

TEST REPORT



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EVALUATION CENTER

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

RENDERED TO

CENDEK RAILINGS LTD.
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CANADA

PRODUCT EVALUATED: 4 in. x 4 in. Maxum Post

EVALUATION PROPERTY: Load Requirements

Report of 4 in. x 4 in. Maxum Post for compliance with the requirements of the following criteria:

- **2015 National Building Code of Canada**
 - **Section 4.1.5.14, Loads on Guards and Handrails, Section 1)c)**
 - **Section 9.8.8.2 Loads on Guards**
- **2012 British Columbia Building Code**
 - **Section 4.1.5.14, Loads on Guards, Section 1)c)**
 - **Section 9.8.8.2 Loads on Guards**
- **2012 Ontario Building Code**
 - **Section 4.1.5.14, Loads on Guards, Section 1)c)**
 - **Section 9.8.8.2 Loads on Guards**

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2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted concentrated load testing for aluminum posts submitted by Cendek Railings Ltd. The evaluation was carried out to determine whether the posts would meet the requirements of the following:

- 2015 National Building Code of Canada (NBC)
 - Section 4.1.5.14, *Loads On Guards and Handrails, Section 1)c)*
 - Section 9.8.8.2 *Loads on Guards*
- 2012 British Columbia Building Code (BCBC)
 - Section 4.1.5.14, *Loads On Guards, Section 1)c)*
 - Section 9.8.8.2 *Loads on Guards*
- 2012 Ontario Building Code (OBC)
 - Section 4.1.5.14, *Loads On Guards, Section 1)c)*
 - Section 9.8.8.2 *Loads on Guards*

This evaluation was conducted in the month of December 2016.

3 Test Samples

3.1. SAMPLE SELECTION

The client submitted three (3) aluminum posts to the Evaluation Center on December 7, 2016 (Coquitlam ID# VAN1612150831-001). Samples were not independently selected for testing.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The samples were identified as the following:

| Table 1. Railing Configuration | | | |
|---------------------------------------|-----------------------------|------------------------------------|---------------|
| Description | Post | Mounting Plate | Height |
| Aluminum with Post Cap | 4" x 4" 6063 T5 Aluminum | 6" x 6" x 1/4" 6061 T6 Aluminum | 42" high |

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

Note: The installation of the post to the deck was not within the scope of this report, and is subject to evaluation and approval by the Authority Having Jurisdiction (AHJ). 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 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. For each test, deflection measurements were taken at the point of load application. As per Section 4.1.5.14 and Section 9.8.8.2 of the 2015 NBC, 2012 BCBC, and 2012 OBC, the following tests were conducted:

4.1 REQUIREMENTS

4.1.1 2015 NBC / 2012 BCBC / 2012 OBC: SECTION 4.1.5.14 LOADS ON GUARDS

- 1) The minimum specified horizontal load applied inward or outward at the minimum required height of every guard shall be 0.75 kN/m or a concentrated load of 1.0 kN applied at any point.

Notes: A safety factor of 1.67 was applied to the above loads.

4.1.2 2015 NBC / 2012 BCBC / 2012 OBC: SECTION 9.8.8.2 LOADS ON GUARDS

- 1) The minimum specified horizontal load applied inward or outward at the minimum required height of every guard shall be 0.5 kN/m or a concentrated load of 1.0 kN applied at any point.

Notes: A safety factor of 1.67 was applied to the above loads.

4.2 TEST PROCEDURE

The top of each post was subjected to a horizontal concentrated load of 1.67 kN (375 lbs). The load was then increased until ultimate failure of the post. The maximum load that each post reached was recorded and reported.

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 | | | | |
|------------------------------|-------------------------------|---------------|--------------------|------------------|
| Sample | Property | Result | Requirement | Pass/Fail |
| 1 | Top of Post Concentrated Load | 375 lbs | 375 lbs | Pass |
| | Ultimate Load | 786.3 lbs | As Reported | As Reported |
| 2 | Top of Post Concentrated Load | 375 lbs | 375 lbs | Pass |
| | Ultimate Load | 765.5 lbs | As Reported | As Reported |
| 3 | Top of Post Concentrated Load | 375 lbs | 375 lbs | Pass |
| | Ultimate Load | 772.7 lbs | As Reported | As Reported |

Mode of failure for all three (3) posts was the plate-to-post screw heads pulled through the base plate and deformation of the base plate. Photos of the failures can be found in Appendix C.

6 Conclusion

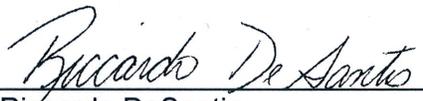
The Cendek Railings Ltd. 4 in. x 4 in. Maxum Post product identified in this test report has been evaluated per the requirements of the following:

- 2015 National Building Code of Canada (NBC)
 - Section 4.1.5.14, *Loads On Guards and Handrails, Section 1)c)*
 - Section 9.8.8.2 *Loads on Guards*
- 2012 British Columbia Building Code (BCBC)
 - Section 4.1.5.14, *Loads On Guards, Section 1)c)*
 - Section 9.8.8.2 *Loads on Guards*
- 2012 Ontario Building Code (OBC)
 - Section 4.1.5.14, *Loads On Guards, Section 1)c)*
 - Section 9.8.8.2 *Loads on Guards*

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

INTERTEK TESTING SERVICES NA LTD.

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