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EVALUATION CENTER

INTERTEK TESTING SERVICES NA LTD.
1500 BRIGANTINE DRIVE
COQUITLAM, BC V3K 7C1

RENDERED TO

FALCON RAILING AND SUPERDECK LTD.
747 FITZPATRICK ROAD
KELOWNA, BC V1X 5E2
CANADA

PRODUCT EVALUATED: Aluminum Topless Glass Railing System
EVALUATION PROPERTY: Load Requirements

Report of Falcon Railing and Superdeck Ltd. Aluminum Topless Glass Railing System for compliance with the applicable requirements of Section 1607.7.1 *Handrails and Guards* of the 2009 International Building Code (IBC)

TEST REPORT

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2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for Falcon Railing and Superdeck Ltd. on aluminum guardrail systems. The evaluation was carried out to determine whether the railing systems would resist the loads specified in Section 1607.7.1 *Handrails and Guards* of the 2009 International Building Code (IBC). This evaluation was conducted in the month of January 2011.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted three (3) aluminum railing systems to the Evaluation Center on January 26, 2011. Samples were not independently selected for testing.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The samples were identified as the following:

Table 1. Railing Configurations					
Railing	Post	Post Spacing	Mounting Plate	Rails	Panel Insert
Glass Panel - Top Mount	2-1/2" x 2-1/2"	54"	4-1/2" x 4-1/2" x 3/8"	No Top Rail	10 mm Glass

Note: Post to sub-structure fastener evaluation is beyond the scope of this report. 3/8 in. Grade 5 bolts were used to install the specimen for testing.

4 Testing and Evaluation Methods

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. As per the 2009 IBC, the following tests were conducted:

4.1. 2009 IBC: SECTION 1607.7.1 HANDRAILS AND GUARDS

- 1) Handrails and guards shall be designed to resist a load of 50 pounds per linear foot (plf) (0.73 kN/m) applied in any direction at the top.
- 2) Handrails and guards shall be able to resist a single concentrated load of 200 pounds (0.89 kN), applied in any direction at any point along the top.
- 3) Intermediate rails, balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds (0.22 kN) on an area equal to 1 square foot (0.093 m²).

Notes:

1. A live load factor of 2.5 is applicable to the above loads. A live load factor of 4.0 is applicable for glass in-fill.

4.2. IN-FILL LOAD TEST

A load of 200 lbs was applied to the glass panel 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.

4.3. UNIFORM LOAD TEST

The guardrail system was subjected to a maximum equivalent uniform load of 125 plf applied horizontally at the top of the railing system; the load was applied directly to the glass panel as there was no top rail. The load was applied using quarter point loading. After release of the load, the system was evaluated for failure, any evidence of disengagements and/or visible cracking from any component.

4.4. CONCENTRATED LOAD TEST

The guardrail system was subjected to a horizontal concentrated load of 500 lbs at the top of post to verify the glass to post connection capacity.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS


The product test results are shown in Table 1 below and a full set of test data is located in Appendix A.

Table 1. Test Results		
System Description	Test	Compliance
Aluminum Topless Glass Panel Railing System – Top Mount	In-fill load	Pass
	Uniform Load	Pass
	Concentrated Top of Post	Pass

6 Conclusion

The Falcon Railing and Superdeck Ltd. aluminum railing systems identified in this test report have complied with the requirements of Section 1607.7.1 *Handrails and Guards* of the 2009 International Building Code. The product test results are presented in Section 5 of this report.

INTERTEK TESTING SERVICES NA LTD.

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APPENDIX A: Test Data (3 pages)



Test: **IBC Loads on Guards** Test #1
 Date: 27-Jan-11
 Client: Falcon Railing and Superdeck Ltd.
 Product: **Aluminum Topless 10 mm Glass Panel Railing System**
 Installation: **Top Mount**
 Post Spacing: 4.50 ft 1.37 m
 Height of Guard: 42 in 1070 mm
 Opening in Guard: 1.625 in 41 mm
 Method: 2009 International Building Code (IBC)
 Section 1607.7.1 Handrails and Guards
 Section 1713 Test Safe Load
 Safety Factor: 2.5
 4.0 For structural glass
 Equipment: Artech 5K load cell (Intertek ID# SN138768, cal due August 20, 2011)
 Vaisala Indicator (Intertek ID# V2920010, cal due November 2, 2011)
 Time/Temp/RH: 11:00AM / 14.4°C / 52.9%

Project: G100320369
 Eng/Tech: Chris Chang *CC*
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Test	Design Load (Inward/Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail	Ultimate Load (lbf)
Individual Elements / Components (1ft ²)	50	200	-	-	200	PASS	
Horizontal Uniform Load (per ft)	50	125	316	281	563	PASS	
Top of Post Horizontal Concentrated Load	200	500	-	-	500	PASS	565.16

Mode of Failure: 2 fasteners connecting base to post broke at the tension side



Test: **IBC Loads on Guards** Test #2
 Date: 27-Jan-11
 Client: Falcon Railing and Superdeck Ltd.
 Product: **Aluminum Topless 10 mm Glass Panel Railing System**
 Installation: **Top Mount**
 Post Spacing: 4.50 ft 1.37 m
 Height of Guard: 42 in 1070 mm
 Opening in Guard: 1.625 in 41 mm
 Method: 2009 International Building Code (IBC)
 Section 1607.7.1 Handrails and Guards
 Section 1713 Test Safe Load
 Safety Factor: 2.5
 4.0 For structural glass
 Equipment: Artech 5K load cell (Intertek ID# SN138768, cal due August 20, 2011)
 Vaisala Indicator (Intertek ID# V2920010, cal due November 2, 2011)
 Time/Temp/RH: 1:00PM / 14.1°C / 53.2%

Project: G100320369
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Test	Design Load (Inward/Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail	Ultimate Load (lbf)
Individual Elements / Components (1ft ²)	50	200	-	-	200	PASS	
Horizontal Uniform Load (per ft)	50	125	316	281	563	PASS	
Top of Post Horizontal Concentrated Load	200	500	-	-	500	PASS	642.07

Mode of Failure: 2 fasteners connecting base to post broke at the tension side



Test: **IBC Loads on Guards** Test #3
 Date: 27-Jan-11
 Client: Falcon Railing and Superdeck Ltd.
 Product: **Aluminum Topless 10 mm Glass Panel Railing System**
 Installation: **Top Mount**
 Post Spacing: 4.50 ft 1.37 m
 Height of Guard: 42 in 1070 mm
 Opening in Guard: 1.625 in 41 mm
 Method: 2009 International Building Code (IBC)
 Section 1607.7.1 Handrails and Guards
 Section 1713 Test Safe Load
 Safety Factor: 2.5
 4.0 For structural glass
 Equipment: Artech 5K load cell (Intertek ID# SN138768, cal due August 20, 2011)
 Vaisala Indicator (Intertek ID# V2920010, cal due November 2, 2011)
 Time/Temp/RH: 1:15PM / 14.2°C / 53.2%

Project: G100320369
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Test	Design Load (Inward/Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail	Ultimate Load (lbf)
Individual Elements / Components (1ft ²)	50	200	-	-	200	PASS	
Horizontal Uniform Load (per ft)	50	125	316	281	563	PASS¹	
Top of Post Horizontal Concentrated Load	200	500	-	-	500	PASS²	574.70

Note 1: Glass dislodged from post at 437.36lbs; system was restrained horizontally using straps to continue test.
 Note 2: Straps were left on for Top of Post Horizontal Concentrated Load.

Mode of Failure: 2 fasteners connecting base to post broke at the tension side