

2018 International Residential Code Report

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Peak[™] Aluminum Railing System

Engineering Review for Compliance with 2018 International Residential Code

Peak Products USA Corporation

July 2, 2019 RJC No. VAN.106169.0022

Prepared for:

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1.0 OVERVIEW

The Peak[™] Aluminum Railing System is intended to act as a guard or barrier to protect the public from a fall. The objectives were to complete a structural review of the structural components based in accordance with applicable material standards and the 2018 International Residential Code.

The following specified loads apply:

- Concentrated load of 200 pounds applied in any direction at any point along the top.
- Horizontally applied normal load of 50 pounds on an area equal to 1 square foot.

Material resistances will be determined in accordance with the respective design codes AA-ADM-1 Aluminum Design Manual 2015, ASTM E1300-12a Standard Practice for Determining Load Resistance of Glass in Buildings, and 2017 AISC Steel Construction Manual, 15th edition.

In this report, the following structural components were reviewed:

A. Infill Elements

- 1. Aluminum pickets 16 mm (5/8") wide Dwg. Title "Aluminum Railing Railing Assembly with Pickets"
- 2. Aluminum pickets 38 mm (1½") wide Dwg. Title "Aluminum Railing Railing Assembly with Wide Pickets"
- 3. Glass panels up to 1.676 m (66") wide Dwg. Title "Aluminum Railing Railing Assembly with Glass Panel"
- 4. Glass panels 152 mm (6") wide Dwg. Title "Aluminum Railing Railing Assembly with 6" Glass Panel"

B. Rail Elements

- 1. Post Dwg. Title "Posts"
- 2. Hand rail See Report Assembly drawings
- 3. Base rail See Report Assembly drawings
- 4. Stair hand rail See Report Assembly drawings

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C. Connectors

- 1. Universal connector Dwg. Title "Brackets and Connectors"
- 2. Wall mount brackets Dwg. Title "Brackets and Connectors"
- 3. Mid/stair/end fascia mount bracket Dwg. Title "Fascia Mount Brackets"
- 4. Corner fascia mount bracket Dwg. Title "Fascia Mount Brackets"
- 5. Stair hand and base rail bracket Dwg. Titles "Aluminum Railing Stair Railing Assembly with Pickets" and "Aluminum Railing Stair Railing Assembly with Wide Pickets"

The complete list of all components (including non-structural components) for the system is included in Appendix A.

2.0 INFILL ELEMENTS

The primary infill elements included: 16 mm (5/8") aluminum picket, 38 mm (1½") aluminum picket, 6 mm (¼") thick glass panels (up to 1.676 m (66") wide), and 8 mm (5/16") thick glass panels (152 mm (6") wide).

The review was based on information and drawings provided by Peak Products USA Corporation (Peak) for the elements listed above.

2.1 Aluminum Infill Elements

Our analysis was based on the following information:

- Loads: Prescribed by the 2018 International Residential Code. See Section 1.0, Overview.
- Resistance: Completed in accordance with the AA-ADM-1, Aluminum Design Manual 2015.
- Section properties: Determined from drawings provided by Peak. Calculations were completed in accordance with AA-ADM-1.
- Load configuration: Span and bearing lengths were provided by Peak.

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2.2 Glass Infill Elements

Our analysis was based on the following information:

- Loads: Prescribed by the 2018 International Residential Code. See Section 1.0, Overview.
- Resistance: Completed in accordance with ASTM E1300-12a, Standard Practice for Determining Load Resistance of Glass in Buildings.
- Material: Tempered glass in accordance with ASTM E1300-12a per information and drawings provided by Peak.
- Section properties: Determined from drawings provided by Peak.
- Load configuration: Span and bearing lengths were provided by Peak.
- Allowable deflection: The allowable deflection was calculated based on preventing fall-out of the glass from the frame.

3.0 RAIL ELEMENTS

3.1 General Rail Elements

The general rail elements include the hand rail, stair hand rail, base rail, and posts. An analysis was completed based on the worst-case configuration for these elements.

- Loads: Prescribed by the 2018 International Residential Code. See Section 1.0, Overview.
- Resistance: Completed in accordance with the AA-ADM-1, Aluminum Design Manual 2015.
- Section properties: Determined from drawings provided by Peak. Calculations were completed in accordance with AA-ADM-1.
- Fastener resistance: Completed in accordance with 2017 AISC Steel Construction Manual.
- Load configuration: Span and dimensions were provided by Peak. Posts were modeled as cantilevers, fixed at the base. The results from our analysis show the maximum span that can be achieved, as calculated from the material and fastener resistances.



4.0 CONNECTORS

4.1 General Connectors

The general connectors included the universal connector, wall mount brackets, mid/stair/end fascia mount bracket, corner fascia mount bracket, and stair hand and base rail brackets. An analysis was completed based on the worst-case configuration for these elements.

- Loads: Prescribed by the 2018 International Residential Code. See Section 1.0, Overview.
- Resistance: Completed in accordance with the AA-ADM-1, Aluminum Design Manual 2015 and 2017 AISC Steel Construction Manual.
- Section properties: Determined from drawings provided by Peak. Calculations were completed in accordance with AA-ADM-1.
- Load configuration: Span and dimensions were provided by Peak.
- Connections to the base building are not included as part of this review, including but not limited to the rail and post connections.

5.0 **RESULTS**

A full set of calculations and results is presented in RJC #VAN.106169.0015 engineering review package, including:

- Dimensioned drawings of each component, including extrusion drawings
- Calculation sheets for the structural capacity of components listed in 1.0 Overview

The above documents contain proprietary information and as such, have not been included in this report.

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6.0 CONCLUSION

The Peak[™] Aluminum Railing System meets the requirements within the 2018 International Residential Code. Limitations of compliance are defined in the assembly drawings presented in Appendix B.

Yours truly,

READ JONES CHRISTOFFERSEN LTD.

Carmen Chun, M.Eng., P.Eng, LEED[®] AP Project Engineer

CCh/hj

Enc. Appendix A – List of Components Appendix B – Assembly Drawings Reviewed by:

Stephan Kordt, S.E., P.E. Kordt Engineering Group, President



LIMITS OF COMMISSION

RJC prepared this report for the use of Peak Products USA Corporation. The material in it reflects RJC's judgement in light of information available to RJC at the time of preparation, including but not limited to material data sheets, independent testing, and physical mock-ups. Any use that a third party makes of this report, or any reliance or decisions to be based on it, is the responsibility of such third parties. RJC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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APPENDIX A LIST OF COMPONENTS

Compliance with 2018 International Residential Code Appendix A - List of Components

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SKU (White)	SKU (Black)	Description	Drawing No.
50000	50001	END POST	post-end R2.5
50010	50011	MID POST	post-mid R2.5
50020	50021	CORNER POST	post-corner R2.5
50050	50051	STAIR POST	post-stair R2.5
50100	50101	4' HAND AND BASE RAIL	hand-rail R2.2, base-rail R2.2, base-rail-support R2.2
50110	50111	6' HAND AND BASE RAIL	hand-rail R2.2, base-rail R2.2, base-rail-support R2.2
50120	50121	8' HAND AND BASE RAIL	hand-rail R2.2, base-rail R2.2, base-rail-support R2.2
50112	50113	STAIR HAND & BASE RAIL	stair-hand-rail R2.2
50200	50201	4' STANDARD PICKETS AND SPACERS	P-S R2.3
50210	50211	6' STANDARD PICKETS AND SPACERS	P-S R2.3
50260	50261	6' STANDARD STAIR PICKETS AND SPACERS	P-S Stair R2.3
50280	50281	SINGLE STAIR PICKET	P-S Stair R2.3
50290	50291	291 SINGLE NARROW PICKET P-S R2.3	
50300	50301	4' WIDE PICKETS AND SPACERS	P-S Wide R2.2
50310	50311	6' WIDE PICKETS AND SPACERS	P-S Wide R2.2
50360	50361	6' WIDE STAIR PICKETS AND SPACERS	P-S Wide Stair R2.2
50380	50381	SINGLE WIDE STAIR PICKET	P-S Wide Stair R2.2
50390	50391	SINGLE WIDE PICKET	P-S Wide R2.2
50710	50713	6" GLASS PANEL KIT	glass-panel-kit R2.2
50820	50820	GLASS PANEL 18" X 36 5/16"	glass-panel US R2.2
50823	50823	GLASS PANEL 21" X 36 5/16"	glass-panel US R2.2
50830	50830	GLASS PANEL 24" X 36 5/16"	glass-panel US R2.2
50833	50833	GLASS PANEL 27" X 36 5/16"	glass-panel US R2.2
50840	50840	GLASS PANEL 30" X 36 5/16"	glass-panel US R2.2
50843	50843	GLASS PANEL 33" X 36 5/16"	glass-panel US R2.2
50850	50850	GLASS PANEL 36" X 36 5/16"	glass-panel US R2.2
50853	50853	GLASS PANEL 39" X 36 5/16"	glass-panel US R2.2
50860	50860	GLASS PANEL 42" X 36 5/16"	glass-panel US R2.2
50863	50863	GLASS PANEL 45" X 36 5/16"	glass-panel US R2.2
50870	50870	GLASS PANEL 48" X 36 5/16"	glass-panel US R2.2
50873	50873	GLASS PANEL 51" X 36 5/16"	glass-panel US R2.2
50880	50880	GLASS PANEL 54" X 36 5/16"	glass-panel US R2.2
50883	50883	GLASS PANEL 57" X 36 5/16"	glass-panel US R2.2
50888	50888	GLASS PANEL 60" X 36 5/16"	glass-panel US R2.2
50891	50891	GLASS PANEL 63" X 36 5/16"	glass-panel US R2.2
50895	50895	GLASS PANEL 66" X 36 5/16"	glass-panel US R2.2
50900	50901	UNIVERSAL CONNECTOR	ubracket-handrail R2.2, ubracket-baserail R2.2, ubracket-wall R2.2
50902	50903	STAIR HAND AND BASE RAIL BRACKET KIT	ubracket-stair-hand-rail R2.2, ubracket-baserail R2.2, ubracket-wall R2.2
50910	50911	BOTTOM RAIL SUPPORT	base-rail-support R2.2
50920	50921	WALL MOUNT BRACKETS	wall-bracket-hand-rail R2.2, wall-bracket-base-rail R2.2
50940	50940	6' GLASS GASKET	glass-gasket-kit R2.2
50960	50961	CORNER FASCIA MOUNT BRACKET	fascia-mount-corner R2.2
50970	50971	MID/END/STAIR FASCIA MOUNT BRACKET	fascia-mount-mid R2.4



APPENDIX B

ASSEMBLY DRAWINGS









STAIR HANDRAIL BRACKET

STANDARD STAIR PICKET

STAIR SPACER

4

5

6

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50902, 50903

50260, 50261, 50280, 50281

50260, 50261, 50280, 50281





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TITLE										
BASE RAIL SUPPORT										
PART FILE										
Report assembly - base rail support										
DWG	REV	А								
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING										
PROPRIET	ARY AND C	ONFIDENTIAL								
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF THE PEAK GROUP OF COMPANIES. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF THE PEAK GROUP OF COMPANIES IS PROHIBITED.										
SIZE	DWG. NO.									
B	B BASE RAIL SUPPORT									
SCALE: 1:1		SHT REV 2015-03	3-03-A							