

# TEST REPORT

**Intertek** ETL SEMKO

**REPORT NUMBER: 3127034COQ-003B**  
ORIGINAL ISSUE DATE: July 31, 2007

## EVALUATION CENTER

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

## RENDERED TO

B.W. CREATIVE WOOD INDUSTRIES LTD.  
23282 RIVER ROAD  
MAPLE RIDGE, BC V2W 1B6

PRODUCT EVALUATED: Axxys™ Railing System  
EVALUATION PROPERTY: Load Requirements

Report of Axxys™ Railing System for compliance with the applicable requirements of the following criteria:

- 2006 International Residential Code
  - Section R301.5 Live Load
  - Section R311.5.6 Handrails
  - Section R312 Guards
- 2006 International Building Code
  - Section 1012 Handrails
  - Section 1013 Guards
  - Section 1607.7.1 Handrails and Guards
  - Section 1714.3.1 Test Procedure

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## 2 Introduction

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Intertek Testing Services NA Ltd. (Intertek) has conducted a test program for the Axxys™ Railing System submitted by B.W. Creative Wood Industries Ltd. The evaluation was carried out to determine whether the railing would resist the required loads for one- and two-family dwellings specified in the following Building Codes:

- 2006 International Residential Code (IRC)
  - Section R301.5 Live Load
  - Section R311.5.6 Handrails
  - Section R312 Guards
- 2006 International Building Code (IBC)
  - Section 1012 Handrails
  - Section 1013 Guards
  - Section 1607.7.1 Handrails and Guards
  - Section 1714.3.1 Test Procedure

This evaluation was conducted in the month of July 2007.

## 3 Test Samples

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### 3.1. SAMPLE SELECTION

Intertek representative, Kalvir Kooner, sampled components of the railing system on June 27, 2007. The specimens were manufactured at B.W. Creative Wood Industries, 23282 River Road, Maple Ridge, British Columbia. The sample selection process was carried out in accordance with recognized independent approved sampling procedures.

### 3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The sample was identified as the Axxys™ Railing system and was assembled as follows: Adjustable aluminum handrail brackets (black) were fastened to the clear hemlock top rail using two No. 6 x 1-¾ in. stainless steel screws. Both top and bottom rails were pre-drilled to accept adjustable baluster brackets (black), which were fastened using two No. 6 x 1 in. stainless steel screws per connection. Powder coated aluminum pickets were assembled by inserting an end plug into each of the balusters and then fastened with No. 6 x 1-¾ in. stainless steel screws. Balusters were then placed into the top and bottom rails. Aluminum newel plate brackets (black) were mechanically fastened to the 82.5 mm clear hemlock posts using two No. 6 x 45 mm stainless steel screws. The top rail was connected to the posts by fastening the adjustable handrail brackets to the newel plate brackets using an M6 x 35 mm hex socket bolt. The bottom rail was not attached to the post.

Post: 3-1/4 in. (82.5 mm) clear hemlock post, profile as shown in Appendix B.

Rails: 36 in. (918 mm) high, clear hemlock, profile as shown in Appendix B.

Picket Insert: 11/16 in. (17.46 mm) x 1.5 mm thick 6063-T5 aluminum extruded tube

Rail Connections: Black aluminum adjustable handrail bracket as detailed in Appendix B.

Detailed installation instructions for the Axxys™ railing assembly is provided in Appendix C of this report.

Note: Post to sub-structure fastener evaluation is beyond the scope of this report. Steel plates with two 3/8 in. Grade 5 bolts on each post were used to install the specimen for testing.

## 4 Testing and Evaluation Methods

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The test specimen was loaded at a rate to achieve the specified loads between 10 seconds and 5 minutes. The test loads with the 2.5 times safety factor specified in Section 1714.3.1 of the 2006 IBC were held for one minute before the load was released. As per the 2006 IRC, the following tests were conducted:

### 4.1. GENERAL

One complete railing system, consisting of two posts, was tested at maximum spacing and in the worst-case scenario.

### 4.2. HEIGHT (Section R312.1)

The railing system formed a protective barrier not less than 36 in. (914 mm) high, for porches, balconies, ramps or raised floor surfaces located more than 30 in. (762 mm) above the floor or grade below.

### 4.3. OPENING LIMITATIONS (Section R312.2)

A maximum opening of 3.89 in. (98.8 mm) between balusters prevented a sphere 4 in. in diameter to pass.

### 4.4. IN-FILL LOAD TEST (Section R301.5)

A load consisting of 125 lbf was applied over 1 sq. ft. (0.0929 m<sup>2</sup>) normal to the in-fill in a worst-case scenario.

### 4.5. CONCENTRATED LOAD TEST (Section R301.5)

The top rail of the guardrail system was subjected to two separate tests where a concentrated load of 500 lbf was applied at the following locations:

- Horizontally at the centre of the guardrail.
- Horizontally at the top rail adjacent to the rail to post connection to verify the connection capacity.

Note: Compliance with the above requirements also meets the applicable requirements of the 2006 International Building Code for a one- and two-family dwelling as specified in Section 1012 *Handrails*, Section 1013 *Guards*, Section 1607.7.1 *Handrails and Guards*, and Section 1714.3.1 *Test Procedure*.

## 5 Testing and Evaluation Results

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### 5.1. RESULTS AND OBSERVATIONS

The product test results are shown in Table 1 below and a copy of the test data sheet is located in Appendix A.

System Description	System Height (inches)	Maximum Post to Post Center Spacing (inches)	Test	Compliance
8 ft. Axxys™ Railing System	36	98-3/4	In-fill load	Complied
			Mid-span Concentrated Load	Complied
			Adjacent to Post Concentrated Load	Complied

## 6 Conclusion

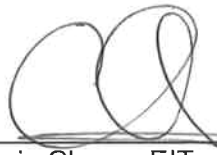
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The B.W. Creative Wood Industries Ltd. Axxys™ Railing System identified in this test report has complied with the following requirements for a one- and two-family dwelling as presented in Section 5 of this report:

- 2006 International Residential Code (IRC)
  - Section R301.5 Live Load
  - Section R311.5.6 Handrails
  - Section R312 Guards
- 2006 International Building Code (IBC)
  - Section 1012 Handrails
  - Section 1013 Guards
  - Section 1607.7.1 Handrails and Guards
  - Section 1714.3.1 Test Procedure

### INTERTEK TESTING SERVICES NA LTD.

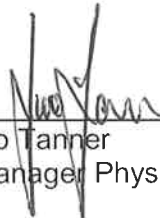
Reported by:



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Engineer, Construction Products

Reviewed by:



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Ivo Tanner  
Manager Physical Testing, Construction Products

CC/ahvs

## **APPENDIX A: Test Data (1 page)**

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Test: **2006 IRC** Project #: 3127034  
 Date: 11-Jul-07 Eng/Tech: Chris Chang  
 Client: BW Creative Wood Industries Phil Irg  
 Product: 6 ft. Axxys Railing System  
 Post Spacing: **8** ft 2.44 m  
 Height of Guard: **36** in 914 mm  
 Opening in Guard: **3.875** in 98 mm  
 Method: 2006 International Residential Code  
 Section R301.5 Live load, Table R301.5 Minimum Uniformly Distributed Live Loads  
 International Building Code 2003, 1714.3.1 Test Procedure

**Safety Factor:** **2.5**

Equipment: Mitutoyo Digital Calipers (ID# 52639, cal due July 20, 2007)  
 Revere 3k lb Load Cell (ID# 2741, cal due August 2007)

**Imperial**

Test	Design Load (Inward/Outward) (lbf)	Factored Load	Calculated Moment (lbf-ft)	Equivalent Quarter-Point Load (lbf)	Required Proof Load (lbf)	Pass/Fail
In-fill Load Test (1 ft x 1 ft)	50	125	-	-	125	Pass
Midspan Concentrated Load	200	500	-	-	500	Pass
Top of Post Concentrated Load	200	500	-	-	500	Pass

**Metric**

Test	Design Load (Inward/Outward) (kN)	Factored Load	Calculated Moment (kNm)	Equivalent 3-Point Load (kN)	Required Proof Load (kN)	Pass/Fail
In-fill Load Test (1 ft x 1 ft)	0.22	0.56	-	-	0.56	Pass
Midspan Concentrated Load	0.89	2.22	-	-	2.22	Pass
Top of Post Concentrated Load	0.89	2.22	-	-	2.22	Pass