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SERVICE DE CONSULTATION DE VALLEYFIELD INC
Service d'ingénierie

Le 28 octobre 2016

DekSmart Railings / Century Aluminium Railings
Phone : 778-516-6000
Fax : 778-765-6003

Réf : Rapport d'évaluation de produit pour leur conformité au Code de Construction du Québec 2010

Monsieur

Pour faire suite au mandat que vous nous avez confié, il me fait plaisir de vous soumettre notre rapport de vérification des documents suivants : « Test report » (rapport numéro 100031923COQ-001A du 25 janvier 2011) et « Engineering Evaluation (rapport numéro 101383221COQ-001 du 18 octobre 2013), pour votre produit appelé « Aluminum Picket and Glass Railing Systems » qui pourrait être traduit en français à « Garde corps avec poteau en aluminium pour panneaux de verre ». Vous trouverez ci-joint une copie de ces documents.

Le but de notre étude était de vérifier ces documents et les essais réalisés par la firme Intertek étaient aussi valables au Québec selon le CCQ 2010 qu'ils le sont pour le Code National du Bâtiment du Canada 2010.

Selon les documents de la firme Intertek, les essais ont été réalisés pour vérifier si la capacité de ce produit est conforme aux exigences des articles suivants du CCQ-2010 :

Article 4.1.5.14 1) à 4) **GARDE-CORPS** qui stipule :

1) La charge spécifique minimale appliquée horizontalement, vers l'extérieur ou l'intérieur, à la hauteur minimale requise d'un garde-corps exigé est de :

a) Non applicable à ce cas.

b) Non applicable à ce cas.

c) 0,75 kN^{3}M ou 1,0 kN concentrée à n'importe quel point du garde-corps, selon le cas qui s'applique aux endroits autres que ceux décrits aux alinéas a) et b).

2) Les éléments constitutifs des garde-corps, y compris les panneaux pleins et les lattes verticales, doivent être conçus pour résister à une charge de 0,5kN, s'exerçant sur un carré de 100 mm de côté, à n'importe quel point de l'élément ou des éléments où elle produit un effet maximal.

3) Il n'est pas obligatoire de considérer que les charges mentionnées au paragraphe 2) agissent en même temps que celles qui sont mentionnées aux paragraphes 1) et 4).

4) La charge spécifiée minimale appliquée verticalement à la partie supérieure de tout garde-corps exigé est de 1,5 kN/m et il n'est pas obligatoire de considérer que cette charge agit en même temps que la charge horizontale qui est mentionnée au paragraphe 1).

Il est important de noter les points suivants avant d'aller plus loin. Premièrement, le texte de ces articles est le même dans le CNB 2010 et dans le CCQ 2010. Deuxièmement, tel qu'indiqué dans les documents d'Intertek, la fixation au support du produit n'a pas été vérifiée, puisque les conditions de fixation changent d'un projet à l'autre. Aussi, le rapport d'essai ne certifie que la résistance du produit lui-même.

Les documents de la compagnie Intertek indiquent que leurs essais ont effectivement vérifié la résistance de ce produit selon plusieurs cas de chargements possibles, tel que spécifié dans les articles du CCQ-2010 cités précédemment. Les résultats de ces essais indiquent que ce produit a résisté adéquatement aux essais de chargement qu'ils ont réalisés.

Aussi, nous pouvons conclure que ce produit est conforme aux critères spécifiés aux articles cités précédemment du CCQ-2010.

Espérant le tout à votre entière satisfaction, je demeure à votre disposition pour toutes informations additionnelles.

Bien à vous

.....

Gérard Pilon, Ing

TEST REPORT

REPORT NUMBER: 100031923COQ-001A
ORIGINAL ISSUE DATE: May 20, 2010
REVISION DATE: January 25, 2011

EVALUATION CENTER

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

RENDERED TO

DEKSMART RAILINGS
375 WARREN AVENUE, EAST
PENTICTON, BC V2A 3M1

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 *2005 National Building Code of Canada, Section 4.1.5.15 Loads on Guards*

1 Table of Contents

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for DekSmart Railings on eight (8) 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 February to March 2010.

3 Test Samples

3.1. SAMPLE SELECTION

Intertek representative, Baldeep Sandhu, sampled and witnessed the manufacture of the aluminum railing products on February 4, 2010. The sample selection process and witnessing was conducted at Deksmart Railings, 375 Warren Avenue East, Penticton, BC, V2A 3M1. Products were selected in accordance with recognized independent sampling procedures, and were received at the Evaluation Center on February 8, 2010.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The different samples were identified as the following:

Table 1. Railing Configurations

Railing	Post	Mounting Plate	Rails	Picket Insert
6 ft. Welded Picket Fascia Mount Round Top (Century)	2-1/2" x 2-1/2" 6063-T5 Aluminum	4" x 4-1/2" 6063-T54	6063-T5 Round Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5
6 ft. Glass Fascia Mount Round Top (Century)	2-1/2" x 2-1/2" 6063-T5 Aluminum	4" x 4-1/2" 6063-T54	6063-T5 Round Top Rail and 6063-T54 Bottom Rail	5 mm Glass
8 ft. Welded Picket Fascia Mount Designer Top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Designer Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5
4 ft. 10 mm Glass Fascia Mount Scenic (Century), Topless (Deksmart)	2-1/2" x 2-1/2" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	No Top Rail and 6063-T54 Bottom Rail	10 mm Glass
5 ft. 5 mm Glass Fascia mount Designer top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Designer Top Rail and 6063-T54 Bottom Rail	5 mm Glass
5 ft. 5 mm Glass Fascia Mount Universal Top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Universal Top Rail and 6063-T54 Bottom Rail	5 mm Glass
8 ft. Welded Picket Deck Mount Round Top (Century)	2-1/2" x 2-1/2" 6063-T5 Aluminum	4" x 4" 6061-T6 Aluminum	6063-T5 Designer Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5
8 ft. Welded Picket Fascia Mount Universal Top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Universal Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5

Note: Post to sub-structure fastener evaluation is beyond the scope of this report. Four 5/16 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 1.67 is applicable to the above loads.

4.2. IN-FILL LOAD TEST

A load of 0.84 kN (188 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 1.25 kN/m (86 plf) was applied horizontally and 2.51 kN/m (172 plf) was applied vertically. The horizontal and vertical loads were applied using quarter point loading. The quarter 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 two separate tests where a concentrated load of 1.67 kN (375 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 2 below (a complete set of test data is provided in Appendix A).

Table 2. Test Results

System Description	System Height (inches)	Post to Post Center Spacing (inches)	Test	Compliance
6 ft. Welded Picket Fascia Mount Round Top (Century)	42	72 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass
6 ft. Glass Fascia Mount Round Top (Century)	42	72 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass
8 ft. Welded Picket Fascia Mount Designer Top (Deksmart)	42	96 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass
4 ft. 10 mm Glass Fascia Mount Scenic (Century), Topless (Deksmart)	42	48 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass
5 ft. 5 mm Glass Fascia mount Designer top (Deksmart)	42	60 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass
5 ft. 5 mm Glass Fascia Mount Universal Top (Deksmart)	42	60 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass
8 ft. Welded Picket Deck Mount Round Top (Century)	42	96 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass
8 ft. Welded Picket Fascia Mount Universal Top (Deksmart)	42	96 in.	In-fill Load	Pass
			Vertical Uniform Load	Pass
			Horizontal Uniform Load	Pass
			Mid-span Concentrated Load	Pass
			Top of Post Concentrated Load	Pass

6 Conclusion

The DekSmart Railings 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. Results are presented in Section 5 of this test report.

INTERTEK TESTING SERVICES NA LTD.

Reported by: _____
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Test Engineer, Construction Products

Reviewed by: _____
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Lab Supervisor / Test Technician, Building Products

Reviewed by: _____
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Reviewed by: _____
Kal Kooner, P.Eng.
Manager, Engineering Services CDN

K.S. KOONER
PROVINCE OF ONTARIO

01/26/11

Intertek

ENGINEERING EVALUATION

REPORT NUMBER: 101383221COQ-001
ORIGINAL ISSUE DATE: October 18, 2013

EVALUATION CENTER:

Intertek Testing Services NA Ltd.
1500 Brigantine Drive
Coquitlam, BC V3K 7C1
Canada

RENDERED TO

DEKSMART RAILINGS
375 CHERRY AVENUE
PENTICTON, BC, V2A 3M1

PRODUCT EVALUATED:	Aluminum Picket and Glass Railing System Mid Rail Picket Railing - Surface Mount Aluminum Welded Picket Railing System
EVALUATION PROPERTY:	Physical Performance

Engineering Evaluation of DekSmart Railing Systems (Aluminum Picket and Glass, Mid Rail Picket and Aluminum Welded Picket Railings) for compliance with the applicable requirements of the following criteria: 2010 National Building Code of Canada (NBC), 2012 British Columbia Building Code (BCBC) and 2012 Ontario Building Code (OBC).

1 Table of Contents

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) is conducting an engineering evaluation for DekSmart Railings to review the Canadian Code requirements for metal railing systems. The evaluation involves reviewing the applicable sections of the 2005 National Building Code (NBC) to determine if they have remained the same in the current editions of 2010 NBC, 2012 British Columbia Building Code (BCBC) and 2012 Ontario Building Code (OBC).

3 Product and Assembly Description

3.1. Product and/or Assembly Description

Details of each DekSmart Railing System being evaluated are listed below. These descriptions are based on Intertek test reports 100031923COQ-001A, 100197661COQ-003 and 100698846COQ-003. Intertek makes no claims that DekSmart Railing Systems are constructed in this same configurations or using the same materials today as the products are not under Intertek follow-up inspections.

Aluminum Picket and Glass Railing Systems				
Railing	**Post**	**Mounting Plate**	**Rails**	**Picket Insert**
6 ft. Welded Picket Fascia Mount Round Top (Century)	2-1/2" x 2-1/2" 6063-T5 Aluminum	4" x 4-1/2" 6063-T54	6063-T5 Round Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5
6 ft. Glass Fascia Mount Round Top (Century)	2-1/2" x 2-1/2" 6063-T5 Aluminum	4" x 4-1/2" 6063-T54	6063-T5 Round Top Rail and 6063-T54 Bottom Rail	5 mm Glass
8 ft. Welded Picket Fascia Mount Designer Top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Designer Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5
4 ft. 10 mm Glass Fascia Mount Scenic (Century), Topless (Deksmart)	2-1/2" x 2-1/2" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	No Top Rail or 6063-T54 Bottom Rail	10 mm Glass
5 ft. 5 mm Glass Fascia mount Designer top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Designer Top Rail and 6063-T54 Bottom Rail	5 mm Glass
5 ft. 5 mm Glass Fascia Mount Universal Top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Universal Top Rail and 6063-T54 Bottom Rail	5 mm Glass
8 ft. Welded Picket Deck Mount Round Top (Century)	2-1/2" x 2-1/2" 6063-T5 Aluminum	4" x 4" 6061-T6 Aluminum	6063-T5 Designer Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5
8 ft. Welded Picket Fascia Mount Universal Top (Deksmart)	1-3/4" x 1-3/4" 6063-T54 Aluminum	4" x 4-1/2" 6063-T54	6063-T54 Universal Top Rail and 6063-T54 Bottom Rail	5/8" x 5/8" 6063-T5

Aluminum Welded Picket Railing System				
Railing	**Post**	**Mounting Plate**	**Rails**	**Picket Insert**
10 ft. Aluminum Welded Picket Railing System	No posts	6063-T5/6061-T6 Aluminum Top Rail Wall Bracket and 6063-T5/6061-T6 Aluminum Bottom Rail Wall Bracket	42 in. high, 6063-T54 Aluminum Designer Top Rail and 6063-T54 Bottom Rail	5/8 in. x 5/8 in. 6063-T5 Aluminum spaced 4-1/2 in. o/c

Mid Rail Picket Railing – Surface Mount				
Railing	**Post**	**Mounting Plate**	**Rails**	**Picket Insert**
5 ft. Mid rail Picket Railing – Surface Mount	1-3/4 " x 1-3/4" 6061-T6	4" x 4" 6061-T6	6063-T54 Low Profile Top Rail; 6061-T6 bottom rail and Mid Rail	5/8" x 5/8" 6063-T5

3.2. Product and/or Assembly Certification

DekSmart Railings Systems are not currently under Intertek certification and on-going follow up inspection program. Details of the assemblies shown in Section 3.1 are as provided by the Client, and Intertek makes no claims of configuration and/or material consistency of these products.

Authorities Having Jurisdiction (AHJ) should be consulted in all cases as to the particular requirements covering the installation and use of Intertek certified products, equipment, systems, devices and materials. The AHJ should be consulted before construction. Fire resistance assemblies and products are developed by the design submitter and have been investigated by Intertek for compliance with specific requirements. The published information (product and design listings) cannot always address every construction nuance encountered in the field. When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the test standard referenced for each Intertek certified product. The test standard includes specifics concerning alternate materials and alternate methods of construction. Only products which bear Intertek's Mark are considered as certified. The appearance of a company's name or product in Intertek Directory of Listed Building Products does not in itself assure that products so identified have been manufactured under Intertek's Follow-Up Service. Only those products bearing the Intertek Mark should be considered to be Listed and covered under Intertek's Follow-Up Service. Always verify the Mark on the product before using it.

4 Reference Documents

As part of this evaluation, Intertek has directly or indirectly used the following referenced documents:

- 2005, 2010 National Building Code of Canada (NBC)
- 2006, 2012 British Columbia Building Code (BCBC)
- 2006, 2012 Ontario Building Code (OBC)
- Intertek Test Report 100031923COQ-001A, revised January 25, 2011
- Intertek Test Report 100197661COQ-003, dated August 20, 2010
- Intertek Test Report 100698846COQ-003, dated April 3, 2012

5 Evaluation Method

The scope of this evaluation involves reviewing the applicable requirements of 2005 NBC to determine if they have remained the same in the 2010 NBC, 2012 BCBC, and 2012 OBC for metal railing systems.

This evaluation is being conducted solely for the above referenced project or use or both. Due to the variables that exist from project to project and the fact that each evaluation requires review of the most current existing data and information, this evaluation is not to be used as justification for any other opinion nor used for any other project, without the express written consent of Intertek. This report should serve as Intertek's opinion regarding the use of the certified product in the conditions described herein. The materials used on the project, which are applied in compliance with Intertek Design Listings, must bear the Intertek listing mark. All certified products must be installed in accordance with the details contained in Intertek's Directory of Listed Building Products.

Intertek has reviewed and summarized Section 4.1.5.15 of 2005 NBC, which is applicable to the DekSmart Railing Systems:

Loads on Guards

1) *The minimum specified horizontal load applied inward or outward at the top of every required guard shall be*
a) 3.0 kN/m for open viewing stands without fixed seats and for means of egress in grandstands, stadia, bleachers and arenas,
b) a concentrated load of 1.0 kN applied at any point for access ways to equipment platforms, contiguous stairs and similar areas where the gathering of many people is improbable, and
c) 0.75 kN/m or a concentrated load of 1.0 kN applied at any point, whichever governs for locations other than those described in Clauses (a) and (b).

2) *Individual elements within the guard, including solid panels and pickets shall be designed for a load of 0.5 kN applied over an area of 100 mm by 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 to be considered to act simultaneously with the horizontal load provided for in Sentence (1).*

It should be noted that Clauses (a) and (b) of Section 4.1.5.15 (1), refer to means of egress and equipment access walkways and therefore are not applicable to DekSmart Railing Systems.

Intertek has reviewed Section 4.1.5.14 of 2010 NBC and determined that it has remained the same as the requirements above. Intertek has also reviewed Section 4.1.5.14 of 2012 BCBC and OBC for Loads on Guards, and concluded that the requirements are equivalent to the requirements of 2010 NBC.

DekSmart Railing Systems described in Section 3.1 of this report have been previously tested by Intertek in accordance the applicable guard load requirements of the 2005 NBC. Results of described below:

1. Aluminum Picket and Glass Railing Systems have complied with the load requirements of Section 4.1.5.15 of 2005 NBC per test report 100031923COQ-001A.

2. 10 ft. Aluminum Welded Picket Railing Systems have complied with the load requirements of Section 4.1.5.15 of 2005 NBC per test report 100197661COQ-003.

3. Mid Rail Picket Railing – Surface Mount Systems have complied with the load requirements of Section 4.1.5.14 of 2010 NBC per test report 100698846COQ-003.

Based on the finding of this report, it can be concluded that the DekSmart Aluminum Picket and Glass, Mid Rail Picket Railing - Surface Mount and Aluminum Welded Picket Railing Systems tested by Intertek in the above test reports would meet the requirements of Section 4.1.5.14 of 2010 NBC, 2012 BCBC and OBC. Please note that this evaluation only applies to the previously tested DekSmart Railing Systems. Intertek does not certify this product and makes no claim of on-going compliance in accordance with the referenced Building Codes.

6 Conclusion

Intertek has conducted an engineering evaluation for DekSmart Railings to review the Canadian Code requirements for metal railing systems. The evaluation involved reviewing the applicable sections of the 2005 National Building Code (NBC) to determine if they have remained the same in the current editions of 2010 NBC, 2012 British Columbia Building Code (BCBC) and 2012 Ontario Building Code (OBC)..

Based on the information contained and referenced herein, it is Intertek's professional judgment based on sound engineering principles that the following is true:

- Requirements of Section 4.1.5.15 of 2005 NBC is equivalent to Section 4.1.5.14 of 2010 NBC for Loads on Guards.
- Requirements of Section 4.1.5.14 of 2010 NBC is equivalent to Section 4.1.5.14 of 2012 BCBC and OBC for Loads on Guards.

INTERTEK TESTING SERVICES NA LTD.

Reported by:
Emma Amiralaei, EIT
Engineer, Building Products

Reviewed by:
Kal Kooner, P. Eng.
Manager, Engineering Services

7 LAST PAGE AND REVISION SUMMARY

DATE	SUMMARY
October 18, 2013	Original