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Valleyfield (Québec)
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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 du « Test report » de la firme Intertek (rapport numéro 102429832COQ-003 du 1 Février 2016), pour votre produit appelé « 6.25 ft. Aluminum 5mm Glass Railing System » qui pourrait être traduit en français à « Garde-corps de 6.25 pieds avec système de rail de support en aluminium pour panneaux de verre de 5mm d'épaisseur ». Vous trouverez ci-joint une copie de ce rapport.

Le but de notre étude était de vérifier si le rapport 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 le rapport de la firme Intertek, les essais ont été réalisés pour vérifier la capacité et la conformité de ce produit 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 :*
 - c) *0,75 kN/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).*

Article 9.8.8.2 1) à 4) RÉSISTANCE DES GARDE-CORPS
qui stipule :

- 1) *Les garde-corps doivent être conçus de façon à résister aux charges spécifiques prescrites au tableau 9.8.8.2*
- 3) *Il n'est pas obligatoire de considérer que plusieurs des charges prescrites au tableau 9.8.8.2 agissent simultanément.*

Tableau 9.8.8.2

Emplacement du garde-corps	Charges de calcul minimales		
	charge appliquée horizontalement vers l'intérieur ou l'extérieur, à n'importe quel point de la hauteur minimale requise d'un garde-corps	charge appliquée horizontalement vers l'extérieur ou l'intérieur, sur les éléments constitutifs des garde-corps, y compris les panneaux pleins et les poteaux	charge verticale appliquée uniformément à la partie supérieure du garde-corps
garde-corps à l'intérieur d'un logement et garde-corps extérieur ne desservant pas plus de 2 logements	0,5 kN/m OU charge concentrée de 1,0 kN appliquée à n'importe quel point	0,5 kN appliquée sur une largeur maximale de 300 mm et à une hauteur de 300 mm	1,5 kN/m

Article 9.8.8.3 1) HAUTEUR DES GARDE-CORPS qui stipule :

- 1) Sous réserve des paragraphes 2) à 4), tous les *garde-corps* doivent avoir une hauteur d'au moins 1070 mm.

Article 9.8.8.5 1) OUVERTURES qui stipule :

- 1) *Sous réserve du paragraphe 2), les parties ajourées d'un garde-corps exigé à l'article 9.8.8.1 ne doivent pas permettre le passage d'un objet sphérique de 100 mm de diamètre, sauf s'il peut être démontré que les ouvertures dépassant cette limite ne présentent pas de danger de par leur emplacement et leur dimension.*

Article 9.8.8.6 1) et 2) CONCEPTION DES GARDE-CORPS NE FACILITANT PAS L'ESCALADE qui stipule :

- 1) Les garde-corps exigés en vertu de l'article 9.8.8.1,; sauf ceux des établissements industriels et sauf s'il peut être démontré que l'emplacement et les dimensions des ouvertures ne présentent pas de danger, ne doivent avoir ni élément de fixation, ni saillir, ni partie ajourée pouvant en faciliter l'escalade.

- 2) Les garde-corps sont réputés conformes au paragraphe 1) si tous les éléments en saillie sur le plan vertical et situés à une hauteur de 140 mm à 900 mm au-dessus du plancher ou de la surface de circulation piétonnière protégé par le garde-corps respectent au moins l'un des alinéas suivants :
- a) Ils sont espacés de plus de 450 mm les uns des autres, horizontalement et verticalement;
 - b) Ils ne sont pas décalés de plus de 15 mm horizontalement;
 - c) Ils n'offrent pas d'appui pour le pied de plus de 45 mm horizontalement et 200 mm verticalement; ou
 - d) Ils ont une pente supérieure à 2 : 1 sur la saillie

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 le rapport 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.

Le rapport de la compagnie Intertek indique 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. Le rapport indique également que le produit est conforme aux autres exigences (hauteurs, etc.) des ces articles du CCQ-2010.

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

Intertek

REPORT NUMBER: 102429832COQ-003
ORIGINAL ISSUE DATE: February 1, 2016

EVALUATION CENTER

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

RENDERED TO

CENDEK RAILINGS LTD.
9685 AGUR STREET
SUMMERLAND, BC V0H 1Z2
CANADA

PRODUCT EVALUATED:
6.25 ft. Aluminum 5mm Glass Railing System

EVALUATION PROPERTY:
Load Requirements

Report of 6.25 ft. Aluminum 5mm Glass Railing System for compliance with the requirements of the following criteria:

- **2010 National Building Code of Canada**
 - **Section 4.1.5.14, Loads on Guards**
 - **Section 9.8.8.2 Loads on Guards**
- **2012 British Columbia Building Code**
 - **Section 4.1.5.14, Loads on Guards**
 - **Section 9.8.8.2 Loads on Guards**
- **2012 Ontario Building Code**
 - **Section 4.1.5.14, Loads on Guards**
 - **Section 9.8.8.2 Loads on Guards**

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2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for an Aluminum Glass Railing System submitted by Cendek Railings Ltd. The evaluation was carried out to determine whether the railings would meet the requirements of the following:

- 2010 National Building Code of Canada (NBC)
 - Section 4.1.5.14, *Loads On Guards*
 - Section 9.8.8.2 *Loads on Guards*
 - Section 9.8.8.3, *Height of Guards*
 - Section 9.8.8.5, *Openings in Guards*
 - Section 9.8.8.6, *Design of Guards to Not Facilitate Climbing*
- 2012 British Columbia Building Code (BCBC)
 - Section 4.1.5.14, *Loads On Guards*
 - Section 9.8.8.2 *Loads on Guards*
 - Section 9.8.8.3, *Height of Guards*
 - Section 9.8.8.5, *Openings in Guards*
 - Section 9.8.8.6, *Design of Guards to Not Facilitate Climbing*
- 2012 Ontario Building Code (OBC)
 - Section 4.1.5.14, *Loads On Guards*
 - Section 9.8.8.2 *Loads on Guards*
 - Section 9.8.8.3, *Height of Guards*
 - Section 9.8.8.5, *Openings in Guards*
 - Section 9.8.8.6, *Guards Designed Not to Facilitate Climbing*

This evaluation was conducted in the months of January to February 2016.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted one (1) aluminum railing system to the Evaluation Center on January 11, 2016 (Coquitlam ID# VAN1601111234-001). Samples were not independently selected for testing.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The sample was identified as the following:

Table 1. Railing Configuration					
Railing	Post	Post Spacing	Mounting Plate	Rails	Panel Insert
Aluminum Glass Panel – Deck Mount	2-1/2" x 2-1/2"	75"	4" x 4" x 1/4"	42" high	5mm Tempered Glass

For detailed drawings of the test sample and components, refer to Appendix B.

Note: The installation of the guardrail to the deck was not within the scope of this report, and is subject to evaluation and approval by the building official. Four 3/8 in. grade 5 bolts and washers on each post were used to install the specimen for testing.

4 Testing and Evaluation Methods

The evaluation was conducted in accordance with the testing procedures of ASTM E935-13e1, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*. The test specimens were 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. As per Section 4.1.5.14 and Section 9.8.8.2 of the 2010 NBC, 2012 BCBC, and 2012 OBC, the following tests were conducted:

4.1 2010 NBC / 2012 BCBC / 2012 OBC: SECTION 4.1.5.14 LOADS ON GUARDS

- 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) 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 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.

Notes: A safety factor of 1.67-2.5 was applied to the above loads.

4.2 2010 NBC / 2012 BCBC / 2012 OBC: SECTION 9.8.8.2 LOADS ON GUARDS

- 1) The minimum specified horizontal load applied inward or outward at the minimum required height of every 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.
- 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.

Notes: A safety factor of 1.67-2.5 was applied to the above loads.

4.3 2010 NBC / 2012 BCBC / 2012 OBC: SECTION 9.8.8.3 HEIGHT OF GUARDS

- 1) All guards shall be not less than 1070 mm high.

4.4 2010 NBC / 2012 BCBC / 2012 OBC: SECTION 9.8.8.5 OPENINGS IN GUARDS

- 1) Openings through any guard shall be of a size that will prevent the passage of a spherical object having a diameter of 100 mm unless it can be shown that the location and size of openings that exceed this limit do not present a hazard.

4.5 2010 NBC / 2012 BCBC / 2012 OBC: SECTION 9.8.8.6 DESIGN OF GUARDS TO NOT FACILITATE CLIMBING / GUARDS DESIGNED NOT TO FACILITATE CLIMBING

- 1) Guards except those in industrial occupancies and where it can be shown that the location and size of openings do not present a hazard, shall be designed so that no member, attachment or opening facilitates climbing.
- 2) Guards shall be deemed to comply with Sentence (1) where all elements protruding from the vertical and located within the area between 140 mm and 900 mm above the floor or walking surface protected by the guard conform to one of the following clauses:
 - a) they are located more than 450mm horizontally and vertically, or
 - b) they provide not more than 15 mm horizontal offset,
 - c) they do not provide a toe-space more than 45mm horizontally and 20 mm vertically, or
 - d) they present more than a 1-in-2 slope on the offset.

4.6 IN-FILL LOAD TEST

A load of 1.25 kN (281 lbs) was applied using a 100 mm x 100 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.

4.7 UNIFORM LOAD TEST

A uniform load of 2.5 kN/m (171 plf) was applied vertically to the top of the guardrail system. A uniform load of 1.25 kN/m (86 plf) was applied horizontally to the top of the guardrail system. The 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.

4.8 CONCENTRATED LOAD TEST

The top of the guardrail system was subjected to three separate tests where a concentrated load of:

- 1.67 kN (375 lbs) was applied horizontally at the midspan of the top of the guard,
- 2.24 kN (503 lbs) was applied horizontally at the top of the guard adjacent to the post connection to verify the connection capacity, and
- 1.67 kN (375 lbs) was applied horizontally at the top of post.

4.9 HEIGHT OF GUARDS

All railings formed a protective barrier not less than 1070 mm (42 in.) high.

4.10 OPENINGS IN GUARDS

All railings had openings that prevented a sphere 4 in. (100 mm) in diameter to pass.

4.11 DESIGN TO PREVENT CLIMBING

No member, attachment or opening located between 140 mm and 900 mm above the floor or walking surface protected by the guards facilitated climbing.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The product test results are shown in Table 2. A copy of the test data is located in Appendix A.

Table 2. Test Results				
Section	Property	Result	Requirement	Pass/Fail
9.8.8.2	In-fill Load	281 lbs	281 lbs	Pass
	Vertical Uniform Load	171 plf	171 plf	Pass
	Horizontal Uniform Load	86 plf	86 plf	Pass
	Mid-span Concentrated Load	375 lbs	375lbs	Pass
	Adjacent to Post Connection Concentrated Load	503 lbs	503 lbs	Pass
	Top of Post Concentrated Load	375 lbs	375 lbs	Pass
9.8.8.3	Height of Guards	1070 mm	≥ 1070 mm	Pass
9.8.8.5	Openings in Guards	60 mm	< 100 mm	Pass
9.8.8.6	Design to Not Facilitate Climbing	No elements protruding from the vertical between 140 mm and 900 mm that facilitate climbing	No elements from the vertical between 140 mm and 900 mm that facilitate climbing	Pass

6 Conclusion

The Cendek Railings Ltd. Aluminum Glass Railing System identified in this test report has been evaluated per the requirements of the following:

- 2010 National Building Code of Canada (NBC)
 - Section 4.1.5.14, *Loads On Guards*
 - Section 9.8.8.2 *Loads on Guards*
 - Section 9.8.8.3, *Height of Guards*
 - Section 9.8.8.5, *Openings in Guards*
 - Section 9.8.8.6, *Design of Guards to Not Facilitate Climbing*
- 2012 British Columbia Building Code (BCBC)
 - Section 4.1.5.14, *Loads On Guards*
 - Section 9.8.8.2 *Loads on Guards*
 - Section 9.8.8.3, *Height of Guards*
 - Section 9.8.8.5, *Openings in Guards*
 - Section 9.8.8.6, *Design of Guards to Not Facilitate Climbing*
- 2012 Ontario Building Code (OBC)
 - Section 4.1.5.14, *Loads On Guards*
 - Section 9.8.8.2 *Loads on Guards*
 - Section 9.8.8.3, *Height of Guards*
 - Section 9.8.8.5, *Openings in Guards*
 - Section 9.8.8.6, *Guards Designed Not to Facilitate Climbing*

The product test results are presented in Section 5 of this report.

INTERTEK TESTING SERVICES NA LTD.

Reported by: _____

Chris Chang, P.Eng.
Engineer, Building Products

Reviewed by: _____

Dan Lungu, P. Eng.
Engineer, Manufactured Housing

Reviewed by: _____

Kal Kooner, P. Eng.
Manager, Building Products



APPENDIX A: Test Data (3 pages)

Company	Cendek Railings Ltd.	Technician(s)	Chris Chang / Kevin Penner
Project No.	G102429832	Reviewer	Dan Lungu / Kal Kooner
Models	6.25 ft. Aluminum 5mm Glass Railing	Start/End Date	January 29, 2016
Product Name	Same as above	Sample ID	VAN1601111234-001
Standard	2010 NBC/2012 OBC/2012 BCBC, Section 4.1.5.14 and 9.8.8.2		

Test Data Package

Table of Contents

Sheet	Page
Table of Contents (This Sheet)	1
Load on Guards	2
Dimensional Checks	3

Test: Loads on Guards
Date: 29-Jan-16

Client: Cendek Railing Ltd.

Product: Aluminum 5mm Glass Railing System

Post Spacing: 6.25 ft 1.91 m

Height of Guard: 42 in 1070 mm

Opening in Guard: 1.38 in 35 mm

Method: 2010 National Building Code of Canada, 4.1.5.14 Loads on Guards

2012 Ontario Building Code, 4.1.5.14 Loads on Guards

2012 British Columbia Building Code, 4.1.5.14 Loads on Guards

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 shear connection)

2.50 (for glass in-fill)

Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60691, cal due November 2016)

Vaisala Temp/RH Indicator (Intertek ID# 9-0176, cal due December 2016)

Stopwatch (Intertek ID# P60624, cal due July 2016)

Mitutoyo Digital Caliper (Intertek ID# P60005, cal due May 2016)

Time/Temp/RH: 1:30PM / 23.0°C / 50.0%

Project: G102429832

Eng/Tech: Kevin Penner

Chris Chang

Reviewer: Kal Kooner

Dan Lungu

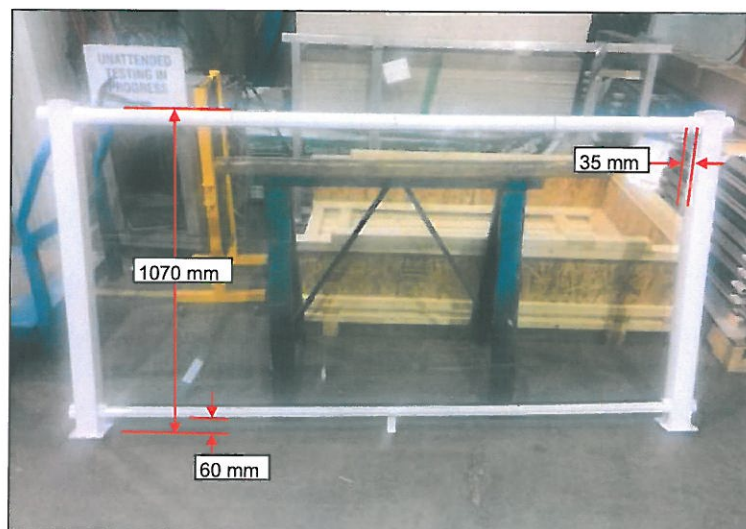
Direction	Test	Design Load (Inward/Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Deflections (in.)	Pass/Fail
Outward	Individual Elements (over 4 in. x 4 in.)	112	281	-	-	281	2.566	Pass
	Vertical Uniform Load (per ft)	103	171	836	535	1070	0.860	Pass
	Horizontal Uniform Load (per ft)	51	86	418	268	535	2.004	Pass
	Midspan Horizontal Concentrated Load	225	375	-	-	375	1.596	Pass
	Top Rail Adjacent to Alum Connection Concentrated Load	225	503	-	-	503	3.002	Pass
	Top of Post Concentrated Load	225	375	-	-	375	2.051	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
Outward	Individual Elements (over 100 mm in. x 100 mm)	0.5	1.25	-	-	1.25	65.2	Pass
	Vertical Uniform Load (per m)	1.5	2.5	1.13	2.38	4.76	21.8	Pass
	Horizontal Uniform Load (per m)	0.75	1.25	0.57	1.19	2.38	50.9	Pass
	Midspan Horizontal Concentrated Load	1	1.67	-	-	1.67	40.5	Pass
	Top Rail Adjacent to Alum Connection Concentrated Load	1	2.24	-	-	2.24	76.3	Pass
	Top of Post Concentrated Load	1	1.67	-	-	1.67	52.1	Pass

Test:	Dimensional Checks	Project:	G102429832
Date:	29-Jan-16	Eng/Tech:	Chris Chang
Client:	Cendek Railing Ltd.	Reviewer:	Kal Kooner
Product:	Aluminum 5mm Glass Railing System		Dan Lungu
Post Spacing:	6.25 ft	1.91	m
Height of Guard:	42 in	1070	mm
Opening in Guard:	1.375 in	35	mm
Method:	2010 National Building Code of Canada 2012 Ontario Building Code 2012 British Columbia Building Code 9.8.8.3 Height of Guards 9.8.8.5 Openings in Guards 9.8.8.6 Design of Guards to Not Facilitate Climbing / Guards Designed Not to Facilitate Climbing / <i>Design to Prevent Climbing</i>		
Time/Temp./RH:	1:30PM / 23.0°C / 50.0%		
Equipment:	Mitutoyo Digital Caliper (Intertek ID# P60005, cal due May 2016) Stanley FatMax Tape Measure (Intertek ID# P60494, cal due August 2016)		

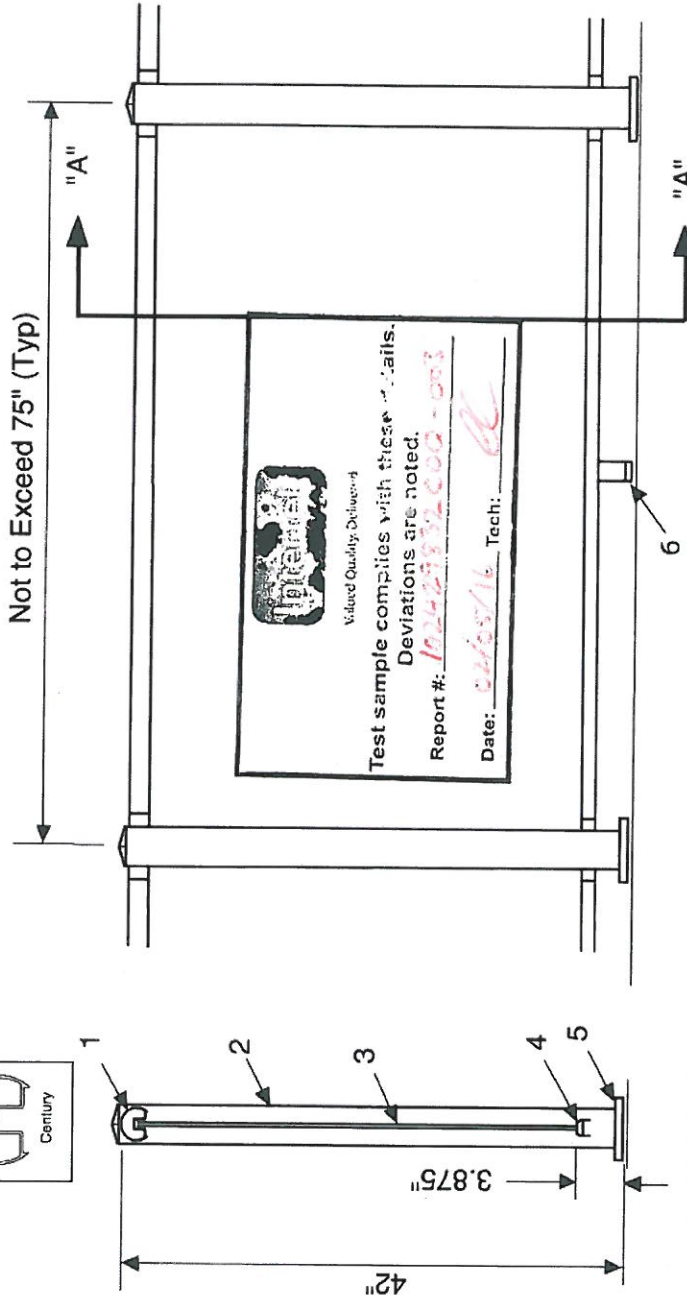
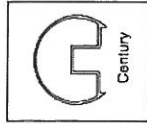
Description	Measured Dimension (mm)	Requirement (mm)	Pass/Fail
9.8.8.3 Height of Guards	1070	≥ 1070	Pass
9.8.8.5 Openings in Guards	Between Glass Panel/Post	35	Pass
	Under Bottom Rail	60	Pass

Description	Result	Requirement	Pass/Fail
9.8.8.6 Design of Guards to Not Facilitate Climbing / Guards Designed Not to Facilitate Climbing	No elements protruding from the vertical between 140 mm and 900 mm that facilitate climbing	No elements protruding from the vertical between 140 mm and 900 mm that facilitate climbing	Pass



APPENDIX B: Drawings (5 pages)

Glass Railing - Surface Mount



Test sample complies with these details.
Deviations are noted.
Report #: 1924-2732-000-003
Date: 01/05/16 Tech: [Signature]

SECTION "A-A"
NOT TO SCALE

ELEVATION OF BALCONY RAILING
NOT TO SCALE

Notes: 1. This guard system complies with the requirements of Part 4 and Part 9 of the 2010 Canadian Building Code (NBC), 2012 British Columbia Building Code (BCBC) and the 2012 Ontario Building Code (OBC).
2. Fastening detail to be determined on-site and is not within the scope of this document.



9685 Agur St., Summerland, B.C. V0H 1Z2
Phone: (778) 516-6000 • Fax: (778) 516-6003 • Toll Free: 1-877-810-4841

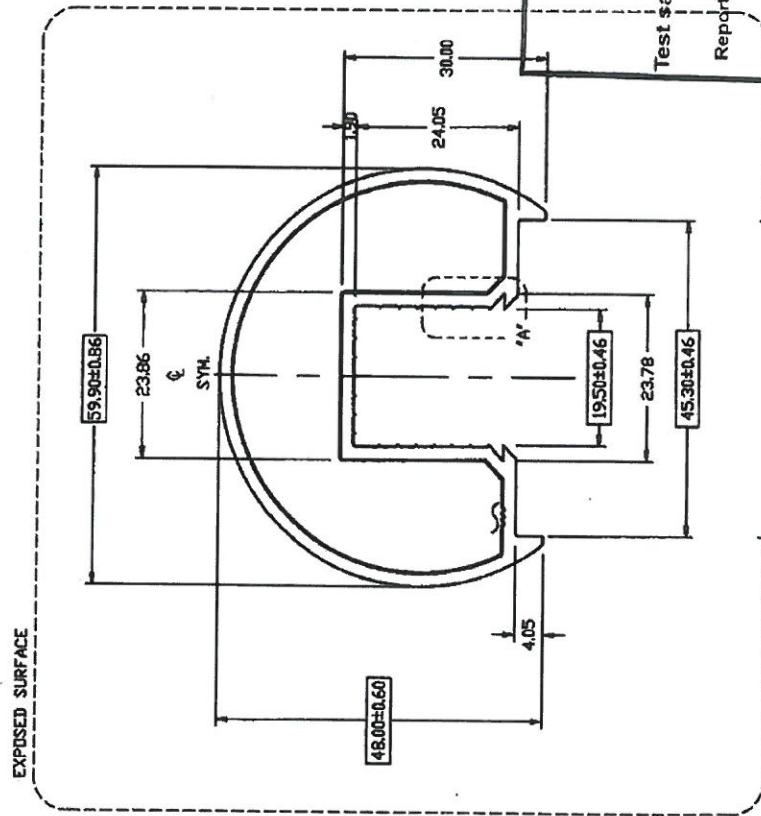
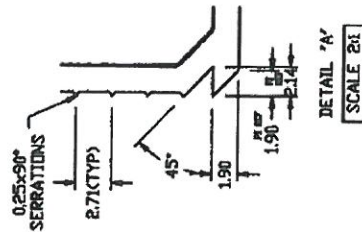
	Material - Aluminum	Thickness	Alloy
1	Top Rail - Century 2.35" x 1.89	.083	6063-T5
2	Post - 2.50" x 2.50"	.075	6063-T5
3	Glass - Tempered 5 mm	.196	N/A
4	Bottom Rail - 1.06" x 1.41"	.070	6063-T5
5	Baseplate - 4" x 4"	.250	6005A-T6
6	Support Leg	.125	6063-T5



Apex Die Number: 2174

Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted

Customer No.:	
Area=sq.mm	433.845
Weight=kg/m	1.200
Perimeter=mm	454.646
Outer Perimeter=mm	244.716
C.C.D.=mm	59.900
Factor:	23
Ratio:	75
Cavities:	1
Press No.:	1
Scale:	AS NOTED
Alloy:	6063 T5
Date:	3/20/2015
Drawn by:	dc



Valued Quality. Delivered.

Test sample complies with these details.
Deviations are noted.

Report #: 102429832600-003

Date: 03/05/13 Tech:

SAL-304-1 5/10/2012

TYP WALL U.O.S.

1.90±0.25

Denotes Apex ID Mark
.25x90° V GROOVE (3X)

All unmarked radii .95R
unless otherwise noted

Break all corners .40R
unless otherwise noted

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Date: _____ **Signed:** _____

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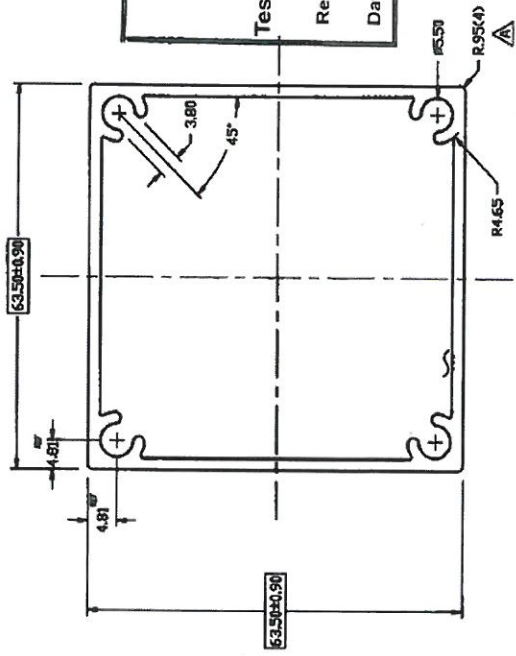
Rev:	Description:	Date:
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Description:

Date: _____

- Denotes Critical Dimension

No Exposed Surfaces Except As Marked

		Customer Name: Dekamart Railings Port Description: 2 1/2" Post Material Note: Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted	Quote No.: 1392-13 Part No.: 885987	Apex Die Number: 2179																										
Customer No.:		<table border="1"> <tr><td>Area=sq.mm</td><td>538.4483</td></tr> <tr><td>Weight=kg/m</td><td>1.490</td></tr> <tr><td>Perimeter=mm</td><td>530.119</td></tr> <tr><td>Outer Perimeter=mm</td><td>253.313</td></tr> <tr><td>C.C.D.=mm</td><td>89.471</td></tr> <tr><td>Factor:</td><td>21</td></tr> <tr><td>Ratio:</td><td>58</td></tr> <tr><td>Cavities:</td><td>1</td></tr> <tr><td>Press No.:</td><td>1</td></tr> <tr><td>Scale:</td><td>AS NOTED</td></tr> <tr><td>Alloy:</td><td>6063 T5</td></tr> <tr><td>Date:</td><td>3/20/2015</td></tr> <tr><td>Drawn by:</td><td>dc</td></tr> </table>			Area=sq.mm	538.4483	Weight=kg/m	1.490	Perimeter=mm	530.119	Outer Perimeter=mm	253.313	C.C.D.=mm	89.471	Factor:	21	Ratio:	58	Cavities:	1	Press No.:	1	Scale:	AS NOTED	Alloy:	6063 T5	Date:	3/20/2015	Drawn by:	dc
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 Valued Quality Elsewhere Test sample complies with these details. Deviations are noted. Report #: 1025-217-32-COR-003 Date: 05/25/15 Tech: <i>MC</i>		<table border="1"> <tr><td>SAL-304-1</td><td>5/10/2012</td></tr> <tr><td colspan="2">TYP WALL U.O.S.</td></tr> <tr><td colspan="2">1.90±0.25</td></tr> <tr><td colspan="2">Denotes Apex ID Mark</td></tr> <tr><td colspan="2">.25x80° V GROOVE (3X)</td></tr> <tr><td colspan="2">All unmarked radii .93R unless otherwise noted</td></tr> <tr><td colspan="2">Break all corners .40R unless otherwise noted</td></tr> </table>			SAL-304-1	5/10/2012	TYP WALL U.O.S.		1.90±0.25		Denotes Apex ID Mark		.25x80° V GROOVE (3X)		All unmarked radii .93R unless otherwise noted		Break all corners .40R unless otherwise noted													
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- Denotes Critical Dimension		This is not on Apex Aluminum Extrusion design. Apex Aluminum Extrusion in accepts no responsibility or liability for the performance of products produced from it. Apex makes no warranty of fitness for a particular purpose with regards to the extrusions produced from this drawings.																												
RADIUS CHANGED FROM R0.40 TO R0.95		5/25/2015																												
Rev:		Date:																												



Deksma Railings

Apex Die Number: 2168

Note: Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted

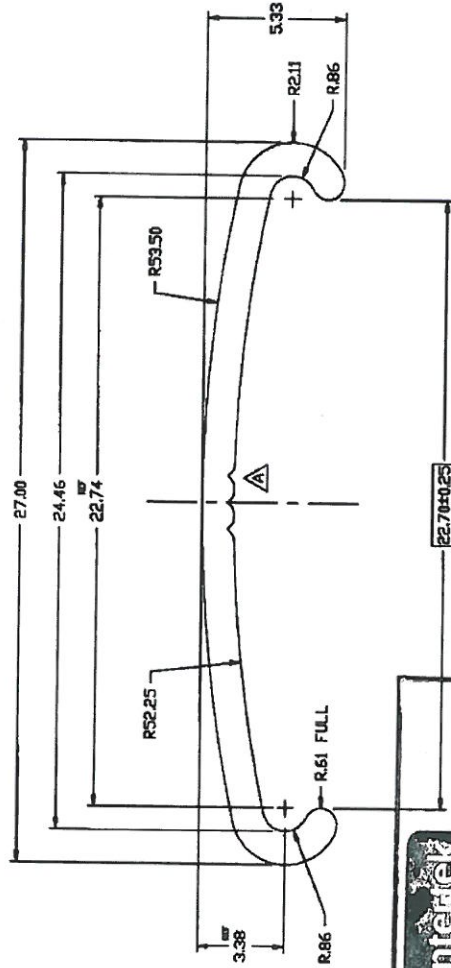
Customer No.:

[illegible]

SAL-304-1 5/10/2012
TYP WALL U.O.S.
1.25±0.15
Denotes Apex ID Mark
.25x90° V GROOVE (3X)
All unmarked radii .00R
unless otherwise noted
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Michael Gill



SCALE 411

EXPOSED SURFACE

ACTION SPE

No Exposed Surfaces Except As Marked

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4/21/2015

I.D. marks changed from bumps to grooves

Date:

Description:

Rev:

□ - Denotes Critical Dimension

Test sample complies with these details.
Deviations are noted.

Report #: 102429783200 - 003

Date: 22/05/16 Tech:

Date: 02/05/16 Tech:



Deksmart Railings

Bottom Rail

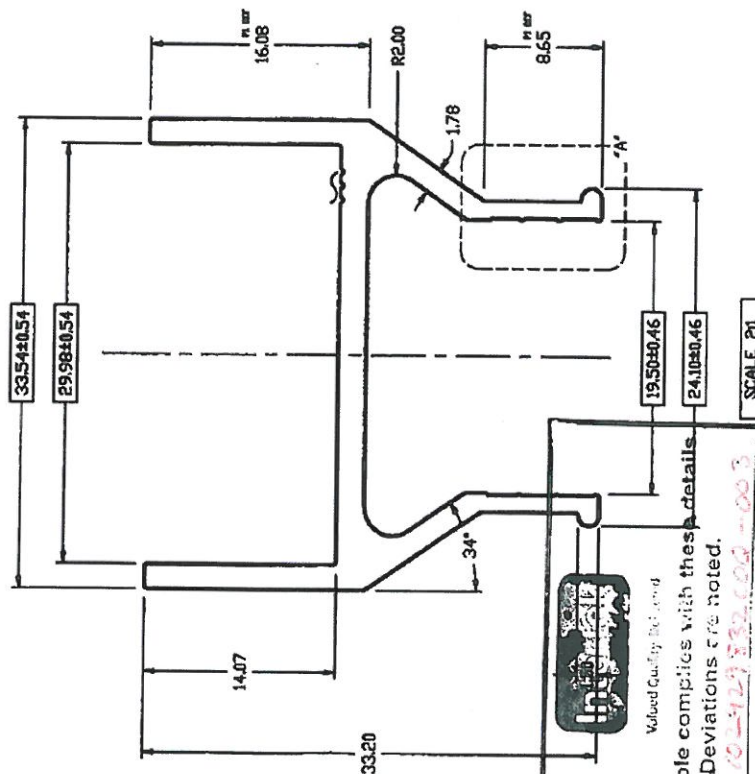
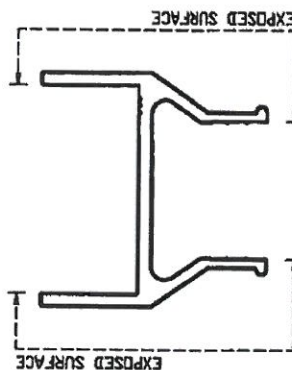
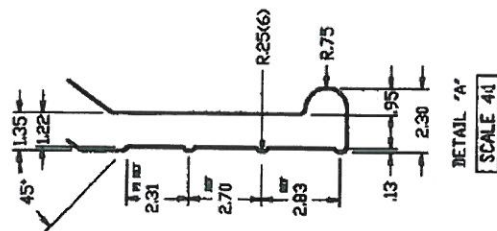
Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted

Quote No.: 1392-3

Part No.: 629082

Apex Die Number: 2169

Customer No.:



Test sample complies with these details.
Deviations are noted.

Report #: 102-129732-003

Date: 02/05/16 Tech:

- Denotes Critical Dimension

No Exposed Surfaces Except As Marked

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Date: _____ **Signed:** _____

iv:	Description:
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Description:

Date:

Signed: