

TEST REPORT

Intertek

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EVALUATION CENTER

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

RENDERED TO

CENTURY ALUMINUM / DEKSMART RAILINGS
DIVISION OF BEAVER HOME IMPROVEMENTS LTD.
9685 AGUR STREET
SUMMERLAND, BC V0H 1Z2
CANADA

PRODUCT EVALUATED:
Pipe Handrail

EVALUATION PROPERTY:
Load Requirements

Report of Pipe Handrail for compliance with the requirements of the following criteria:

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

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1 Table of Contents

1	Table Of Contents	2
2	Introduction	3
3	Test Samples	3
	3.1. Sample Selection.....	3
	3.2. Sample And Assembly Description	3
4	Testing And Evaluation Methods	3
	4.1 2015 IBC / 2015 IRC.....	4
	4.2 Uniform Load Test	4
	4.3 Concentrated Load Test	4
5	Testing And Evaluation Results	5
	5.1. Results And Observations	5
6	Conclusion	6
	Appendix A Test Data	2 Pages
	Appendix B Drawings.....	1 Page

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for the Pipe Handrail submitted by Century Aluminum/Deksmart Railings. The evaluation was carried out to determine whether the handrail would resist the required loads as specified in the following Building Codes:

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

This evaluation was conducted in the month of January 2015.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted the handrail system components to the Evaluation Center on December 17, 2014. The product was identified as Coquitlam ID# VAN1501141059-001.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The railing system was identified as the Pipe Handrail. A drawing of the handrail and components can be found in Appendix B. The details of the handrail system are outlined below in Table 1:

Table 1. Railing Details			
	Description	Thickness	Material
Pipe Handrail	1-5/8" OD Schedule 40 Pipe Handrail	0.140"	6063-T54
	90° Elbow 1-5/8" OD Schedule 40	0.140"	6063-T54
	180° 1-5/8" OD Schedule 40	0.140"	6063-T54
	32°/35° Elbow 1-5/8" OD Schedule 40	0.140"	6063-T54
	Handrail Bracket	0.210"	6063-T54
	End Cap	0.125"	6063-T54
	Internal Splice	0.077"	6063-T54
	#10 x 3/4" TEK Screws	-	-
	#12 x 1" TEK Screws	-	-

Note: The installation of the handrail to the wall connection was not within the scope of this report, and is subject to evaluation and approval by the building official. The handrail brackets at wall locations were bolted directly to a steel test frame using 1/4 in. grade 5 bolts and washers.

At the bottom termination of the handrail, two (2) handrail brackets were attached to a supplied 2-1/2 in. post using four (4) #12 x 1 in. self drilling screws.

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. As per

Section 1607.8.1 of the IBC and Section R301.5 of the IRC, the following tests were conducted:

4.1 2015 IBC / 2015 IRC

2015 INTERNATIONAL BUILDING CODE

SECTION 1607.8.1, HANDRAILS AND GUARDS

Handrails and guards shall be designed to resist a linear load of 50 pounds per linear foot (plf) (0.73 kN/m).

SECTION 1607.8.1.1 CONCENTRATED LOAD

Handrails and guards shall be designed to resist a concentrated load of 200 pounds (0.89 kN).

2015 INTERNATIONAL RESIDENTIAL CODE

SECTION R301.5 LIVE LOAD

Handrails and guards shall be designed to resist a concentrated load of 200 pounds (0.89 kN).

Notes: A safety factor of 2.5 is applicable to the above loads for both Sections 1607.8.1 of the IBC and R301.5 of the IRC.

4.2 UNIFORM LOAD TEST

A uniform load of 125 plf (1.88 kN/m) was applied in two orientations – downward and perpendicular to the handrail, and in an outwards direction to the handrail. The loads were applied between the bracket span of 3.94 ft. (1.2 m) 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.

4.3 CONCENTRATED LOAD TEST

The handrail system was subjected to five separate tests where a concentrated load of 500 lbs (2.22 kN) was applied:

- downwards on the handrail at a joint,
- downwards at the mid-span handrail bracket,
- outwards on the handrail at a joint,
- outwards on the handrail adjacent to post bracket, and
- outwards at the top of post.

After release of the load, the system was evaluated for failure, any evidence of disengagements of any component and visible cracks in any component.

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				
Orientation	Property	Result	Requirement	Pass/Fail
Outward	Uniform Distributed Load	125 plf	≥ 125 plf	Pass
	Point Load on Handrail at Joint	500 lbs	≥ 500 lbs	Pass
	Point Load on Handrail Adjacent to Post Bracket	500 lbs	≥ 500 lbs	Pass
	Top of Post	500 lbs	≥ 500 lbs	Pass
Downward / Perpendicular to Handrail	Uniform Distributed Load	125 plf	≥ 125 plf	Pass
	Point Load on Handrail at Joint	500 lbs	≥ 500 lbs	Pass
	Point Load on Handrail at Center Bracket	500 lbs	≥ 500 lbs	Pass


6 Conclusion

The Century Aluminum/Deksmart Pipe Handrail product identified in this test report has complied with the load requirements as specified in the following Building Codes:

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

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

INTERTEK TESTING SERVICES NA LTD.

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