TEST REPORT

REPORT NUMBER: 102560897COQ-002
ORIGINAL ISSUE DATE: May 25, 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: Century Aluminum Railings 8 ft. Aluminum Component Picket Railing System
EVALUATION PROPERTY: Load Requirements

Report of 8 ft. Aluminum Component Picket Railing System for compliance with the applicable requirements of the following:

- **2015 International Residential Code (IRC), Section R301.5** ***Live Load***

1 Table of Contents

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for Cendek Railings Ltd. on Century Aluminum Railings aluminum railing system. The evaluation was carried out to determine whether the railing system would resist the loads specified in the following:

- 2015 International Residential Code (IRC), Section R301.5 *Live Load*

This evaluation was conducted in the month of May 2016.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted one (1) aluminum railing system to the Evaluation Center on May 9, 2016 (Coquitlam ID# VAN1605241528-001). 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	Picket/Panel Insert
Aluminum Component Picket – Deck Mount	2-1/2” x 2-1/2”	99”	4” x 4” x 1/4”	42” high	5/8” x 5/8”

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 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. The following tests were conducted:

4.1. 2015 IRC: SECTION R301.5 LIVE LOAD

1) Handrails and guards shall be designed to resist a concentrated load of 200 pounds (0.89 kN), applied in any direction at any point on the handrail or top rail and to transfer the load through the supports to the structure to produce the maximum load effect on the element being considered.

2) Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds (0.22 kN) on an area not to exceed 12 in. by 12 in. (305 mm by 305 mm) including openings and space between rails and located so as to produce the maximum load effect.

Notes:

1. A live load factor of 2.5 was applied to the above loads.

4.2. IN-FILL LOAD TEST

A load of 125 lbs was applied 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. CONCENTRATED LOAD TEST

The top rail of the guardrail system was subjected to three separate tests where a concentrated load of 500 lbs was applied:

- horizontally at the mid-span of the top rail,
- horizontally at the top rail adjacent to the post connection to verify the connection capacity, and
- horizontally at the top of post.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The product test results are shown in Table 2 below and a full set of test data is located in Appendix A.

Table 2. Test Results

System Description	Test	Compliance
Century Aluminum Railings 8 ft. Aluminum Component Picket Railing System – Deck Mount	In-fill Load	Pass
	Mid-span Concentrated Load	Pass
	Adjacent to Post Connection Concentrated Load	Pass
	Top of Post Concentrated Load	Pass

6 Conclusion

The Cendek Railings Ltd. aluminum railing system identified in this test report has complied with the requirements of the following:

- 2015 International Residential Code (IRC), Section R301.5 *Live Load*

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: _____
Riccardo DeSantis
Manager, Building Products Canada

APPENDIX A: Test Data (2 pages)

Company	Cendek Railings Ltd.	Technician(s)	Chris Chang / Frank Gadea-Lopez
Project No.	G102560897	Reviewer	Riccardo DeSantis
Models	Aluminum Picket Guardrail System	Start/End Date	May 25, 2016
Product Name	Same as above	Sample ID	VAN1605241528-001
Standard	**2015 International Residential Code (IRC)**		

Test Data Package

Table of Contents

Test:	**Loads on Guards**			Project:	G102560897
Date:	25-May-16			Eng/Tech:	Chris Chang
Client:	Cendek Railings Ltd.				Frank Gadea-Lopez
Product:	**Aluminum Picket Guardrail System**			Reviewer:	Riccardo DeSantis
Post Spacing:	8.250 ft	2.51 m			
Height of Guard:	42 in	1067 mm			
Opening in Guard:	3.875 in	98 mm			

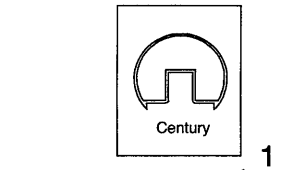
Method: 2015 International Residential Code (IRC)
Safety Factor: 2.50
Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60691, cal due November 2016)
Vaisala Temp/RH Indicator (Intertek ID# 9-0176, cal due December 2016)
Stopwatch (Intertek ID# P60624, cal due July 2016)
Time/Temp/RH: 8:30AM / 23.0°C / 50.0%

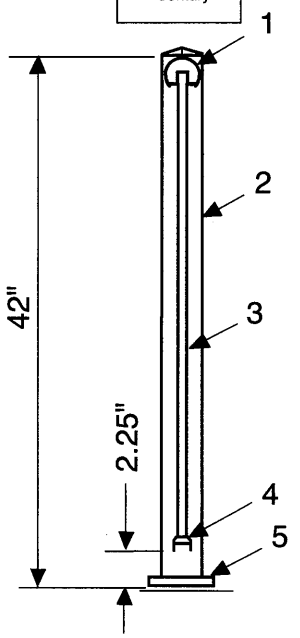
Direction	Test	Design Load (Inward/ Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
Outward	Individual Elements (over 12 in. x 12 in.) (most critical location)	50	125	-	-	125	**Pass**
	Midspan Horizontal Concentrated Load	200	500	-	-	500	**Pass**
	Top Rail Adjacent to Connection Concentrated Load	200	500	-	-	500	**Pass**
	Top of Post	200	500	-	-	500	**Pass**

Direction	Test	Design Load (Inward/ Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
Outward	Individual Elements (over 305 mm in. x 305 mm) (most critical location)	0.22	0.56	-	-	0.56	**Pass**
	Midspan Horizontal Concentrated Load	0.89	2.22	-	-	2.22	**Pass**
	Top Rail Adjacent to Connection Concentrated Load	0.89	2.22	-	-	2.22	**Pass**
	Top of Post	0.89	2.22	-	-	2.22	**Pass**

APPENDIX B: Drawings (6 pages)

5/8" x 5/8" x 8' Component Picket Railing - Surface Mount

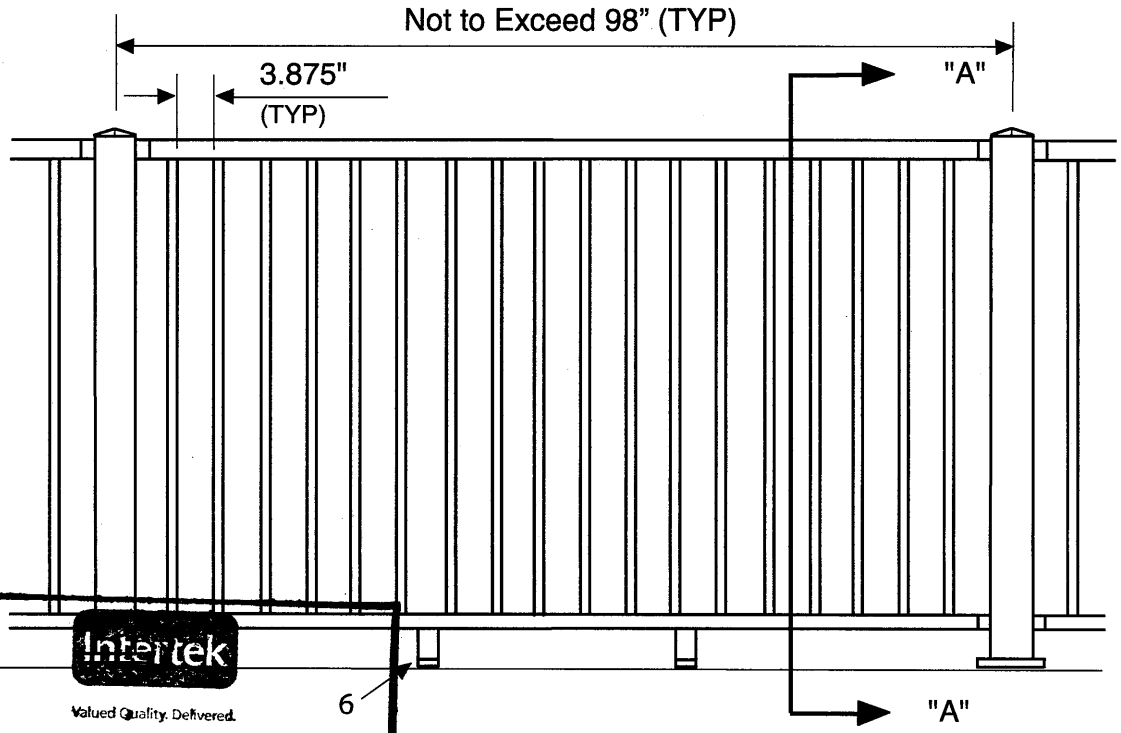




SECTION "A-A"

NOT TO SCALE

Note: Post to Substrate fastening detail is not within the scope of this drawing



ELEVATION OF BALCONY RAILING

NOT TO SCALE

Intertek
Valued Quality. Delivered.
Test sample complies with these details.
Deviations are noted.
Report #: 102560897COQ-002
Date: MAY 25/16 Tech:

NOTE: THE STUCTURES INCLUDED WITHIN THE SCOPE OF THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2015 IRC.

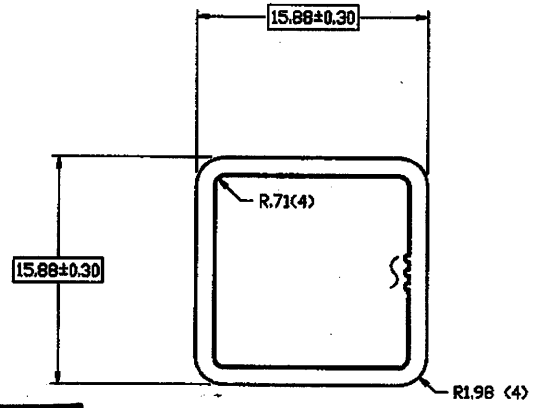
Century Aluminum Railings
A DIVISION OF CENDER RAILINGS LTD.
9685 Agur St., Summerland ,B.C. V0H 1Z2
Phone: (778) 516-6250 • Fax: (778) 516-6003 • **Toll Free: 1-888-493-1103**

	Material - Aluminum	Thickness	Alloy
1	Top Rail - Century 2.35" x 1.89	.083	6063-T54
2	Post - 2.50" x 2.50"	.075	6063-T54
3	Picket - .625" x .625"	.050	6063-T54
4	Bottom Rail - 1.06" x 1.41"	.070	6063-T54
5	Baseplate - 4" x 4"	.250	6005A-T6
6	Support Leg	.125	6063-T54

03/24/16

APEX aluminum extrusions

Customer Name:	Deksmart Railings	Quote No.: 1392-9	Apex Die Number: 2175
Part Description:	5/8" Picket	Part No.: 695273	
Note:	Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted		Customer No.:



SCALE 2:1

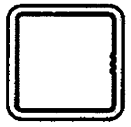
Area=sq.mm	71.286
Weight=kg/m	0.197
Perimeter=mm	112.262
Outer Perimeter=mm	60.121
C.C.D.=mm	20.817
Factor:	33
Ratio:	55
Cavities:	8
Press No.:	1
Scale:	AS NOTED
Alloy:	6063 T5
Date:	3/20/2015
Drawn by:	dc

Intertek
Valued Quality. Delivered.

Test sample complies with these details.
Deviations are noted.

Report #: 102560897COQ-002

Date: MAY 25/16 Tech: CC



ACTUAL SIZE

Exposed All Around

SAL-304-1 5/10/2012

TYP WALL U.O.S. 1.27±0.25

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

All unmarked radii .00R unless otherwise noted

Break all corners .00R unless otherwise noted

[ ] - Denotes Critical Dimension

Rev:	Description:	Date:

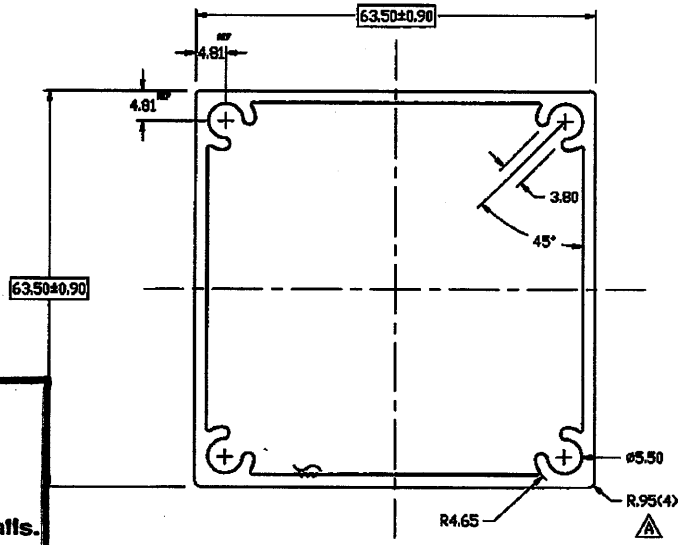
This is not an Apex Aluminum Extrusion design. Apex Aluminum Extrusion in accepts no responsibility or liability for the performance of products produced from it. Apex makes no warranty of fitness for a particular purpose with regards to the extrusions produced from this drawings.

PRINT APPROVAL: Customer signature indicates that dimensions and tolerances have been accepted as shown. Customer also assumes all legal responsibility for having this profile made and will fully protect Apex Aluminum Extrusions Ltd. in case of patent or any other claims.

Date: Signed:

APEX aluminum extrusions

Customer Name:	Deksmart Railings	Quote No.: 1392-13	Apex Die Number: 2179
Part Description:	2 1/2" Post Material	Part No.: 695987	
Note:	Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted		Customer No.:



ACTUAL SIZE

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
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

Intertek
Valued Quality. Delivered.
Test sample complies with these details.
Deviations are noted.
Report #: 102560897COQ-002
Date: MAY 25/16 Tech:

- Denotes Critical Dimension

Exposed All Around

Rev:	Description:	Date:
A	RADII CHANGED FROM R0.40 to R0.95	5/25/2015

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Date: 05/25/15 Signed: Michael Gill

APEL Extrusions Limited

Finish	ARCH
Exposed Surface	2
Area (mm^2)	540
Lineal mass	1.453
Perimeter	340.9
Outside Perimeter	
C.C.D.	89.2
Break corners	.80
Unmarked Thickness	3.18
Unmarked Radii	
Date	7DEC98
Drawn by	EJS
Scale	1:1
Gap Ratio	

- ☐ Important Dimension
- † Toolmaker's Dimension
- * Close Tolerance
- CK APEL ID Mark
- R Full radii
- ▲ Metallurgical Streaking may occur here and will not be a cause for rejection

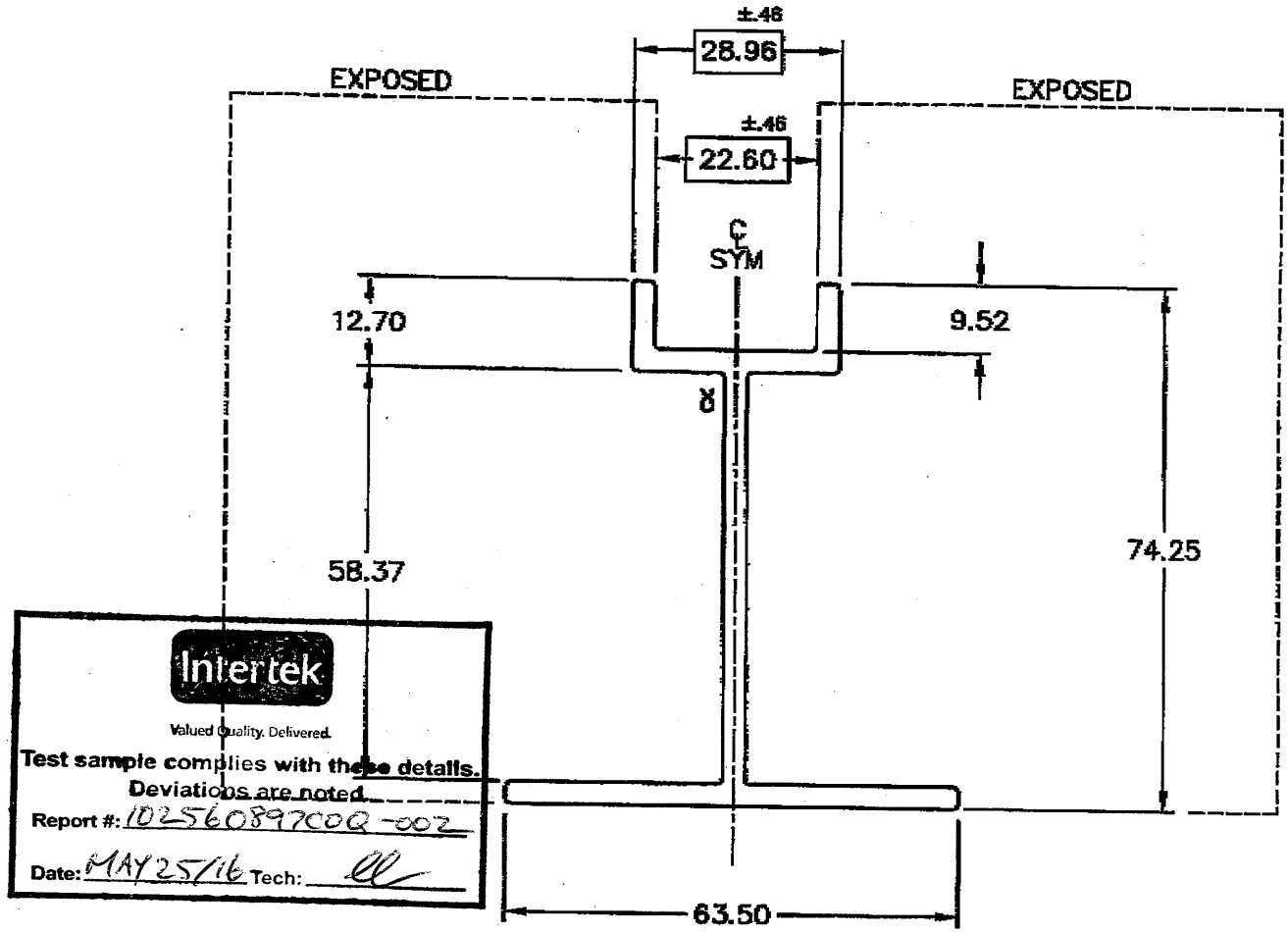
Customer no.
VS-10330

APEL SHAPE NO.
628025

REV. DEC/

NOTE: Commercial tolerances to apply unless otherwise stated.

APEL SHAPE NO.
628025



Intertek
Valued Quality. Delivered.
Test sample complies with these details.
Deviations are noted.
Report #: 102560897COQ-002
Date: MAY 25/16 Tech:

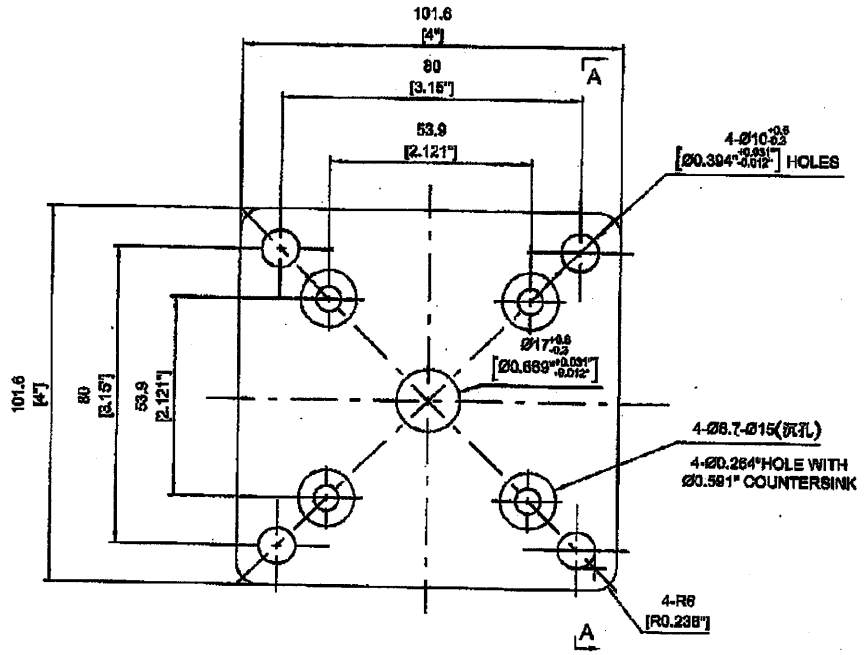
Date	By	Rev.	
19JULY16	EJS	(B)	CUSTOMER NAME CHANGED
10FEB09	EJS	(A)	CUSTOMER NAME CHANGED

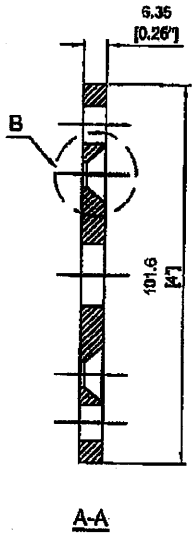
Description: BOTTOM RAIL SUPPORT LEG

Customer: (B) (A) DEKSMART RAILINGS

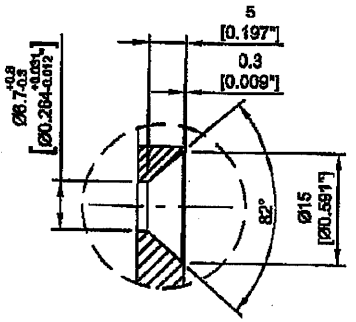
PLATE PROCESSING DRAWING	EDITION NO: 0

DRAWING NO:	0067-H-101.6-3(plate)
CUSTOMER PART NO.	-





A-A



DETAIL:B
2:1

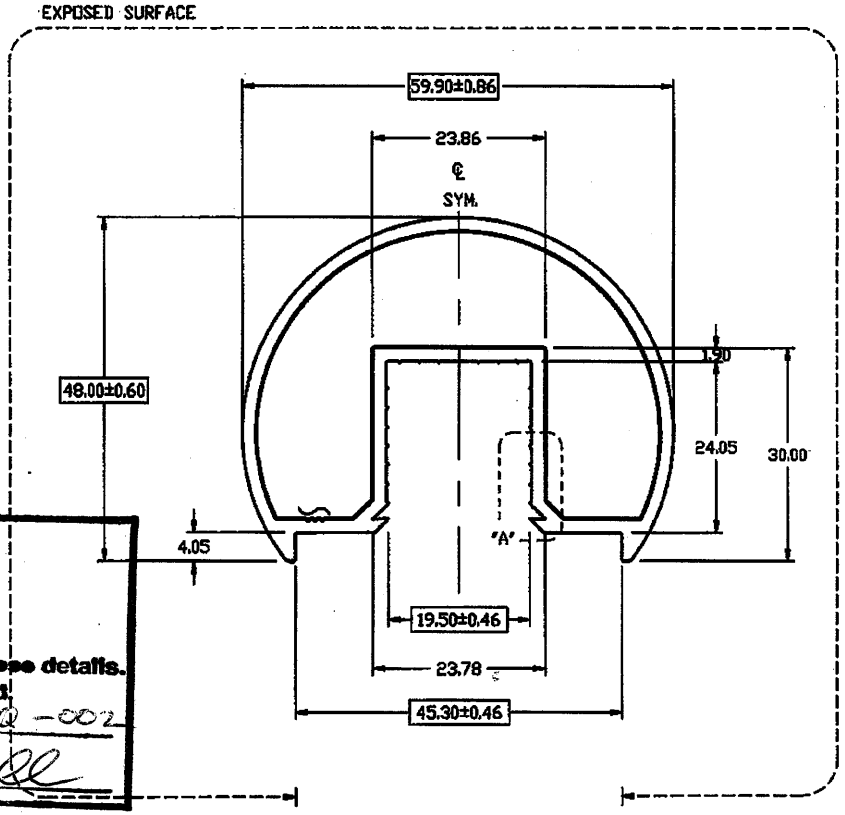
Castings & Pastoral Dimension		Machining & Fabricated Dimension	
Dimension	Tolerance	Dimension	Tolerance
≤100	±0.5	≤10	±0.2
>100~500	±0.8	>10~20	±0.3
>500~1000	±1.0	>20~30	±0.4
>1000~1500	±1.5	>30~40	±0.5
>1500~3000	±1.8	>40~60	±0.6
>3000~6000	±2.0	>60~100	±0.8
Above 6000	±2.5	Above 100	±1.0
Tolerance of angular dimensions±0.5°			

Intertek
Valued Quality. Delivered.
Test sample complies with these details.
Deviations are noted.
Report #: 102560897002-002
Date: MAY 25/12 Tech:

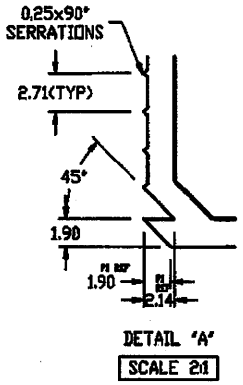
EXTRUSION: PLATE	DRAWING:	APPROVED:	CHECKER:	DATE: 2012.02.14	ALLOY & TEMPER N/A	CUSTOMER: -

APEX aluminum extrusions

Customer Name:	Deksmart Railings	Quote No.: 1392-8	Apex Die Number: 2174
Part Description:	Century Component Top Rail	Part No.: 695950	
Note:	**Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted**		Customer No.:



ACTUAL SIZE



DETAIL 'A'
SCALE 2:1

Intertek
Valued Quality. Delivered.
Test sample complies with these details.
Deviations are noted.
Report #: 102560897COQ-002
Date: MAY 25/16 Tech:

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

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

[ ] - Denotes Critical Dimension

No Exposed Surfaces Except As Marked

Rev:	Description:	Date:

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Date: Signed: