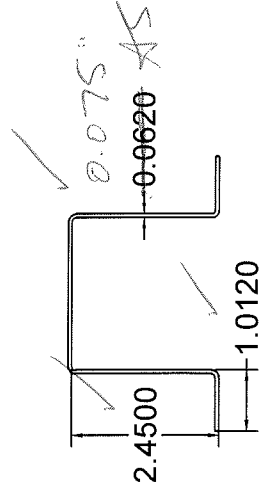


Top Strap Support

Flat Support Waster
(For Top Strap Support X2)



Front View



Test sample complies with these details.
Deviations are noted.

Report # C6604.01-119-19

Date 7/3/13 Tech AJS

Key-Link

Fencing & Railing, Inc.

03/21/13



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report #

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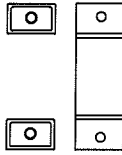
Date

7/2/13

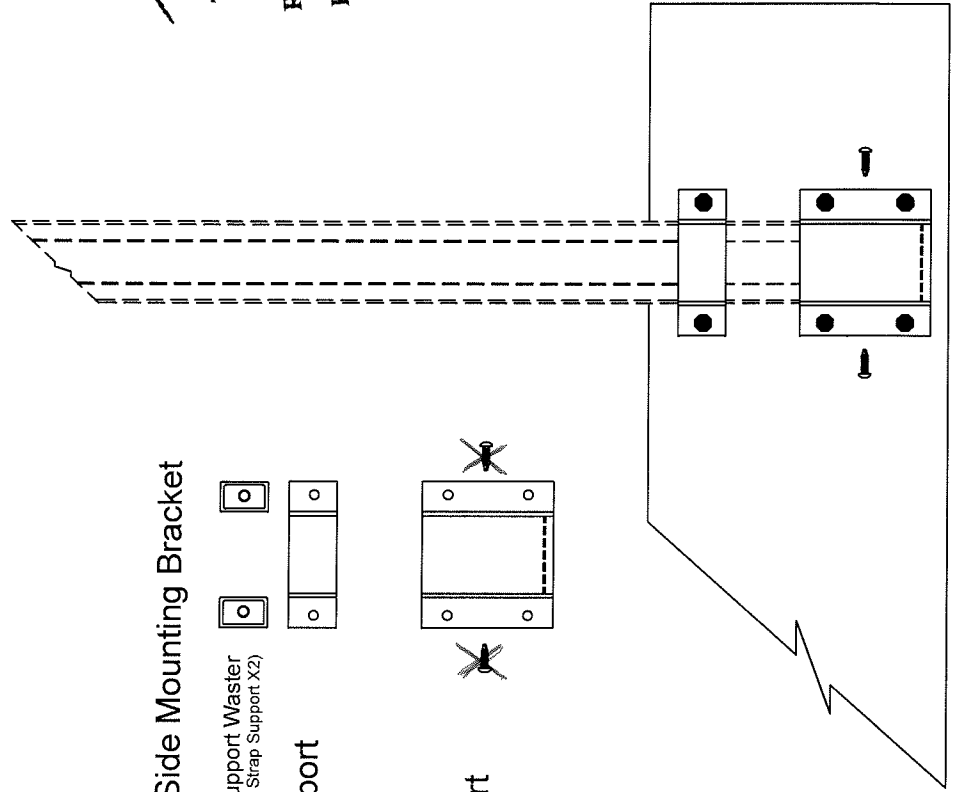
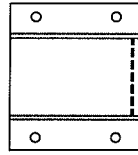
Tech

Top Strap Support

Flat Support Washer
(For Top Strap Support X2)



Bottom Support



APPENDIX B

Photographs



Photo No. 1
Concentrated Load at Top of Post

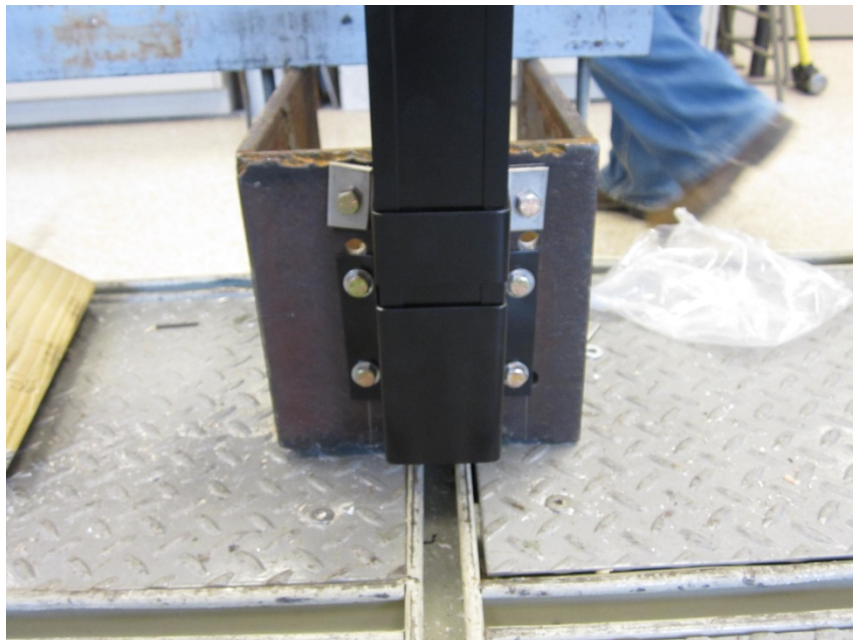


Photo No. 2
Post Side Mount Bracket