

# VISTA RAILING SYSTEMS INC. TEST REPORT

## SCOPE OF WORK

REPORT OF 6 FT. PRIVACY WALL TESTED IN ACCORDANCE WITH ASTM E935-21,  
*STANDARD TEST METHODS FOR PERFORMANCE OF PERMANENT METAL RAILING  
SYSTEMS AND RAILS FOR BUILDINGS*

## REPORT NUMBER

105627913COQ-001A

## TEST DATE

03/06/24

## ISSUE DATE      REVISED DATE

04/10/24      [05/08/24]

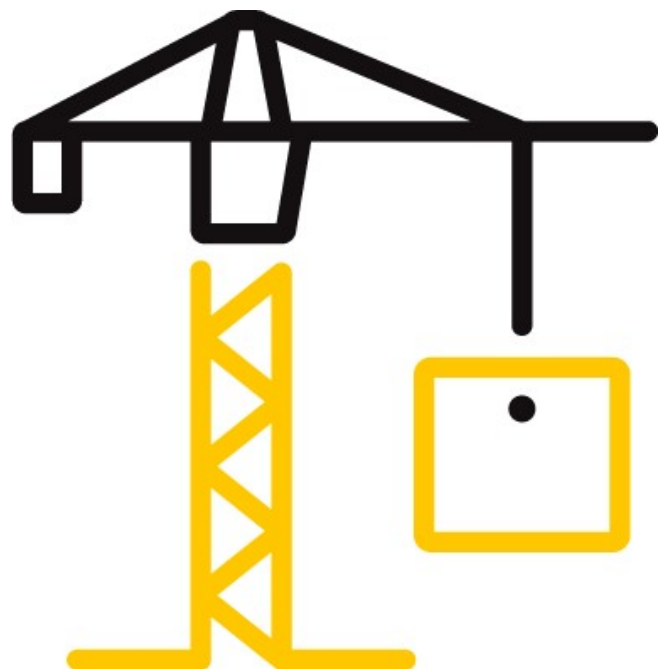
## PAGES

20

## DOCUMENT CONTROL NUMBER

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## TEST REPORT FOR VISTA RAILING SYSTEMS INC.

Report No.: 105627913COQ-001A

Date: 05/08/24

### 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 their 6 ft. Privacy Wall product 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 4.1.5.14 and Section 9.8.8.2 of the 2020 NBC, 2012 OBC, 2018 BCBC, and 2019 NBC-AE. Results obtained are tested values. Testing was conducted at the Intertek test facility in Coquitlam, BC, Canada on March 6, 2024.

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:

<b>COMPLETED BY:</b>	Chris Chang, P.Eng.	<b>REVIEWED BY:</b>	Baldeep Sandhu
<b>TITLE:</b>	Sr. Tech – Building & Construction	<b>TITLE:</b>	Manager – Building & Construction
<b>SIGNATURE:</b>	 EGBC Permit No.: 1000953	<b>SIGNATURE:</b>	
<b>DATE:</b>	05/08/24	<b>DATE:</b>	05/08/24

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### 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



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**SECTION 2**

**SUMMARY OF TEST RESULTS**

SYSTEM DESCRIPTION	TEST	PASS/FAIL
Privacy Wall (6 ft. o/c span)	In-fill Load	Pass
	Vertical Uniform Load Test	Pass
	Horizontal Uniform Load Test	Pass
	Horizontal – Mid-Span Concentrated Load	Pass
	Horizontal – Adjacent to Post Concentrated Load	Pass
	Horizontal – Top of Post Concentrated Load	Pass
	Size of Opening	Not Evaluated

Refer to Appendix B for photos of testing.

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### 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 4.1.5.14 *Loads on Guards and Handrails*
- Section 9.8.8.2 *Loads on Guards*

#### **2012 Ontario Building Code (OBC)**

- Section 4.1.5.14 *Loads on Guards*
- Section 9.8.8.2 *Loads on Guards*

#### **2018 British Columbia Building Code (BCBC)**

- Section 4.1.5.14 *Loads on Guards and Handrails*
- Section 9.8.8.2 *Loads on Guards*

#### **2019 National Building Code – Alberta Edition (NBC-AE)**

- Section 4.1.5.14 *Loads on Guards and Handrails*
- Section 9.8.8.2 *Loads on Guards*

### SECTION 4

#### MATERIAL SOURCE

The client submitted the guard system and components to the Evaluation Center on January 8, 2024 (Coquitlam ID# VAN2401081205-001) and March 1, 2024 (Coquitlam ID# VAN2403010844-001). The samples were received in good condition and were suitable for testing unless noted otherwise. The samples were not independently selected for testing.

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**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	01/15/25
P60610	T&D Temperature and Humidity Indicator	TR-72Ui	08/30/24
P60494	Stanley Tape Measure	FatMax	10/19/24
P60624	Extech Stopwatch	365515	12/15/24
52650	Mitutoyo 8 in. Digital Caliper	CD-8	06/22/24
D7810	Micro Mule	Intertek-York	10/03/24
P60673	Tyco Electronics Linear Transducer	PT1MA-20-UP-420E-M6	06/05/24

**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.

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**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 / 2019 NBC-AE:****SECTION 4.1.5.14 LOADS ON GUARDS AND HANDRAILS**

- 1) The minimum specified horizontal load applied inward or outward at the minimum required height of every guard shall be 0.75 kN/m or a concentrated load of 1.0 kN applied at any point.
- 2) The minimum specified horizontal load applied inward at the minimum required height of every required guard shall be half that specified in Sentence (1).
- 3) 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 100 mm x 100 mm located at any point in the element or elements so as to produce the most critical effect.
- 4) The size of the opening between any two adjacent vertical elements within a *guard* shall not exceed 100 mm when each of these elements is subjected to a specified *live load* of 0.1 kN applied in opposite directions in the in-plane direction of the *guard* so as to produce the most critical effect.
- 5) The minimum specified load applied vertically at the top of every required *guard* shall be 1.5 kN/m.
- 6) None of the loads specified above need be considered to act simultaneously.

**2020 NBC / 2012 OBC / 2018 BCBC / 2019 NBC-AE:****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.

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- 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.

- $\phi=0.90$  resistance factor for bending failure mode, resulting safety factor = 1.67
- $\phi=0.75$  resistance factor for ductile failure mode, resulting safety factor = 2.0
- $\phi=0.67$  resistance factor for brittle failure mode, resulting safety factor = 2.24

### IN-FILL LOAD TEST

A test load was applied using a 100 mm x 100 mm square block on the center of an individual Slat 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.

### UNIFORM LOAD TEST

Uniform test loads were applied vertically to the top of the Privacy Wall system and horizontally on an individual Slat at 42 in. height. 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 on an individual Slat at 42 in. height at the following locations:

- horizontally at the midspan of the Slat,
- horizontally at the Slat adjacent to the post connection to verify connection capacity, and
- horizontally on the post at 42 in. height.

After completion of the above load tests, the concentrated load on the post at 42 in. height was loaded until failure.

### SIZE OF OPENING

Size of opening was not evaluated as there were no openings between adjacent vertical elements.

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**SECTION 8**

**TEST SPECIMEN DESCRIPTION**

The sample was identified as the following:

<b>TABLE 1. RAILING CONFIGURATION</b>						
<b>PART NAME</b>	<b>QTY</b>	<b>PART DIMENSIONS</b>				<b>REPORTED MATERIAL</b>
		<b>LENGTH</b>	<b>WIDTH</b>	<b>HEIGHT</b>	<b>NOMINAL THICKNESS</b>	
Post	2	2.50 in.	2.50 in.	70.00 in.	0.10 in.	Aluminum
Baseplate	2	4.00 in.	4.00 in.	0.38 in.	N/A	Aluminum
Top Rail	1	74.00 in.	2.25 in.	1.88 in.	0.06 in.	Aluminum
Infill – Slat	11	72.00 in.	5.91 in.	0.63 in.	0.08 in.	Aluminum
Pin	4	3.50 in.	0.25 in.	0.25 in.	N/A	Aluminum

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

Note 2: The supporting structure attachment was outside the scope of this evaluation, and is subject to evaluation and approval by the Engineer of Record and the Authority Having Jurisdiction (AHJ). The assemblies were attached to a rigid test support using steel plates with four (4) 3/8 in. Grade 5 bolts on each post.

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### 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 Privacy Wall product 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 4.1.5.14 *Loads on Guards and Handrails*
- Section 9.8.8.2 *Loads on Guards*

##### **2012 Ontario Building Code (OBC)**

- Section 4.1.5.14 *Loads on Guards*
- Section 9.8.8.2 *Loads on Guards*

##### **2018 British Columbia Building Code (BCBC)**

- Section 4.1.5.14 *Loads on Guards and Handrails*
- Section 9.8.8.2 *Loads on Guards*

##### **2019 National Building Code – Alberta Edition (NBC-AE)**

- Section 4.1.5.14 *Loads on Guards and Handrails*
- Section 9.8.8.2 *Loads on Guards*

The Vista Railing Systems Inc. Privacy Wall product 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.

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**SECTION 11**

**APPENDIX A – TEST DATA (2 PAGES)**

Company	Vista Railing Systems Inc.	Technician(s)	Jason Komorski
Project No.	G105627913	Reviewer	Baldeep Sandhu
Models	6 ft. Privacy Wall	Start/End Date	March 6, 2024
Product Name	Same as above	Sample ID	VAN2401081205-001, VAN2403010844-001
Standard	2020 NBC / 2012 OBC / 2018 BCBC / 2019 NBC-AE, Section 4.1.5.14		

**Test Data Package**

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6 ft Privacy Wall	2

Test: **Loads on Guards - Section 4.1.5.14**  
 Date: 6-Mar-24  
 Client: Vista Railing Systems Inc.  
 Product: **6 ft. Privacy Wall**

Project: G105627913  
 Eng/Tech: Jason Komorski  
 Reviewer: Baldeep Sandhu  
 Location: Coquitlam, BC, Canada

Post Spacing: 6.10 ft 1.86 m  
 Height of Guard: 72.1 in 1832 mm  
 Opening in Guard: 0.25 in 6 mm (between panels)  
 2.50 in 64 mm (under bottom panel)

Method: ASTM E935-21, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*  
 2020 National Building Code of Canada, Section 4.1.5.14 *Loads on Guards and Handrails*  
 2012 Ontario Building Code, Section 4.1.5.14 *Loads on Guards*  
 2018 British Columbia Building Code, Section 4.1.5.14 *Loads on Guards and Handrails*  
 2019 National Building Code - Alberta Edition, Section 4.1.5.14 *Loads on Guards and Handrails*

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

Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due January 15, 2025)  
 T&D TR-72Ui Temperature and Humidity Logger (Intertek ID# P60610, cal due August 30, 2024)  
 Stopwatch (Intertek ID# P60624, cal due December 15, 2024)  
 Stanley Tape Measure (Intertek ID# P60494, cal due October 19, 2024)  
 Mitutoyo Digital Caliper (Intertek ID# 52650, cal due June 22, 2024)  
 Micro Mule Measurement System (Intertek ID# D7810, cal due October 3, 2024)  
 Tyco Electronics Linear Transducer (Intertek ID# P60673, cal due June 5, 2024)

Time/Temp/RH: 8:30AM / 23.0°C / 49.0%

Direction	Test	Design Load (Inward/Outward) (lbf)	Factored Load	Required Proof Load (lbf)	Deflections (in.)	Pass/Fail
Outward	Individual Elements (over 4 in. x 4 in.)	112	187	187	1.236	Pass
	Vertical Uniform Load (per ft)	103	171	1045	1.402	Pass
	Horizontal Uniform Load (per ft)	51	86	522	2.673	Pass
	Midspan Horizontal Concentrated Load	225	375	375	2.484	Pass
	Adjacent to Post Concentrated Load	225	503	503	1.976	Pass
	Top of Post Horizontal Concentrated Load	225	375	375	2.150	Pass
	Top of Post Horizontal Concentrated Load Ultimate Load	878.2 lb - Fasteners for the post base connection failed.				
In-plane	Size of Opening	22.5	-	22.5	N/A	N/A

Direction	Test	Design Load (Inward/Outward) (kN)	Factored Load	Required Proof Load (kN)	Deflections (mm)	Pass/Fail
Outward	Individual Elements (over 100 mm in. x 100 mm)	0.5	0.83	0.83	31.4	Pass
	Vertical Uniform Load (per m)	1.5	2.50	4.65	35.6	Pass
	Horizontal Uniform Load (per m)	0.75	1.25	2.32	67.9	Pass
	Midspan Horizontal Concentrated Load	1	1.67	1.67	63.1	Pass
	Adjacent to Post Concentrated Load	1	2.24	2.24	50.2	Pass
	Top of Post Horizontal Concentrated Load	1	1.67	1.67	54.6	Pass
	Top of Post Horizontal Concentrated Load Ultimate Load	3.9 kN - Fasteners for the post base connection failed.				
In-plane	Size of Opening	0.1	-	0.10	N/A	N/A