

# **Report of:**

## **RailBlazers® Aluminum Railing System Post Attachment Kit for Decks with Wood Joists**

- **2014 Alberta Building Code - Part 9**
- **2012 British Columbia Building Code - Part 9**
- **2015 National Building Code of Canada - Part 9**
- **2012 Ontario Building Code - Part 9**

**WARNING**

No representation or warranty is given that your particular application of these products complies with relevant building codes or that the fasteners provided or used are appropriate for your application. Therefore consult with professionals and local building officials before beginning work: (i) to ensure compliance with relevant building codes for your application and for your proposed use of fasteners; (ii) to ensure the integrity of the structural components in connection with which these products are to be used; (iii) to identify appropriate safety gear that is to be used during installation such as a safety harness when working above ground; (iv) to ensure that the work area is free from utilities, services and hazards; and, (v) to clarify any instructions or warnings that may not be clear. Work in a safe manner wearing protective gear such as gloves, eyewear, headwear, footwear and clothing. When using tools always comply with operation manuals and instructions. Metal and glass may have sharp edges and could fragment or splinter during or as a result of handling or cutting. Do not use these products in connection with any substance that is or may be harmful or corrosive to the products. Inspect and maintain these products and the structural components that they are used in connection with on a regular basis using professionals when appropriate. These instructions have been prepared for certain standard residential applications. Obtain professional advice for any non-standard or non-residential application.



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**Peak Products Manufacturing Inc.**  
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**RailBlazers® Post Attachment Kit**

**Engineering Review for Compliance with Canadian Building Codes  
Part 9 (1 and 2 Dwelling Units)**

May 26, 2017



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## **Purpose and Limitations**

Peak Products Manufacturing Inc. (Peak) manufactures the RailBlazers® Aluminum Railing System to protect occupants at edges of decks, stairs and landings. This review by L.H. Schwindt & Company Inc. addresses structural compliance of the RailBlazers® Post Attachment Kit for top mounted post attachment with local blocking in a wood-framed deck assembly, where the guard is installed parallel or perpendicular to the deck joists, or at a corner. It is understood decks will be level. The evaluation was done in accordance with the following Canadian Building Codes:

- 2014 Alberta Building Code
- 2012 British Columbia Building Code
- 2015 National Building Code of Canada
- 2012 Ontario Building Code

## **Related Reports**

Peak has previously engaged Intertek to conduct physical tests (Intertek Ref 101344959COQ-001B) for guards mounted perpendicular to joists. The tests showed no structural failures at loads exceeding the code-mandated loads, implying effectiveness of wood blocking to distribute the guard base forces into the deck assembly in that scenario.

The above-deck components of the RailBlazers® Aluminum Railing System including optional infill components were the subject of a structural code compliance review by Read Jones Christoffersen Ltd. (RJC# VAN.106169.0001 "RailBlazers® Aluminum Railing System Engineering Review for Compliance with Canadian Building Codes Part 9").

L.H. Schwindt & Company Inc. does not warrant the applicability, method, or conclusions of reports by others.

## **Components** (please refer to drawings)

The RailBlazers® Post Attachment Kit includes steel bolts ¼" diameter, with top flat washers, and backing plates, lock washers and hex nuts for the underside. The bolts are 6" long, threaded length approx. 2", with flange head, and are intended as through-fasteners to a deck structure. The RailBlazers® Post Attachment Kit is available in two retail options: SKU 10060 (White) and SKU 10061 (Black).

It is understood the bolt holes will be drilled vertically; to avoid drill interference the installer may use a template to pre-drill before positioning the post.

The post base installation details include sawn wood blocking assembled to deck framing with fasteners (3" spiral nails or #8x3" deck screws). It is understood blocking will be the same material grade as deck framing (typically S-P-F No 1 or 2, or "select") and that blocking will be sawn square for correct fit-up. The

RailBlazers® Post Attachment Kit may be bolted through any assembly of locally approved non-compressible decking materials, such as solid wood, plywood, or composite.

The intent of the installation detail is that all four bolts should penetrate the blocking, and all bolts are vertical and at least 1" from edge of blocking.

### **Analysis**

The Canadian building codes ("the Codes") specify guard design requirements within Part 9. The required design loads in various directions (non-concurrent) are stated as follows:

"0.5kN/m or a concentrated load of 1.0kN applied at any point that creates the most critical condition"

We have established the governing load for post base connections is the 1.0kN horizontal load at top of guard.

Guard height established in the Codes is commonly 1070mm (3'-6"). In locations where the adjacent lower surface is 10m or more below the protected walking surface, guard height is increased to 1500mm. This difference in elevation is very uncommon for Part 9 buildings (by definition they are up to 3 storeys).

Accordingly, this review addresses application of the design load to a guard 1070mm high. Guard height directly affects the magnitude of the moment being transferred to the deck, and of the resisting force couple.

As RailBlazers® Aluminum Railing System is not intended for use with post spacing greater than 2.0m, the uniform load would not govern. The base moment at guard posts is thus  $1.07\text{m} \times 1.0\text{kN} = 1.07\text{kN}\cdot\text{m}$ .

2012 Ontario Building Code Supplementary Bulletin SB-7 prescribes construction details for wood guards that are deemed to satisfy the Part 9 guard design requirements. SB-7 details address connection of wood posts by a variety of fastener types and arrangements, in all cases depending on penetration of the post to the underside of deck framing or lower to enable moment transfer from the post into the deck assembly. The SB-7 details do not include fastening of top-mounted post base plates. Detail EB-6, for guard parallel to joists, relies on the post being bolted to a single block, wherein the block transfers moment to the rim and adjacent joists, as a force-couple.

Peak's moment transfer method is to create a build-up of timber blocking in the space between joists, as described above under Components. The blocking must transfer load to the rim joist and adjacent joist in a manner at least equivalent to the post details in SB-7.

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Peak's blocking detail achieves this by using nominal 2x8 sawn lumber blocks, fitted in a horizontal-plane as follows (in all cases, the horizontal-plane blocks are fitted between four vertical-plane elements):

- For guards parallel to joists: Blocks between the rim and adjacent joists and between a pair of vertical-plane fitted blocks.
- For guards perpendicular to joists: Blocks between the joist trimmer and a vertical-plane block, and between nearby joists.
- At corners: Blocks between a combination of joists and blocks.

The upper horizontal block serves to establish the spacing down to the lower block, and distribute any lateral force from the guard post to the deck structure. The lower horizontal block distributes the primary guard post force (moment resulting from horizontal outward force at the top of post) into the deck structure.

The position of blocks tight to underside of decking is critical to performance. Tightening of the steel bolts on a timber assembly approximately 4" thick (including decking) is required for moment transfer and to minimize deflection.

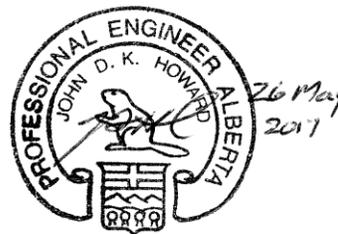
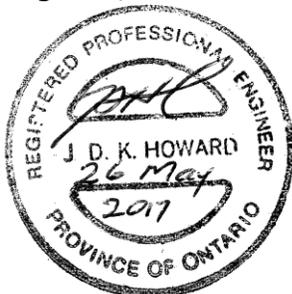
Unlike the SB-7 details that use a block or joist on one side of a post, the Peak details use blocking in a manner that will involve joists or vertical plane blocks on both sides of the post. This arrangement serves to minimize deflection that may result from asymmetric load transfer.

**Conclusion**

The RailBlazers® Post Attachment Kit adequately supports the post base and transfers the design load and moment into the deck framing assembly, and adequately secures the post base.

All components must be used in accordance with the "Post Attachment Kit" drawings (see pages 4-6 of this report) including positioning the upper horizontal block element flush with the top of deck assembly before boards are installed.

Regards,

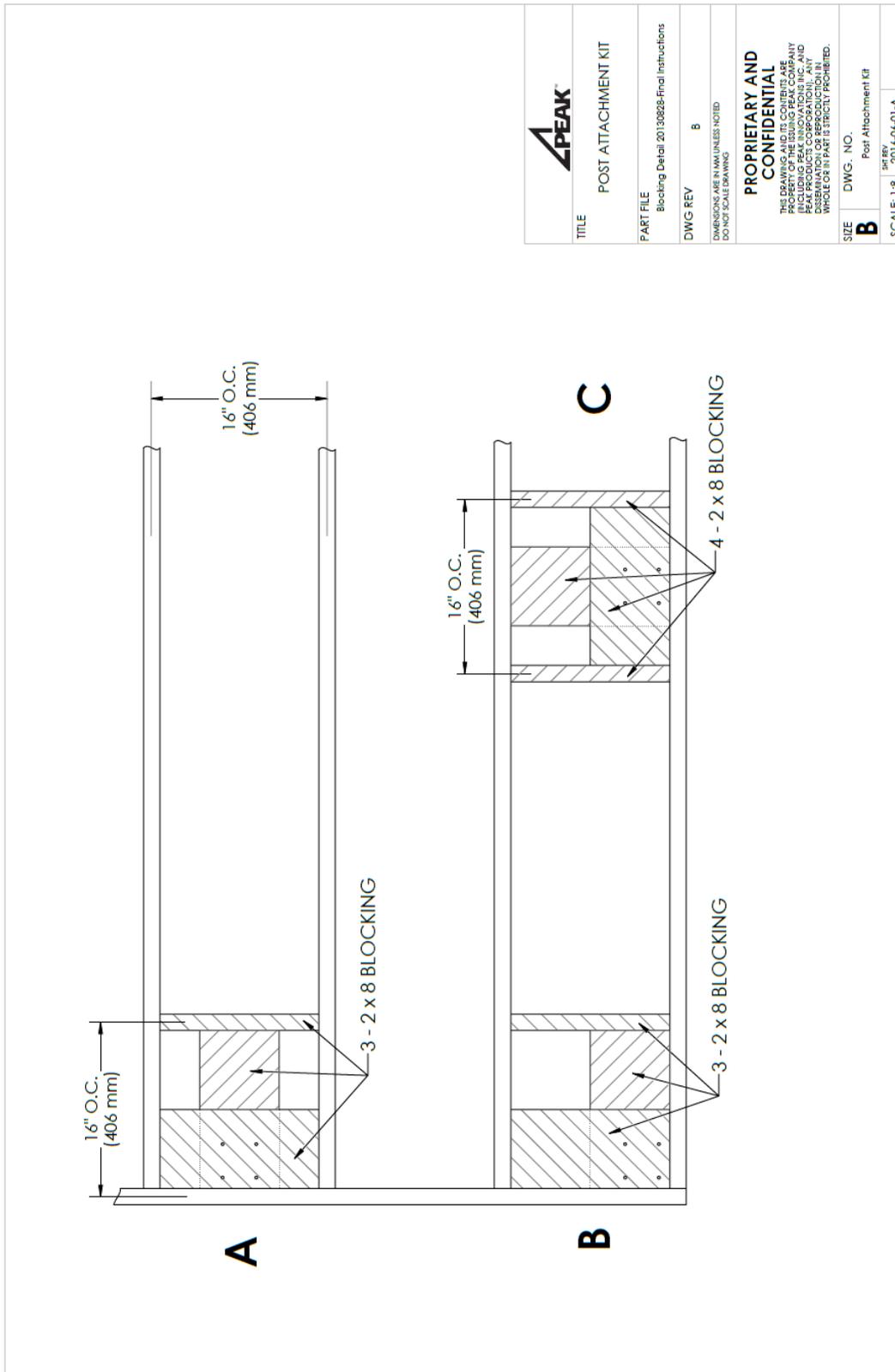


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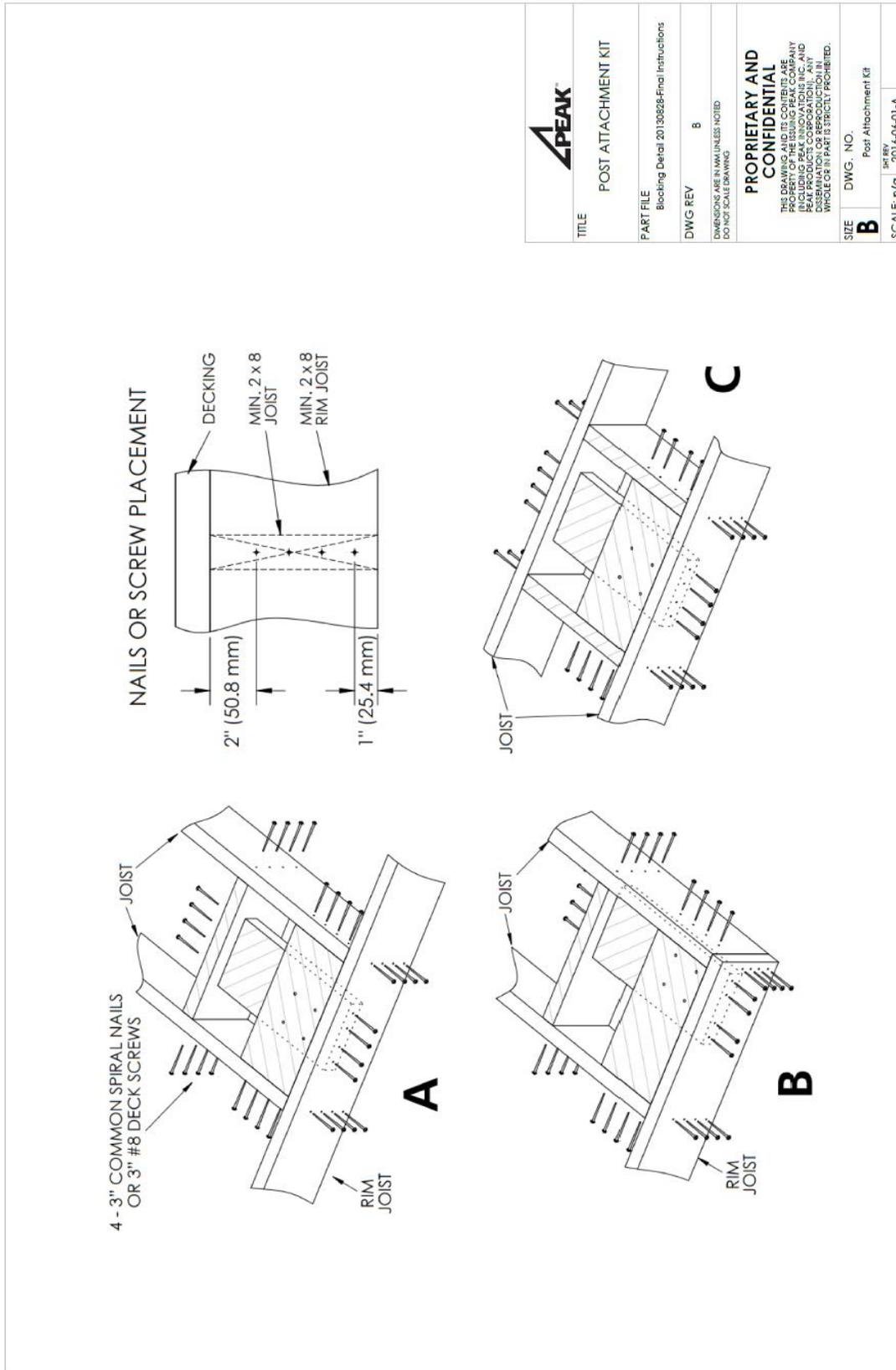
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