VISTA RAILING SYSTEMS INC.
TEST REPORT

SCOPE OF WORK
REPORT OF 6 FT. FASCIA BRACKET ALUMINUM RAILING SYSTEM – 5/8 IN. PICKET TESTED IN ACCORDANCE WITH ASTM E935-21, *STANDARD TEST METHODS FOR PERFORMANCE OF PERMANENT METAL RAILING SYSTEMS AND RAILS FOR BUILDINGS*

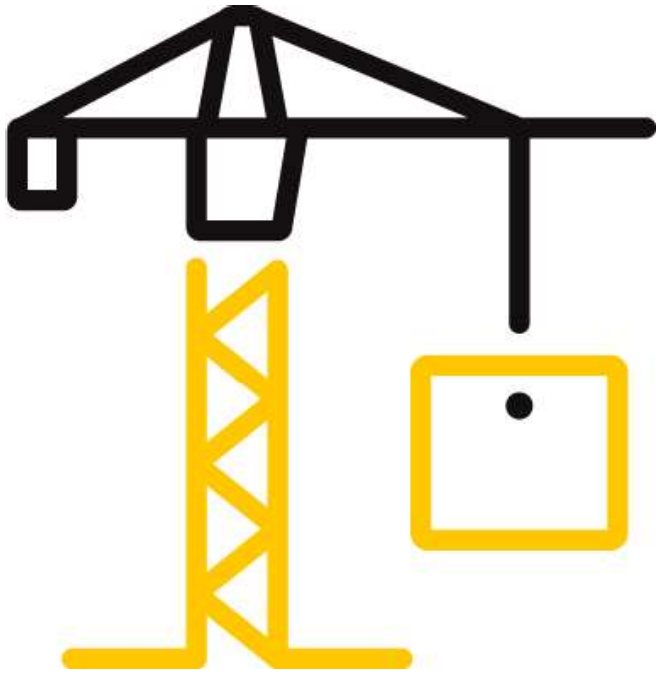
REPORT NUMBER
105224861COQ-002E

TEST DATE
05/25/23

ISSUE DATE
06/13/23

PAGES
27

DOCUMENT CONTROL NUMBER
GFT-OP-10c (09/29/20)



1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR VISTA RAILING SYSTEMS INC.
Report No.: 105224861COQ-002E
Date: 06/13/23

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., 23282 River Road, Maple Ridge, BC, V2W 1B6, Canada, to perform testing on a 6 ft. Fascia Bracket Aluminum Railing System – 5/8 in. Picket in accordance with ASTM E935-21, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*. The scope of the testing as requested by Vista Railing Systems Inc., was to assess the ability of the guard system to resist the load requirements of Section 9.8.8.2 of the 2020 NBC, 2012 OBC and 2018 BCBC. Results obtained are tested values. Testing was conducted at the Intertek test facility in Coquitlam, BC, Canada on May 25, 2023.

Unless differently required, Intertek reports apply the "Simple Acceptance" rule also called “Shared Risk approach,” of ILAC-G8:09/2019, Guidelines on Decision Rules and Statements of Conformity.

For INTERTEK B&C:

COMPLETED BY:	Jason Komorski	**REVIEWED BY:**	Baldeep Sandhu
TITLE:	Technician – Building & Construction	**TITLE:**	Manager – Building & Construction
SIGNATURE:		**SIGNATURE:**	
DATE:	06/13/23	**DATE:**	06/13/23

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

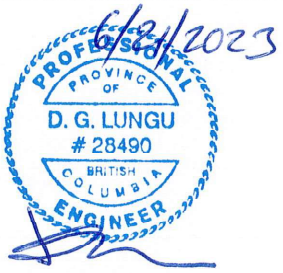
TEST REPORT FOR VISTA RAILING SYSTEMS INC.
Report No.: 105224861COQ-002E
Date: 06/13/23

Engineer's Disclaimer:

- Intertek Engineers do not assume professional responsibility of Engineer of Record.
- Compliance to Building Codes must be approved by the Engineer of Record or Authority Having Jurisdiction.
- Intertek Engineer's seal and signature is limited to the review of applicable code required loads, review of test setup, and witnessing of laboratory testing.
- Additional disclaimers are shown in Notes of Section 7 and Section 8

Engineers Approval Stamp

Kal Kooner, P.Eng.
EGBC Permit No.: 1000953
Director, Building & Construction
Intertek



Dan Lungu, P.Eng.
EGBC Permit No.: 1000953
Engineer, Building & Construction
Intertek

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR VISTA RAILING SYSTEMS INC.
Report No.: 105224861COQ-002E
Date: 06/13/23

SECTION 2
SUMMARY OF TEST RESULTS

SYSTEM DESCRIPTION	SECTION	TEST	PASS/FAIL
6 ft. Fascia Bracket Aluminum Railing System – 5/8 in. Picket	9.8.8.2	Outward In-fill Load	Pass
		Vertical Uniform Load Test	Pass
		Outward Horizontal Uniform Load Test	Pass
		Outward Horizontal – Mid-Span Concentrated Load	Pass
		Outward Horizontal – Adjacent to Post Concentrated Load	Pass
		Outward Horizontal – Top of Post Concentrated Load	Pass
		Inward Horizontal Uniform Load Test	Pass
		Inward Horizontal – Mid-Span Concentrated Load	Pass
		Inward Horizontal – Adjacent to Post Concentrated Load	Pass
		Inward Horizontal – Top of Post Concentrated Load	Pass

Refer to Appendix B for photos of testing.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 3
TEST METHOD

The guard specimen was evaluated in accordance with the following:

> **ASTM E935-21**, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*

The required test loads were based on the Specified Loads per the following Building Code articles with the Safety Factors applied as indicated in this report:

2020 National Building Code of Canada (NBC)

- Section 9.8.8.2 *Loads on Guards*

2012 Ontario Building Code (OBC)

- Section 9.8.8.2 *Loads on Guards*

2018 British Columbia Building Code (BCBC)

- Section 9.8.8.2 *Loads on Guards*

SECTION 4
MATERIAL SOURCE

The client submitted the railing system to the Evaluation Center on March 21, 2023 (Coquitlam ID# VAN2303211010-001). The sample was received in good condition and was suitable for testing unless noted otherwise. The sample was not independently selected for testing.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 5
EQUIPMENT

Calibration of test equipment was performed by Intertek B&C in accordance with ISO 17025 requirements.

ASSET #	DESCRIPTION	MODEL	CAL DUE DATE
P60692	Artech 5k lb S-Type Load Cell	20210-5k	12/08/23
P60554	T&D Temperature and Humidity Indicator	TR-72Ui	10/19/23
P60624	Extech Stopwatch	365515	12/27/23
P60494	Stanley Tape Measure	FatMax	10/14/23
52650	Mitutoyo 8 in. Digital Caliper	CD-8	06/08/23
D7810	Micro Mule	Intertek-York	08/06/23
64920	Tyco Electronics Linear Transducer	PT1MA-20-UP-420E-M6	11/02/23
64922	Tyco Electronics Linear Transducer	PT1MA-20-UP-420E-M6	11/02/23

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Jason Komorski	Intertek B&C
Chris Chang	Intertek B&C
Kal Kooner	Intertek B&C
Dan Lungu	Intertek B&C

The above observer(s) witnessed part of the test program.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 7
TESTING PROCEDURE

The evaluation was conducted in accordance with the testing procedures of ASTM E935-21, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.* The test specimen was 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. For each test, deflection measurements were taken at the point of load application. Testing was conducted with reference to the specified load requirements of the following:

2020 NBC / 2012 OBC / 2018 BCBC: SECTION 9.8.8.2 LOADS ON GUARDS

1) The minimum specified horizontal load applied inward or outward at the top of every required guard shall be 0.5 kN/m or a concentrated load of 1.0 kN applied at any point

2) Individual elements within the *guard*, including solid panels and pickets, shall be designed for a concentrated load of 0.5 kN applied over an area of 300 mm x 300 mm located at any point in the element or elements so as to engage 3 balusters when possible.

3) The minimum specified load applied vertically at the top of every required *guard* shall be 1.5 kN/m.

4) None of the loads specified above need be considered to act simultaneously.

Note 1: A safety factor of 1.67-2.24 was applied to the above loads, based on an assumed failure mode and tested material. The safety factor was calculated by dividing the live load factor of 1.5 by the material resistance factors below, as defined in the CAN/CSA S157, *Strength Design in Aluminum* standard.

- ø=0.90 resistance factor for bending failure mode, resulting safety factor = 1.67
- ø=0.67 resistance factor for brittle failure mode, resulting safety factor = 2.24

IN-FILL LOAD TEST

A test load was applied using a 300 mm x 300 mm square block on the center of the railing system normal to the in-fill. After release of the load, the system was evaluated for failure, any evidence of disengagements of any component and visible cracks in any component.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

UNIFORM LOAD TEST

Uniform test loads were applied vertically to the top of the guardrail system and horizontally to the top of the guardrail system. The test loads were applied using quarter point loads. After release of the load, the system was evaluated for failure, any evidence of disengagements of any component and visible cracks in any component.

CONCENTRATED LOAD TEST

Concentrated test loads were applied horizontally at the midspan of the top of the guard, at the top rail adjacent to the post connection to verify the connection capacity, and at the top of post. After completion of the above load tests, the concentrated load at the top of post was loaded until failure.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 8
TEST SPECIMEN DESCRIPTION

The sample was identified as the following:

TABLE 1. RAILING CONFIGURATION						
PART NAME	QTY	PART DIMENSIONS				REPORTED MATERIAL
		LENGTH	WIDTH	HEIGHT	NOMINAL THICKNESS	
Post	2	2.00 in.	2.00 in.	39.75 in.	0.11 in.	Aluminum
Fascia Post	2	2.00 in.	2.00 in.	7.25 in.	0.17 in.	Aluminum
Spigot	2	1.72 in.	1.72 in.	6.50 in.	0.17 in.	Aluminum
Baseplate	4	4.00 in.	4.00 in.	0.38 in.	-	Aluminum
Top Rail	1	72.00 in.	2.30 in.	2.60 in.	0.06 in.	Aluminum
Bottom Rail	1	72.00 in.	1.06 in.	1.64 in.	0.06 in.	Aluminum
Top Rail Backet	2	3.78 in.	2.52 in.	2.40 in.	0.06 in.	Aluminum
Infill - Picket	16	0.63 in.	0.63 in.	37.25 in.	0.04 in.	Aluminum

Note 1: For detailed drawings of the test samples and components, refer to Appendix C.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 9
TEST RESULTS

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

SECTION 10
CONCLUSION

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for Vista Railing Systems Inc. on the 6 ft. Fascia Bracket Aluminum Railing System – 5/8 in. Picket per ASTM E935-21, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.* The scope of the testing as requested by Vista Railing Systems Inc., was to assess the ability of the guard system to resist the loads as prescribed in the following building code articles:

2020 National Building Code of Canada (NBC)

- Section 9.8.8.2 *Loads on Guards*

2012 Ontario Building Code (OBC)

- Section 9.8.8.2 *Loads on Guards*

2018 British Columbia Building Code (BCBC)

- Section 9.8.8.2 *Loads on Guards*

The Vista Railing Systems Inc. railing system identified and evaluated in this report has met the load requirements using the safety factors as defined in Section 7, Note 1 of this report. Overall compliance with the Building Codes must be evaluated and approved by the Engineer of Record and Authority Having Jurisdiction.

The conclusions of this test may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 11

APPENDIX A – TEST DATA (3 PAGES)

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR VISTA RAILING SYSTEMS INC.
Report No.: 105224861COQ-002E
Date: 06/13/23

Company	Vista Railing Systems Inc.	Technician(s)	Jason Komorski
Project No.	G105224861	Reviewer	Baldeep Sandhu
Models	Narrow Picket - Fascia Mount Railing	Start/End Date	May 25, 2023
Product Name	Same as above	Sample ID	VAN2303211010-001
Standard	2020 NBC/2018 BCBC/2012 OBC, Section 9.8.8.2		

Test Data Package

Table of Contents

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR VISTA RAILING SYSTEMS INC.
Report No.: 105224861COQ-002E
Date: 06/13/23

intertek
Total Quality. Assured.

Test:	**Loads on Guards - Section 9.8.8.2 - Outwards**	Project:	G105224861
Date:		Eng/Tech:	Jason Komorski
Client:	Vista Railing Systems	Reviewer:	Baldeep Sandhu
Product:	**Aluminum Narrow Picket Railing System - Fascia Mount**	Location:	Coquitlam, BC, Canada
Post Spacing:	6.17 ft 1.88 m		
Height of Guard:	42 in 1070 mm		
Opening in Guard:	3.00 in 76 mm		
Method:	ASTM E935-21, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings* 2020 National Building Code of Canada, 9.8.8.2 *Loads on Guards* 2012 Ontario Building Code, 9.8.8.2 *Loads on Guards*		
Safety Factor:	1.67 (based on a resistance factor Ø = 0.9 for aluminum) 2.24 (based on a resistance factor Ø = 0.67 for connection)		
Equipment:	Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due December 8, 2023) T&D TR-72Ui Temperature and Humidity Logger (Intertek ID# P60554, cal due October 19, 2023) Stopwatch (Intertek ID# P60624, cal due December 7, 2023) Stanley Tape Measure (Intertek ID# P60494, cal due October 14, 2023) Mitutoyo Digital Caliper (Intertek ID# 52650, cal due June 8, 2023) Micro Mule Measurement System (Intertek ID# 63170, cal due August 6, 2023) Tyco Electronics Linear Transducer (Intertek ID# 64922 cal due November 2, 2023) Tyco Electronics Linear Transducer (Intertek ID# 64920 cal due November 2, 2023)		
Time/Temp/RH:	8:00/72.2°F/18%		

Direction	Test	Design Load (Inward/ Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Deflections (in.)	Pass/Fail
Outward	Individual Elements (over 11.8 in. x 11.8 in.)	112	187	-	-	187	2.598	Pass
	Vertical Uniform Load (per ft)	103	171	814	528	1056	1.260	Pass
	Horizontal Uniform Load (per ft)	34	57	271	176	352	2.925	Pass
	Midspan Horizontal Concentrated Load	225	375	-	-	375	3.161	Pass
	Adjacent to Post Concentrated Load	225	503	-	-	503	6.000	Pass
	Top of Post Concentrated Load	225	375	-	-	375	5.130	Pass
	Top of Post Concentrated Load	604.4 lb						

Direction	Test	Design Load (Inward/ Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Deflections (mm)	Pass/Fail
Outward	Individual Elements (over 300 mm in. x 300 mm)	0.5	0.83	-	-	0.83	66.0	Pass
	Vertical Uniform Load (per m)	1.5	2.50	1.10	2.35	4.70	32.0	Pass
	Horizontal Uniform Load (per m)	0.5	0.83	0.37	0.78	1.57	74.3	Pass
	Midspan Horizontal Concentrated Load	1	1.67	-	-	1.67	80.3	Pass
	Adjacent to Post Concentrated Load	1	2.24	-	-	2.24	152.4	Pass
	Top of Post Concentrated Load	1	1.67	-	-	1.67	130.3	Pass
	Top of Post Concentrated Load	274.2 kg						

ULTIMATE LOAD: 604.4 lb (274.2 kg)

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR VISTA RAILING SYSTEMS INC.
Report No.: 105224861COQ-002E
Date: 06/13/23

intertek
Total Quality. Assured.

Test:	**Loads on Guards - Section 9.8.8.2 - Inwards**	Project:	G105224861
Date:		Eng/Tech:	Jason Komorski
Client:	Vista Railing Systems	Reviewer:	Baldeep Sandhu
Product:	**Aluminum Narrow Picket Railing System - Fascia Mount**	Location:	Coquitlam, BC, Canada
Post Spacing:	6.17 ft 1.88 m		
Height of Guard:	42 in 1070 mm		
Opening in Guard:	3.00 in 76 mm		

Method: ASTM E935-21, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*
2020 National Building Code of Canada, 9.8.8.2 *Loads on Guards*
2012 Ontario Building Code, 9.8.8.2 *Loads on Guards*

Safety Factor: 1.67 (based on a resistance factor Ø = 0.9 for aluminum)
2.24 (based on a resistance factor Ø = 0.67 for connection)

Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due December 8, 2023)
T&D TR-72Ui Temperature and Humidity Logger (Intertek ID# P60554, cal due October 19, 2023)
Stopwatch (Intertek ID# P60624, cal due December 7, 2023)
Stanley Tape Measure (Intertek ID# P60494, cal due October 14, 2023)
Mitutoyo Digital Caliper (Intertek ID# 52650, cal due June 8, 2023)
Micro Mule Measurement System (Intertek ID# 63170, cal due August 6, 2023)
Tyco Electronics Linear Transducer (Intertek ID# 64922 cal due November 2, 2023)
Tyco Electronics Linear Transducer (Intertek ID# 64920 cal due November 2, 2023)

Time/Temp/RH: 8:00/72.2°F/18%

Direction	Test	Design Load (Inward/ Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Deflections (in.)	Pass/Fail
Inward	Horizontal Uniform Load (per ft)	17	29	136	88	176	1.736	Pass
	Midspan Horizontal Concentrated Load	112	187	-	-	187	1.764	Pass
	Adjacent to Post Concentrated Load	112	252	-	-	252	3.177	Pass
	Top of Post Concentrated Load	112	187	-	-	187	2.630	Pass

Direction	Test	Design Load (Inward/ Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Deflections (mm)	Pass/Fail
Inward	Horizontal Uniform Load (per m)	0.25	0.42	0.18	0.39	0.78	44.1	Pass
	Midspan Horizontal Concentrated Load	0.5	0.83	-	-	0.83	44.8	Pass
	Adjacent to Post Concentrated Load	0.5	1.12	-	-	1.12	80.7	Pass
	Top of Post Concentrated Load	0.5	0.83	-	-	0.83	66.8	Pass