

CENDEK RAILINGS LTD. TEST REPORT

SCOPE OF WORK

REPORT OF 8 FT. CENTURY ROUND WELDED PANEL – WB MOUNT (3.875 IN. PICKET SPACING) AND 8 FT. CENTURY ROUND WELDED PANEL – WB MOUNT (3.5 IN. PICKET SPACING) RAILING SYSTEMS TESTED IN ACCORDANCE WITH ASTM E935-E13E¹, STANDARD TEST METHODS FOR PERFORMANCE OF PERMANENT METAL RAILING SYSTEMS AND RAILS FOR BUILDINGS

REPORT NUMBER 104715588COQ-002D

TEST DATES 07/16/21 – 07/23/21

ISSUE DATE

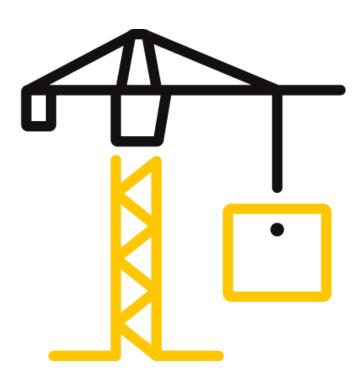
08/16/21

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TEST REPORT FOR CENDEK RAILINGS LTD.

Report No.: 104715588COQ-002D Date: 08/16/21

REPORT ISSUED TO

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

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Cendek Railings Ltd., 9685 Agur St., Summerland, BC, VOH 1Z2, Canada to perform testing on the 8 ft. Century Round Welded Panel – WB Mount (3.875 in. Picket Spacing) and 8 ft. Century Round Welded Panel – WB mount (3.5 in. Picket Spacing) Railing Systems in accordance with ASTM E935-13e¹, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*. The scope of the testing as requested by Cendek Railings Ltd., was to assess the ability of the guard systems 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 July 16, 2021 to July 23, 2021.

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



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SECTION 2

SUMMARY OF TEST RESULTS

SYSTEM DESCRIPTION	TEST	PASS/FAIL
	In-fill Load	Pass
8 ft. Century Round Welded Panel – WB Mount (3.875 in. Picket Spacing)	Uniform Load	Pass
	Horizontal – Mid-Span Concentrated Load	Pass
	Horizontal – Adjacent to Post Concentrated Load	Pass
	In-fill Load	Pass
8 ft. Century Round Welded	Uniform Load	Pass
Panel – WB Mount (3.5 in. Picket Spacing)	Horizontal – Mid-Span Concentrated Load	Pass
,	Horizontal – Adjacent to Post Concentrated Load	Pass

Refer to Appendix B for photos of testing.



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SECTION 3

TEST METHOD

The guard specimens were evaluated in accordance with the following:

ASTM E935-13e1, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.*

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 systems to the Evaluation Center on July 9, 2021 (Coquitlam ID# VAN2107090927-001) and July 22, 2021 (Coquitlam ID# VAN2107220908-001). The samples were received in good condition and were suitable for testing unless noted otherwise. The samples were 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



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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.



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SECTION 7 TESTING PROCEDURE

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. 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 2.5. 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 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.

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



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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.



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SECTION 8

TEST SPECIMEN DESCRIPTION

The samples were identified as the following:

TABLE 1. RAILING CONFIGURATION										
			PART DIM	ENSIONS						
PART NAME	PART NUMBER	QTY	LENGTH	WIDTH	HEIGHT	NOMINAL THICKNESS	REPORTED MATERIAL			
8 FT. CENTURY ROUND WELDED PANEL – WB MOUNT (3.5 IN. PICKET SPACING)										
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	N/A	1	96.0 in.	2.36 in.	1.89 in.	0.08 in.	Aluminum			
Bottom Rail	N/A	1	96.0 in.	1.32 in.	1.41 in.	0.07 in.	Aluminum			
Support Leg	4600-LEG-60100	2	2.50 in.	1.00 in.	2.92 in.	0.125 in.	Aluminum			
Infill - Picket	N/A	23	0.625 in.	0.625 in.	39.0 in.	0.050 in.	Aluminum			
8 F	T. CENTURY ROUND	WELD	ED PANEL –	WB MOL	JNT (3.875	IN. PICKET SP	PACING)			
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	N/A	1	96.0 in.	2.36 in.	1.89 in.	0.08 in.	Aluminum			
Bottom Rail	N/A	1	96.0 in.	1.32 in.	1.41 in.	0.07 in.	Aluminum			
Support Leg	4600-LEG-60100	2	2.50 in.	1.00 in.	2.92 in.	0.125 in.	Aluminum			
Infill - Picket	N/A	21	0.625 in.	0.625 in.	39.0 in.	0.050 in.	Aluminum			

Note 1: Each railing had two (2) support legs positioned under the bottom rail spaced 32.75 in. from each end and were set on a steel test frame. For detailed drawings of the test samples and components, refer to Appendix C.

Note 2: As the railing systems had no posts, the assemblies were attached to a wood support through wall brackets. Per the client's request, the guard assemblies were 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.



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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 8 ft. Century Round Welded Panel – WB Mount (3.875 in. Picket Spacing) and 8 ft. Century Round Welded Panel – WB mount (3.5 in. Picket Spacing) railing systems per ASTM E935-13e1, *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.* The scope of the testing as requested by Cendek Railings Ltd. was to assess the ability of the guard systems 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. 8 ft. Century Round Welded Panel – WB Mount (3.875 in. Picket Spacing) and 8 ft. Century Round Welded Panel – WB mount (3.5 in. Picket Spacing) railing systems identified and evaluated in this report have 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.



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SECTION 11

APPENDIX A – TEST DATA (3 PAGES)



Test Data Package Page 1 of 3

Company	Cendek Railings Ltd.	Technician(s)	Kevin Penner			
Project No.	G104715588	Reviewer	Baldeep Sandhu			
Models	8 ft. Century Round Welded - 3.5 in. and 3.875 in. spacing	Start/End Date	July 16-23, 2021			
Product Name	Same as above	Sample ID	VAN2107090927-001, VAN2107220908-001			
Standard	2018 International Building Code (IBC), 2018 International Residential Code (IRC)					

Test Data Package

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Loads on Guards - 8 ft. Century Round Welded Panel - WB Mount (3.875 in. Picket Spacing)	3

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Total Quality. Assured.

Test:	Loads on Guards			Project:	G104715588
Date:	16-Jul-21			Eng/Tech:	Kevin Penner
Client:	Cendek Railings Ltd.			U U	Baldeep Sandhu
Product:	8 ft. Century Round Welded Panel - W	/B Mount (3.875 in. P	icket Spacing)	Reviewer:	Coquitlam, BC, Canada
Post Spacing:	8.04 ft	2.45 m			
Height of Guard:	42.1 in	1070 mm			
Opening in Guard:	3.88 in	98 mm	(between pickets)		
	2.25 in	57 mm	(under bottom rail)		
Method:	ASTM E935-13e1, Standard Test Metho	ods for Performance o	f Permanent Metal Railing Sy	stems and Rail	s for Buildings
	2018 International Building Code (IBC)				
	2018 International Residential Code (IR	C)			
Safety Factor:	2.50				
Equipment:	Artech 5000 lbf Load Cell (Intertek ID# I	P60692, cal due Octol	per 22, 2021)		
	T&D TR-72Ui Temperature and Humidi	ty Logger (Intertek ID#	P60554, cal due September	10, 2021)	
	Stopwatch (Intertek ID# P60444, cal du	e March 5, 2022)			
	Mitutoyo Digital Caliper (Intertek ID# 52	650, cal due June 8, 2	2022)		
Time/Tome/DU:	10.15 M / 22 0°C / 40 0%		,		

Time/Temp/RH: 10:15AM / 22.9°C / 49.0%

Direction	Test	Design Load (Inward/ Outward) (Ibf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter- Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
	Individual Elements (over 12 in. x 12 in.) (most critical location)	50	125	-	-	125	Pass
Outward	Midspan Horizontal Concentrated Load	200	500	-	-	500	Pass
Outward	Top Rail Adjacent to Connection Concentrated Load	200	500	-	-	500	Pass
	Horizontal Uniform Load (per ft)	50	125	1010	503	1005	Pass

Direction	Test	Design Load (Inward/ Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter- Point Load (kN)	Required Proof Load (kN)	Pass/Fail
	Individual Elements (over 305 mm in. x 305 mm) (most critical location)	0.22	0.56	-	-	0.56	Pass
Outward	Midspan Horizontal Concentrated Load	0.89	2.22	-	-	2.22	Pass
Outward	Top Rail Adjacent to Connection Concentrated Load	0.89	2.22	-	-	2.22	Pass
	Horizontal Uniform Load (per m)	0.73	1.83	1.37	2.24	4.47	Pass

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Total Quality. Assured.

Test: Date:	Loads on Guards 23-Jul-21			,	G104715588 Kevin Penner
Client:	Cendek Railings Ltd.				Baldeep Sandhu
Product:	8 ft. Century Round Welded Panel - W	B Mount (3.5 in. Pic	ket Spacing)	Reviewer:	Coquitlam, BC, Canada
Post Spacing:	8.04 ft	2.45 m			
Height of Guard:	42.1 in	1070 mm			
Opening in Guard:	3.50 in	89 mm	(between pickets)		
	2.25 in	57 mm	(under bottom rail)		
Method:	ASTM E935-13e1, Standard Test Metho	ds for Performance o	f Permanent Metal Railing Sy	stems and Rail	s for Buildings
	2018 International Building Code (IBC)				
	2018 International Residential Code (IRC	2)			
Safety Factor:	2.50				
Equipment:	Artech 5000 lbf Load Cell (Intertek ID# P	60692, cal due Octo	ber 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# 526	50, cal due June 8, 2	2022)		
Time/Temp/RH:	1:15PM / 22.8°C / 48.0%				

Direction	Test	Design Load (Inward/ Outward) (Ibf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter- Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
	Individual Elements (over 12 in. x 12 in.) (most critical location)	50	125	-	-	125	Pass
Outward	Midspan Horizontal Concentrated Load	200	500	-	-	500	Pass
Outward	Top Rail Adjacent to Connection Concentrated Load	200	500	-	-	500	Pass
	Horizontal Uniform Load (per ft)	50	125	1010	503	1005	Pass

Direction	Test	Design Load (Inward/ Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent Quarter- Point Load (kN)	Required Proof Load (kN)	Pass/Fail
	Individual Elements (over 305 mm in. x 305 mm) (most critical location)	0.22	0.56	-	-	0.56	Pass
Outward	Midspan Horizontal Concentrated Load	0.89	2.22	-	-	2.22	Pass
Outward	Top Rail Adjacent to Connection Concentrated Load	0.89	2.22	-	-	2.22	Pass
	Horizontal Uniform Load (per m)	0.73	1.83	1.37	2.24	4.47	Pass



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APPENDIX B – PHOTOS (2 PAGES)



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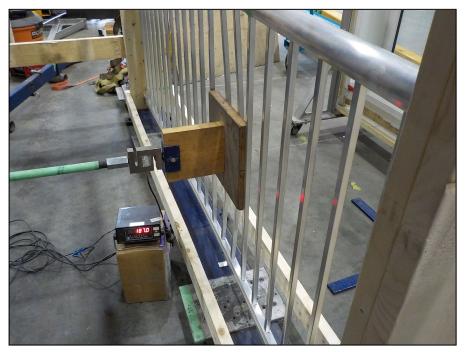


Figure 1. In-fill Load Test



Figure 2. Horizontal Uniform Load Test



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

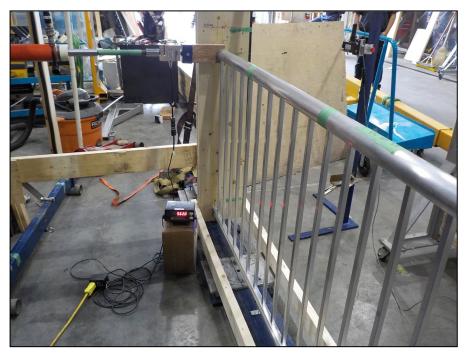


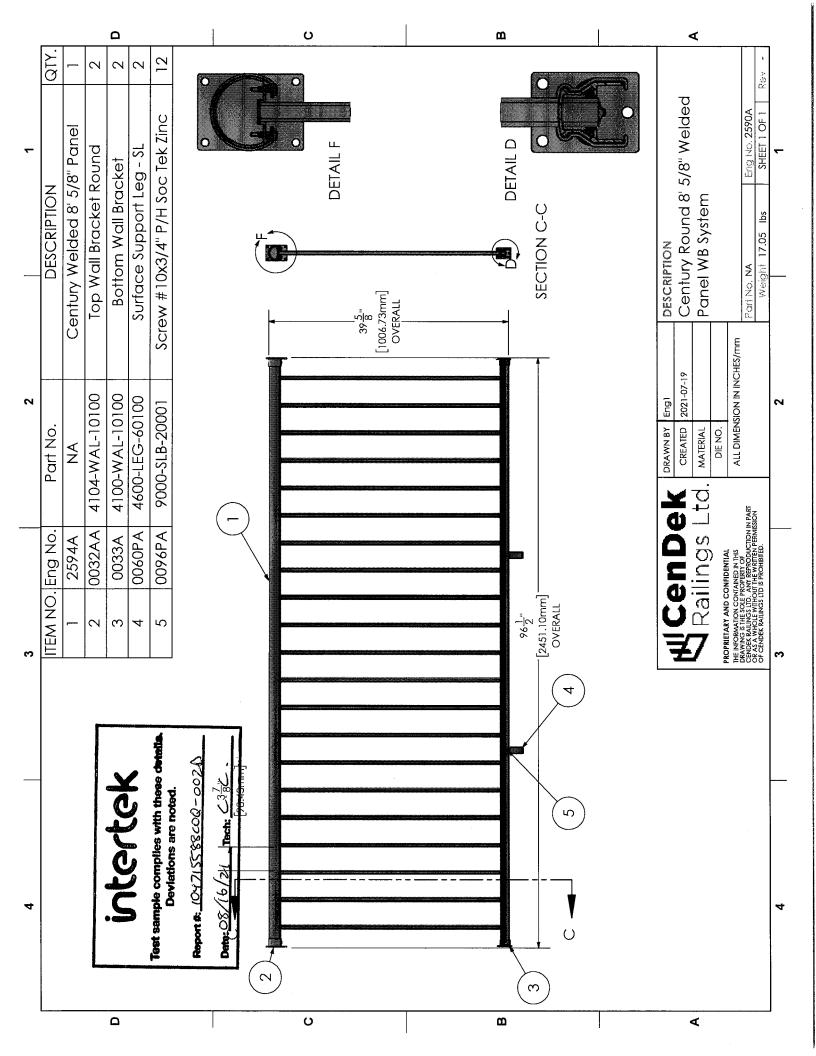
Figure 4. Horizontal – Top Rail Adjacent to Post Connection Concentrated Load

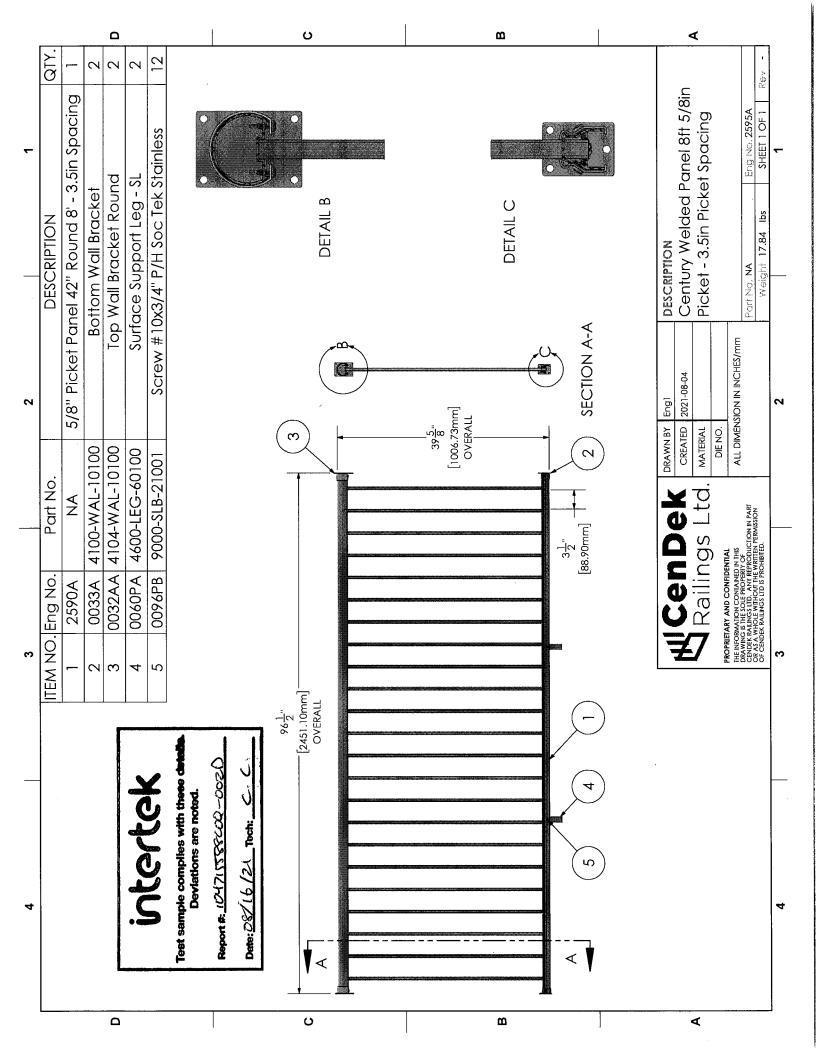


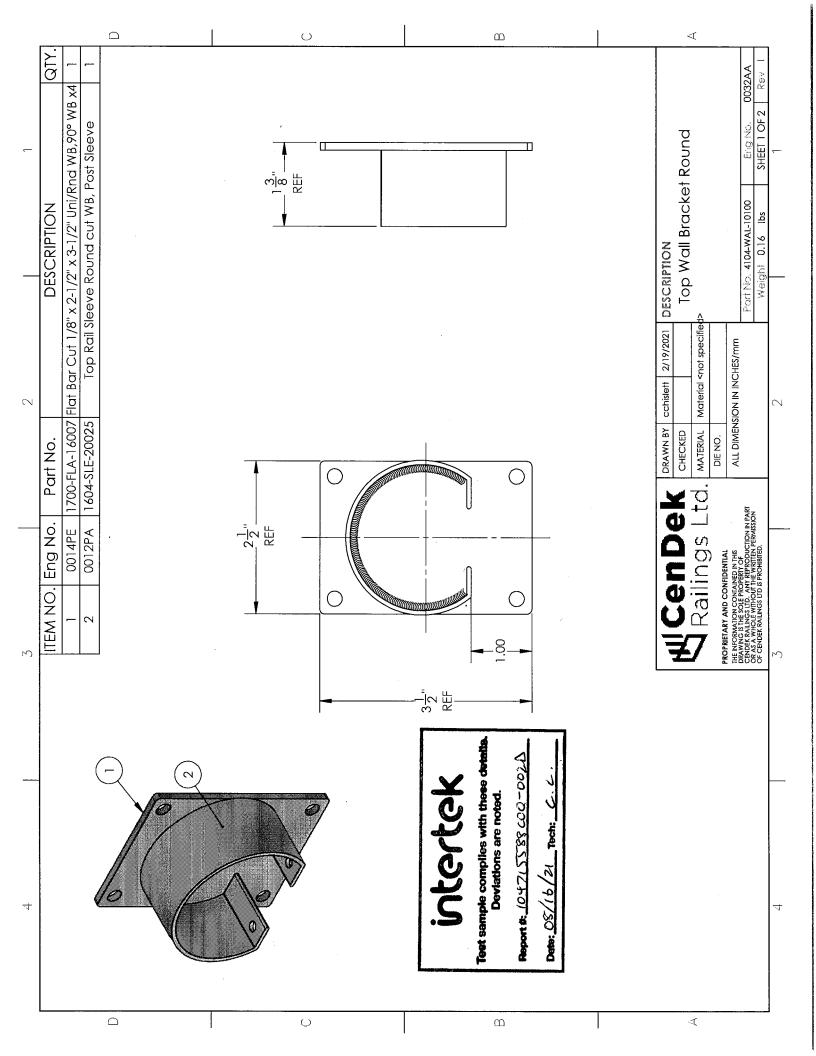
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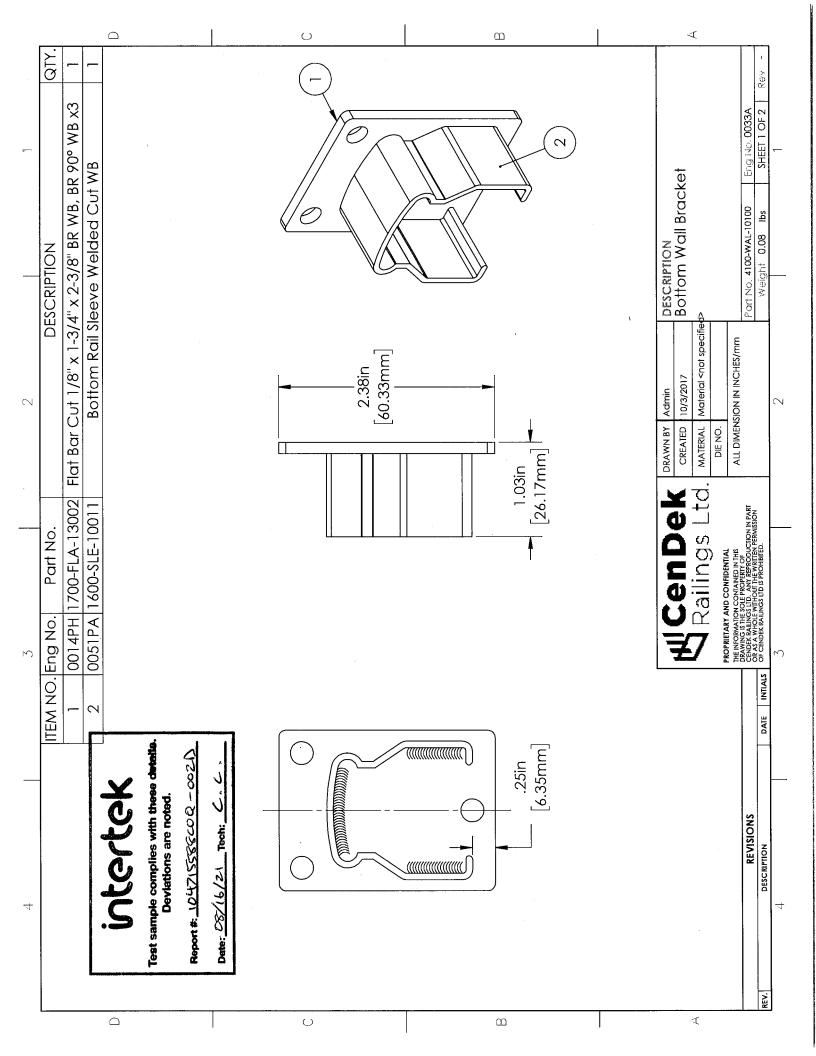
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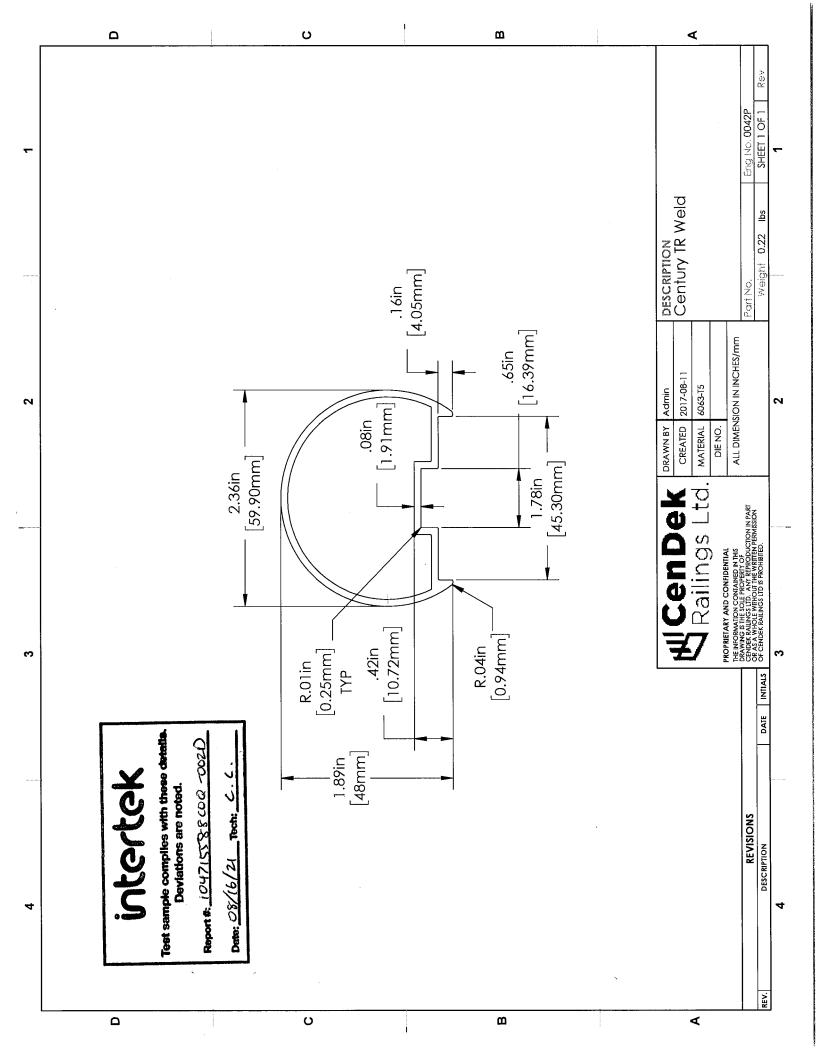
APPENDIX C - CENTURY ROUND WELDED PANEL DRAWINGS (8 PAGES)

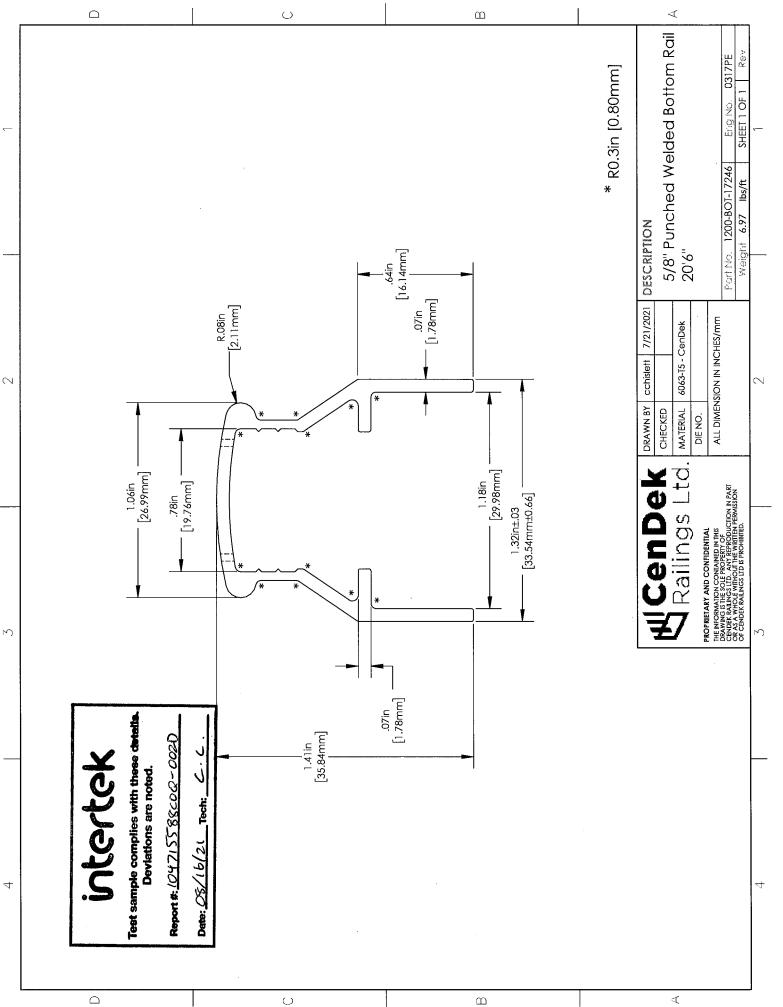


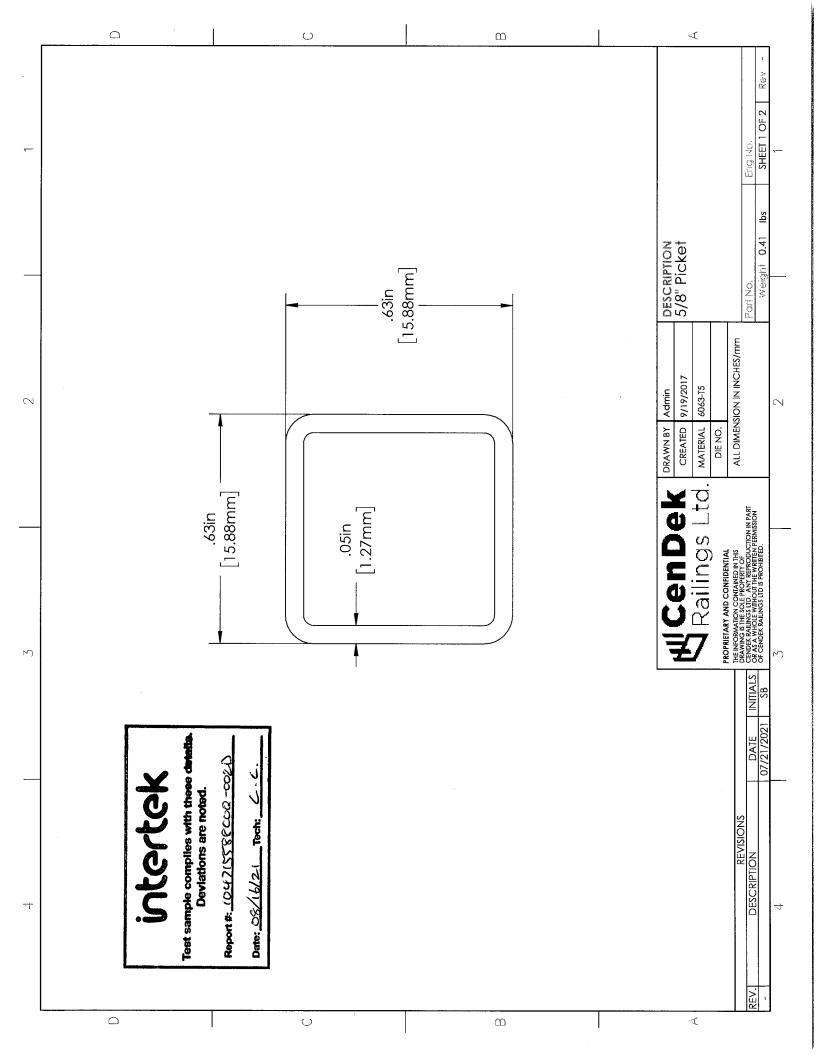


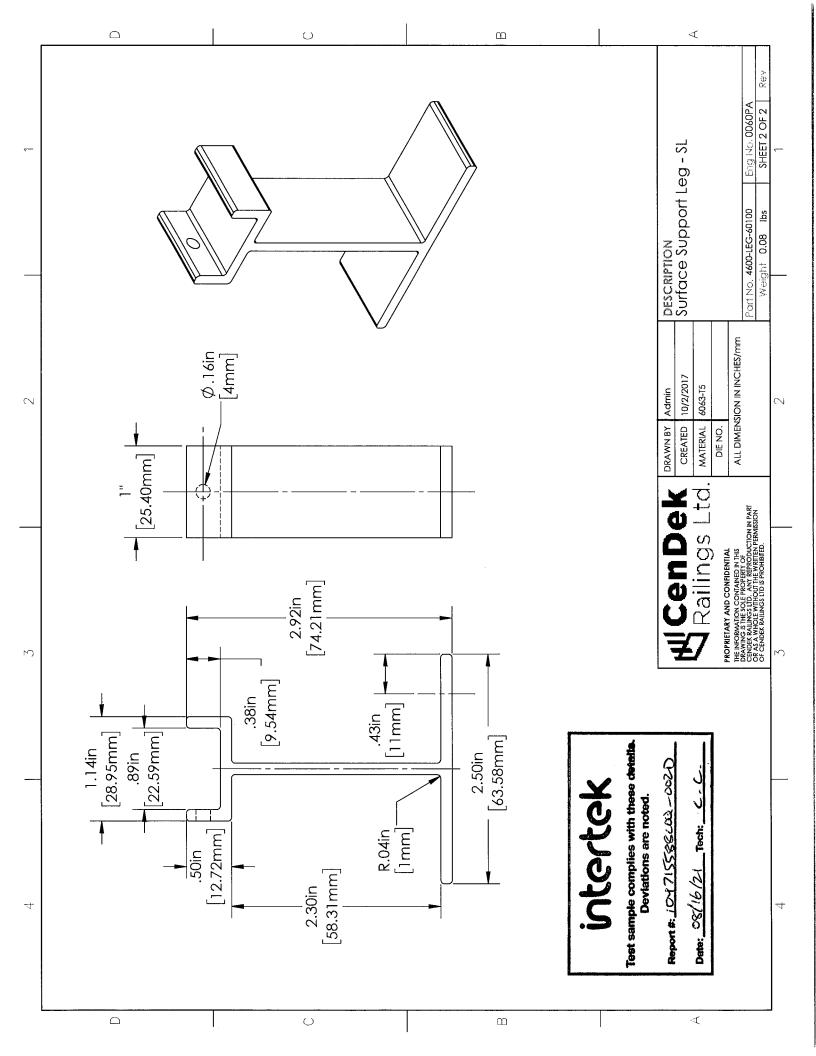














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REVISION LOG

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