

TEST REPORT

Intertek

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EVALUATION CENTER

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1500 BRIGANTINE DRIVE
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RENDERED TO

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PRODUCT EVALUATED: Aluminum Picket and Glass Railing Systems
EVALUATION PROPERTY: Load Requirements

Report of Aluminum Picket and Glass Railing Systems for compliance with the applicable requirements of the following criteria: 2005 National Building Code of Canada, Section 4.1.5.15 Loads on Guards

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2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for DekSmart Products Ltd. on five (5) aluminum guardrail systems. The testing was conducted in accordance with the 2005 National Building Code of Canada, Section 4.1.5.15 *Loads on Guards*. This evaluation was completed during the months of March and July 2008.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted three (3) railing systems to the Evaluation Center on March 6, 2008 and two (2) railing systems on July 4, 2008. Samples were not independently selected for testing.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The different samples were identified as the following:

- 8 ft. Aluminum Picket Railing System, which consists of the following:

Post: 2-1/2 in. x 2-1/2 in. 6061-T6 Aluminum Post

Mounting plate: 4 in. x 4 in. x 1/4 in. 6061-T6 Aluminum plate with 4 screw holes

Rails: 42 in. high, 6063-T54 Aluminum Low-Profile Top Rail and 6060-T5 Bottom Rail

Picket Insert: 5/8 in. x 5/8 in. 6063-T5 Aluminum spaced 4-1/2 in. o/c

Connections: Connection details are provided in Appendix B.

- 5 ft. Aluminum 5 mm Glass Railing System, which consists of the following:

Post: 2-1/2 in. x 2-1/2 in. 6061-T6 Aluminum Post

Mounting plate: 4 in. x 4 in. x 1/4 in. 6061-T6 Aluminum plate with 4 screw holes

Rails: 42 in. high, 6063-T54 Aluminum Low-Profile Top Rail and 6060-T5 Bottom Rail

Panel Insert: 5 mm Glass

Connections: Connection details are provided in Appendix B.

- 4 ft. Aluminum Topless 10 mm Glass Railing System, which consists of the following:

Post: 2-1/2 in. x 2-1/2 in. 6061-T6 Aluminum Post

Mounting plate: 4 in. x 4 in. x 1/4 in. 6061-T6 Aluminum plate with 4 screw holes

Rails: Topless (42 in. high to top of glass)

Panel Insert: 10 mm Glass

Connections: Connection details are provided in Appendix B.

- 8 ft. Aluminum Picket Railing System, which consists of the following:

Post: 1-3/4 in. x 1-3/4 in. 6061-T6 Aluminum Post

Mounting plate: 4 in. x 4 in. x 1/4 in. 6061-T6 Aluminum plate with 4 screw holes

Rails: 42 in. high, 6063-T54 Aluminum Universal Top Rail and
6060-T5 Bottom Rail

Picket Insert: 5/8 in. x 5/8 in. 6063-T5 Aluminum spaced 4-1/2 in. o/c

Connections: Connection details are provided in Appendix B.

- 5 ft. Aluminum 5 mm Glass Railing System, which consists of the following:

Post: 1-3/4 in. x 1-3/4 in. 6061-T6 Aluminum Post

Mounting plate: 4 in. x 4 in. x 1/4 in. 6061-T6 Aluminum plate with 4 screw holes

Rails: 42 in. high, 6063-T54 Aluminum Universal Top Rail and
6060-T5 Bottom Rail

Panel Insert: 5 mm Glass

Connections: Connection details are provided in Appendix B.

Note: Post to sub-structure fastener evaluation is beyond the scope of this report. Four 3/8 in. grade 5 bolts on each post 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 Section 4.1.5.15 of the 2005 National Building Code, the following tests were conducted:

4.1. 2005 NBC: SECTION 4.1.5.15. LOADS ON GUARDS REQUIREMENTS

- 1) The minimum specified horizontal load applied inward or outward at the top of every required *guard* shall be:

(c) 0.75 kN/m or a concentrated load of 1.0 kN applied at any point, whichever governs, for locations other than described in Clauses (a) and (b) [refer to Notes below].

- 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 100 mm x 100 mm located at any point in the element or elements so as to produce the most critical effect.
- 3) The loads required in Sentence (2) need not be considered to act simultaneously with the loads provided for in Sentences (1) and (4).
- 4) The minimum specified load applied vertically at the top of every required *guard* shall be 1.5 kN/m and need not be considered to act simultaneously with the horizontal load provided for in Sentence (1).

Notes:

1. Clauses (a) and (b) refer to means of egress and equipment access walkways and therefore are not applicable.
2. A live load factor of 1.5 is applicable to the above loads.

4.2. IN-FILL LOAD TEST

A load of 0.75 kN (169 lbf) was applied using a 100 mm x 100 mm square block normal to the in-fill so as to produce the most critical effect. 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 top rail of the guardrail system was subjected to two separate tests where a maximum equivalent uniform load of 1.125 kN/m (77 plf) was applied horizontally and 2.25 kN/m (154 plf) was applied vertically. The horizontal and vertical loads were applied using third point loading. The third point loads applied were calculated to impose an equivalent moment to the uniform loads specified. 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 top rail of the guardrail system was subjected to three separate tests where a concentrated load of 1.5 kN (337 lbs) was applied:

- Horizontally at the centre of the guardrail.
- Horizontally at the top rail adjacent to the rail post connection to verify the connection capacity

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The product test results are shown in Table 1 below (a complete set of test data is provided in Appendix A).

Table 1. Test Results				
System Description	System Height (inches)	Post to Post Center Spacing (inches)	Test	Compliance
8 ft. Aluminum Picket Railing System (Low-profile Top Rail)	42	95-1/2	In-fill Load	Complied
			Vertical Uniform Load	Complied
			Horizontal Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Top of Post Concentrated Load	Complied
5 ft. Aluminum 5 mm Glass Railing System (Low-profile Top Rail)	42	60	In-fill Load (Center of Glass)	Complied
			In-fill Load (Edge of Glass)	Complied
			Vertical Uniform Load	Complied
			Horizontal Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Top of Post Concentrated Load	Complied
4 ft. Aluminum Topless 10 mm Glass Railing System	42	48	In-fill Load (Edge of Glass)	Complied
			Vertical Uniform Load	Complied
			Horizontal Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Top of Post Concentrated Load	Complied
8 ft. Aluminum Picket Railing System (Universal Top Rail)	42	95-3/4	In-fill Load	Complied
			Vertical Uniform Load	Complied
			Horizontal Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Top of Post Concentrated Load	Complied
5 ft. Aluminum 5 mm Glass Railing System (Universal Top Rail)	42	60	In-fill Load (Center of Glass)	Complied
			In-fill Load (Edge of Glass)	Complied
			Vertical Uniform Load	Complied
			Horizontal Uniform Load	Complied
			Mid-span Concentrated Load	Complied
			Top of Post Concentrated Load	Complied

6 Conclusion

The DekSmart Products Ltd. Aluminum Picket and Glass Railing Systems described in this test report have complied with the loads as specified in Section 4.1.5.15 *Loads on Guards* of the 2005 National Building Code of Canada.

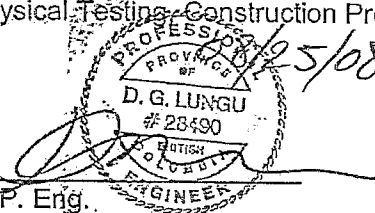
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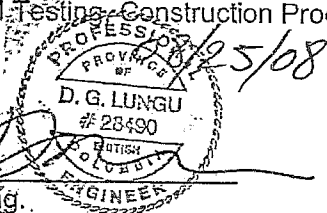
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