intertek
Total Quality. Assured.

CENDEK RAILINGS LTD.
TEST REPORT

SCOPE OF WORK
REPORT OF 6 FT. CENTURY ROUND 5 MM GLASS PANEL BRACKET SYSTEM TESTED IN ACCORDANCE WITH ASTM SELECTED SECTIONS OF ASTM E2353-16, *STANDARD TEST METHODS FOR PERFORMANCE OF GLAZING IN PERMANENT RAILING SYSTEMS, GUARDS, AND BALUSTRADES*

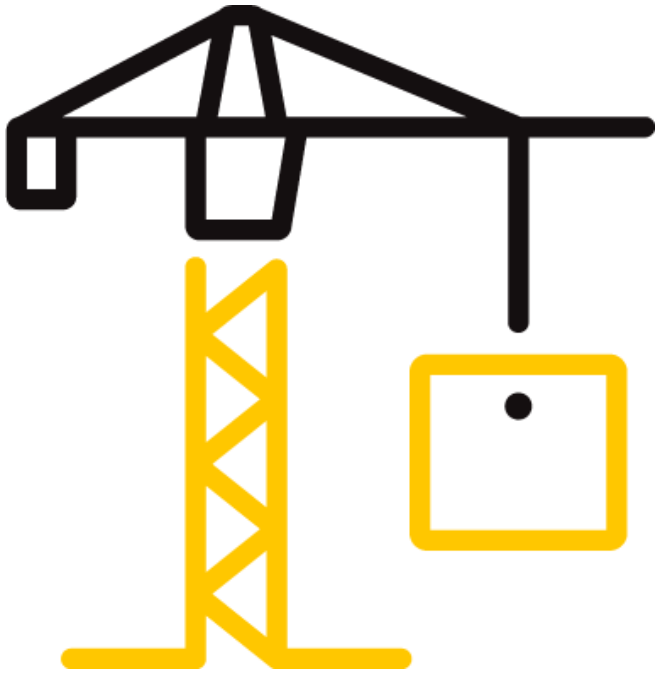
REPORT NUMBER
104715588COQ-002F

TEST DATES
06/25/21

ISSUE DATE
08/16/21

PAGES
22

DOCUMENT CONTROL NUMBER
GFT-OP-10c (09/29/20)



1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR CENDEK RAILINGS LTD.
Report No.: 104715588COQ-002F
Date: 08/16/21

REPORT ISSUED TO

CENDEK RAILINGS LTD.
9685 Agur St.
Summerland, BC, V0H 1Z2
Canada

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Cendek Railings Ltd., 9685 Agur St., Summerland, BC, V0H 1Z2, Canada to perform testing on the 6 ft. Century Round 5 mm Glass Wall Bracket System in accordance with selected sections of ASTM E2353-16, *Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrades.* The scope of the testing as requested by Cendek Railings Ltd., was to assess the ability of the guard system to resist the load requirements of Section 1607.8.1 of the 2018 IBC and R301.5 of the 2018 IRC. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at the Intertek test facility in Coquitlam, BC, Canada between June 25, 2021.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

COMPLETED BY:	Chris Chang	**REVIEWED BY:**	Baldeep Sandhu
TITLE:	Sr. Tech – Building & Construction	**TITLE:**	Manager – Building & Construction
SIGNATURE:		**SIGNATURE:**	
DATE:	08/16/21	**DATE:**	08/16/21

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR CENDEK RAILINGS LTD.
Report No.: 104715588COQ-002F
Date: 08/16/21

SECTION 2
SUMMARY OF TEST RESULTS

SYSTEM DESCRIPTION	TEST	PASS/FAIL
6 ft. Century Round 5 mm Glass Wall Bracket System	In-fill Load	Pass
	Uniform Load	Pass
	Horizontal – Mid-Span Concentrated Load	Pass
	Horizontal – Adjacent to Post Concentrated Load	Pass

Refer to Appendix B for photos of testing.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR CENDEK RAILINGS LTD.
Report No.: 104715588COQ-002F
Date: 08/16/21

SECTION 3
TEST METHOD

The guard specimen was evaluated in accordance with selected sections of the following:

> **ASTM E2353-16**, *Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrades,* Section 12.1.1 *Static Load Testing*

The required test loads were based on the Specified Loads per the following Building Code articles with the Safety Factors applied as indicated in this report.

2018 International Building Code (IBC)

- Section 1607.8.1 *Handrails and Guards*

2018 International Residential Code (IRC)

- R301.5 *Live Load*

SECTION 4
MATERIAL SOURCE

The client submitted the railing system to the Evaluation Center on June 4, 2021 (Coquitlam ID# VAN2106041232-001). The samples was received in good condition and was suitable for testing unless noted otherwise. The sample was not independently selected for testing.

SECTION 5
EQUIPMENT

Calibration of test equipment was performed by Intertek B&C in accordance with ISO 17025 requirements.

ASSET #	DESCRIPTION	MODEL	CAL DUE DATE
P60692	Artech 5k lb S-Type Load Cell	20210-5k	10/22/21
P60554	T&D Temperature and Humidity Indicator	TR-72Ui	09/10/21
P60444	Extech Stopwatch	365515	03/05/22
52650	Mitutoyo 8 in. Digital Caliper	CD-8	06/08/22
P60494	Stanley Tape Measure	FatMax	09/08/21

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Kevin Penner	Intertek B&C
Chris Chang	Intertek B&C

Note: The above observer(s) witnessed part of the test program.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 7
TESTING PROCEDURE

The evaluation was conducted in accordance with Section 12.1.1 *Static Load Testing* of ASTM E2353-16, *Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrades,* with reference to ASTM E935-13e1, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.* 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. For each test, deflection measurements were taken at the point of load application. Testing was conducted with reference to the specified load requirements of the following:

IN-FILL LOAD TEST

The in-fill load test was conducted in accordance with Section 1607.8.1.2 *Intermediate Rails* of the 2018 IBC and Table R301.5 *Minimum Uniformly Distributed Live Loads* of the 2018 IRC. Testing was conducted with reference to Section 4.5.1 *Loads on Handrail and Guardrail Systems* of ASCE/SEI 7-10, *Minimum Design Loads for Buildings and Other Structures* with a safety factor of 4.0. A load of 200 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 uniform load test was conducted in accordance with Section 1607.8.1 *Handrails and Guards* of the 2018 IBC and Table R301.5 *Minimum Uniformly Distributed Live Loads* of the 2018 IRC. Testing was conducted with reference to Section 4.5.1 *Loads on Handrail and Guardrail Systems* of ASCE/SEI 7-10, *Minimum Design Loads for Buildings and Other Structures* with a safety factor of 2.5. The top rail of the guardrail system was subjected to a uniform load of 125 plf applied horizontally. The load was 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.

CONCENTRATED LOAD TEST

The concentrated load tests were conducted in accordance with Section 1607.8.1.1 *Concentrated Load* of the 2018 IBC and Table R301.5 *Minimum Uniformly Distributed Live Loads* of the 2018 IRC. Testing was conducted with reference to Section 4.5.1 *Loads on Handrail and Guardrail Systems* of ASCE/SEI 7-10, *Minimum Design Loads for Buildings and Other Structures* with a safety factor of 2.5. The top rail of the guardrail system was subjected to two (2) separate horizontal tests where a concentrated load of 500 lbs was applied:

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

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR CENDEK RAILINGS LTD.
Report No.: 104715588COQ-002F
Date: 08/16/21

As there were no posts in the railing system, the concentrated load at the top of post was not evaluated. 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.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR CENDEK RAILINGS LTD.
Report No.: 104715588COQ-002F
Date: 08/16/21

SECTION 8
TEST SPECIMEN DESCRIPTION

The sample was identified as the following:

TABLE 1. RAILING CONFIGURATION							
PART NAME	PART NUMBER	QTY	PART DIMENSIONS				REPORTED MATERIAL
			LENGTH	WIDTH	HEIGHT	NOMINAL THICKNESS	
6 FT. CENTURY ROUND 5 MM GLASS WALL BRACKET SYSTEM							
Top Rail Wall Bracket	4104-WAL-10100	2	3.5 in.	2.5 in.	1.375 in.	0.125 in.	Aluminum
Bottom Rail Wall Bracket	4100-WAL-10100	2	2.38 in.	1.75 in.	1.03 in.	0.125 in.	Aluminum
Top Rail	1004-TOP-00072	1	72.0 in.	2.37 in.	1.87 in.	0.07 in.	Aluminum
Bottom Rail	1200-BOT-00072	1	72.0 in.	1.33 in.	1.30 in.	0.07 in.	Aluminum
Support Leg	4600-LEG-60100	1	-	1.00 in.	2.25 in.	0.125 in.	Aluminum
Infill	N/A	1	-	66 in.	37.31 in.	0.197 in.	Clear Tempered Glass

Note 1: The railing had one (1) support leg positioned under the bottom rail at mid-span and was set on a steel test frame. For detailed drawings of the test samples and components, refer to Appendix C.

Note 2: As the railing system had no posts, the assembly was attached to a wood support through wall brackets. Per the client's request, the guard assembly was attached using supplied #12 x 2 in. long Pan Head Robertson steel sheet metal screws (0.416 in. head diameter x 0.158 in. shank diameter). The wood support was constructed from 2 layers of nominal 2 in. x 12 in. SPF lumber.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 9
TEST RESULTS

A full set of test results is included in Appendix A.

SECTION 10
CONCLUSION

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for Cendek Railings Ltd. on the 6 ft. Century Round 5 mm Glass Wall Bracket System per ASTM E2353-16, *Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrade.* The scope of the testing as requested by Cendek Railings Ltd. was to assess the ability of the guard system to resist the loads as prescribed in the following building code articles:

2018 International Building Code (IBC)

- Section 1607.8.1 *Handrails and Guards*

2018 International Residential Code (IRC)

- R301.5 *Live Load*

The Cendek Railings Ltd. 6 ft. Century Round 5 mm Glass Wall Bracket System identified and evaluated in this report has met the load requirements of the above criteria. Overall compliance with the Building Codes must be evaluated and approved by the Engineer of Record and Authority Having Jurisdiction.

The conclusions of this test may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

SECTION 11

APPENDIX A – TEST DATA (2 PAGES)

Company	Cendek Railings Ltd.	Technician(s)	Kevin Penner
Project No.	G104715588	Reviewer	Baldeep Sandhu
Models	6 ft. Century Round 5 mm Glass Wall Bracket System	Start/End Date	June 25, 2021
Product Name	Same as above	Sample ID	VAN2106041232-001
Standard	**2018 International Building Code (IBC), 2018 International Residential Code (IRC)**		

Test Data Package

Table of Contents

intertek
Total Quality. Assured.

Test:	**Loads on Guards**					Project:	G104715588
Date:	25-Jun-21					Eng/Tech:	Kevin Penner
Client:	Cendek Railings Ltd.						Baldeep Sandhu
Product:	**6 ft. Century Round 5 mm Glass Wall Bracket System**					Reviewer:	Coquitlam, BC, Canada
Post Spacing:		6.04	ft	1.84	m		
Height of Guard:		42.1	in	1070	mm		
Opening in Guard:		3.25	in	83	mm	(between glass and wall)	
		2.38	in	60	mm	(under bottom rail)	

Method: ASTM E2353-16, *Standard Test Methods for Performance of Glazing in Permanent Railing Systems, Guards, and Balustrades*
2018 International Building Code (IBC)
2018 International Residential Code (IRC)

Safety Factor: 2.50
4.00 (for glass in-fill)

Equipment: Artech 5000 lbf Load Cell (Intertek ID# P60692, cal due October 22, 2021)
T&D TR-72Ui Temperature and Humidity Logger (Intertek ID# P60554, cal due September 10, 2021)
Stopwatch (Intertek ID# P60444, cal due March 5, 2022)
Mitutoyo Digital Caliper (Intertek ID# 52650, cal due June 8, 2022)

Time/Temp/RH: 9:00AM / 23.0°C / 49.0%

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	200	-	-	200	**Pass**
	Midspan Horizontal Concentrated Load	200	500	-	-	500	**Pass**
	Top Rail Adjacent to Connection Concentrated Load	200	500	-	-	500	**Pass**
	Horizontal Uniform Load (per ft)	50	125	570	378	755	**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	0.89	-	-	0.89	**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**
	Horizontal Uniform Load (per m)	0.73	1.83	0.77	1.68	3.36	**Pass**

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

APPENDIX B – PHOTOS (2 PAGES)

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

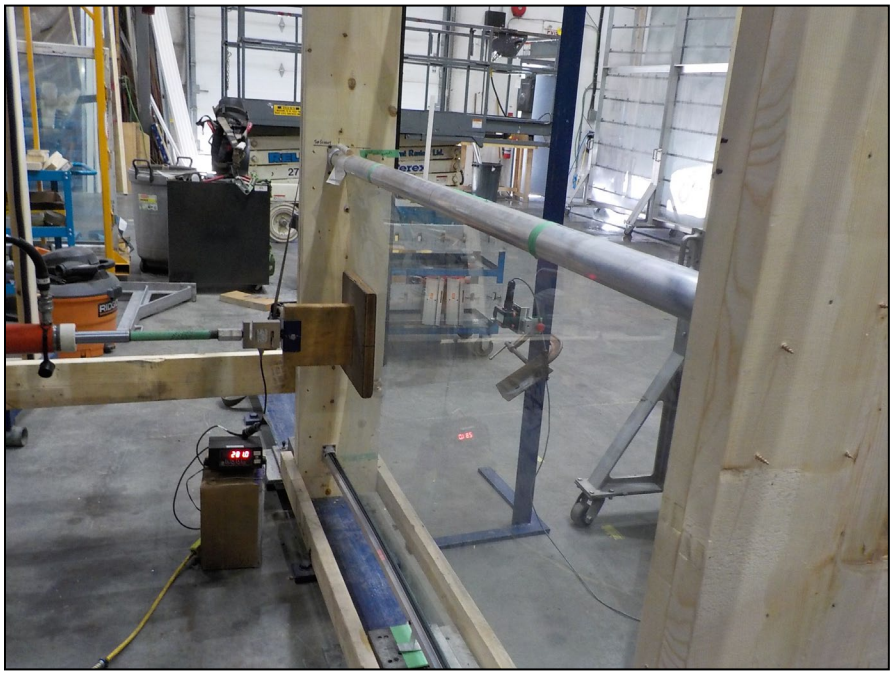


Figure 1. In-fill Load Test

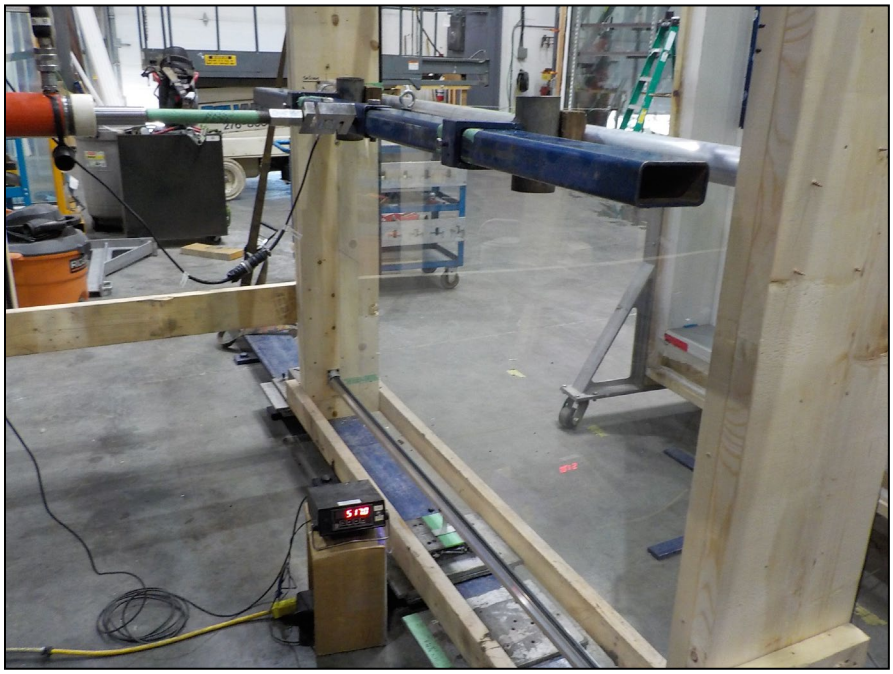


Figure 2. Horizontal Uniform Load Test

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR CENDEK RAILINGS LTD.
Report No.: 104715588COQ-002F
Date: 08/16/21

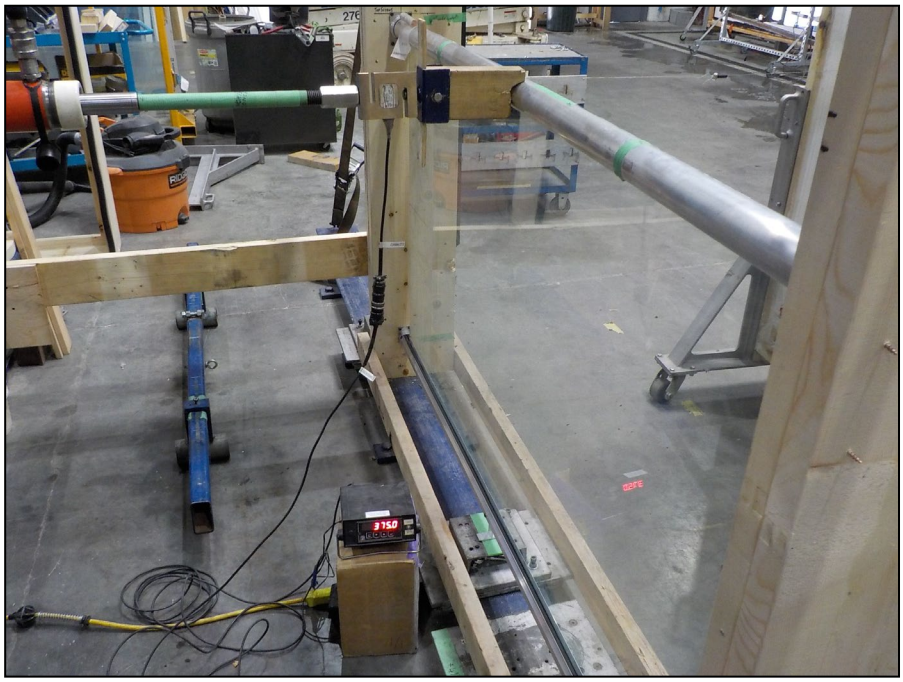


Figure 3. Horizontal – Mid-Span of Top Rail Concentrated Load

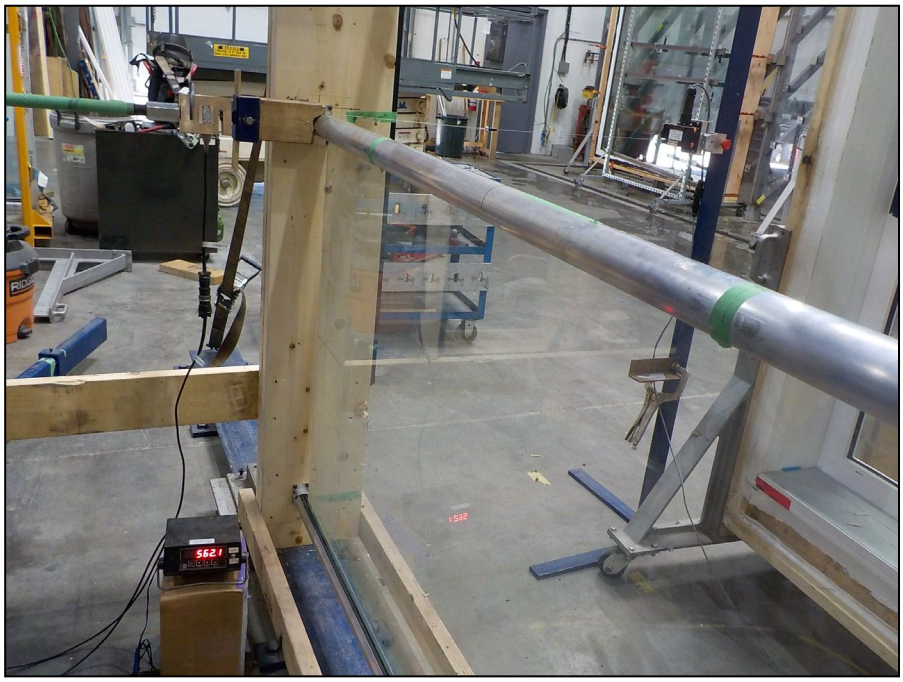


Figure 4. Horizontal – Top Rail Adjacent to Post Connection Concentrated Load

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

APPENDIX C – DRAWINGS (5 PAGES)

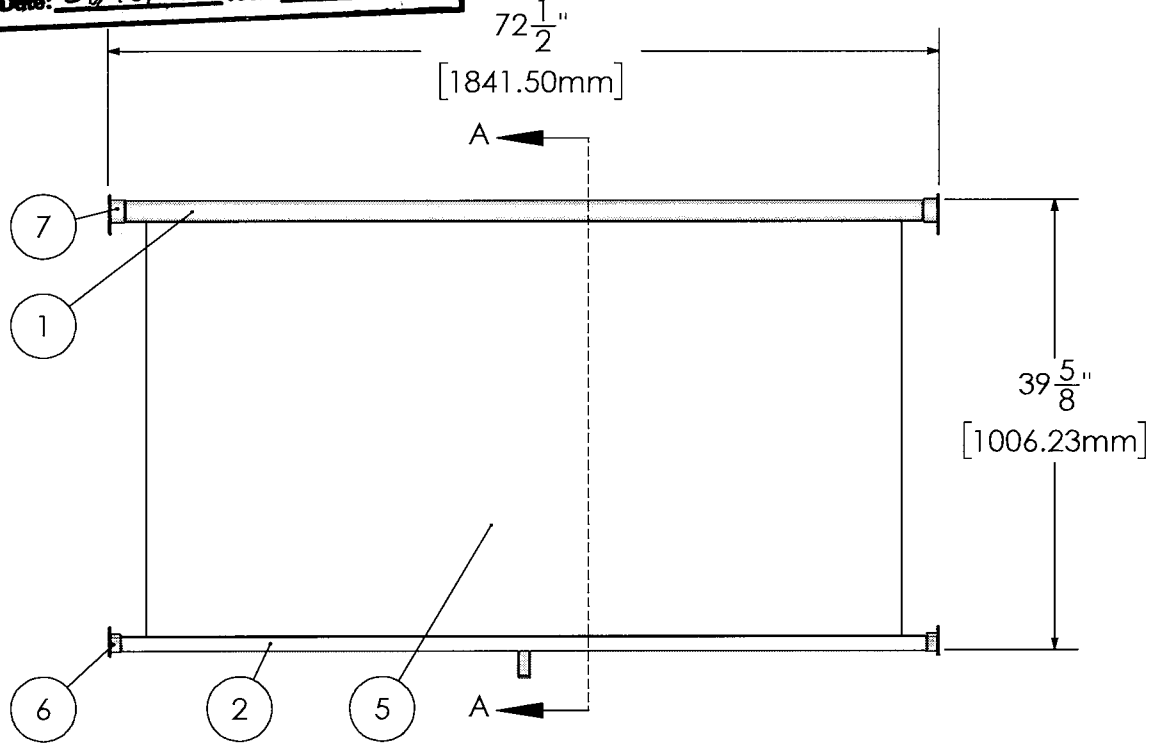
ITEM NO.	Eng No.	Part No.	DESCRIPTION	QTY.
1	0041PA	1004-TOP-00072	Component Top Rail Round 6'	1
2	0057PB	1200-BOT-00072	Glass Bottom Rail 6'	1
3	0296P	3500-VIN-06072	Bottom Rail Glass insert 6'	1
4	0297P	3500-VIN-03072	Top Rail Glass Insert Tall 6'	1
5	2082P	8004-KIT-76642	CTG66- 66" x 37 5/16" Clear Tempered Glass 5mm	1
6	0614A	4100-WAL-10100	Bottom Rail WB Straight	2
7	0032AA	4104-WAL-10100	Top Wall Bracket Round	2
8	0328PA	3800-VIN-09001	5 mil Glass Setting Block (for Glass Bottom Rail) 1-1/2"	2
9	0060PA	4600-LEG-60100	Surface Support Leg - SL	1

intertek

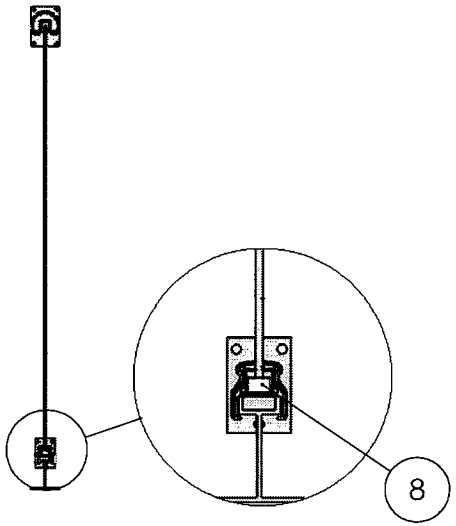
Test sample complies with these details.
Deviations are noted.

Report #: 104715588COQ-002F

Date: 08/16/21 Tech: C. C.



SECTION A-A



DETAIL D
SCALE 1 : 5

CenDek Railings Ltd.

DRAWN BY	cchislett	6/30/2021
CHECKED		
MATERIAL		
DIE NO.		

ALL DIMENSION IN INCHES/mm

DESCRIPTION

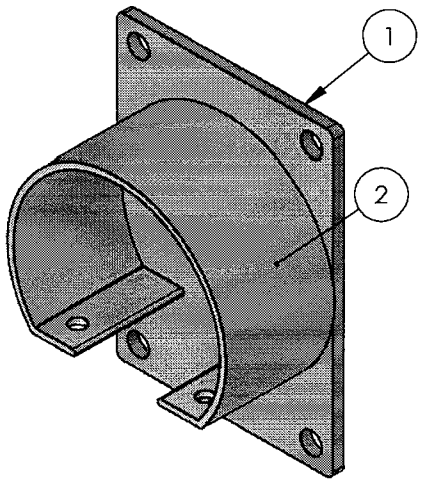
Century Round 5mm Glass Wall Bracket System

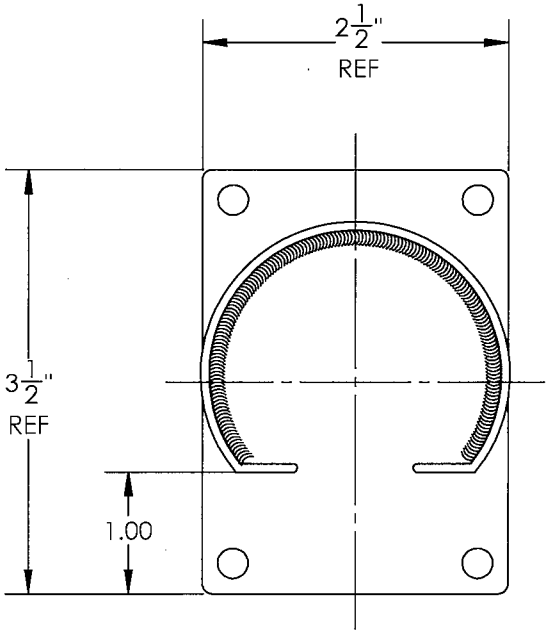
Part No.		Eng No.	2083A
Weight	lbs	SHEET 1 OF 1	Rev -

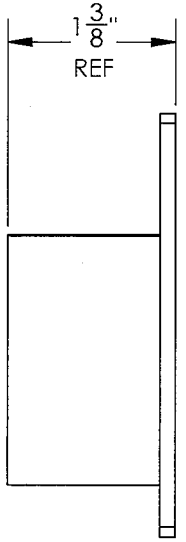
REVISIONS

REV.	DESCRIPTION	DATE	INTIALS

ITEM NO.	Eng No.	Part No.	DESCRIPTION	QTY.
1	0014PE	1700-FLA-16007	Flat Bar Cut 1/8" x 2-1/2" x 3-1/2" Uni/Rnd WB,90° WB x4	1
2	0012PA	1604-SLE-20025	Top Rail Sleeve Round cut WB, Post Sleeve	1







intertek

Test sample complies with these details. Deviations are noted.

Report #: 104715588COQ-002F

Date: 08/16/21 Tech: C.C.

CenDek Railings Ltd.

DRAWN BY	cchislett	2/19/2021
CHECKED		
MATERIAL	Material <not specified>	
DIE NO.		

ALL DIMENSION IN INCHES/mm

DESCRIPTION
Top Wall Bracket Round

Part No. 4104-WAL-10100		Eng No. 0032AA	
Weight 0.16 lbs		SHEET 1 OF 2	Rev 1

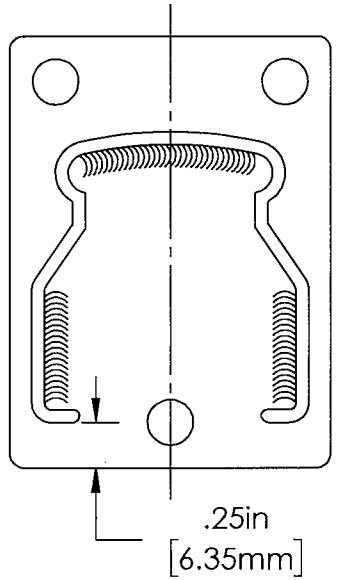
ITEM NO.	Eng No.	Part No.	DESCRIPTION	QTY.
1	0014PH	1700-FLA-13002	Flat Bar Cut 1/8" x 1-3/4" x 2-3/8" BR WB, BR 90° WB x3	1
2	0051PA	1600-SLE-10011	Bottom Rail Sleeve Welded Cut WB	1

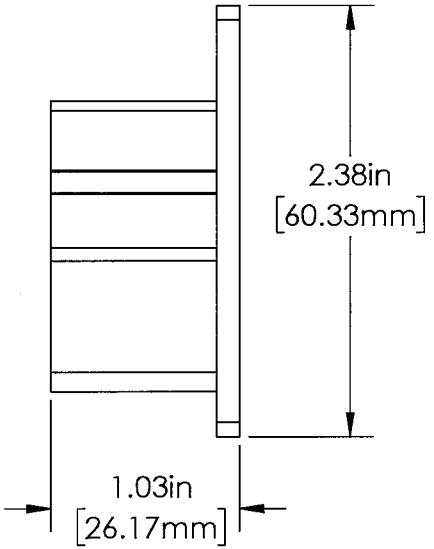
intertek

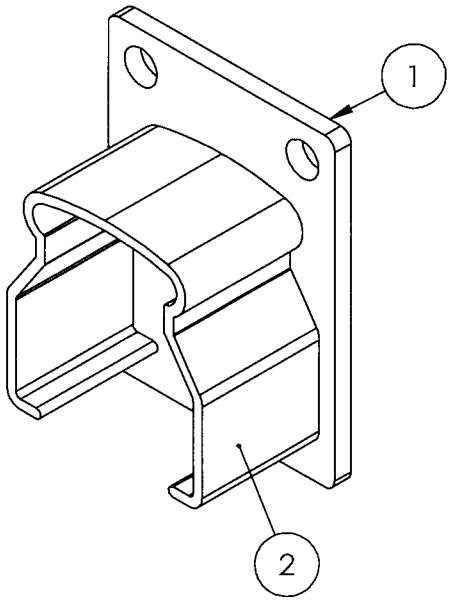
Test sample complies with these details.
Deviations are noted.

Report #: 104715588COQ-002F

Date: 08/16/21 Tech: C.C.







CenDek Railings Ltd.

DRAWN BY	Admin
CREATED	10/3/2017
MATERIAL	Material <not specified>
DIE NO.	

ALL DIMENSION IN INCHES/mm

DESCRIPTION
Bottom Wall Bracket

Part No. 4100-WAL-10100 | Eng No. 0033A
Weight 0.08 lbs | SHEET 1 OF 2 | Rev -

REVISIONS

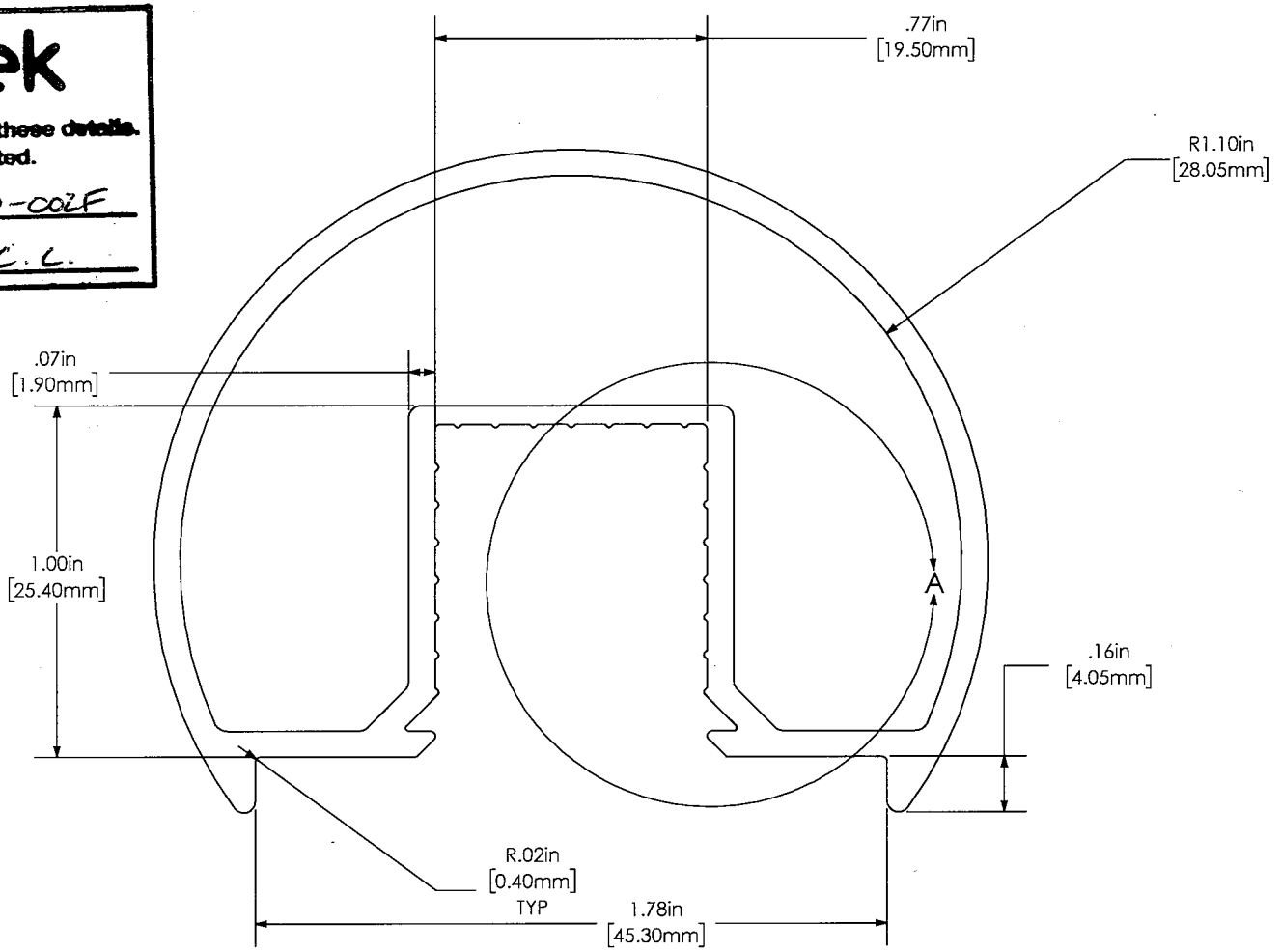
REV.	DESCRIPTION	DATE	INITIALS

intertek

Test sample complies with these details.
Deviations are noted.

Report #: 104715588COQ-002F

Date: 08/16/21 Tech: C. C.



EXTRUSION TOLERANCE	
<1	±0.10
<1-2	±0.12
<2-3	±0.14
<3-4	±0.16
<4-6	±0.18
<6-12	±0.20
<12-19	±0.23
<19-25	±0.25
<25-38	±0.30
<38-50	±0.36
<50-100	±0.61
<100-150	±0.86
<150-200	±1.12
<200-250	±1.38

CUT LENGTH TOLERANCE		MACHINING TOLERANCE	
Dimension (mm)	Tolerance	Dimension (mm)	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

REVISIONS

REV.	DESCRIPTION	DATE	INITIALS

CenDek Railings Ltd.

DRAWN BY	Admin
CREATED	2/27/2018
MATERIAL	6063-T5
DIE NO.	DYG12073190

ALL DIMENSION IN INCHES/mm

DESCRIPTION
Century Top Rail Die

Part No.
Eng No. 0041P
Weight 0.77 lbs
SHEET 1 OF 1
Rev -

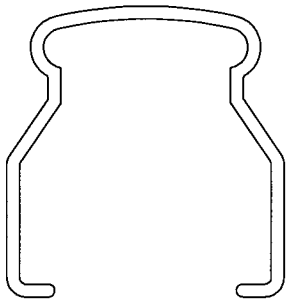
ITEM NO.	Eng No.	Part No.	DESCRIPTION	QTY.	CUT QTY.
1	0051P	1600-SLE-10120	Bottom Rail Sleeve Welded Material 10'	1	100

intertek

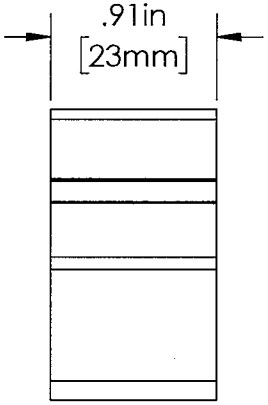
Test sample complies with these details.
Deviations are noted.

Report #: 104715588COQ-002F

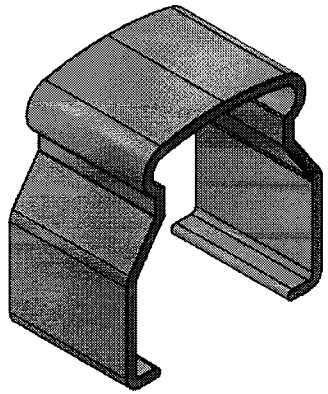
Date: 08/16/21 Tech: C. L.



FRONT VIEW



2. CUT 23mm SECTIONS
[SIDE VIEW]



CenDek Railings Ltd.

DRAWN BY	cchislett	6/28/2021
CHECKED		
MATERIAL	6063-T5	
DIE NO.	DYG12215178	

ALL DIMENSION IN INCHES/mm

DESCRIPTION

Bottom Rail Sleeve Welded Cut WB

Part No. 1600-SLE-10011		Eng No. 0051PA	
Weight 0.03 lbs		SHEET 1 OF 1	Rev 0

1500 Brigantine Drive
Coquitlam, BC, V3K 7C1

Telephone: 604-520-3321
Facsimile: 604-524-9186
www.intertek.com

TEST REPORT FOR CENDEK RAILINGS LTD.
Report No.: 104715588COQ-002F
Date: 08/16/21

SECTION 12

REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	08/16/21	N/A	Original Report Issue