

VISTA RAILING SYSTEMS INC. TEST REPORT

SCOPE OF WORK

REPORT OF 8 FT. VISTA ALUMINUM RAILING SYSTEM WITH NARROW PICKETS, 8 FT. VISTA ALUMINUM RAILING SYSTEM WITH WIDE PICKETS, AND 5 FT. VISTA ALUMINUM GLASS RAILING SYSTEM TESTED IN ACCORDANCE WITH SELECTED LOAD REQUIREMENTS OF ICC-ES AC273, *ACCEPTANCE CRITERIA FOR HANDRAILS AND GUARDS*, APPROVED JUNE 2017, "FOR USE IN ONE- AND TWO-FAMILY DWELLINGS ONLY"

REPORT NUMBER

103705875COQ-001B

TEST DATES

11/06/18 – 12/10/18

ISSUE DATE

12/17/18

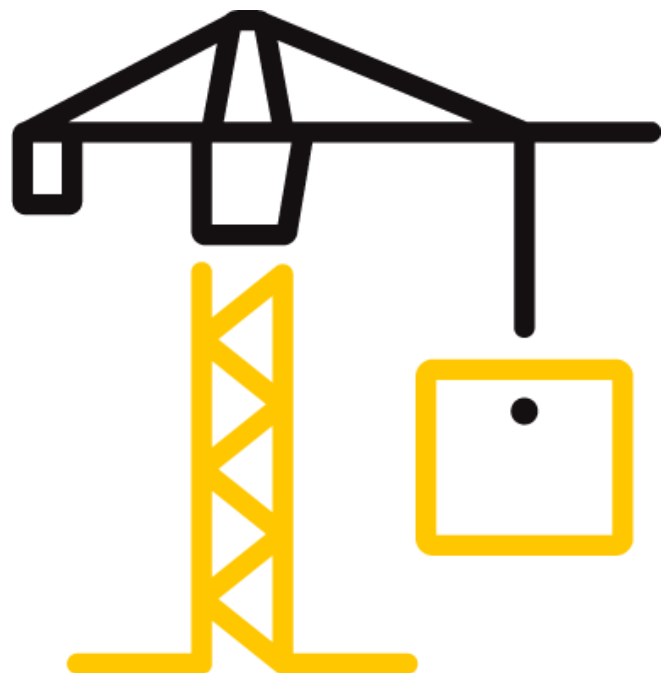
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TEST REPORT FOR VISTA RAILING SYSTEMS INC.

Report No.: 103705875COQ-001B

Date: 12/17/18

REPORT ISSUED TO

VISTA RAILING SYSTEMS INC.

23282 River Road
Maple Ridge, BC, V2W 1B6
Canada



SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Vista Railing Systems Inc. to perform testing in accordance with the load requirements of ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*, Approved June 2017, for use in one- and two-family dwellings only, on their various aluminum railing systems. Results obtained are tested values and were secured by using the designated standard. Testing was conducted at the Intertek test facility in Coquitlam, BC, Canada.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

COMPLETED BY:	Chris Chang	REVIEWED BY:	Baldeep Sandhu
TITLE:	Senior Tech – Building & Construction	TITLE:	Manager – Building & Construction
SIGNATURE:		SIGNATURE:	
DATE:	12/17/18	DATE:	12/17/18

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SECTION 2

SUMMARY OF TEST RESULTS

SYSTEM DESCRIPTION	TEST	PASS/FAIL
8 ft. Vista Aluminum Railing System with Narrow (5/8 in. x 5/8 in.) Pickets	In-fill Load	Pass
	Horizontal – Mid-Span Concentrated Load	Pass
	Horizontal – Adjacent to Post Concentrated Load	Pass
	Horizontal – Top of Post Concentrated Load	Pass
	Vertical – Mid-Span Concentrated Load	Pass
	Vertical – Adjacent to Post Concentrated Load	Pass
	Vertical – Top of Post Concentrated Load	Pass
8 ft. Vista Aluminum Railing System with Wide (5/8 in. x 1-1/2 in.) Pickets	In-fill Load	Pass
	Horizontal – Mid-Span Concentrated Load	Pass
	Horizontal – Adjacent to Post Concentrated Load	Pass
	Horizontal – Top of Post Concentrated Load	Pass
	Vertical – Mid-Span Concentrated Load	Pass
	Vertical – Adjacent to Post Concentrated Load	Pass
	Vertical – Top of Post Concentrated Load	Pass
5 ft. Vista Aluminum Glass Railing System	In-fill Load	Pass
	Horizontal – Mid-Span Concentrated Load	Pass
	Horizontal – Adjacent to Post Concentrated Load	Pass
	Horizontal – Top of Post Concentrated Load	Pass
	Vertical – Mid-Span Concentrated Load	Pass
	Vertical – Adjacent to Post Concentrated Load	Pass
	Vertical – Top of Post Concentrated Load	Pass

Refer to Appendix B for photos of testing.

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SECTION 3 TEST METHOD

The specimens were evaluated in accordance with selected sections of the following:

ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*, Approved June 2017, “for use in one- and two-family dwellings only”

SECTION 4 MATERIAL SOURCE

The client submitted the railing systems to the Evaluation Center on November 5, 2018 (Coquitlam ID# VAN1811051245-001). Samples were received in good condition and were suitable for testing unless noted otherwise. Samples were not independently selected for testing.

SECTION 5 EQUIPMENT

ASSET #	DESCRIPTION	MODEL	CAL DUE DATE
P60692	Artech 5k lb S-Type Load Cell	20210-5k	08/21/19
9-0176	Vaisala Temperature and Humidity Indicator	HMI 41/46	01/24/19
P60444	Extech Stopwatch	365515	06/26/19
52650	Mitutoyo 8 in. Digital Caliper	CD-8	05/23/19
P60016	Mitutoyo 2 in. Digital Deflection Gauge	C150 1050	02/01/19
P60020	Mitutoyo 2 in. Digital Deflection Gauge	C150 1050	02/01/19
P60022	Mitutoyo 2 in. Digital Deflection Gauge	C150 1050	02/01/19

SECTION 6 LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Kevin Penner	Intertek B&C
Chris Chang	Intertek B&C
Frank Gadea-Lopez	Intertek B&C

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SECTION 7

TESTING PROCEDURE

Testing was conducted with reference to the test procedures of ASTM E935-13e1, *Standard Test Methods for Permanent Metal Railing Systems and Rails for Buildings* and ASTM E985-00 (Reapproved 2006), *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*. The test specimens were loaded at a rate to achieve the specified loads between 10 seconds and 5 minutes. The specified test loads were held for one minute before the load was released. As per Section 4.2 of ICC-ES AC273, the following tests were conducted:

IN-FILL LOAD TEST

The in-fill load test was conducted in accordance with Section 4.2.4 *In-fill Load Test* of ICC-ES AC273. Testing was conducted with reference to Section 10.4 of ASTM E935-13e1 and the load specified in Section 7.1.7 of ASTM E985-00 (2006) with a safety factor of 2.5 for picket railing systems and 4.0 for glass railing systems. A load of 125 lbs for pickets and 200 lbs for glass was applied using a 1 square foot block normal to the in-fill. After release of the load, the system was evaluated for failure, any evidence of disengagements of any component and/or visible cracking from any component.

UNIFORM LOAD TEST

For one- and two-family dwellings, the uniform load test was not required as per Section 4.2.3 *Structural Test Requirements* of ICC-ES AC273.

CONCENTRATED LOAD TEST

The concentrated load tests were conducted in accordance with Section 4.2.6 *Concentrated Load Test* of ICC-ES AC273. Testing was conducted with reference to Section 10.6 of ASTM E935-13e1 and the load specified in Section 7.1.1 of ASTM E985-00 (2006) with a safety factor of 2.5. The top rail of the guardrail system was subjected to three (3) separate horizontal and three (3) separate vertical tests where a concentrated load of 500 lbs was applied:

- horizontally at the mid-span of the top rail,
- horizontally at the top rail adjacent to the post connection to verify the connection capacity,
- horizontally at the top of the post,
- vertically at the mid-span of the top rail,
- vertically at the top rail adjacent to the post connection to verify the connection capacity, and
- vertically at the top of the post.

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After release of the load, the system was evaluated for failure, any evidence of disengagements of any component and/or visible cracking from any component.

During testing, when the applied concentrated load reached 200 lbf (0.890 kN), the vertical and horizontal deflection of the top rail and horizontal deflection of the posts, measured at the point of loading, was recorded. When the load was applied mid-span of the rail, the horizontal deflection was not to exceed the sum of the rail height (h) divided by 24 plus the rail length (l) between the vertical supports divided by 96, or $h/24 + l/96$. When the load was applied mid-span of the rail, the vertical deflection was not to exceed the length (l) divided by 96, or $l/96$. Additionally, the top rail horizontal mid-span net deflection was not to exceed $L/96$, where the horizontal mid-span net deflection was the measured top rail mid-span horizontal deflection reading minus the post average horizontal deflection readings. When the load was applied at the top rail adjacent to the post connection and at top of the post, the horizontal deflection was not to exceed the rail height (h) divided by 12, or $h/12$.

DEVIATION FROM STANDARD METHOD

Per the client's request, samples were not independently selected for testing per Section 2.4 *Product Sampling* of ICC-ES AC273. Only one (1) railing was tested per the load requirements instead of the three (3) railing tests required per Section 4.2.2 of ICC-ES AC273. Additionally, testing of the top rail-to-post connections at corners was not evaluated per Section 4.7 of ICC-ES AC273.

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SECTION 8

TEST SPECIMEN DESCRIPTION

The samples were identified as the following:

Table 1. Railing Configuration ¹					
Railing	Post	Post Spacing	Mounting Plate	Rails	In-fill
8 ft. Vista Aluminum Railing System with Narrow Pickets (5/8 in. x 5/8 in.) – Surface Mount	2 in. x 2 in.	98 in. (single bay)	4 in. x 4 in. x 5/16 in.	42 in. high	5/8 in. x 5/8 in. Narrow Pickets
8 ft. Vista Aluminum Railing System with Wide Pickets (5/8 in. x 1-1/2 in.) – Surface Mount	2 in. x 2 in.	98 in. (single bay)	4 in. x 4 in. x 5/16 in.	42 in. high	5/8 in. x 1-1/2 in. Wide Pickets
5 ft. Vista Aluminum Glass Railing System	2 in. x 2 in.	62 in. (single bay)	4 in. x 4 in. x 5/16 in.	42-1/8 in. high	54 in. x 36 in. x 1/4 in. Tempered Glass ²

Each railing had one (1) support leg under the bottom rail at mid-span. The support leg was rigidly fixed to the test frame by screwing the front side with a #8 x 1-1/2 in. long deck screw into nominal 2x4 SPF lumber, which was then clamped to the steel test frame. For detailed drawings of the test sample and components, refer to Appendix C.

Note 1: The supporting structure attachment was outside the scope of this evaluation, and is subject to evaluation and approval by the building official. The guard assemblies were attached to a rigid test support using steel plates with four (4) 3/8 in. Grade 5 bolts on each post.

Note 2: The 5 ft. Vista Aluminum Glass Railing System was submitted to the Evaluation Center with a single sheet of tempered glass. Per the 2018 International Building Code (IBC), a single fully tempered glass sheet complying with Category II of CPSC 16 CFR Part 1201 or Class A of ANSI Z97.1 shall be permitted to be used in handrails and guards where there is no walking surface beneath them or the walking surface is permanently protected from the risk of falling glass.

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SECTION 9

TEST RESULTS

A full set of test results is included in Appendix A.

SECTION 10

CONCLUSION

The Vista Railing Systems Inc. aluminum railing systems identified and evaluated in this report have met the load requirements of ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*, Approved June 2017, "for use in one- and two-family dwellings only" with deviations as noted in Section 7 of this report.



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SECTION 11

APPENDIX A – TEST DATA (4 PAGES)

Company	Vista Railing Systems Inc.	Technician(s)	Kevin Penner, Chris Chang, Frank Gadea-Lopez
Project No.	G103705875	Reviewer	Baldeep Sandhu
Models	8 ft. Picket, 8 ft. Wide Picket, and 5 ft. Glass Infill	Start/End Date	November 6-December 10, 2018
Product Name	Vista Aluminum Railing Systems	Sample ID	VAN1811051245-001
Standard	ICC-ES AC273, <i>Acceptance Criteria for Handrails and Guards</i> , Approved June 2017		

Test Data Package

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8 ft. Vista Aluminum Picket Railing System - 5/8 in. x 5/8 in. Test Data	2
8 ft. Vista Aluminum Wide Picket Railing System - 5/8 in. x 1.5 in. Test Data	3
5 ft. Vista Aluminum Glass Panel Railing System - Test Data	4

Test: **AC 273 Structural Tests (for one- and two- family dwellings)**
 Date: 6-Nov-18
 Client: Vista Railing Systems Inc.
 Product: 8 ft. Vista Aluminum Railing System with 5/8 in. x 5/8 in. Pickets
 Post Spacing: 8 3/16 ft 2.49 m
 Effective Length: 96 in. 2.44 m
 Height of Guard: 42 in 1067 mm
 Opening in Guard: 3.8125 in 97 mm
 Method: AC 273, *Acceptance Criteria for Handrails and Guards*, Approved June 2017
 4.2 Guard Assembly Load Test
 Safety Factor: 2.5
 Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due August 21, 2019)
 Vaisala Temp/RH Indicator (Intertek ID# 9-0176, cal due January 24, 2019)
 Stopwatch (Intertek ID# P60444, cal due June 26, 2019)
 Mitutoyo Digital Caliper (Intertek ID# 52650, cal due May 23, 2019)
 Mitutoyo Digital Deflection Gauge (Intertek ID# P60016, cal due February 1, 2019)
 Mitutoyo Digital Deflection Gauge (Intertek ID# P60020, cal due February 1, 2019)
 Time/Temp/RH: 11:23AM / 23.0°C / 50.0%

Project: G103705875
 Eng/Tech: Kevin Penner
 Reviewer: Baldeep Sandhu
 Location: Coquitlam, BC, Canada

Test	Design Load (Inward/Outward) (lbf)	Factored Load (lbf)	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Required Maximum Deflection $h/24 + l/96$ (in)	Required Maximum Deflection $h/12$ (in)	Vertical Deflection limit $l/96$ (in)	Net Deflection limit $l/96$ (in)	Measured Deflection at 200 lbf (in)	Pass/Fail
In-fill Load Test (12 in. x 12 in.)	50	125	-	-	125	-	-	-	-	-	Pass
Horizontal: Midspan Concentrated Load	200	500	-	-	500	2.75	-	-	1.00	Max: 1.4590 in. Net: 0.6678 in.	Pass
Horizontal: Adjacent to Post Concentrated Load	200	500	-	-	500	-	3.50	-	-	2.456	Pass
Horizontal: Top of Post Concentrated Load	200	500	-	-	500	-	3.50	-	-	2.649	Pass
Vertical: Midspan Concentrated Load	200	500	-	-	500	-	-	1.00	-	0.097	Pass
Vertical: Adjacent to Post Concentrated Load	200	500	-	-	500	-	-	-	-	-	Pass
Vertical: Top of Post Concentrated Load	200	500	-	-	500	-	-	-	-	-	Pass

Test	Design Load (Inward/Outward) (kN)	Factored Load (kN)	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Required Maximum Deflection $h/24 + l/96$ (mm)	Required Maximum Deflection $h/12$ (mm)	Vertical Deflection limit $l/96$ (mm)	Net Deflection limit $l/96$ (mm)	Measured Deflection at 0.890 kN (mm)	Pass/Fail
In-fill Load Test (305 mm x 305 mm)	0.22	0.56	-	-	0.56	-	-	-	-	-	Pass
Horizontal: Midspan Concentrated Load	0.89	2.22	-	-	2.22	69.9	-	-	25.40	Max: 37.1 mm Net: 16.96 mm	Pass
Horizontal: Adjacent to Post Concentrated Load	0.89	2.22	-	-	2.22	-	88.9	-	-	62.38	Pass
Horizontal: Top of Post Concentrated Load	0.89	2.22	-	-	2.22	-	88.9	-	-	67.28	Pass
Vertical: Midspan Concentrated Load	0.89	2.22	-	-	2.22	-	-	25.40	-	2.46	Pass
Vertical: Adjacent to Post Concentrated Load	0.89	2.22	-	-	2.22	-	-	-	-	-	Pass
Vertical: Top of Post Concentrated Load	0.89	2.22	-	-	2.22	-	-	-	-	-	Pass

Test: **AC 273 Structural Tests (for one- and two- family dwellings)**
 Date: 6-Nov-18
 Client: Vista Railing Systems Inc.
 Product: 8 ft. Vista Aluminum Wide Railing System with 5/8 in. x 1-1/2 in. Pickets
 Post Spacing: 8 3/16 ft 2.49 m
 Effective Length: 96 in. 2.44 m
 Height of Guard: 42 in 1067 mm
 Opening in Guard: 3.8125 in 97 mm
 Method: AC 273, *Acceptance Criteria for Handrails and Guards*, Approved June 2017
 4.2 Guard Assembly Load Test
 Safety Factor: 2.5
 Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due August 21, 2019)
 Vaisala Temp/RH Indicator (Intertek ID# 9-0176, cal due January 24, 2019)
 Stopwatch (Intertek ID# P60444, cal due June 26, 2019)
 Mitutoyo Digital Caliper (Intertek ID# 52650, cal due May 23, 2019)
 Mitutoyo Digital Deflection Gauge (Intertek ID# P60016, cal due February 1, 2019)
 Mitutoyo Digital Deflection Gauge (Intertek ID# P60020, cal due February 1, 2019)
 Time/Temp/RH: 1:30PM / 23.0°C / 50.0%

Project: G103705875
 Eng/Tech: Kevin Penner
 Reviewer: Baldeep Sandhu
 Location: Coquitlam, BC, Canada

Test	Design Load (Inward/Outward) (lbf)	Factored Load (lbf)	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Required Maximum Deflection $h/24 + l/96$ (in)	Required Maximum Deflection $h/12$ (in)	Vertical Deflection limit $l/96$ (in)	Net Deflection limit $l/96$ (in)	Measured Deflection at 200 lbf (in)	Pass/Fail
In-fill Load Test (12 in. x 12 in.)	50	125	-	-	125	-	-	-	-	-	Pass
Horizontal: Midspan Concentrated Load	200	500	-	-	500	2.75	-	-	1.00	Max: 1.4280 in. Net: 0.6605 in.	Pass
Horizontal: Adjacent to Post Concentrated Load	200	500	-	-	500	-	3.50	-	-	1.521	Pass
Horizontal: Top of Post Concentrated Load	200	500	-	-	500	-	3.50	-	-	1.422	Pass
Vertical: Midspan Concentrated Load	200	500	-	-	500	-	-	1.00	-	0.1615	Pass
Vertical: Adjacent to Post Concentrated Load	200	500	-	-	500	-	-	-	-	-	Pass
Vertical: Top of Post Concentrated Load	200	500	-	-	500	-	-	-	-	-	Pass

Test	Design Load (Inward/Outward) (kN)	Factored Load (kN)	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Required Maximum Deflection $h/24 + l/96$ (mm)	Required Maximum Deflection $h/12$ (mm)	Vertical Deflection limit $l/96$ (mm)	Net Deflection limit $l/96$ (mm)	Measured Deflection at 0.890 kN (mm)	Pass/Fail
In-fill Load Test (305 mm x 305 mm)	0.22	0.56	-	-	0.56	-	-	-	-	-	Pass
Horizontal: Midspan Concentrated Load	0.89	2.22	-	-	2.22	69.9	-	-	25.40	Max: 36.3 mm Net: 16.78 mm	Pass
Horizontal: Adjacent to Post Concentrated Load	0.89	2.22	-	-	2.22	-	88.9	-	-	38.62	Pass
Horizontal: Top of Post Concentrated Load	0.89	2.22	-	-	2.22	-	88.9	-	-	36.11	Pass
Vertical: Midspan Concentrated Load	0.89	2.22	-	-	2.22	-	-	25.40	-	4.10	Pass
Vertical: Adjacent to Post Concentrated Load	0.89	2.22	-	-	2.22	-	-	-	-	-	Pass
Vertical: Top of Post Concentrated Load	0.89	2.22	-	-	2.22	-	-	-	-	-	Pass

Test: **AC 273 Structural Tests (for one- and two- family dwellings)**
 Date: 10-Dec-18
 Client: Vista Railing Systems Inc.
 Product: 5 ft. Vista Aluminum Glass Railing System
 Post Spacing: 5 3/16 ft 1.57 m
 Effective Length: 60 in. 1.52 m
 Height of Guard: 42.125 in 1070 mm
 Opening in Guard: 3 in 76 mm
 Method: AC 273, *Acceptance Criteria for Handrails and Guards*, Approved June 2017
 4.2 Guard Assembly Load Test
 Safety Factor: 2.5
 4

Project: G103705875
 Eng/Tech: Chris Chang
 Frank Gadea-Lopez
 Reviewer: Baldeep Sandhu
 Location: Coquitlam, BC, Canada

Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due August 21, 2019)
 Vaisala Temp/RH Indicator (Intertek ID# 9-0176, cal due January 24, 2019)
 Stopwatch (Intertek ID# P60444, cal due June 26, 2019)
 Mitutoyo Digital Caliper (Intertek ID# 52650, cal due May 23, 2019)
 Mitutoyo Digital Deflection Gauge (Intertek ID# P60016, cal due February 1, 2019)
 Mitutoyo Digital Deflection Gauge (Intertek ID# P60020, cal due February 1, 2019)
 Time/Temp/RH: 10:30:00 AM / 23.1°C / 50.0%

Test	Design Load (Inward/Outward) (lbf)	Factored Load (lbf)	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Required Maximum Deflection h/24 + l/96 (in)	Required Maximum Deflection h/12 (in)	Vertical Deflection limit l/96 (in)	Net Deflection limit l/96 (in)	Measured Deflection at 200 lbf (in)	Pass/Fail
In-fill Load Test (12 in. x 12 in.)	50	200	-	-	200	-	-	-	-	-	Pass
Horizontal: Midspan Concentrated Load	200	500	-	-	500	2.38	-	-	0.63	Max: 1.0700 in. Net: 0.1625 in.	Pass
Horizontal: Adjacent to Post Concentrated Load	200	500	-	-	500	-	3.51	-	-	1.544	Pass
Horizontal: Top of Post Concentrated Load	200	500	-	-	500	-	3.51	-	-	1.866	Pass
Vertical: Midspan Concentrated Load	200	500	-	-	500	-	-	0.63	-	0.1955	Pass
Vertical: Adjacent to Post Concentrated Load	200	500	-	-	500	-	-	-	-	-	Pass
Vertical: Top of Post Concentrated Load	200	500	-	-	500	-	-	-	-	-	Pass

Test	Design Load (Inward/Outward) (kN)	Factored Load (kN)	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Required Maximum Deflection h/24 + l/96 (mm)	Required Maximum Deflection h/12 (mm)	Vertical Deflection limit l/96 (mm)	Net Deflection limit l/96 (mm)	Measured Deflection at 0.890 kN (mm)	Pass/Fail
In-fill Load Test (305 mm x 305 mm)	0.22	0.89	-	-	0.89	-	-	-	-	-	Pass
Horizontal: Midspan Concentrated Load	0.89	2.22	-	-	2.22	60.5	-	-	15.88	Max: 27.18 mm Net: 4.13 mm	Pass
Horizontal: Adjacent to Post Concentrated Load	0.89	2.22	-	-	2.22	-	89.2	-	-	39.20	Pass
Horizontal: Top of Post Concentrated Load	0.89	2.22	-	-	2.22	-	89.2	-	-	47.40	Pass
Vertical: Midspan Concentrated Load	0.89	2.22	-	-	2.22	-	-	15.88	-	4.97	Pass
Vertical: Adjacent to Post Concentrated Load	0.89	2.22	-	-	2.22	-	-	-	-	-	Pass
Vertical: Top of Post Concentrated Load	0.89	2.22	-	-	2.22	-	-	-	-	-	Pass



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APPENDIX B – PHOTOS (5 PAGES)

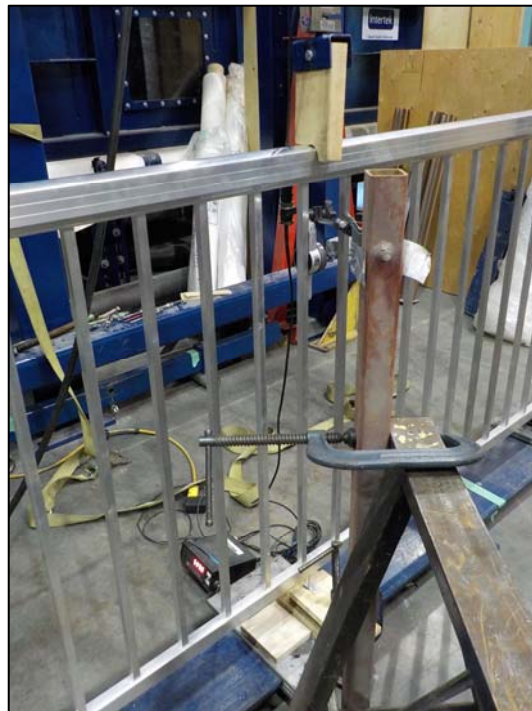
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Figure 1. 8 ft. Vista Aluminum Narrow Picket Railing System – In-Fill Load Test



**Figure 2. 8 ft. Vista Aluminum Narrow Picket Railing System
Vertical – Mid-Span of Top Rail Concentrated Load**

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**Figure 3. 8 ft. Vista Aluminum Narrow Picket Railing System
Horizontal – Top Rail Adjacent to Post Connection Concentrated Load**



Figure 4. 8 ft. Vista Aluminum Wide Picket Railing System – In-Fill Load Test

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**Figure 5. 8 ft. Vista Aluminum Wide Picket Railing System
Vertical – Top Of Post Concentrated Load**



**Figure 6. 8 ft. Vista Aluminum Wide Picket Railing System
Vertical – Mid-Span of Top Rail Concentrated Load**

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**Figure 7. 8 ft. Vista Aluminum Wide Picket Railing System
Horizontal – Mid-Span of Top Rail Concentrated Load**



**Figure 8. 5 ft. Vista Aluminum Glass Railing System
Vertical – Mid-Span of Top Rail Concentrated Load**

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**Figure 9. 5 ft. Vista Aluminum Glass Railing System
Vertical – Top of Post Concentrated Load**



**Figure 10. 5 ft. Vista Aluminum Glass Railing System
Horizontal – Mid-Span of Top Rail Concentrated Load**