

REPORT NUMBER: 101707527COQ-001

ORIGINAL ISSUE DATE: June 24, 2014

REVISION DATE: July 30, 2014

EVALUATION CENTER:

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RENDERED TO

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

PRODUCT EVALUATED: B.W. Creative Wood Industries Railing Systems
EVALUATION PROPERTY: Structural Performance

Engineering Evaluation of B.W. Creative Wood Industries Railing Systems for compliance with the applicable requirements of the following criteria:

- **2010 National Building Code of Canada (NBC)**
- **2012 Ontario Building Code (OBC)**

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1 Table of Contents

1	Table of Contents	2
2	Introduction	3
3	Product and Assembly Description	3
3.1.	Product and/or Assembly Description	3
3.2.	Product and/or Assembly Certification	4
4	Reference Documents.....	4
5	Evaluation Method.....	5
6	Conclusion.....	8
7	Last Page And Revision Summary.....	9

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) is conducting an engineering evaluation for B.W. Creative Wood Industries Ltd. on their wood railing systems to evaluate their structural performance. The evaluation involves reviewing the applicable sections of the 1997 and 2006 Ontario Building Code (OBC), and 2005 National Building Code of Canada (NBC) to determine if they have remained the same in the current editions of 2012 OBC and 2010 NBC.

3 Product and Assembly Description

3.1. Product and/or Assembly Description

Details of each railing system being evaluated are listed below. These descriptions are based on Intertek Test Reports and Engineering Evaluations. Intertek makes no claims that B.W. Creative Wood Industries railings are constructed in these same configurations or using the same materials today as the products are not under Intertek follow-up inspections.

Table 1. Configurations				
Railing	Post	Rails	Picket Insert	Report #
8 ft. Axxys Rail	3-1/4" x 3-1/4" Hemlock	Hemlock Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	3136807COQ-002
6 ft. Axxys Rail	3-3/16" x 3-3/16" Treated SPF	Treated SPF Top and Bottom Rail	21/32" x 2-1/4" Treated SPF	100639397COQ-002
6 ft. Clearview Glass Rail	3-1/4" x 3-1/4" Cedar	Cedar Top and Bottom Rail	6 in. x 8 mm thick Tempered Glass	3088853COQ-002B
Clearview Glass Stair Rail	3-1/4" x 3-1/4" Cedar	Cedar Top and Bottom Rail	6 in. x 8 mm thick Tempered Glass	3088853COQ-014B
6 ft. Clearview Glass Rail	3-3/16" x 3-3/16" Treated SPF	Treated SPF Top and Bottom Rail	6 in. x 8 mm thick Tempered Glass	3174450COQ-004
Clearview Glass Stair Rail	3-3/16" x 3-3/16" Treated SPF	Treated SPF Top and Bottom Rail	6 in. x 8 mm thick Tempered Glass	
8 ft. Traditional Cedar Rail	3-1/4" x 3-1/4" Treated Pine	Treated SPF Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	3116513COQ-004A
8 ft. Traditional Pine Rail	3-1/4" x 3-1/4" Treated Pine	Treated SPF Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	
Traditional Pine Stair Rail	3-1/4" x 3-1/4" Treated Pine	Treated SPF Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	
8 ft. Tuscany Rail	3-1/4" x 3-1/4" Treated Pine	Treated SPF Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	3116513COQ-003B ¹
8 ft. Craftsman Rail	3-1/4" x 3-1/4" Treated Pine	Treated SPF Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	
Posts only	3-1/4" x 3-1/4" Treated Pine	N/A	N/A	3088853COQ-016
	3-1/4" x 3-1/4" Cedar	N/A	N/A	

8 ft. 36" Baluster Rail	3-1/2" x 3-1/2" Treated Hem-Fir	Treated SPF Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	3142592COQ-005
36" Baluster Stair Rail	3-1/2" x 3-1/2" Treated Hem-Fir	Treated SPF Top and Bottom Rail	11/16" 6063-T5 Aluminum Tube	
In-Fill Only	N/A	N/A	11/16" Q195 Steel Tube	3127027COQ-003
In-Fill Only	N/A	N/A	6 in. x 8 mm thick Tempered Glass	101707527COQ-002

Note 1 – Engineering Evaluation report 3116513COQ-003B qualified the 8 ft. Tuscany and 8 ft. Craftsman Railing Systems to Section 9.8.8.2 of the 2005 NBC and 2006 OBC based on Test Report 3116513COQ-004A

3.2. Product and/or Assembly Certification

B.W. Creative Wood Industries Ltd. railings are not currently under Intertek certification and on-going follow up inspection program. Details of the assemblies shown in Section 3.1 are as provided by the Client, and Intertek makes no claims of configuration and/or material consistency of these products.

Authorities Having Jurisdiction (AHJ) should be consulted in all cases as to the particular requirements covering the installation and use of Intertek certified products, equipment, systems, devices and materials. The AHJ should be consulted before construction. Fire resistance assemblies and products are developed by the design submitter and have been investigated by Intertek for compliance with specific requirements. The published information (product and design listings) cannot always address every construction nuance encountered in the field. When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the test standard referenced for each Intertek certified product. The test standard includes specifics concerning alternate materials and alternate methods of construction. Only products which bear Intertek's Mark are considered as certified. The appearance of a company's name or product in Intertek Directory of Listed Building Products does not in itself assure that products so identified have been manufactured under Intertek's Follow-Up Service. Only those products bearing the Intertek Mark should be considered to be Listed and covered under Intertek's Follow-Up Service. Always verify the Mark on the product before using it.

4 Reference Documents

As part of this evaluation, Intertek has directly or indirectly used the following referenced documents:

- 2005 and 2010 National Building Code of Canada (NBC)
- 1997, 2006, and 2012 Ontario Building Code (OBC)
- Intertek Test Report 100639397COQ-002, dated April 19, 2012
- Intertek Test Report 3136807COQ-002, dated November 15, 2007
- Intertek Test Report 3088853COQ-002B, dated November 30, 2006
- Intertek Test Report 3088853COQ-014B, dated November 30, 2006
- Intertek Test Report 3088853COQ-016, dated November 30, 2007
- Intertek Test Report 3174450COQ-004, dated March 11, 2009
- Intertek Test Report 3116513COQ-004A, dated June 5, 2007
- Intertek Test Report 3142592COQ-005, dated January 31, 2008
- Intertek Test Report 101707527COQ-002, dated June 24, 2014
- Engineering Evaluation Report 100258172COQ-001a, dated November 26, 2010
- Engineering Evaluation Report 3116513COQ-003A, dated May 16, 2007
- Engineering Evaluation Report 3116513COQ-003B, dated June 5, 2007
- Engineering Evaluation Report 3127027COQ-003, dated July 20, 2007

5 Evaluation Method

The scope of this evaluation involves reviewing the applicable load and dimensional requirements of the 1997 and 2006 OBC, and 2005 NBC to determine if they are equivalent to the 2010 NBC and 2012 OBC for wood railing systems.

This evaluation is being conducted solely for the above referenced project or use or both. Due to the variables that exist from project to project and the fact that each evaluation requires review of the most current existing data and information, this evaluation is not to be used as justification for any other opinion nor used for any other project, without the express written consent of Intertek. This report should serve as Intertek's opinion regarding the use of the certified product in the conditions described herein. The materials used on the project, which are applied in compliance with Intertek Design Listings, must bear the Intertek listing mark. All certified products must be installed in accordance with the details contained in Intertek's Directory of Listed Building Products.

Intertek has reviewed and summarized Sections 4.1.5.14, 9.8.7.7, 9.8.8.2, 9.8.8.3, 9.8.8.5, and 9.8.8.6 of the 2010 NBC and 2012 OBC, which are applicable to B.W. Creative Wood Industries Ltd.:

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 required guard shall be
 - a) 3.0 kN/m for open viewing stands without fixed seats and for means of egress in grandstands, stadia, bleachers and arenas,
 - b) a concentrated load of 1.0 kN applied at any point for access ways to equipment platforms, contiguous stairs and similar areas where the gathering of many people is improbable, and
 - c) 0.75 kN/m or a concentrated load of 1.0 kN applied at any point, whichever governs for locations other than those described in Clauses (a) and (b).*
- 2) *Individual elements within the guard, including solid panels and pickets, shall be designed for a load of 0.5 kN applied over an area of 100 mm by 100 mm located at any point in the element or elements so as to produce the most critical effect.*
- 3) *The loads required in Sentence (2) need not be considered to act simultaneously with the loads provided for in Sentences (1) and (4).*
- 4) *The minimum specified load applied vertically at the top of every required guard shall be 1.5 kN/m and need to be considered to act simultaneously with the horizontal load provided for in Sentence (1).*

It should be noted that Clauses (a) and (b) of Section 4.1.5.14 (1), refer to means of egress and equipment access walkways and therefore are not applicable to B.W. Creative Wood Industries Ltd.

Section 9.8.7.7 Design and Attachment of Handrails

- 1) *Handrails and any building element that could be used as a handrail shall be designed and attached in such a manner as to resist
 - a) a concentrated load at any point of not less than 0.9 kN, and
 - b) for handrails other than those serving a single dwelling unit, a uniformly distributed load of 0.7 kN/m*

Section 9.8.8.2 Loads on Guards

- 1) *Guards shall be designed to resist the specified loads prescribed in Table 9.8.8.2.*

Table 9.8.8.2
Specified Loads for Guards
Forming Part of Sentence 9.8.8.2 (1)

Location of Guard	Minimum Design Loads		
	Horizontal Load Applied Inward or Outward at any Point at the Minimum Required Height of the Guard	Horizontal Load Applied Inward or Outward on Elements Within the Guard, Including Solid Panels and Pickets	Evenly Distributed Vertical Load Applied at the Top of the Guard
Guards within dwelling units and exterior guards serving not more than 2 dwelling units	0.5 kN/m OR concentrated load of 1.0 kN applied at any point ⁽¹⁾	0.5 kN applied over a maximum width of 300 mm and a height of 300 mm ⁽²⁾	1.5 kN/m
Guards serving access walkways to equipment platforms, contiguous stairs and similar areas	Concentrated load of 1.0 kN applied at any point	Concentrated load of 0.5 kN applied at any point on individual elements	1.5 kN/m
All other guards	0.75 kN/m OR concentrated load of 1.0 kN applied at any point ⁽¹⁾	Concentrated load of 0.5 kN applied at any point on individual elements	1.5 kN/m

Notes to Table 9.8.8.2.:

⁽¹⁾ The load that creates the most critical condition shall apply.

⁽²⁾ See Sentence (2)

- 2) Where the width and spacing of balusters in guards within dwelling units and in exterior guards serving not more than 2 dwelling units is such that 3 balusters can be engaged by a load imposed over a 300 mm width, the load shall be imposed so as to engage 3 balusters.
- 3) None of the loads specified in Table 9.8.8.2 need be considered to act simultaneously.
- 4) For guards within dwelling units and for exterior guards serving not more than 2 dwelling units, Table 9.8.8.2 need not apply where the guard construction used has been demonstrated to provide effective performance.

Section 9.8.8.3 Height of Guards

- 1) All guards shall be not less than 1070 mm high.

Section 9.8.8.5 Openings in Guards

- 1) Openings through any guard that is required by Article 9.8.8.1 shall be of a size that will prevent the passage of a spherical object having a diameter of 100 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard.

Section 9.8.8.6 Design of Guards to Not Facilitate Climbing

- 1) Guards required by Article 9.8.8.1, except those in industrial occupancies and where it can be shown that the location and size of openings do not present a hazard, shall be designed so that no member, attachment or opening facilitates climbing.
- 2) Guards shall be deemed to comply with Sentence (1) where all elements protruding from the vertical and located within the area between 140 mm and 900 mm above the floor or walking surface protected by the guard conform to at least one of the following Clauses:
 - a) they are located more than 450 mm horizontally and vertically from each other,

- b) they provide not more than 15 mm horizontal offset,*
- c) they do not provide a toe-space more than 45 mm horizontally and 20 mm vertically, or*
- d) they present more than a 2-in-1 slope on the offset.*

Based on the Code sections presented above, it is evident that the 2012 OBC and 2010 NBC requirements are equivalent. Intertek has reviewed these requirements and compared them to the requirements of 1997 OBC, 2006 OBC, and 2005 NBC, and has concluded that they have remained the same. Therefore, systems described in Section 3.1 of this report meet the requirements of the current editions of 2012 OBC and 2010 NBC. Refer to test reports for full details including load factors.

Please note that this evaluation only applies to the previously tested B.W. Creative Wood Industries Ltd. railings. B.W. Creative Wood Industries Ltd. railings are not currently under Intertek certification and on-going follow up inspection program and Intertek makes no claim of on-going compliance in accordance with the referenced Building Codes.

6 Conclusion

Intertek has conducted an engineering evaluation for B.W. Creative Wood Industries Ltd. to review the Canadian Code requirements for wood railing systems. The evaluation involved reviewing the applicable sections of the 1997 OBC, 2006 OBC, and 2005 NBC to determine if they are equivalent to the 2012 OBC and 2010 NBC.

Based on the information contained and referenced herein, it is Intertek's professional judgment based on sound engineering principles that the following is true:

- Load requirements of Sections 4.1.5.15, 9.8.7.7, and 9.8.8.2 of 2005 NBC are equivalent to Sections 4.1.5.14, 9.8.7.7, and 9.8.8.2 of 2010 NBC, respectively
- Load requirements of Section 4.1.10.1 of 1997 OBC and Section 4.1.5.15 of 2006 OBC are equivalent to Section 4.1.5.14 of 2012 OBC
- Load requirements of Section 9.8.8.2 of 2006 OBC are equivalent to Section 9.8.8.2 of 2012 OBC
- Dimensional requirements of Sections 9.8.8.3, 9.8.8.5, and 9.8.8.6 of 2005 NBC and 2006 OBC are equivalent to Sections 9.8.8.3, 9.8.8.5, and 9.8.8.6 of the 2010 NBC and 2012 OBC, respectively
- B.W. Creative Wood Industries Railing Systems described in Section 3.1 of this report meet the requirements of 2012 OBC and 2010 NBC.

INTERTEK TESTING SERVICES NA LTD.

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7 LAST PAGE AND REVISION SUMMARY

DATE	SUMMARY
June 24, 2014	Original
July 30, 2014	Included Sections 9.8.8.3, 9.8.8.5, and 9.8.8.6 of NBC/OBC