

Report Of:

- **2012 Ontario Building Code - Part 4**

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.

Railblazers® Aluminum Railing System

Engineering Review for Compliance with Ontario Building Code Part 4

Peak Products Manufacturing Inc.

June 22, 2020

RJC No. VAN.106169.0028

Prepared for:

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1.0 OVERVIEW

The Railblazers® 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 on Limit States Design, in accordance with applicable material standards and Part 4 of the Ontario Building Code 2012.

The following specified loads apply:

- Concentrated lateral load of 1 kN (applied to the Railing System at top of guard)
- Uniformly distributed lateral load of 0.75 kN/m (applied at top of guard)
- Uniformly distributed vertical load of 1.5 kN/m (applied at top of guard)
- Concentrated infill load of 0.5 kN (anywhere within the guard)
- Uniform wind load per the limits shown in Appendix B Assembly Drawings

In this report, the following structural components were reviewed:

A. Infill Elements

1. Aluminum pickets 38 mm (1½") wide - Dwg. Title "Railblazers® – Railing Assembly with Wide Pickets"
2. Glass panels up to 1.676 m (66") wide – Dwg. Title "Railblazers®– Railing Assembly with Glass Panel"

B. Rail Elements

1. Post – Dwg. Title "Railblazers® Posts"
2. Hand rail – See Report Assembly drawings
3. Base rail – See Report Assembly drawings

C. Connectors

1. Universal connector – Dwg. Title "Railblazers® Brackets and Connectors"
2. Wall mount brackets – Dwg. Title "Railblazers® Brackets and Connectors"
3. Mid/stair/end fascia mount bracket – Dwg. Title "Railblazers® Fascia Mount Brackets"
4. Corner fascia mount bracket – Dwg. Title "Railblazers® Fascia Mount Brackets"



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 38 mm (1½") aluminum picket and 6 mm (¼") thick glass panels (up to 1.676 m (66") wide).

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

2.1 Aluminum Infill Elements

Our analysis was based on the following information:

- Loads: Prescribed by the Ontario Building Code. See Section 1.0, Overview.
- Resistance: Completed in accordance with CAN/CSA S157-17, Strength in Aluminum Design.
- Section properties: Determined from drawings provided by Peak. Calculations were completed in accordance with CAN/CSA S157-17.
- Load configuration: Span and bearing lengths were provided by Peak.

2.2 Glass Infill Elements

Our analysis was based on the following information:

- Loads: Prescribed by the Canadian building codes. See Section 1.0, Overview.
- Resistance: Completed in accordance with CSA A500-16 Building Guards, which notes that the strength of glass can be determined 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, base rail, and posts. An analysis was completed based on the worst-case configuration for these elements.

- Loads: Prescribed by the Canadian building codes. See Section 1.0, Overview.
- Resistance: Completed in accordance with CAN/CSA S157-17, Strength in Aluminum Design.
- Section properties: Determined from drawings provided by Peak. Calculations were completed in accordance with CAN/CSA S157-17.
- Fastener resistance: Completed in accordance with CAN/CSA S16-14, Design of Steel Structures.
- 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, and corner fascia mount bracket. An analysis was completed based on the worst-case configuration for these elements.

- Loads: Prescribed by the Canadian building codes. See Section 1.0, Overview.
- Resistance: Completed in accordance with the CAN/CSA S157-17, Strength in Aluminum Design and CAN/CSA S16-14, Design of Steel Structures.
- Section properties: Determined from drawings provided by Peak. Calculations were completed in accordance with CAN/CSA S157-17.
- 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.106169.0028 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.

6.0 CONCLUSION

The Railblazers® Aluminum Railing System meets the requirements within Part 4 of the Ontario Building Code 2012. Limitations of compliance are defined in the assembly drawings presented in Appendix B.

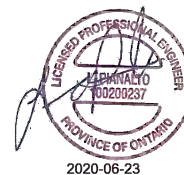
Yours truly,

READ JONES CHRISTOFFERSEN LTD.


2020-06-23

Hafeez Noormohamed, BEng, EIT
Design Engineer

Reviewed by:



Leonard Pianalto, M.Sc., P.Eng., LEED® AP, FEC
Principal

HNo/dch

Enc. Appendix A – List of Components
Appendix B – Assembly Drawings



LIMITS OF COMMISSION

RJC prepared this report for the use of Peak Products Manufacturing Inc. 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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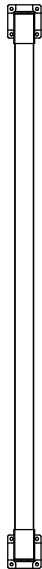
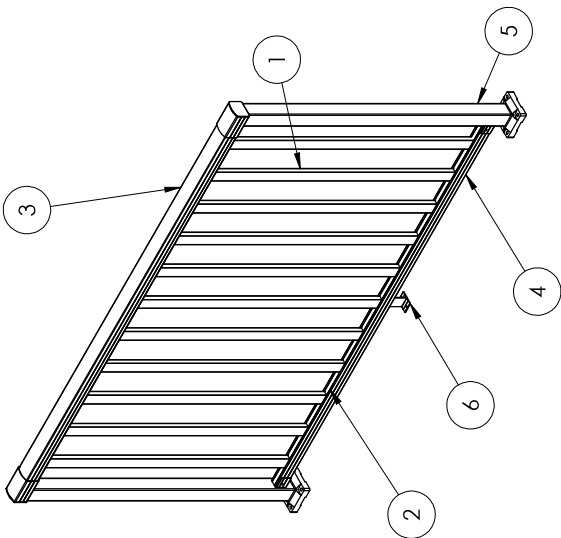
APPENDIX A

LIST OF COMPONENTS

SKU (White)	SKU (Black)	Description
90000	90001	END POST
90010	90011	MID POST
90020	90021	CORNER POST
90050	90051	STAIR POST
90100	90101	4' HAND AND BASE RAIL
90110	90111	6' HAND AND BASE RAIL
90300	90301	4' WIDE PICKET AND SPACER
90310	90311	6' WIDE PICKET AND SPACER
90360	90361	6' WIDE STAIR PICKET AND SPACER
90920	90921	WALL BRACKET
90940	90940	6' GLASS GASKET
90960	90961	CORNER FASCIA BRACKET
90970	90971	MID/END/STAIR FASCIA BRACKET
10820	10820	GLASS PANEL 18 X 36 5/16
10823	10823	GLASS PANEL 21 X 36 5/16
10830	10830	GLASS PANEL 24 X 36 5/16
10833	10833	GLASS PANEL 27 X 36 5/16
10840	10840	GLASS PANEL 30 X 36 5/16
10843	10843	GLASS PANEL 33 X 36 5/16
10850	10850	GLASS PANEL 36 X 36 5/16
10853	10853	GLASS PANEL 39 X 36 5/16
90860	90860	GLASS PANEL 42 X 36 5/16
10863	10863	GLASS PANEL 45 X 36 5/16
10870	10870	GLASS PANEL 48 X 36 5/16
10873	10873	GLASS PANEL 51 X 36 5/16
10880	10880	GLASS PANEL 54 X 36 5/16
10883	10883	GLASS PANEL 57 X 36 5/16
10888	10888	GLASS PANEL 60 X 36 5/16
10891	10891	GLASS PANEL 63 X 36 5/16
90895	90895	GLASS PANEL 66 X 36 5/16
90900	90901	UNIVERSAL CONNECTOR

APPENDIX B

ASSEMBLY DRAWINGS



SEE DRAWING:
RAILBLAZERS® ALLOWABLE SPANS

MAXIMUM: 98 mm [3-27/32 in]

1070 mm [42-1/8 in]

SEE DRAWING: POSTS

SEE DRAWING: BASE RAIL SUPPORT

SEE DRAWING: BRACKETS AND CONNECTORS



TITLE
RailBlazers® - Railing Assembly
with Wide Pickets

PART FILE
Report assembly P4 64in- wide pickets

DWG REV
B

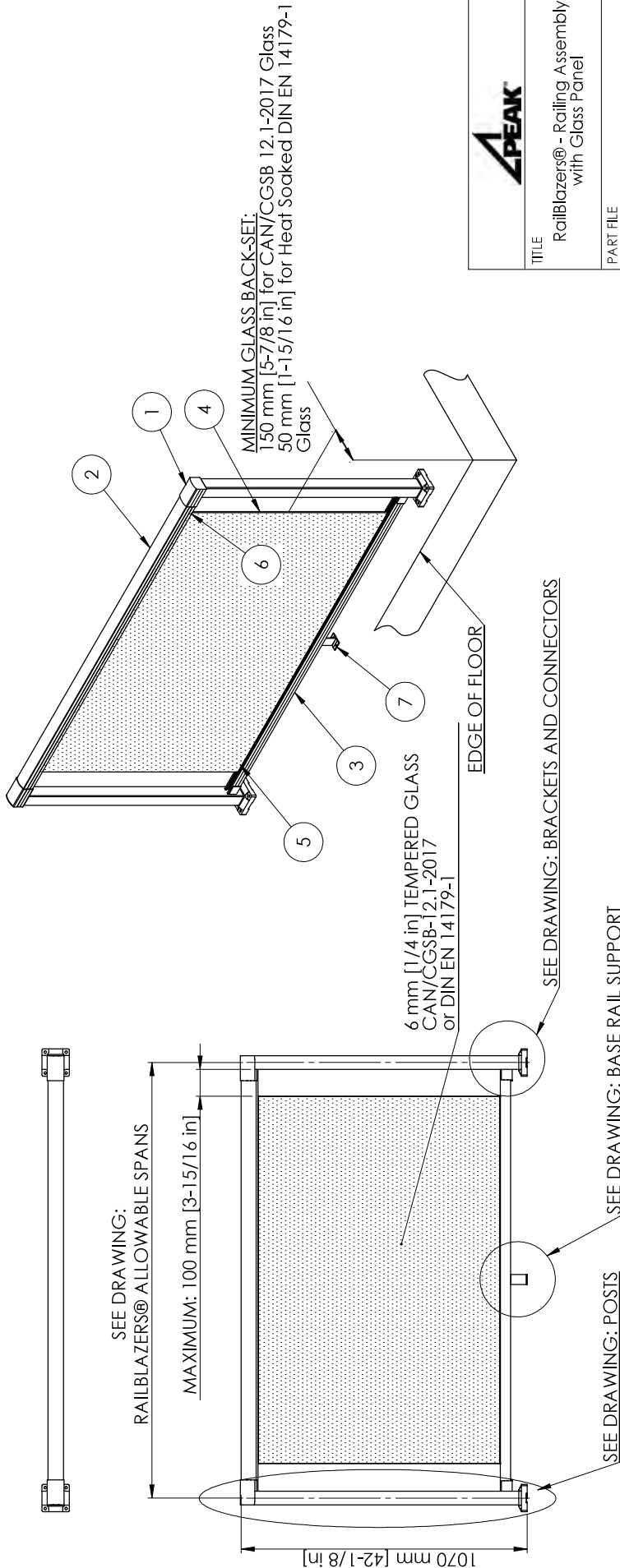
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DO NOT SCALE DRAWING

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SIZE
DWG. NO.
B Report assembly P4 Assembly Wide Pickets

SCALE: 1:15
SHEET NO. 2017-05-16

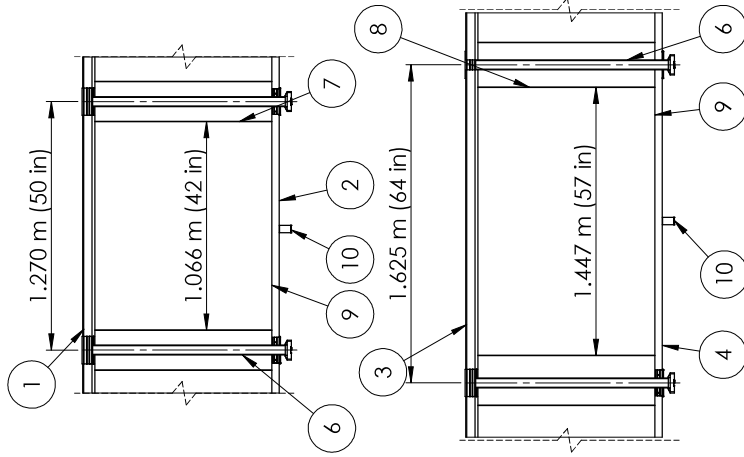
ITEM NO.	DESCRIPTION	SKU
1	WIDE PICKET	90350, 90351
2	SPACER (98 mm)	90350, 90351
3	HAND RAIL	90100, 90101, 90110, 90111
4	BASE RAIL	90100, 90101, 90110, 90111
5	POST	90000, 90001, 90010, 90011, 90020, 90021
6	BASE RAIL SUPPORT	90100, 90101, 90110, 90111



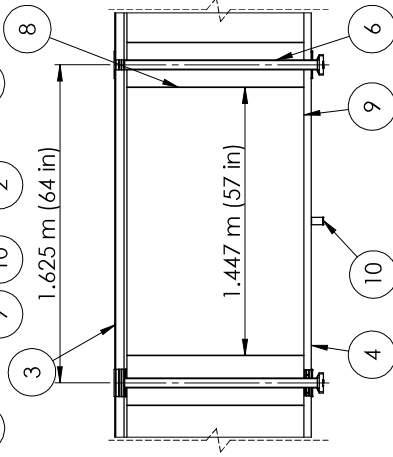
TITLE		RailBlazers® - Railing Assembly with Glass Panel	
PART FILE		Report assembly P4 - 64in span-glass panel	
DWG REV		B	
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING			
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SIZE	DWG. NO.		
B	Report assembly P4 Assembly Glass Panel ON		
SCALE: 1:15	SHEET NO.		2017-05-16

ITEM NO.	DESCRIPTION	SKU
1	POST	90000, 90001, 90010, 90011, 90020, 90021
2	HAND RAIL	90100, 90101, 90110, 90111
3	BASE RAIL	90100, 90101, 90110, 90111
4	GLASS PANEL	10820, 10823, 10830, 10833, 10840, 10843, 10850, 10853, 90860, 10863, 10866, 10870, 10873, 10880, 10883, 10888, 10891, 90895
5	LOWER GLASS GASKET	90940
6	UPPER GLASS GASKET	90940
7	BASE RAIL SUPPORT	90100, 90101, 90110, 90111

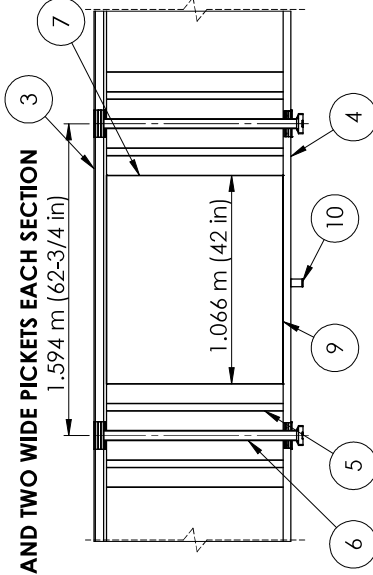
42 in GLASS PANEL



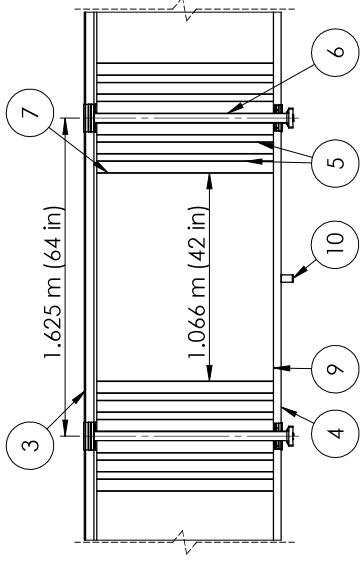
57 in GLASS PANEL



42 in GLASS PANEL AND TWO WIDE PICKETS EACH SECTION



42 in GLASS PANEL AND FOUR WIDE PICKETS EACH SECTION

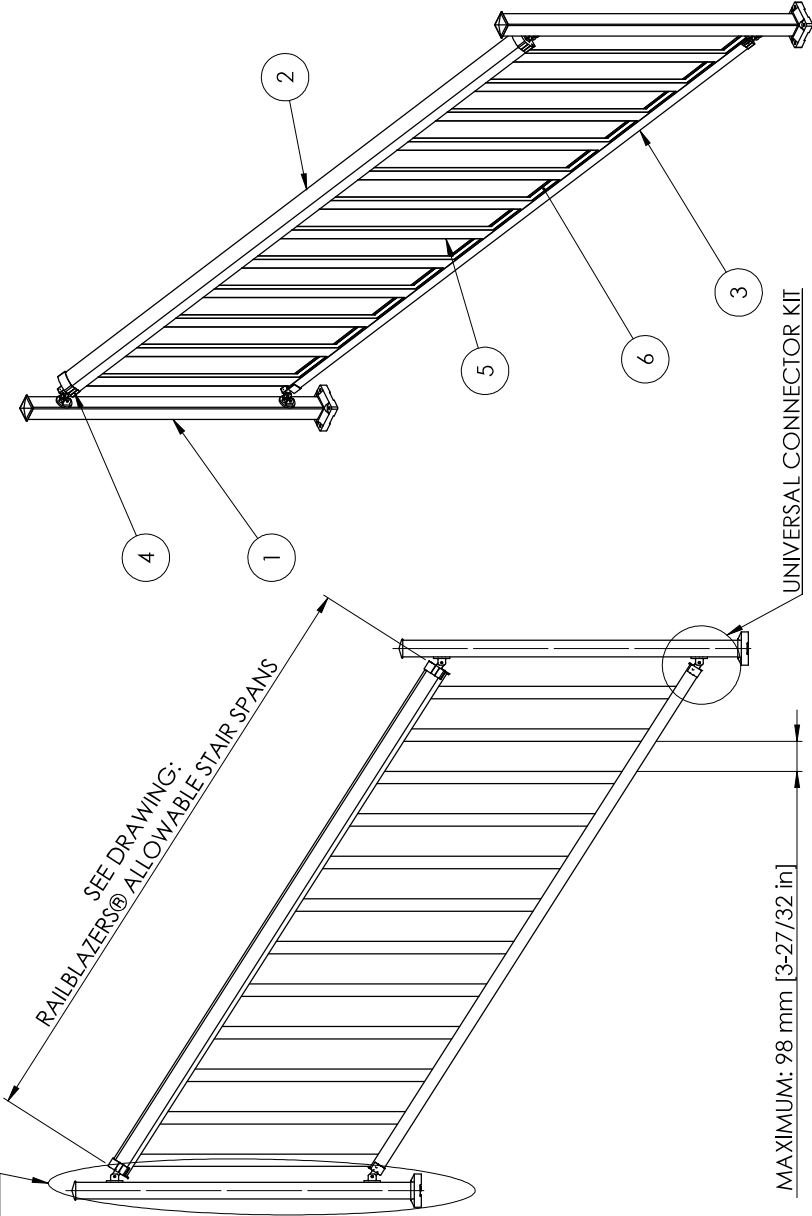


TITLE
Railblazers® - Glass Panel
Configuration Examples

PART FILE		Report assembly P4 50in repeating glass panel	
ITEM NO.	DESCRIPTION	SKU	
1	HANDRAIL 4 FT	90100, 90101	DWG REV B
2	BASE RAIL 4 FT	90100, 90101	
3	HANDRAIL 6 FT	90110, 90111	
4	BASE RAIL 6 FT	90110, 90111	DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING
5	WIDE PICKET	90350, 90351	
6	POST	90000, 90001, 90010, 90011, 90020, 90021	
7	GLASS PANEL 42 IN	90860	PROPRIETARY AND CONFIDENTIAL THIS DRAWING AND ITS CONTENTS ARE PROPERTY OF THE ISSUING PEAK COMPANY (INCLUDING PEAK INNOVATIONS INC. AND PEAK PRODUCTS CORPORATION). ANY REPRODUCTION OR REPRODUCTION OR UNLICENSED USE IN WHOLE OR IN PART IS STRICTLY PROHIBITED.
8	GLASS PANEL 57 IN	10880	
9	GLASS GASKET	90940	
10	BASE RAIL SUPPORT	90100, 90101, 90110, 90111	SIZE B Report assembly P4 Glass Examples
		SCALE: 1:25 SHEET NO. 2017-05-16	

ITEM NO.	DESCRIPTION	SKU
1	HANDRAIL 4 FT	90100, 90101
2	BASE RAIL 4 FT	90100, 90101
3	HANDRAIL 6 FT	90110, 90111
4	BASE RAIL 6 FT	90110, 90111
5	WIDE PICKET	90350, 90351
6	POST	90000, 90001, 90010, 90011, 90020, 90021
7	GLASS PANEL 42 IN	90860
8	GLASS PANEL 57 IN	10880
9	GLASS GASKET	90940
10	BASE RAIL SUPPORT	90100, 90101, 90110, 90111

SEE DRAWING: POSTS

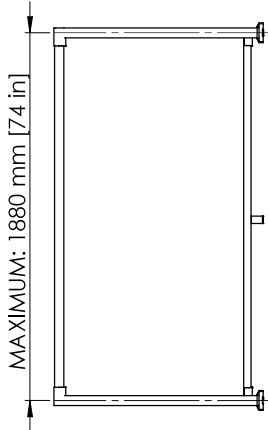


UNIVERSAL CONNECTOR

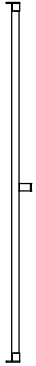


TITLE	RailBlazers® - Stair Railing with Wide Pickets		
PART FILE	Report assembly - stair - Wide pickets - CAN		
DWG REV	B		
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SIZE	DWG. NO.		
B	Report assembly P4 Stair Wide Pickets		
SCALE: 1:15	SHEET REV	2017-05-16	

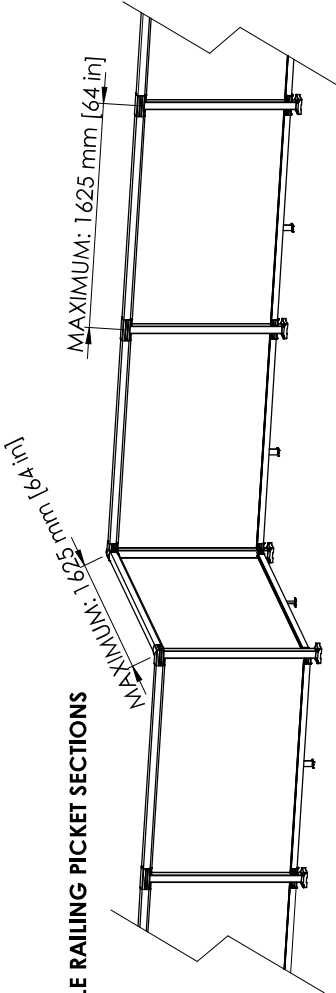
SINGLE RAILING PICKET SECTION



WALL MOUNT PICKET SECTION



MULTIPLE RAILING PICKET SECTIONS



ALLOWABLE SPANS* 6 in GLASS PANELS AND GLASS PANELS UP TO 1.676 m (66 in)

Wind Load	Live Load	Maximum Wall Mount Single Span	Maximum Post Spacing	
			Single Section	Multiple Section
≤ 0.2 kPa (low exposure area)	0.75 kN/m	1.838 m [72-3/8 in]	1.880 m [74 in]	1.625 m [64 in]
≤ 0.67 kPa (low-rise)	0.75 kN/m	1.838 m [72-3/8 in]	1.880 m [74 in]	1.524 m [60 in]
≤ 0.97 kPa (high-rise)	0.75 kN/m	1.838 m [72-3/8 in]	1.880 m [74 in]	1.422 m [56 in]
≤ 1.15 kPa (high-exposure area)	1 kN	1.838 m [72-3/8 in]	1.880 m [74 in]	1.321 m [52 in]

*Note: The above wind loads provided are guidelines for typical building types for a q50 = 0.48kPa in rough terrain. Actual wind loads must be determined by a professional engineer for the intended location.



TITLE
RailBlazers® - Allowable Spans

PART FILE
Report assembly P4 Span 74in

DWG REV
B

DIMENSIONS ARE IN MM UNLESS NOTED
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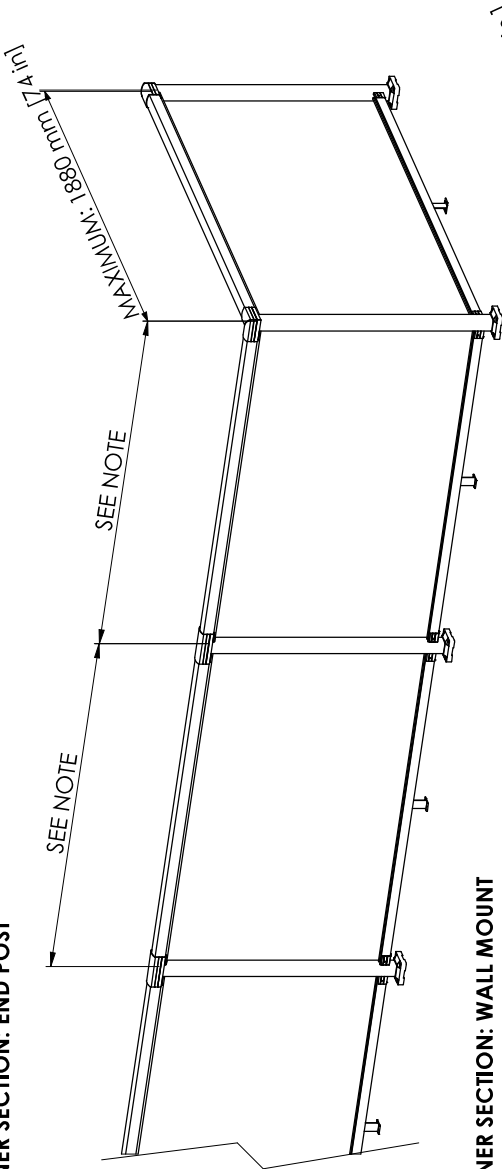
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SIZE
DWG. NO.

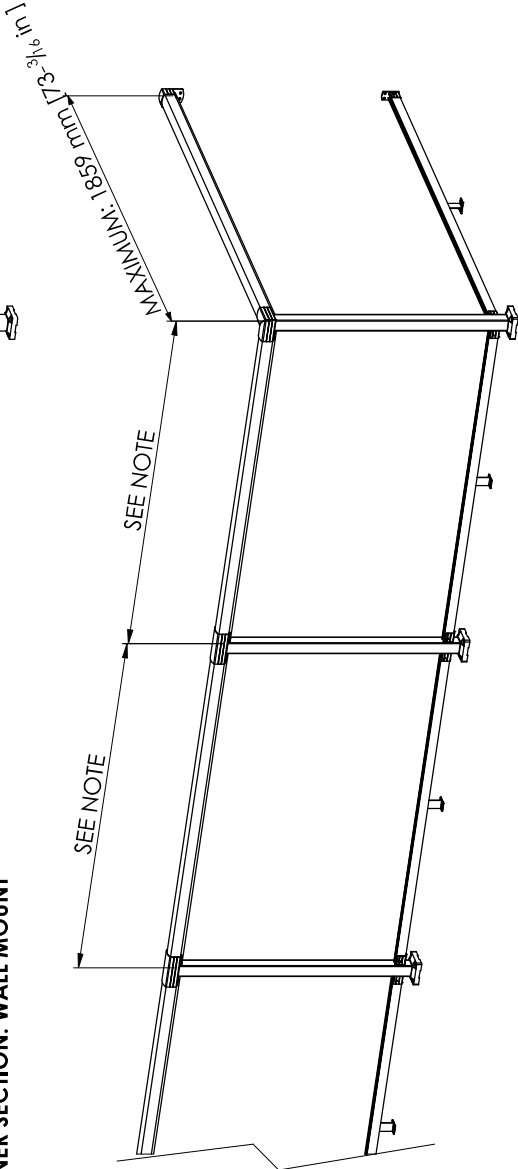
B Report assembly P4 Allowable Spans

SCALE: 1:20
SHEET NO. 2017-05-16

L-SHAPED CORNER SECTION: END POST



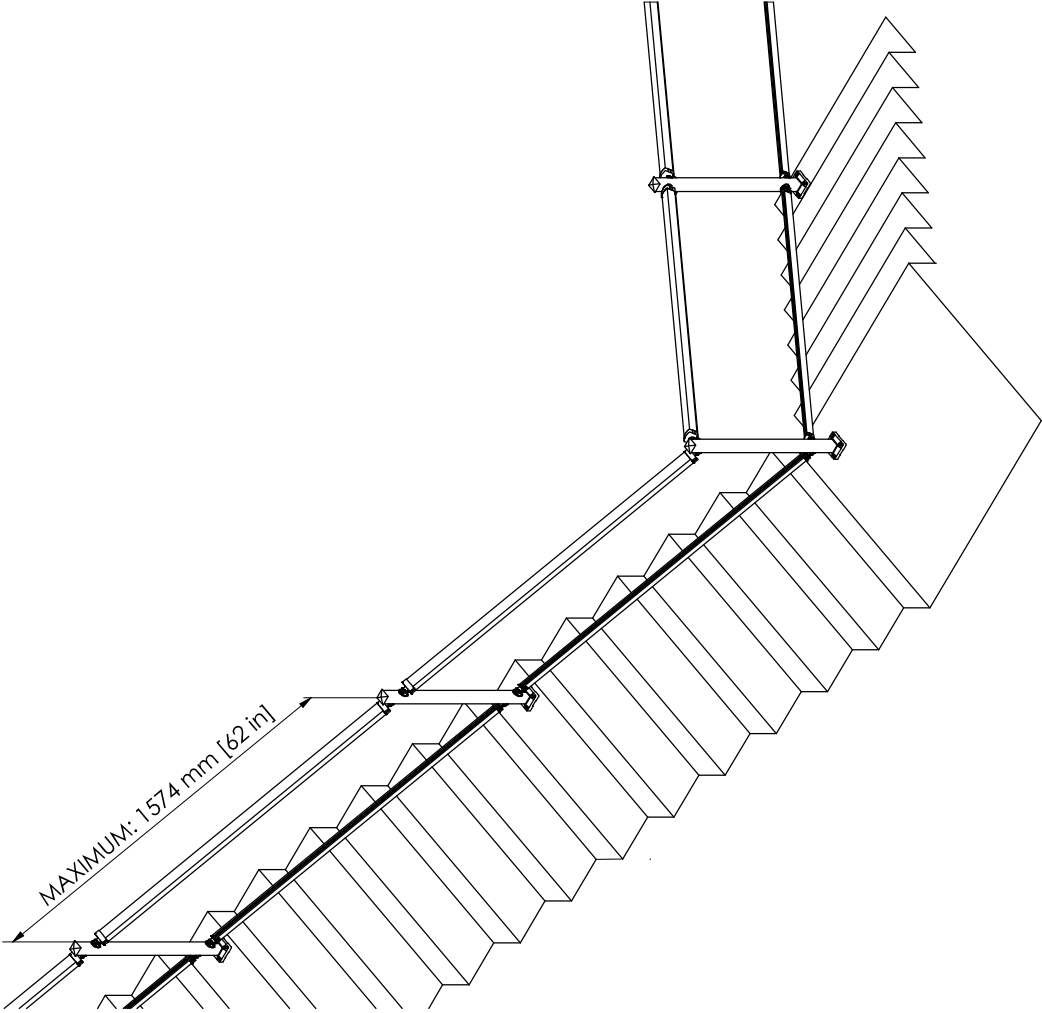
L-SHAPED CORNER SECTION: WALL MOUNT



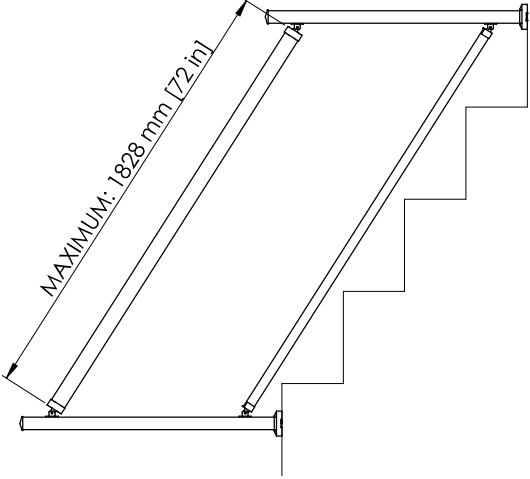
NOTE: Refer to drawing "RailBlazers® - Allowable Spans" for multiple railing section allowable spans.

	
TITLE	RailBlazers® - Allowable spans for a single return section
PART FILE	US - Return
DWG REV	B
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING	
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SIZE	DWG. NO.
B	Report assembly P4 L-Return
SCALE: 1:20	SHEET REV: 2017-05-16

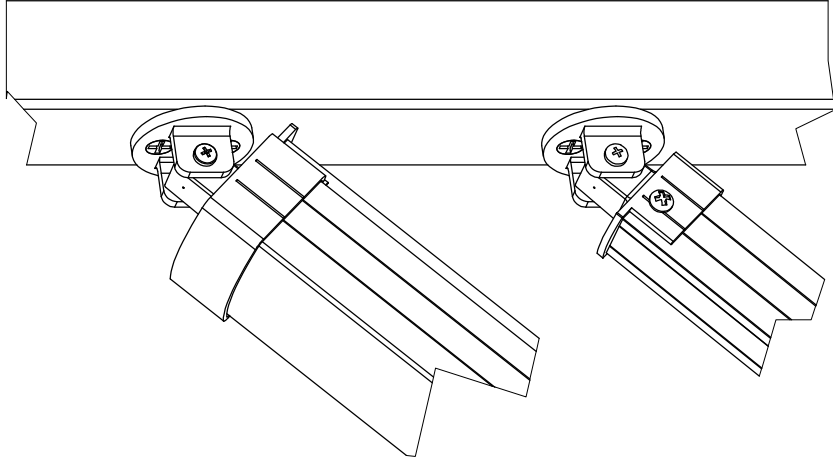
MULTIPLE STAIR RAILING SECTIONS



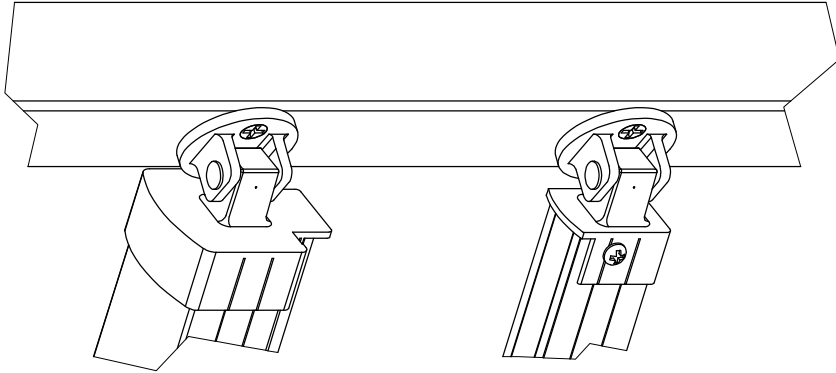
SINGLE STAIR RAILING SECTION



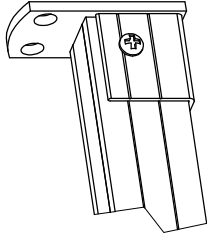
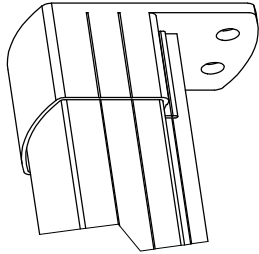
	
TITLE	RailBlazers® - Allowable Stair Spans
PART FILE	Report assembly - stair span single
DWG REV	B
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING	
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SIZE	DWG. NO.
B	Report assembly P4 Stair Span
SCALE: 1:20	
SHEET NO. 2017-05-16	



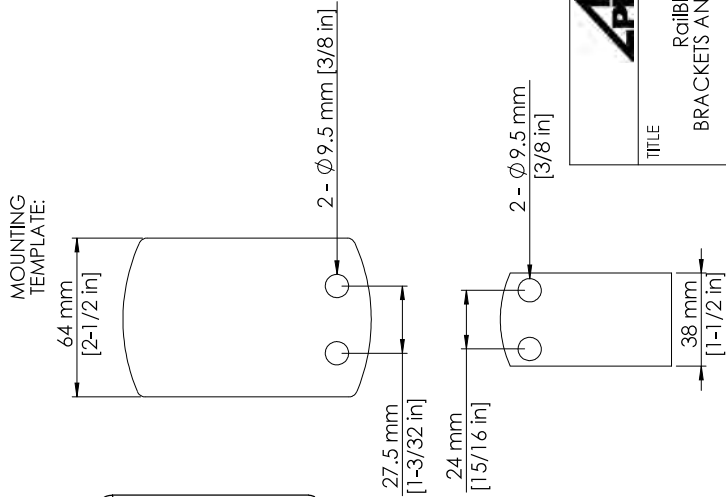
UNIVERSAL CONNECTOR
VERTICAL INSTALLATION
SKU: 90900, 90901



UNIVERSAL CONNECTOR
HORIZONTAL INSTALLATION
SKU: 90900, 90901

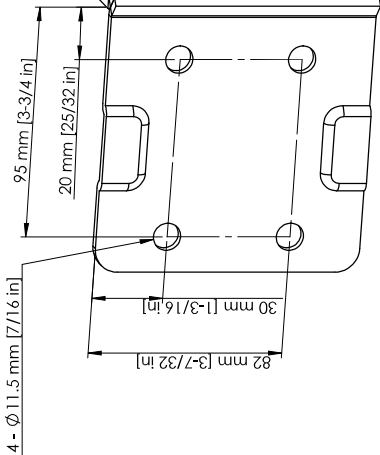


WALL MOUNT BRACKETS
SKU: 90920, 90921

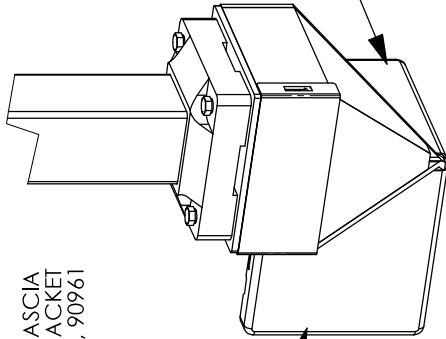


TITLE	RailBlazers® - BRACKETS AND CONNECTORS		
PART FILE	fig-brackets-horiz		
DWG REV	C		
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING			
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SIZE	DWG. NO.	Report-brackets RB-CAN	
B		SHEET REV	2017-05-16
SCALE: 1:2			

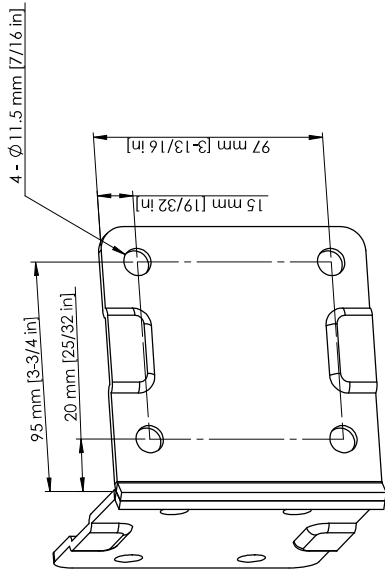
LEFT MOUNTING
TEMPLATE:



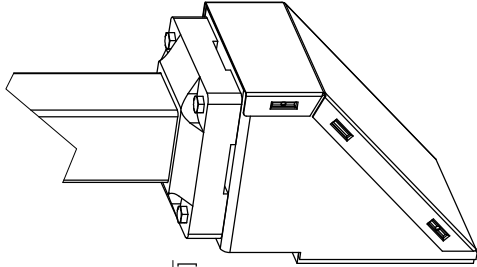
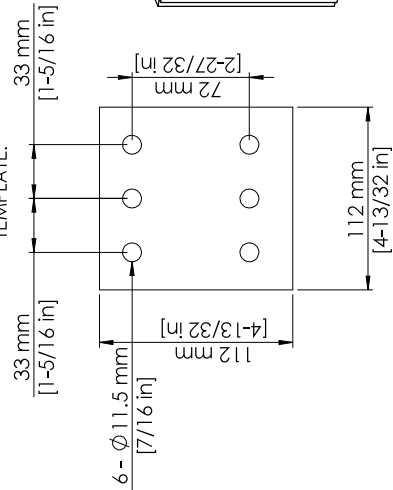
CORNER FASCIA
MOUNT BRACKET
SKU: 90960, 90961



RIGHT MOUNTING
TEMPLATE:



MOUNTING
TEMPLATE:

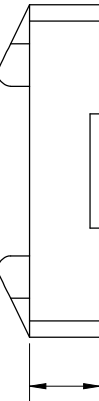
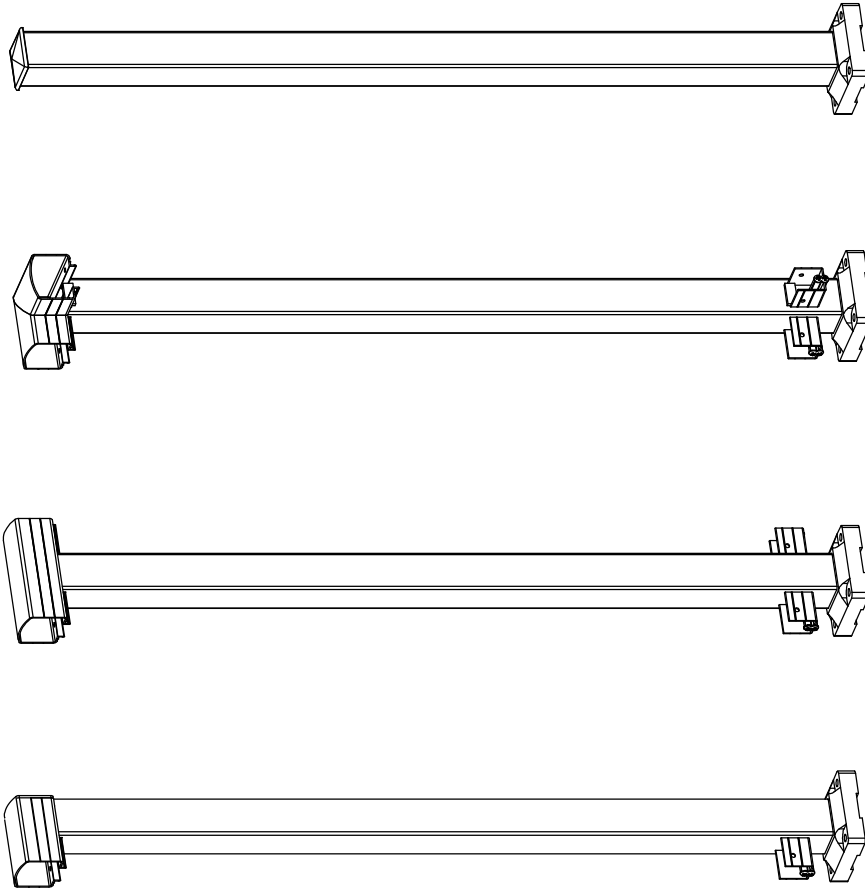
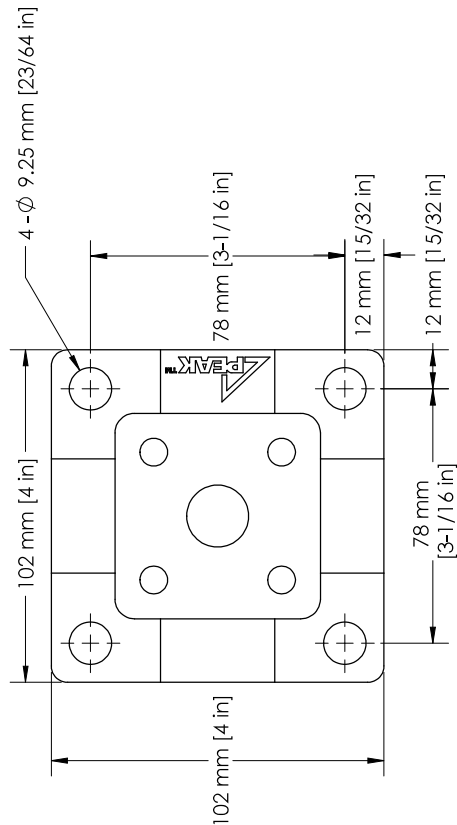


MID/STAIR/END FASCIA
MOUNT BRACKET
SKU: 90970, 90971



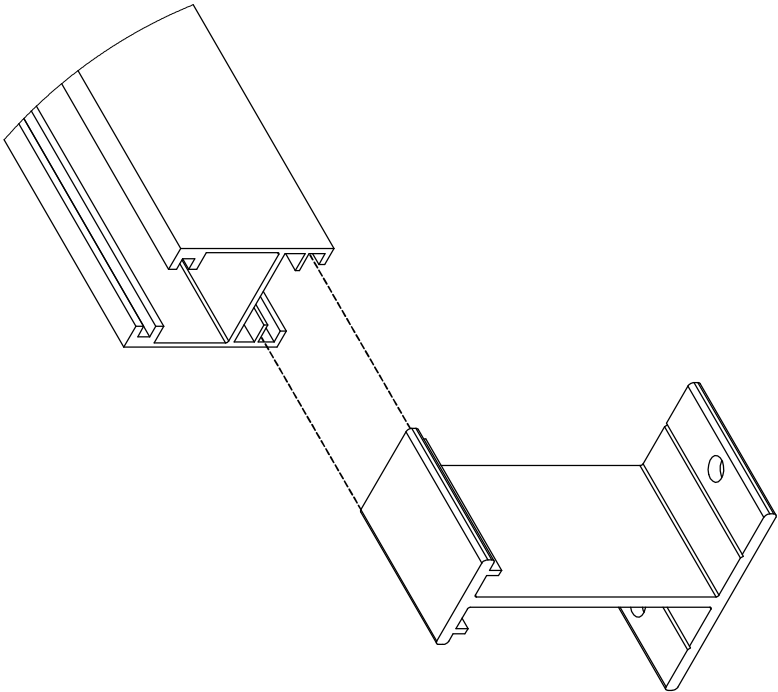
TITLE	RailBlazers® - FASCIA MOUNT BRACKETS		
PART FILE	fig-fascia-corner		
DWG REV	C		
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING			
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SIZE	DWG. NO.	Report-brackets RB-CAN	
B			SHEET / SCALE: 1:3 2017-05-16

MOUNTING
TEMPLATE

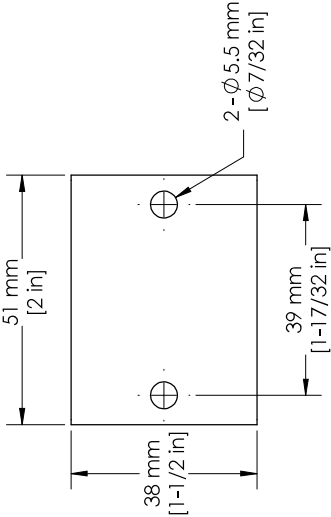


TITLE		RailBlazers® - POSTS	
PART FILE		figpost-corner PAB	
DWG REV		C	
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING			
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SIZE	DWG. NO.		
B	Report-Posts RB-CAN-2019		
SCALE: 1:8	SHEET REV	2017-05-16	

DESCRIPTION	SKU
END POST	90000, 90001
MID POST	90010, 90011
CORNER POST	90020, 90021
STAIR POST	90050, 90051



MOUNTING TEMPLATE:



NOTE: The bottom rail support was not evaluated as a structural component necessary to resist the loads stated in Section 1.0 of this report. It does not form part of the structural system of the guard assembly.

	
TITLE	RailBlazers® - BASE RAIL SUPPORT
PART FILE	Report assembly - base rail support
DWG REV	B
DIMENSIONS ARE IN MM UNLESS NOTED DO NOT SCALE DRAWING	
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SIZE	DWG. NO.
B	BASE RAIL SUPPORT CA
SCALE: 1:1	SHEET REV: 2017-05-16