

# CENDEK RAILINGS LTD.

## TEST REPORT

**SCOPE OF WORK**

Report of Century Narrow Component Picket Railing Systems for compliance with the applicable requirements of the following:

- 2015 International Building Code (IBC), Section 1607.8.1 *Handrails and Guards*
- 2015 International Residential Code (IRC), Section R301.5 *Live Load*

**REPORT NUMBER**

103176847COQ-001A

**ISSUE DATE**

13-September-2017

**PAGES**

Report	9 pages
Appendix A	4 pages
Appendix B	4 pages
Appendix C	14 pages

**DOCUMENT CONTROL NUMBER**

GFT-OP-10b (13-March-2017)

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## **CONCLUSION**

The Cendek Railings Ltd. products identified and evaluated in this report have met the load requirements contained in the following:

- 2015 International Building Code (IBC), Section 1607.8.1 *Handrails and Guards*
- 2015 International Residential Code (IRC), Section R301.5 *Live Load*

The product test results are presented in Section 6 of this report.



**CHRIS CHANG, P.ENG.  
ENGINEER  
BUILDING & CONSTRUCTION**



**RICCARDO DESANTIS  
TECHNICAL MANAGER  
BUILDING & CONSTRUCTION**

## SECTION 1

### INDEX

SECTION NAMES	PAGE
Objective	4
Sample Selection	5
Sample and Assembly Description	5
Testing and Evaluation Methods	6
2015 IBC: Section 1607.8.1 Handrails and Guards	6
2015 IRC: Section R301.5 Live Load	6
In-fill Load Test	6
Uniform Load Test	7
Concentrated Load Test	7
Results and Observations	8
Conclusion	9
Appendix A: Test Data	3 Pages
Appendix B: Photos	3 Pages
Appendix C: Drawings	13 Pages

## **SECTION 2**

### **OBJECTIVE**

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for Century Narrow Component Picket Railing Systems submitted by Cendek Railings Ltd. The evaluation was carried out to determine whether the railings would meet the requirements of the following:

- 2015 International Building Code (IBC), Section 1607.8.1 *Handrails and Guards*
- 2015 International Residential Code (IRC), Section R301.5 *Live Load*

This evaluation was conducted in the month of August 2017.

**SECTION 3**

**SAMPLE SELECTION**

The client submitted two (2) aluminum railing systems to the Evaluation Center on August 22, 2017 (Coquitlam ID# VAN1708221440-001). Samples were not independently selected for testing.

**SECTION 4**

**SAMPLE ASSEMBLY AND DESCRIPTION**

The samples were identified as the following:

<b>Table 1. Railing Configuration</b>					
<b>Railing</b>	<b>Post</b>	<b>Post Spacing</b>	<b>Mounting Plate</b>	<b>Rails</b>	<b>Picket Insert</b>
8 ft. Century Narrow Component Picket Railing	2-1/2" x 2-1/2"	98"	4" x 4" x 1/4"	42" high	5/8" x 5/8"
8 ft. Century Narrow Component Picket Railing with Swivel Brackets	2-1/2" x 2-1/2"	98"	4" x 4" x 1/4"	42" high	5/8" x 5/8"

For both Century Narrow aluminum railing systems, two (2) support legs were placed under the bottom rail at third points. Each support leg was rigidly fixed to the test frame by screwing the front and back sides with 1 in. long screws into nominal 2x4 SPF lumber, which were then clamped to the steel test frame.

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

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.

## SECTION 5

### 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:

#### 2015 IBC: SECTION 1607.8.1 HANDRAILS AND GUARDS

- 1) Handrails and guards shall be designed to resist a linear load of 50 pounds per linear foot (plf) (0.73 kN/m) applied in any direction along the handrail or top rail.
- 2) 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.
- 3) 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.

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

#### 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.

## **UNIFORM LOAD TEST**

The guardrail system was subjected to a maximum equivalent uniform load of 125 plf applied horizontally to the 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.

## **CONCENTRATED LOAD TEST**

The top rail of the guardrail system was subjected to three (3) 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 the post.

**SECTION 6**

**RESULTS AND OBSERVATIONS**

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

<b>Table 2. Test Results</b>		
<b>System Description</b>	<b>Test</b>	<b>Compliance</b>
8 ft. Century Narrow Component Picket Railing	In-fill Load	Pass
	Uniform Load	Pass
	Mid-Span Concentrated Load	Pass
	Adjacent to Post Connection Concentrated Load	Pass
	Top of Post	Pass
8 ft. Century Narrow Component Picket Railing with Swivel Brackets	Adjacent to Post Connection Concentrated Load	Pass



## SECTION 7 CONCLUSION

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for Century Narrow Component Picket Railing Systems submitted by Cendek Railings Ltd. The evaluation was carried out to determine whether the railing would meet the requirements of the following:

- 2015 International Building Code (IBC), Section 1607.8.1 *Handrails and Guards*
- 2015 International Residential Code (IRC), Section R301.5 *Live Load*

The product test results are presented in Section 6 of this report.

**SECTION 8**

**APPENDIX A: TEST DATA (3 PAGES)**

Company	Cendek Railings Ltd.	Technician(s)	Chris Chang / Kevin Penner
Project No.	G103176847	Reviewer	Riccardo DeSantis
Models	Century Narrow aluminum railing systems	Start/End Date	August 22, 2017
Product Name	Same as above	Sample ID	VAN1708221440-001
Standard	<b>2015 International Building Code (IBC), 2015 International Residential Code (IRC)</b>		

**Test Data Package**

**Table of Contents**

Sheet	Page
Table of Contents (This Sheet)	1
Century Narrow Component Picket Railing - Loads on Guards	2
Century Narrow Component Picket Railing with Swivel Brackets - Loads on Guards	3

Test:	<b>Loads on Guards</b>	Project:	G103176847
Date:	29-Aug-17	Eng/Tech:	Kevin Penner
Client:	Cendek Railings Ltd.	Reviewer:	Riccardo DeSantis
Product:	<b>8 ft. Century Narrow Component Picket Railing</b>		
Post Spacing:	8.17 ft	2.49 m	
Height of Guard:	42 in	1067 mm	
Opening in Guard:	3.875 in	98 mm	
Method:	2015 International Building Code (IBC) 2015 International Residential Code (IRC)		
Safety Factor:	2.50		
Equipment:	Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due August 4, 2018) Vaisala Temp/RH Indicator (Intertek ID# 9-0176, cal due January 12, 2018) Stopwatch (Intertek ID# P60444, cal due June 28, 2017)		
Time/Temp/RH:	8:00AM / 23.0°C / 49.4%		

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	<b>Pass</b>
	Midspan Horizontal Concentrated Load	200	500	-	-	500	<b>Pass</b>
	Top Rail Adjacent to Connection Concentrated Load	200	500	-	-	500	<b>Pass</b>
	Top of Post	200	500	-	-	500	<b>Pass</b>
	Horizontal Uniform Load (per ft)	50	125	1042	510	1021	<b>Pass</b>

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	<b>Pass</b>
	Midspan Horizontal Concentrated Load	0.89	2.22	-	-	2.22	<b>Pass</b>
	Top Rail Adjacent to Connection Concentrated Load	0.89	2.22	-	-	2.22	<b>Pass</b>
	Top of Post	0.89	2.22	-	-	2.22	<b>Pass</b>
	Horizontal Uniform Load (per m)	0.73	1.83	1.41	2.27	4.54	<b>Pass</b>

Test: **Loads on Guards**  
 Date: 29-Aug-17  
 Client: Cendek Railings Ltd.  
 Product: **8 ft. Century Narrow Component Picket Railing with Swivel Brackets**  
**Brackets swivel up and down in a stair configuration**

Project: G103176847  
 Eng/Tech: Kevin Penner  
 Reviewer: Riccardo DeSantis

Post Spacing: 8.17 ft 2.49 m  
 Height of Guard: 42 in 1067 mm  
 Opening in Guard: 3.875 in 98 mm  
 Method: 2015 International Building Code (IBC)  
 2015 International Residential Code (IRC)

Safety Factor: 2.50  
 Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due August 4, 2018)  
 Vaisala Temp/RH Indicator (Intertek ID# 9-0176, cal due January 12, 2018)  
 Stopwatch (Intertek ID# P60444, cal due June 28, 2017)

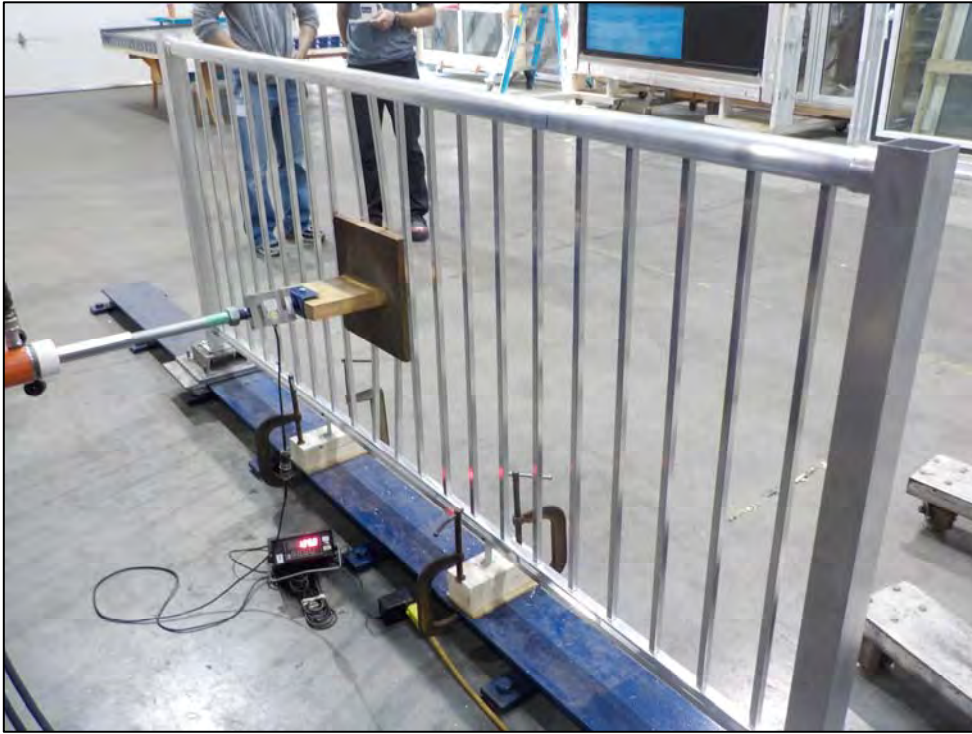
Time/Temp/RH: 8:00AM / 23.0°C / 49.4%

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	Top Rail Adjacent to Connection Concentrated Load	200	500	-	-	500	<b>Pass</b>

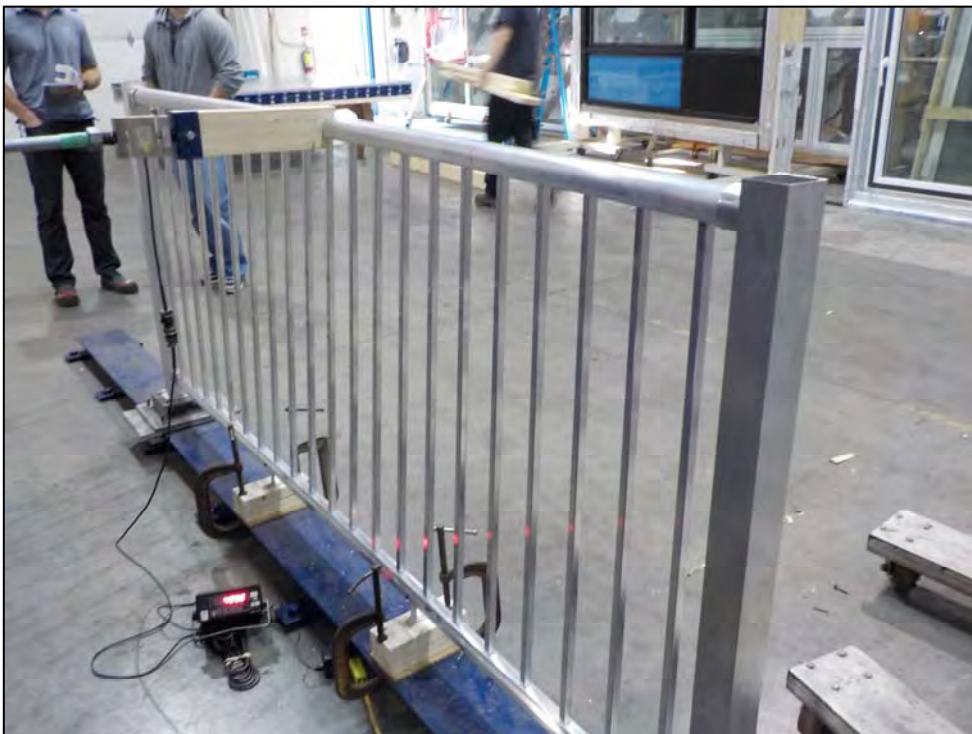
Direction	Test	Design Load (Inward/Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
Outward	Top Rail Adjacent to Connection Concentrated Load	0.89	2.22	-	-	2.22	<b>Pass</b>

Ultimate Load: 534.1 lbs

**APPENDIX B: PHOTOS (3 PAGES)**



**Photo 1. In-fill Load Test**



**Photo 2. Mid-Span Concentrated Load Test**



**Photo 3. Adjacent to Post Connection Concentrated Load Test**



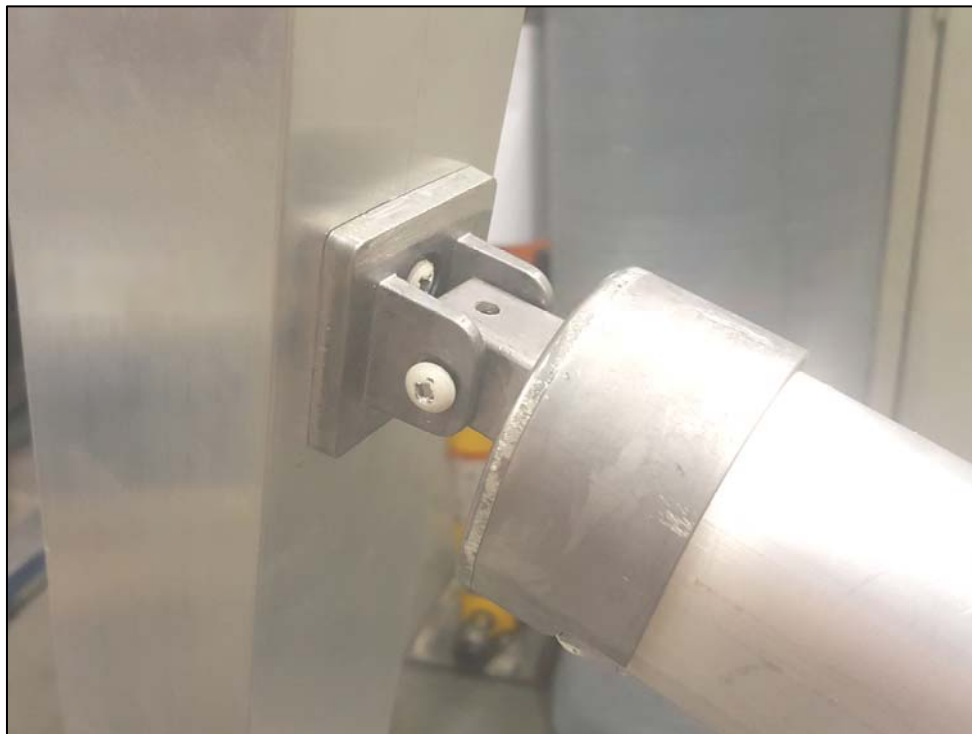
**Photo 4. Uniform Load Test**

Benchmark and Non-standard Test Report: Report must be reproduced in its entirety





**Photo 5. Support Leg**



**Photo 6. Swivel Bracket**

**APPENDIX C: DRAWINGS (13 PAGES)**

Material - Aluminum	Thickness	Alloy
1 TOP RAIL - CENT NARROW 1.93" x 1.75"	.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

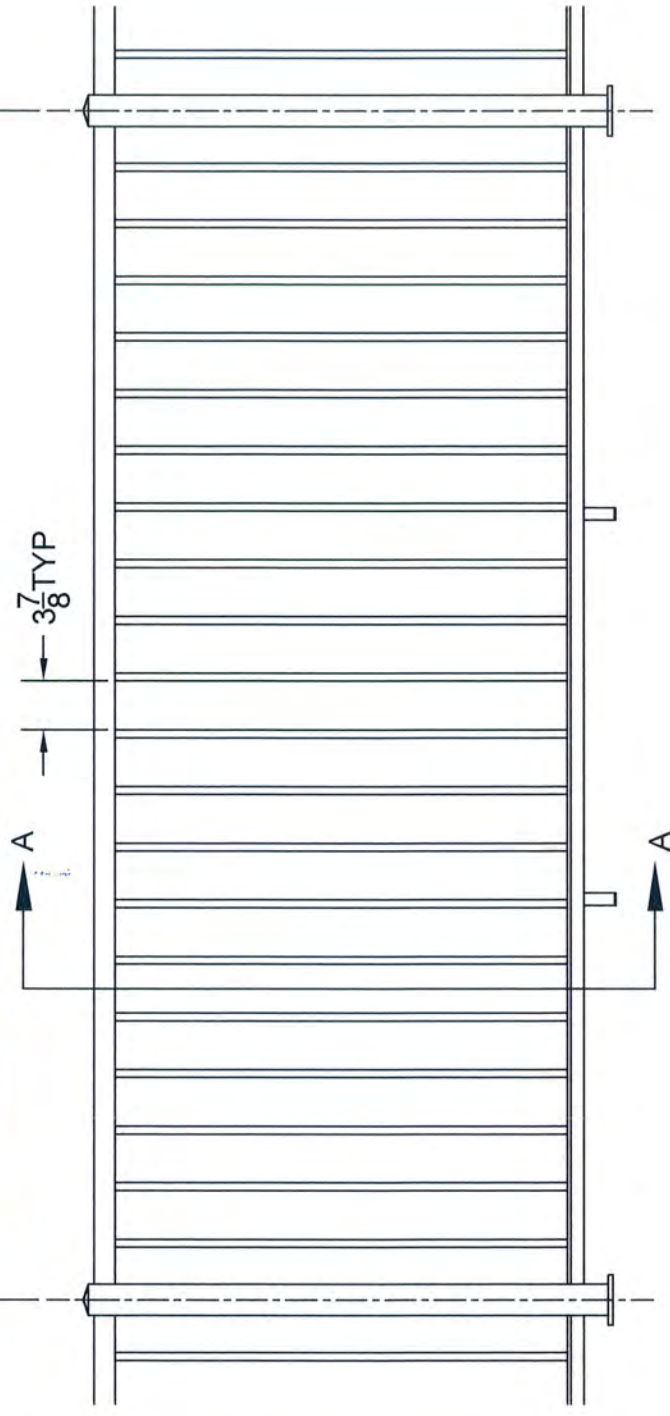
**Intertek**  
 Valued Quality. Delivered.  
 Test sample complies with these details.  
 Deviations are noted.  
 Report #: 103176847COR-001A  
 Date: 07/13/17 Tech: *RL*



CENTURY NARROW

NOT TO EXCEED 98"

$3\frac{7}{8}$  TYP



SECTION "A-A"  
NOT TO SCALE

ELEVATION OF BALCONY RAILING  
NOT TO SCALE

REV	DESCRIPTION	DATE	INITIALS

DRAWN	CDC	DATE	09/01/17
CHECKED	MG	DATE	09/01/17

DESCRIPTION	
CENTURY NARROW	
COMPONENT PICKET RAILING	
DWG NO.	REV

DIMENSIONS IN INCHES		1
SHEET 1 OF 1		1

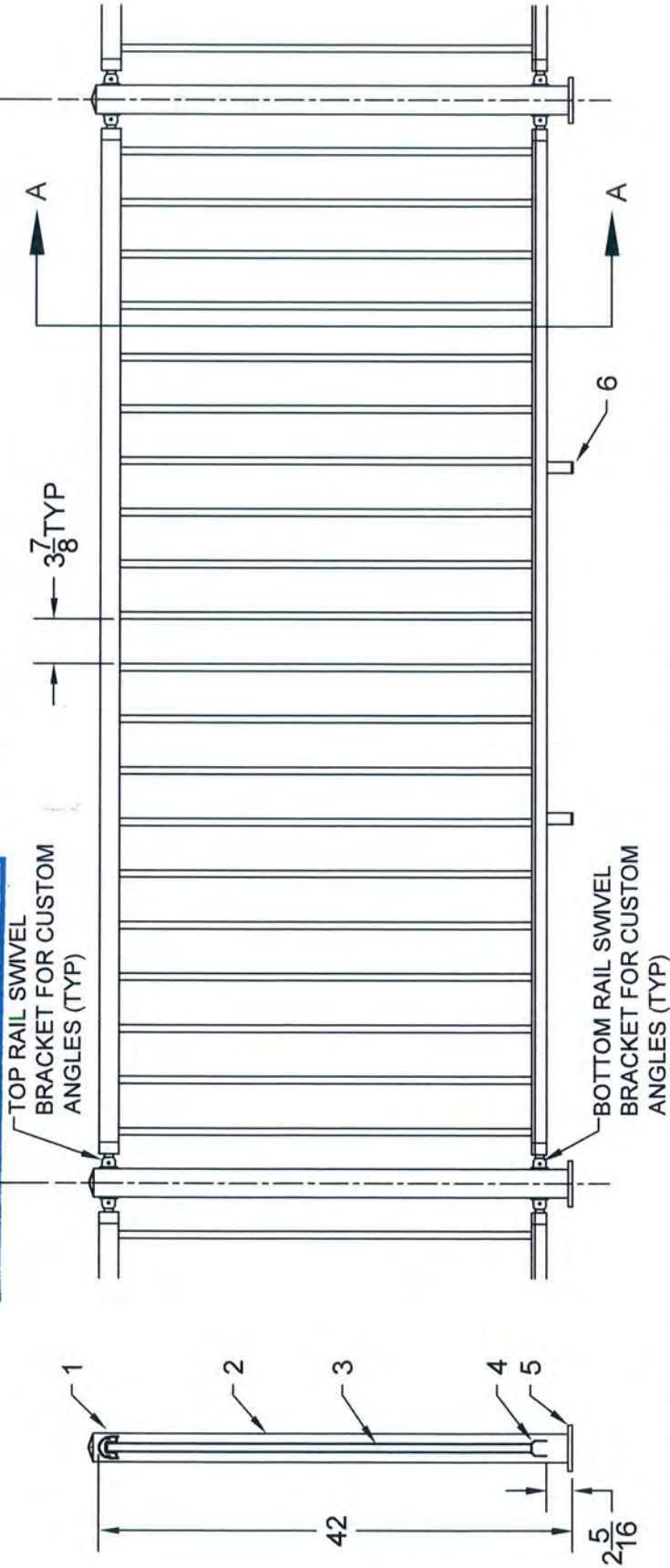


CENTURY  
NARROW

**Intertek**  
 Reduced Quality. Delivered.  
 Test sample complies with these details.  
 Deviations are noted.  
 Report #: 103176847CEQ-001A  
 Date: 09/13/17 Tech: [Signature]

	Material - Aluminum	Thickness	Alloy
1	TOP RAIL - CENT NARROW 1.93" x 1.75"	.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

NOT TO EXCEED 98"



SECTION "A-A"  
NOT TO SCALE

ELEVATION OF BALCONY RAILING  
NOT TO SCALE

REV	DESCRIPTION	DATE	INITIALS

DRAWN	CDC	DATE	09/01/17
CHECKED	MG	DATE	09/01/17

DESCRIPTION	CENTURY NARROW COMPONENT PICKET RAILING WITH SWIVEL BRACKETS
DWG NO.	REV

DIMENSIONS IN INCHES	SHEET 1 OF 1
----------------------	--------------



Customer Name: Deksmart  
 Part Description: Century Stair Top Rail  
 Note: Standard Aluminum Association Tolerances to Apply Unless Otherwise Noted

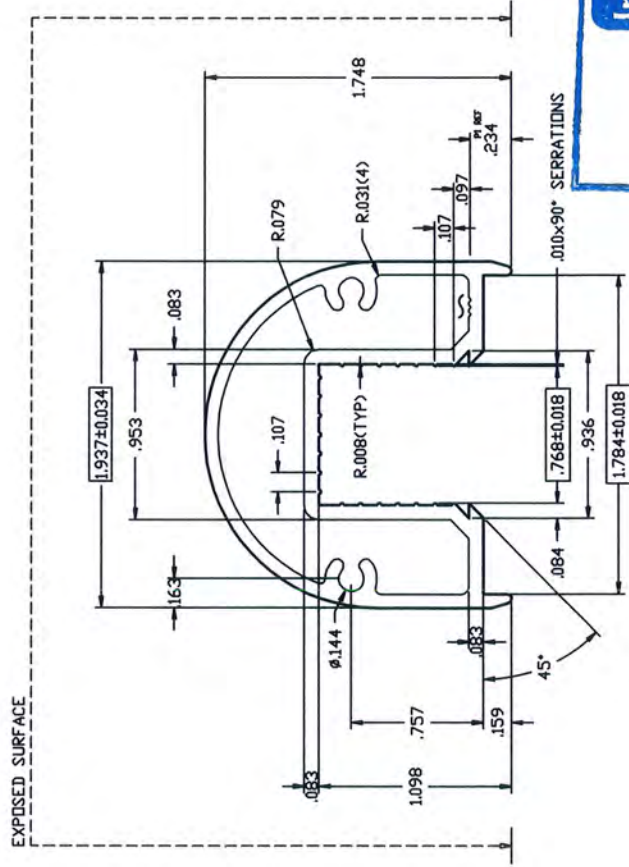
Quote No.: 1814-1  
 Part No.: 696760

Apex Die Number: 2457

Customer No.: DEKSMA

Area=sq.mm	0.697
Weight=kg/m	0.836
Perimeter=mm	17.479
Outer Perimeter=mm	8.956
C.C.D.=mm	2.248
Factor:	21
Ratio:	35
Cavities:	2
Press No.:	1
Scale:	1:1
Alloy:	6063 T5
Date:	15/10/2015
Drawn by:	dc

SAL-304-1	5/10/2012
TYP WALL U.O.S.	0.075±0.010
Denotes Apex ID Mark	0.010x90° V GROOVE (3X)
All unmarked radii	.00R unless otherwise noted
Break all corners	0.010R unless otherwise noted



ACTUAL SIZE

**Intertek**  
 Velocity Quality Delivered  
 Test sample complies with these details.  
 Deviations are noted.  
 Report #: 103176847COR-001A  
 Date: 02/13/17 Tech: [Signature]

No Exposed Surfaces Except As Marked

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: \_\_\_\_\_

□ - Denotes Critical Dimension

Rev:	
Description:	
Date:	



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NOTE: Commercial tolerances to apply unless otherwise stated.

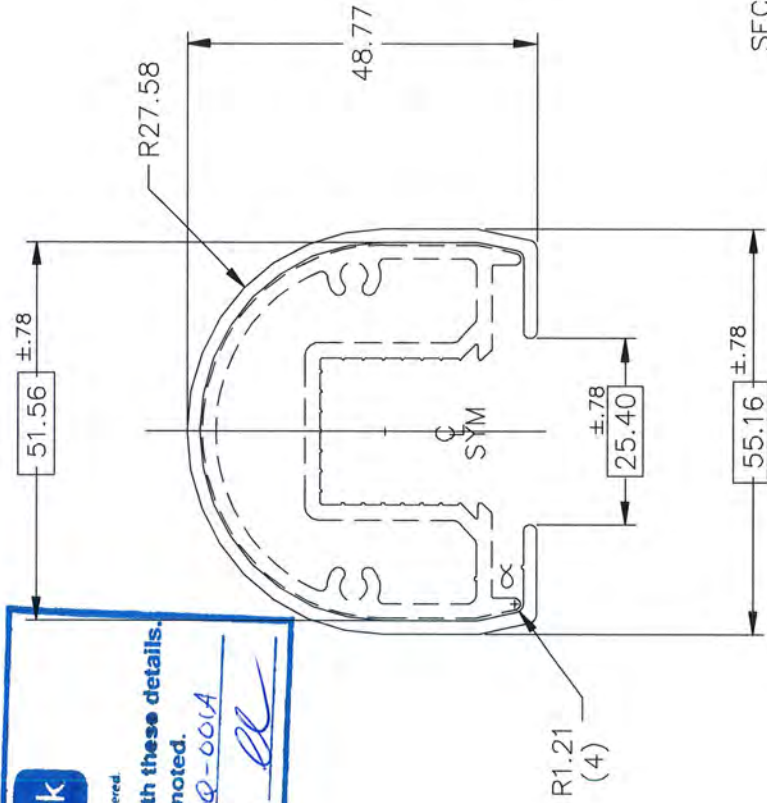
APEL SHAPE NO.  
673042

**Intertek**  
Valued Quality Delivered.

**Test sample complies with these details. Deviations are noted.**

Report #: 03176847000-001A

Date: 09/22/17 Tech: *ll*



SECTION TO SLEEVE  
FIT WITH 696760

Finish	ARCH	
Exposed Surface	4	
Area (mm <sup>2</sup> / in <sup>2</sup> )	268.87	
Lineal mass (Kg/m - lb/ft)	.726	
Perimeter (mm / in)	300.50	
Outside Perimeter (mm / in)		
C.C.D. (mm / in)	72.33	
Break corners (mm / in)	.80	
Unmarked Thickness (mm / in)	1.80	
Unmarked Radii		
Date	22AUG14	
Drawn by	JEJ	
Scale	1:1	
Gap Ratio		
Calgary: <input checked="" type="checkbox"/> Oregon: <input type="checkbox"/>		
<input type="checkbox"/> Important Dimension		
<input type="checkbox"/> Toolmaker's Dimension		
* Close Tolerance		
⊗ APEL ID Mark		
R Full radii		
⚠ Metallurgical Streaking may occur here and will not be a cause for rejection		
Customer no.		
Description: Century STAIR Top Rail OUTER SLEEVE		
Customer: BEAVER DEKSMART		
Date	By	Rev.
APEL SHAPE NO. 673042		

REV. NOV/10

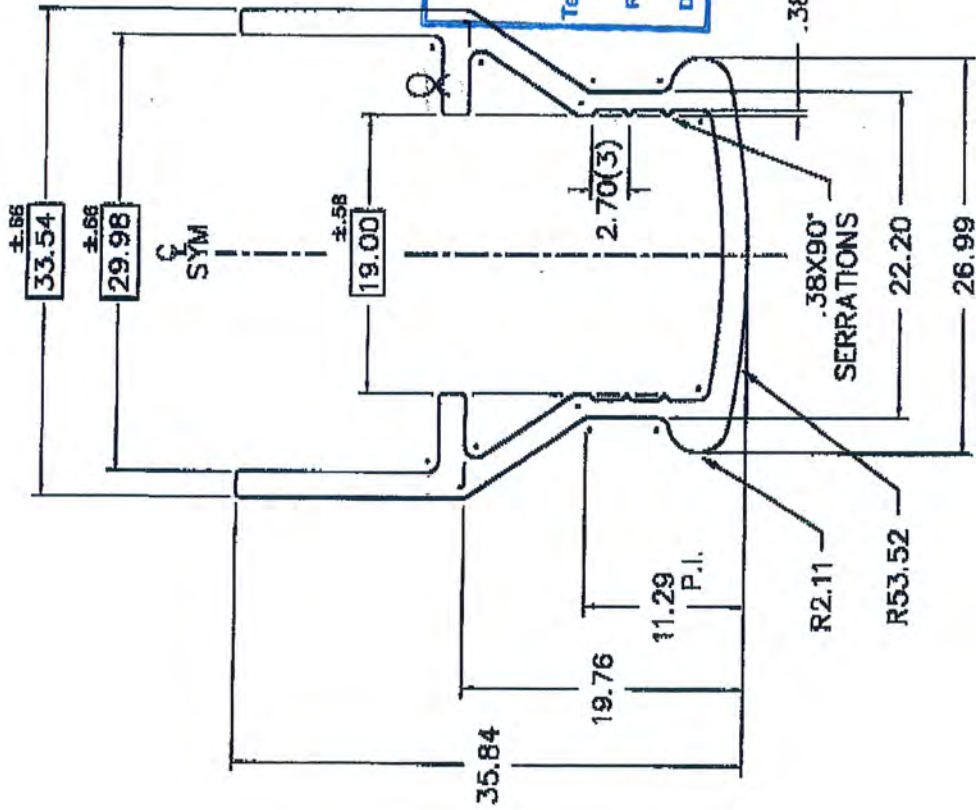


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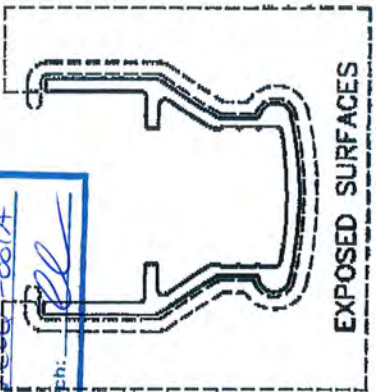
Finish	ARCH	APEL SHAPE NO.	626646
Exposed Surface	3		
Area (mm <sup>2</sup> )	192		
Lined mass	.517		
Perimeter	211.6		
Outside Perimeter			
C.C.D.	45.3		
Break corners	.25		
Unmarked Thickness	1.78		
Unmarked Radii	.80		
Date	13SEPT99		
Drawn by	SLE		
Scale	2:1		
Gap Ratio			
<input type="checkbox"/> Important Dimension <input type="checkbox"/> Toolmaker's Dimension <input checked="" type="checkbox"/> Close Tolerance <input checked="" type="checkbox"/> APEL ID Mark <input type="checkbox"/> R Full radii <input checked="" type="checkbox"/> Metallurgical Streaking may occur here and will not be a cause for rejection Customer no.			
21JULY02JS 12FE08 Date		Description A CUSTOMER NAME CHANGED B DESCRIPTION AND CUSTOMER NAME CHANGED Customer	
APEL SHAPE NO. 626646		BOTTOM RAIL DEKSMART RAILINGS	
REV. DEC/7			



Ordered in 246", 222", 198", 171" & 147"

SECTION TO SLEEVE FIT WITH 626647

**Intertek**  
 Validated Quality Delivered.  
 Test sample complies with these details. Deviations are noted.  
 Report #: 103176847666-00(A)  
 Date: 09/13/17 Tech: [Signature]



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Finish	ARCH
Exposed Surface	2
Area (mm <sup>2</sup> )	176
Lineal mass	.473
Perimeter	196.6
Outside Perimeter	
C.C.D.	43.5
Break corners	0.25
Unmarked Thickness	1.78
Unmarked Radii	.80
Date	12DEC03
Drawn by	EJS
Scale	2:1
Gap Ratio	

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

Customer no.

APEL SHAPE NO.  
**629082**

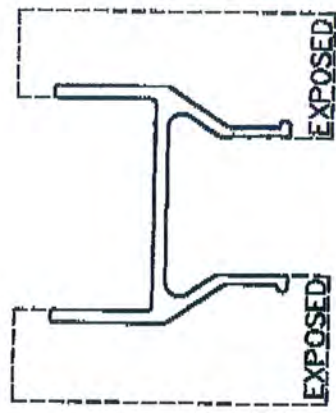
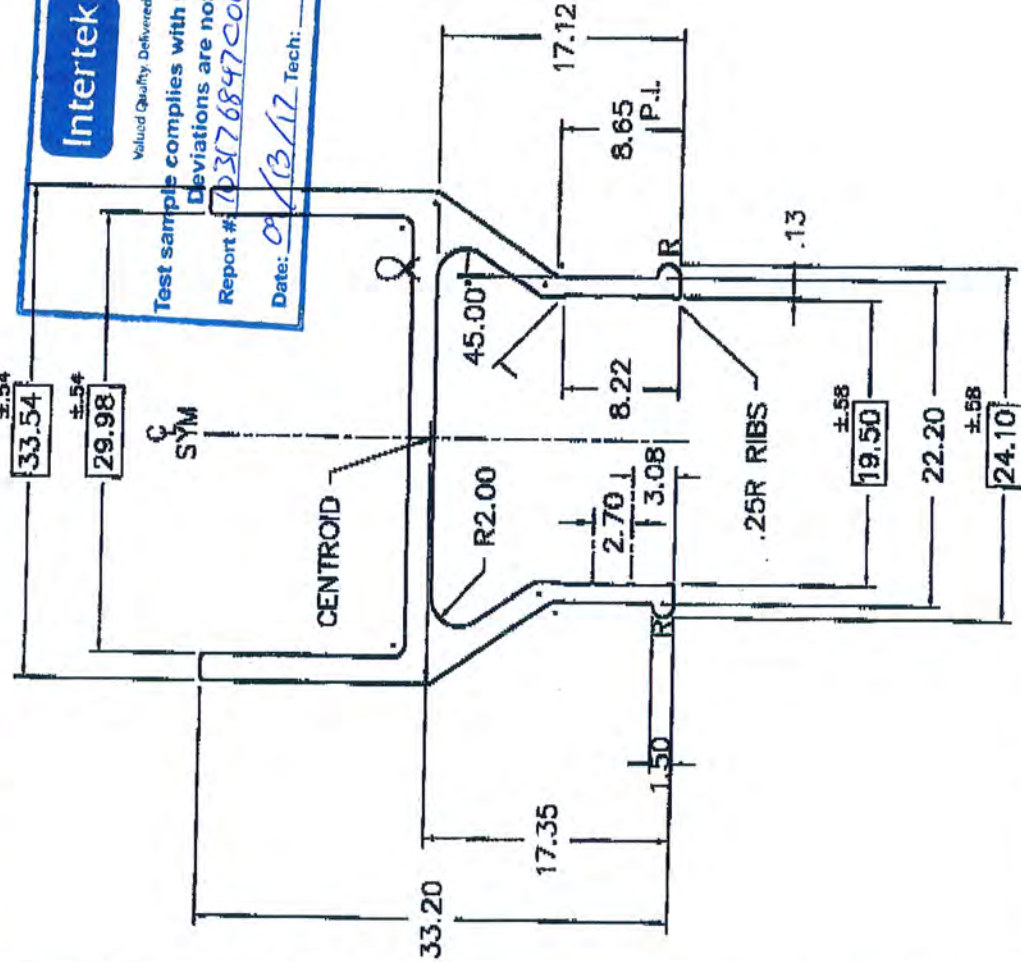
**Intertek**  
Validated Quality Delivered

Test sample complies with these details. Deviations are noted.

Report # D376847C0Q-001A  
Date: 02/13/12 Tech: OL

Ixx 0.0100 x 10<sup>-6</sup> mm<sup>4</sup>  
Sxx 0.0005 x 10<sup>-6</sup> mm<sup>3</sup>  
Rxx 7.55 mm  
Iyy 0.0283 x 10<sup>-6</sup> mm<sup>4</sup>  
Syy 0.0016 x 10<sup>-6</sup> mm<sup>3</sup>  
Ryy 12.66 mm

Ordered in 246", 198", & 150"



ACTUAL SIZE

APEL SHAPE NO. <b>629082</b>	21 JULY 2003 Date	② CUSTOMER NAME CHANGED	① BOTTOM RAIL
REV. DEC/07	10 FEB 2009 Date	② DESCRIPTION AND CUSTOMER NAME CHANGED	① DEKSMART RAILINGS
	By	Rev.	Customer





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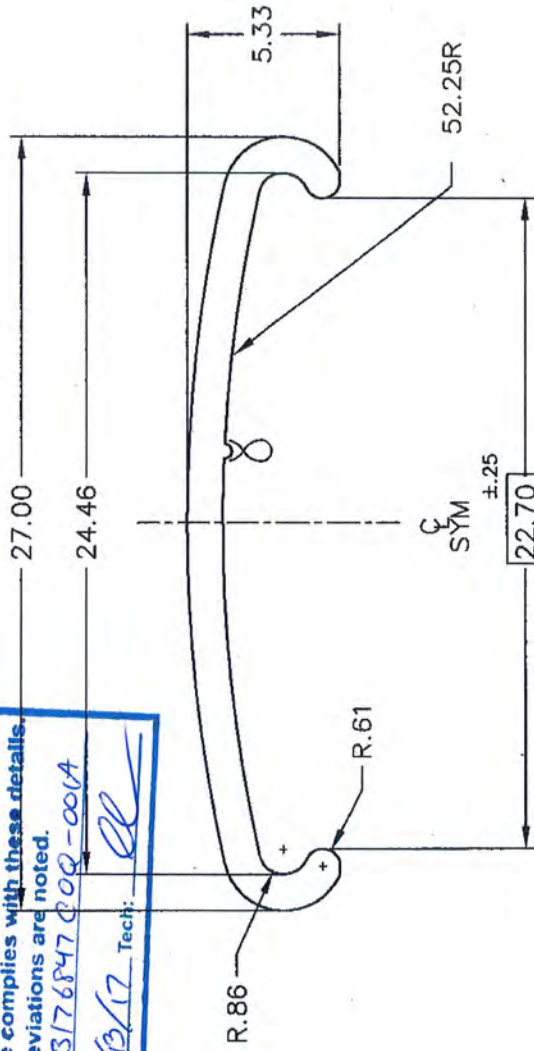
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615128

**Intertek**  
Validated Quality Delivered.

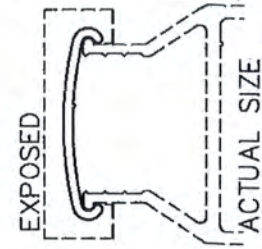
**Test sample complies with these details. Deviations are noted.**

Report #: 103176847 PQQ-001A

Date: 09/13/17 Tech: *RL*



Ordered in 246", 198", & 150"



SECTION TO SNAP FIT OVER  
629048 AND 629082

Finish	ARCH
Exposed Surface	1
Area (mm <sup>2</sup> )	41
Lineal mass	.110
Perimeter	66.3
Outside Perimeter	
C.C.D.	27.0
Break corners	0.25
Unmarked Thickness	1.25
Unmarked Radii	
Date	11MAR04
Drawn by	EJS
Scale	4:1
Gap Ratio	
<input type="checkbox"/> Important Dimension <input type="checkbox"/> Toolmaker's Dimension <input checked="" type="checkbox"/> Close Tolerance <input checked="" type="checkbox"/> APEL ID Mark <input type="checkbox"/> Full radii <input checked="" type="checkbox"/> Metallurgical Streaking may occur here and will not be a cause for rejection	
Customer no.	

50CT10	EJS	Customer Name	CHANGED
20JUN08	EJS	Customer Name	CHANGED
Date	By	Rev.	
APEL SHAPE NO.		615128	
Description		SPACER CLIP	
Customer		DEKSMART RAILINGS	



**Extrusions Limited**

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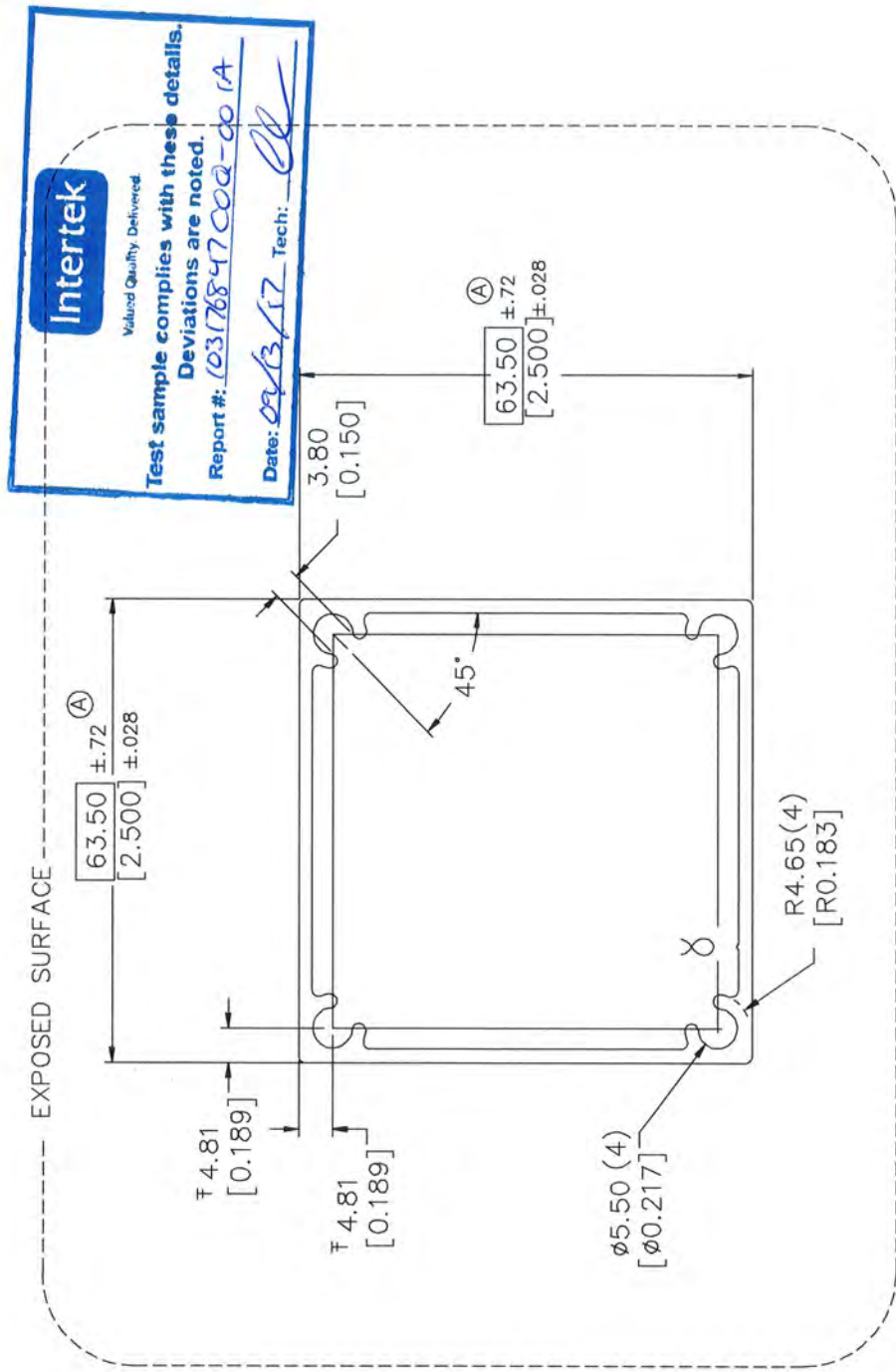
NOTE: Commercial tolerances to apply unless otherwise stated.

Finish	ARCH
Exposed Surface	4
Area (mm <sup>2</sup> / in <sup>2</sup> )	541.11 / .839
Lineal mass (Kg/m - lb/ft)	1.456 / .978
Perimeter (mm / in)	524.32 / 20.64
Outside Perimeter (mm / in)	252.37 / 9.936
C.C.D. (mm / in)	90 / 3.543
Break corners (mm / in)	.40 / .016
Unmarked Thickness (mm / in)	1.90 / .075
Unmarked Radii	.95 / .037
Date	9FEB09
Drawn by	JEJ
Scale	1:1
Gap Ratio	

- Important Dimension
- $\nabla$  Toolmaker's Dimension
- \* Close Tolerance
- $\otimes$  APEL ID Mark
- R Full radii
- $\blacktriangle$  Metallurgical Streaking may occur here and will not be a cause for rejection

Customer no. H212212075  
 APEL SHAPE NO. 695987

APL SHAPE NO. 695987



Description 63.50 POST WITH SCREW CHASES  
 Customer BEAVER HOME IMPROVEMENTS

By JEJ  
 Date 11NOV13  
 Rev. (A) Tolerance Revised



**Extrusions Limited**

This is not an APEL EXTRUSIONS LIMITED design. Customer MUST check and test the design since APEL is NOT responsible or liable for products produced from it. APEL's only warranty is stated on APEL's order acknowledgment.

NOTE: Commercial tolerances to apply unless otherwise stated.

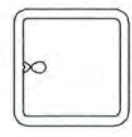
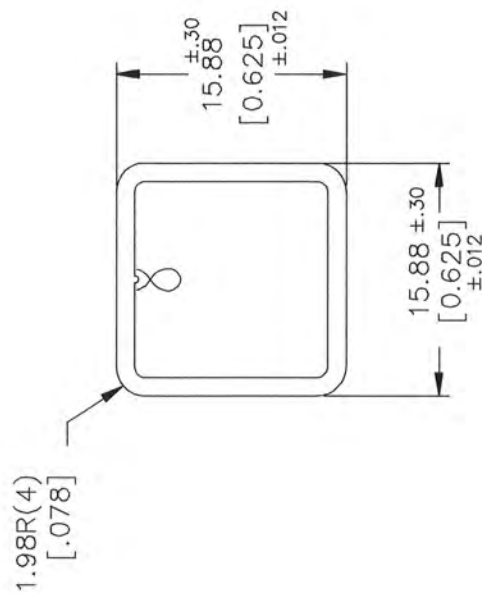
Finish	ARCH
Exposed Surface	4
Area (mm <sup>2</sup> )	71
Lineal mass	.191
Perimeter	112.6
Outside Perimeter	60.1
C.C.D.	20.8
Break corners	.71
Unmarked Thickness	1.27
Unmarked Radii	
Date	22MAR02
Drawn by	EJS
Scale	2:1
Gap Ratio	

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

Customer no.

APEL SHAPE NO. **695273**

**Intertek**  
 Valued Quality Delivered.  
 Test sample complies with these details.  
 Deviations are noted.  
 Report #: 10317684700Q-001A  
 Date: 02/13/17 Tech: *RL*



EXPOSED ALL AROUND

ACTUAL SIZE

5/8" PICKET

19JULY0EJS	(B) CUSTOMER NAME CHANGED	Description
20MAR08EJS	(A) CUSTOMER NAME CHANGED	(B) (A)
Date	By	Customer
		DEKSMART RAILINGS

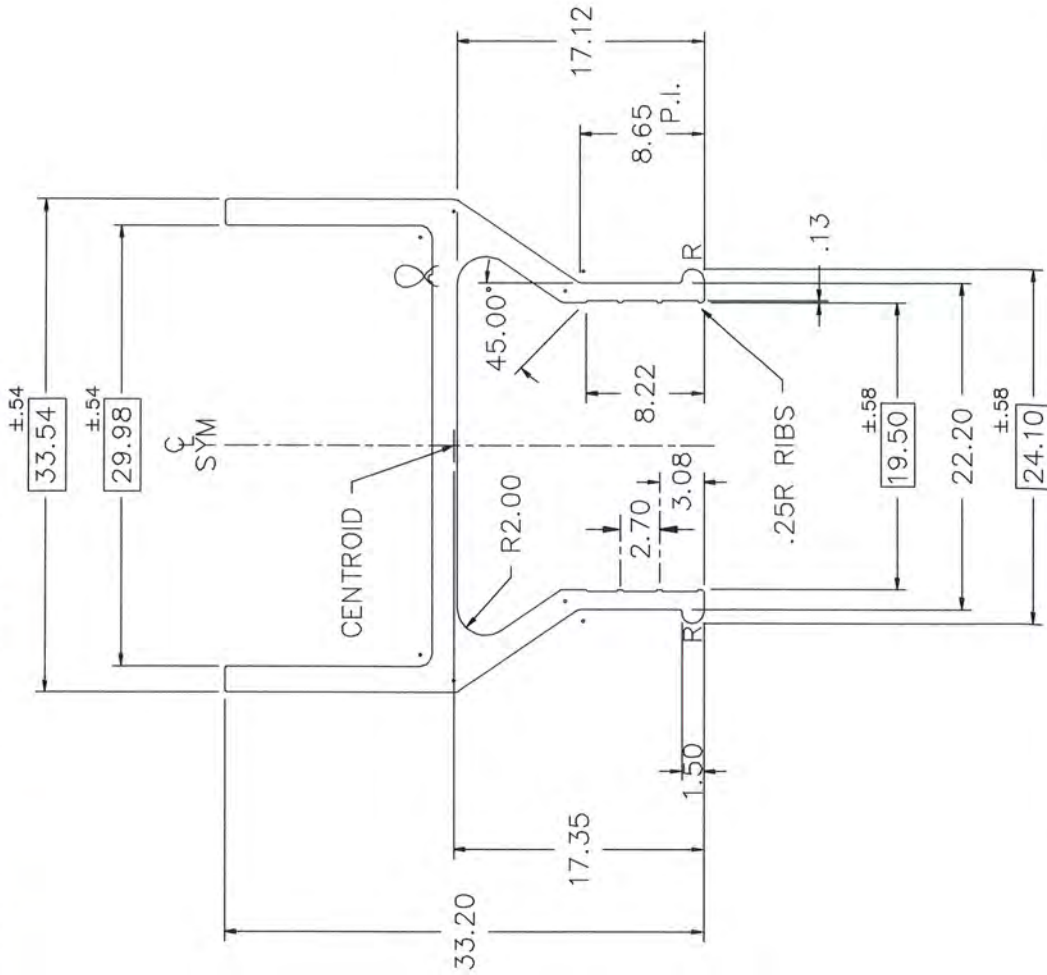


**Extrusions Limited**

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Finish	ARCH	APEL SHAPE NO.	629082
Exposed Surface	2		
Area (mm <sup>2</sup> )	176		
Lined mass	.473		
Perimeter	196.6		
Outside Perimeter			
C.C.D.	43.5		
Break corners	0.25		
Unmarked Thickness	1.78		
Unmarked Radii	.80		
Date	12DEC03		
Drawn by	EJS		
Scale	2:1		
Gap Ratio			

NOTE: Commercial tolerances to apply unless otherwise stated.



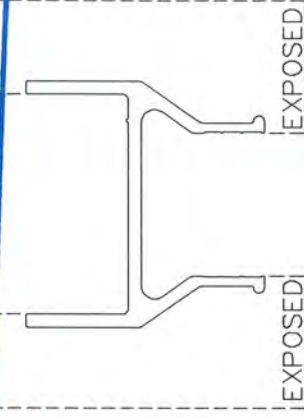
Ixx	0.0100 x 10 <sup>6</sup>	mm <sup>4</sup>
Sxx	0.0005 x 10 <sup>6</sup>	mm <sup>3</sup>
Rxx	7.55	mm
Iyy	0.0283 x 10 <sup>6</sup>	mm <sup>4</sup>
Syy	0.0016 x 10 <sup>6</sup>	mm <sup>3</sup>
Ryy	12.66	mm

**Intertek**  
Valued Quality. Delivered.

**Test sample complies with these details.**  
Deviations are noted.

Report #: 103176847C0Q-00A

Date: 09/13/17 Tech: [Signature]



ACTUAL SIZE

Customer no.			
Legend:	<input type="checkbox"/> Important Dimension <input type="checkbox"/> Toolmaker's Dimension <input type="checkbox"/> Close Tolerance <input type="checkbox"/> APEL ID Mark <input type="checkbox"/> Full radii <input type="checkbox"/> Metallurgical Streaking may occur here and will not be a cause for rejection		
Customer no.			
APEL SHAPE NO.	629082	Description	(A) BOTTOM RAIL
Date	21JULY10EJS	Customer Name Changed	(B)
By	10FEB09 EJS	Description and Customer Name Changed	(A)
Rev.			
		Customer	



**Extrusions Limited**

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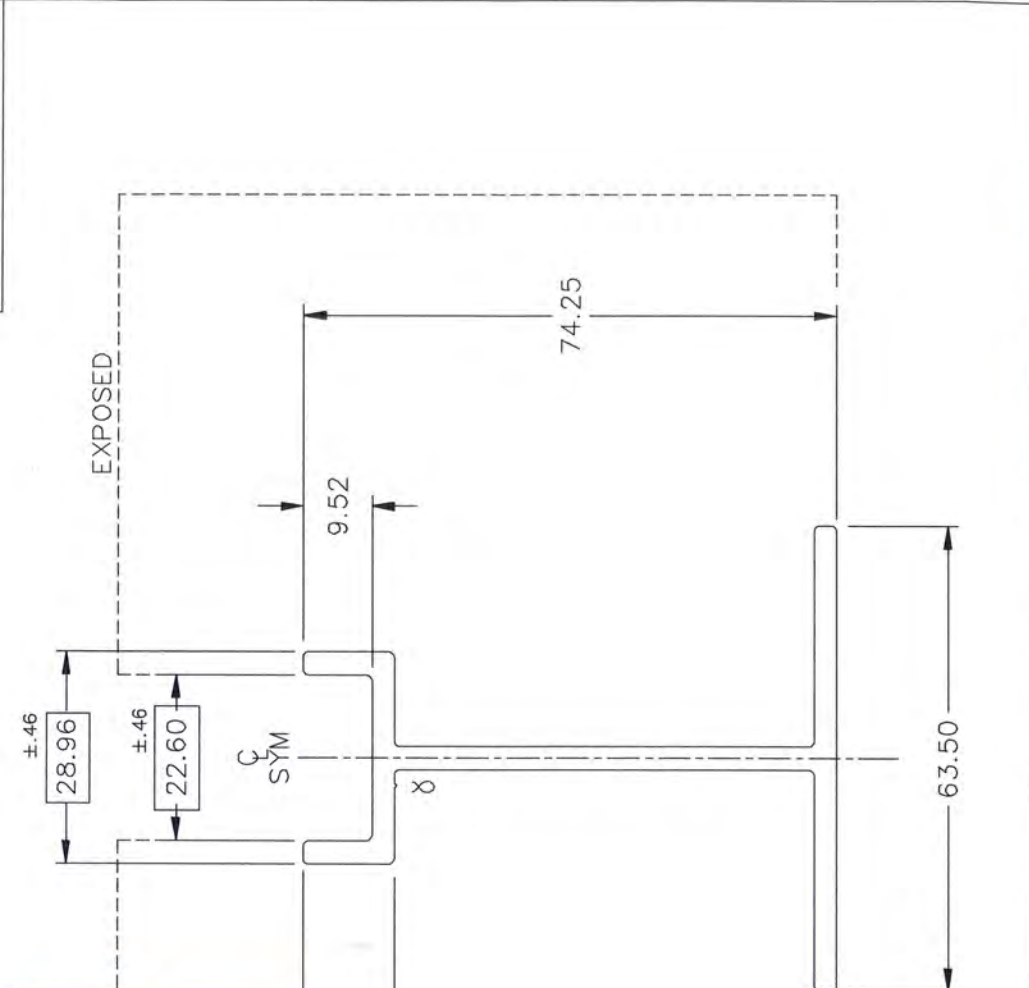
Finish	ARCH	NOTE: Commercial tolerances to apply unless otherwise stated.	APEL SHAPE NO. 628025
Exposed Surface	2		
Area (mm <sup>2</sup> )	540		
Lineal mass	1.453		
Perimeter	340.9		
Outside Perimeter			
C.C.D.	89.2		
Break corners	.80		
Unmarked Thickness	3.18		
Unmarked Radii			
Date	7DEC98		
Drawn by	EJS		
Scale	1:1		
Gap Ratio			

**Intertek** EXPOSED  
Validated Quality Data

**Test sample complies with these details. Deviations are noted.**

Report #: 103176847 COQ-001A

Date: 09/13/17 Tech: *[Signature]*



Customer no.		VS-10330
APEL SHAPE NO.		628025
Description		BOTTOM RAIL SUPPORT LEG
19JULY09EJS	By	Customer
10FEB09EJS	Rev.	

REV. DEC/09



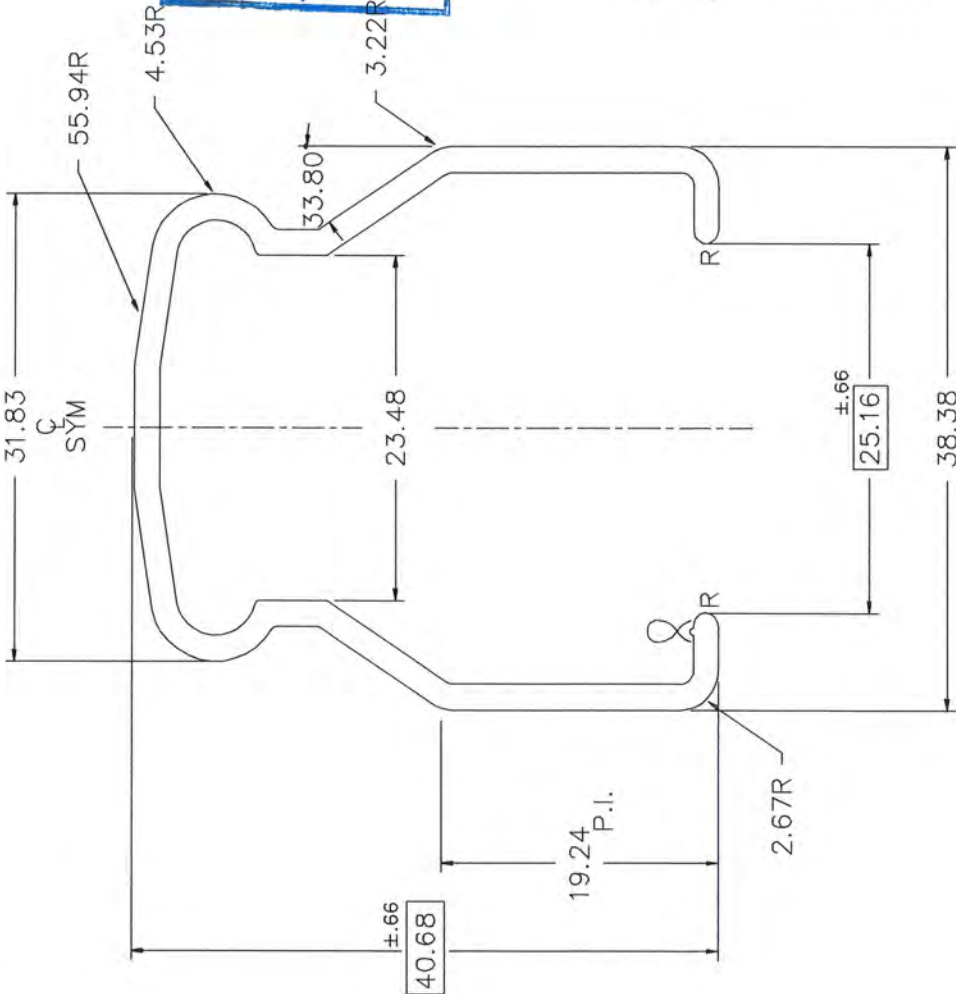
**Extrusions Limited**

This is not an APEL EXTRUSIONS LIMITED design. Customer MUST check and test the design since APEL is NOT responsible or liable for products produced from it. APEL's only warranty is stated on APEL's order acknowledgment.

NOTE: Commercial tolerances to apply unless otherwise stated.

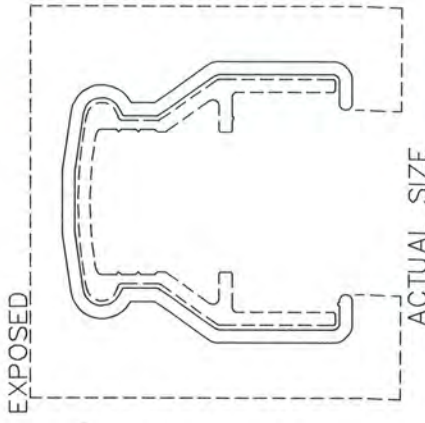
Finish	ARCH
Exposed Surface	3
Area (mm <sup>2</sup> )	209
Lineal mass	.562
Perimeter	237.5
Outside Perimeter	
C.C.D.	50.1
Break corners	.42
Unmarked Thickness	1.78
Unmarked Radii	
Date	29SEPT99
Drawn by	EJS
Scale	2:1
Gap Ratio	
<input type="checkbox"/> Important Dimension <input type="checkbox"/> Toolmaker's Dimension <input checked="" type="checkbox"/> Close Tolerance <input checked="" type="checkbox"/> APEL ID Mark <input type="checkbox"/> Full radii <input checked="" type="checkbox"/> Metallurgical Streaking may occur here and will not be a cause for rejection	
Customer no.	

APEL SHAPE NO.  
**626647**



**Intertek**  
 Valued Quality Delivered.  
**Test sample complies with these details.**  
 Deviations are noted.  
 Report #: 03176847000-001A  
 Date: 09/13/17 Tech: *ll*

SECTION TO SLEEVE  
FIT WITH 626646



APEL SHAPE NO. <b>626647</b>		Description A OUTSIDE SLEEVE FOR NEW BOTTOM RAIL	
120CT10	EJS	B	CUSTOMER NAME CHANGED
10FEB09	EJS	A	CUSTOMER NAME AND DESCRIPTION CHANGED
Date	By	Rev.	
			Customer B A DEKSMART RAILINGS

REV. DEC/09



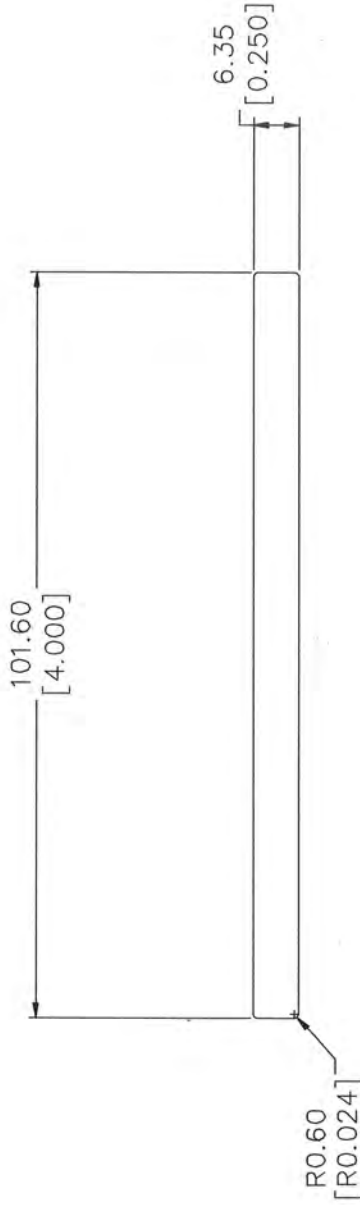
**Extrusions Limited**

This is not an APEL EXTRUSIONS LIMITED design. Customer MUST check and test the design since APEL is NOT responsible or liable for products produced from it. APEL's only warranty is stated on APEL's order acknowledgment.

NOTE: Commercial tolerances to apply unless otherwise stated.

Finish	MILL
Exposed Surface	0
Area (mm <sup>2</sup> / in <sup>2</sup> )	644.8 / .999
Lineal mass (Kg/m - lb/ft)	1.735 / 1.166
Perimeter (mm / in)	215 / 8.465
Outside Perimeter (mm / in)	
C.C.D. (mm / in)	101.6 / 4.00
Break corners (mm / in)	.60 / .024
Unmarked Thickness (mm / in)	
Unmarked Radii	
Date	28JAN74
Drawn by	RJT
Scale	1:1
Cap Ratio	
<input type="checkbox"/> Important Dimension <input checked="" type="checkbox"/> Toolmaker's Dimension <input checked="" type="checkbox"/> Close Tolerance <input checked="" type="checkbox"/> APEL ID Mark <input type="checkbox"/> Full radii <input checked="" type="checkbox"/> Metallurgical Streaking may occur here and will not be a cause for rejection Customer no.	

APEL SHAPE NO.  
613029



**Intertek**  
 Valued Quality. Delivered.  
**Test sample complies with these details.**  
 Deviations are noted.  
 Report #: 10317684700Q-001A  
 Date: 09/13/17 Tech: *[Signature]*

APEL SHAPE NO. 613029		Description 4" x .250" FLT BAR	
Date	By	Rev.	Customer APEL OPEN