

March 3, 2016

Orion Solar Racking  
2917 Vail Avenue  
Commerce, California 90040  
TEL: (310) 409-4616  
FAX: (310) 409-4717

Attn.: Engineering Department,

Re: Engineering Certification for the Orion Solar Rail with Heavy Duty Rail Insert

PZSE, Inc.-Structural Engineers has analyzed the subject Orion Heavy Duty Rail Insert (Part No. FAB-R-DH-1) and determined that it is in compliance with, and will meet the structural requirements of the applicable sections of the following Reference Documents.

1. 2012 International Building Code, by International Code Council, Inc., 2012
2. 2013 California Building Code, by California Building Standards Commission, 2013
3. ASCE/SEI 7-10 Minimum Design Loads for Buildings and other Structures
4. 2010 Aluminum Design Manual, by The Aluminum Association, 2010
5. Acceptance Criteria AC428, by International Code Council, Inc., 2012

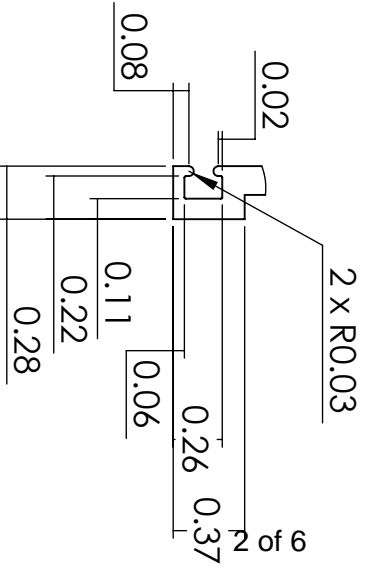
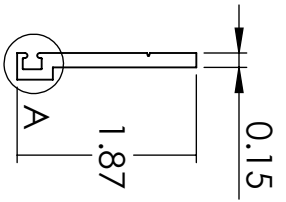
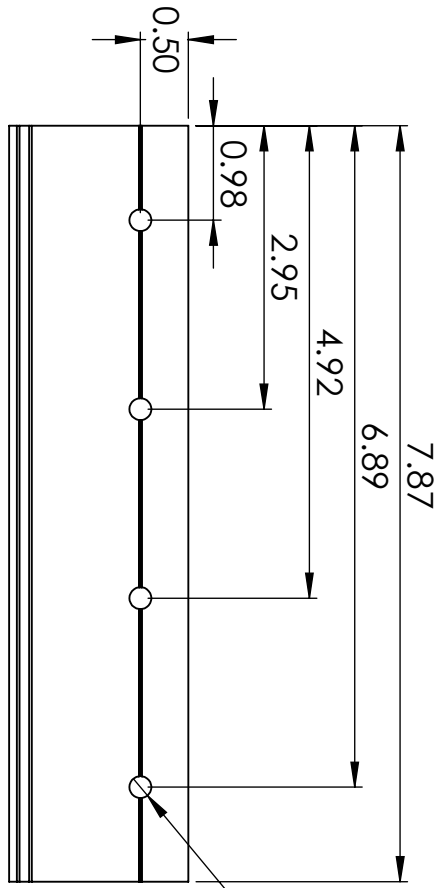
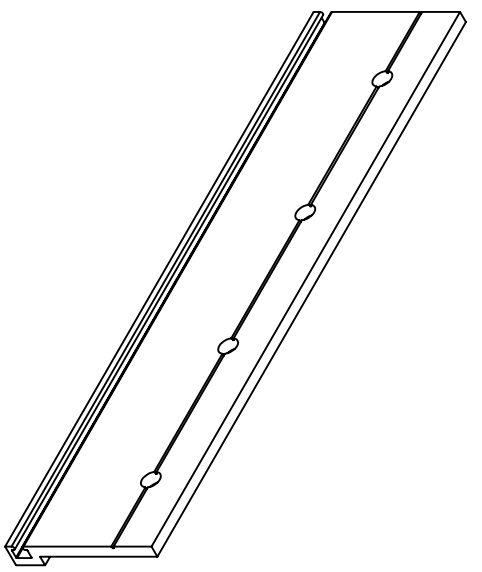
This letter certifies that the loading criteria and design basis for the Standard Rail Span Table contained within the Orion Heavy Duty Rail Insert Specification Sheets, and Tables 1, 2 and 3 below are in compliance with the above Codes.

This certification excludes connections to building structures and the effects on building structure components.

If you have any questions on the above, do not hesitate to call.

Prepared by:  
PZSE, Inc. - Structural Engineers  
Roseville, CA





DETAIL A  
SCALE 1 : 1

<b>DO NOT SCALE DRAWING</b>		Orion Solar Racking 2917 Vail Ave. Commerce, CA 90040 TEL: (310) 409-4616 Copyright © 2011 Orion Racking. <a href="http://orionsolartracking.com">orionsolartracking.com</a>	
DRAWN BY	C. Schwartzman	DATE	02/22/16
CHECKED		DATE	
MFG APPR		DATE	
MATERIAL	AL 6005-T5		
FINISH			
SHEET 1 OF 2		SIZE	A
		PART NO.	FAB-R-HD-I
		REV	B

Heavy Duty Rail Insert

4

3

2

1

A

B

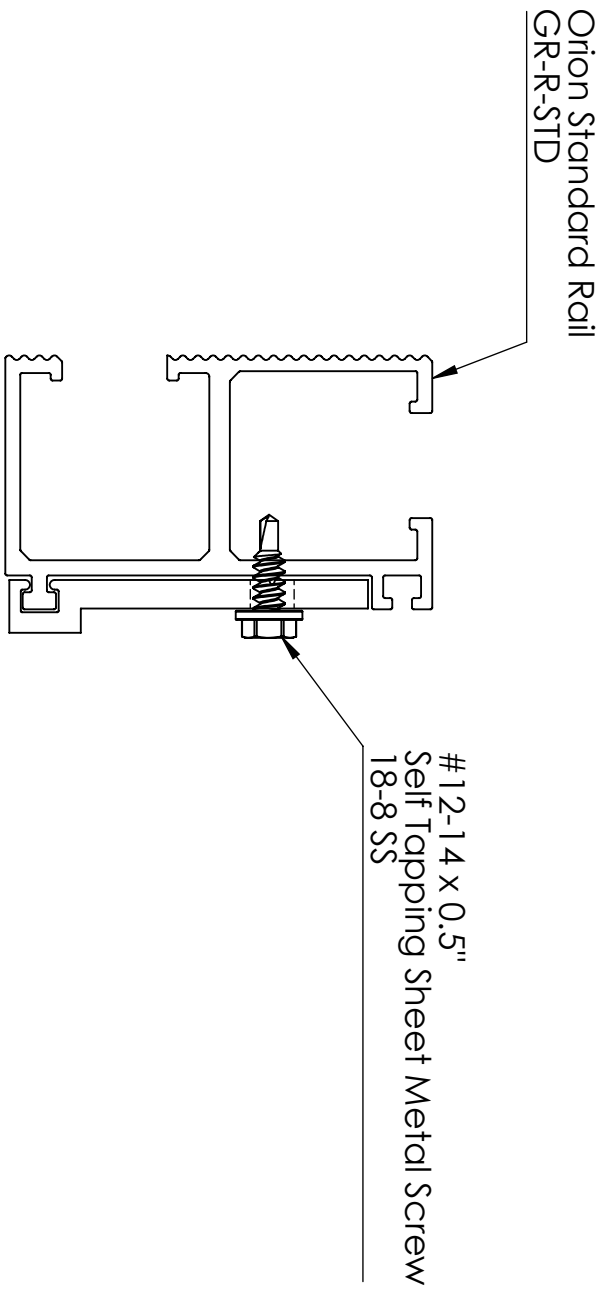
C

4

3

2

1



<b>DO NOT SCALE DRAWING</b>		Orion Solar Racking 2917 Vail Ave. Commerce, CA 90040 TEL: (310) 409-4616 Copyright © 2011 Orion Racking. <a href="http://OrionSolarRacking.com">OrionSolarRacking.com</a>	
DRAWN BY	C. Schwartzman	DATE	02/26/16
CHECKED		DATE	
MFG APPR		DATE	
<b>PROPRIETARY AND CONFIDENTIAL</b> THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ORION SOLAR RACKING. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ORION SOLAR RACKING IS PROHIBITED.		<b>ORION</b> SOLAR RACKING <i>We Make Solar Installation Simple!</i>	
<b>TITLE</b> Heavy Duty Rail Insert - Connection Method		<b>SIZE</b> <b>A</b>	<b>PART NO.</b> FAB-R-HD-I
<b>FINISH</b> SHEET 2 OF 2		<b>REV</b> <b>B</b>	<b>CONNECTION METHOD</b>

4 3 2 1

Table 1: Zone 1 Span

Orion Heavy Duty Insert Rail Span (ft)									
EXP	WIND SPEED (mph)	ZONE 1							
		Snow Load (psf)							
		0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0
B	110	11.0	9.5	8.5	7.5	6.5	6.0	5.5	5.0
	120	11.0	9.5	8.5	7.5	6.5	6.0	5.5	5.0
	130	11.0	9.5	8.5	7.5	6.5	6.0	5.5	5.0
	140	10.0	9.5	8.5	7.5	6.5	6.0	5.5	5.0
	150	9.5	9.5	8.0	7.5	6.5	6.0	5.5	5.0
	160	9.0	9.0	8.0	7.0	6.5	6.0	5.5	5.0
	170	8.0	8.0	8.0	7.0	6.5	6.0	5.5	5.0
	180	7.5	7.5	7.5	7.0	6.5	6.0	5.5	5.0
C	110	11.0	9.5	8.5	7.5	6.5	6.0	5.5	5.0
	120	10.0	9.5	8.5	7.5	6.5	6.0	5.5	5.0
	130	9.0	9.0	8.0	7.5	6.5	6.0	5.5	5.0
	140	8.5	8.5	8.0	7.0	6.5	6.0	5.5	5.0
	150	8.0	8.0	7.5	7.0	6.5	6.0	5.5	5.0
	160	7.5	7.5	7.5	7.0	6.5	6.0	5.5	5.0
	170	7.0	7.0	7.0	6.5	6.0	5.5	5.5	5.0
	180	6.5	6.5	6.5	6.5	6.0	5.5	5.5	5.0

- a. The table above ONLY includes Orion rail + HD insert capacity check. It does not include roof attachment or roof capacity check
- b. Wind risk category II per ASCE7-10
- c. Topographic factor, kzt is 1.0
- d. Maximum mean roof height is 30 ft.
- e. Average parapet height is 0 ft
- f. Roof pitch is between 7 degree and 27 degree
- g. Maximum solar panel weight is 50 lbs
- h. Height of solar panel is between 2" and 10" to roof
- i. Maximum rail end cantilever length= 0.35 x angle bracket spacing along rail
- j. The HD insert shall be installed as a continuous member along the length of the rail, but may be held short of each end of the rail by no more than 6 inches.

Table 2: Zone 2 Span

Orion Heavy Duty Insert Rail Span (ft)									
EXP	WIND SPEED (mph)	ZONE 2							
		Snow Load (psf)							
		0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0
B	110	9.5	9.5	8.5	7.5	6.5	6.0	5.5	5.0
	120	8.5	8.5	8.5	7.5	6.5	6.0	5.5	5.0
	130	8.0	8.0	8.0	7.5	6.5	6.0	5.5	5.0
	140	7.0	7.0	7.0	7.0	6.5	6.0	5.5	5.0
	150	6.5	6.5	6.5	6.5	6.5	6.0	5.5	5.0
	160	6.5	6.5	6.5	6.5	6.5	6.0	5.5	5.0
	170	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.0
C	180	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0
	110	8.0	8.0	8.0	7.5	6.5	6.0	5.5	5.0
	120	7.0	7.0	7.0	7.0	6.5	6.0	5.5	5.0
	130	6.5	6.5	6.5	6.5	6.5	6.0	5.5	5.0
	140	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.0
	150	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0
	160	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
170	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
180	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5

- a. The table above ONLY includes Orion rail + HD insert capacity check. It does not include roof attachment or roof capacity check
- b. Wind risk category II per ASCE7-10
- c. Topographic factor, kzt is 1.0
- d. Maximum mean roof height is 30 ft
- e. Average parapet height is 0 ft
- f. Roof pitch is between 7 degree and 27 degree
- g. Maximum solar panel weight is 50 lbs
- h. Height of solar panel is between 2" and 10" to roof
- i. Maximum rail end cantilever length= 0.35 x angle bracket spacing along rail
- j. The HD insert shall be installed as a continuous member along the length of the rail, but may be held short of each end of the rail by no more than 6 inches.

Table 3: Zone 3 Span

Orion Heavy Duty Insert Rail Span (ft)									
EXP	WIND SPEED (mph)	ZONE 3							
		Snow Load (psf)							
		0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0
B	110	7.5	7.5	7.5	7.5	6.5	6.0	5.5	5.0
	120	7.0	7.0	7.0	7.0	6.5	6.0	5.5	5.0
	130	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.0
	140	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.0
	150	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0
	160	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	170	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	180	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
C	110	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.0
	120	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.0
	130	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	140	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	150	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	160	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	170	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	180	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

- a. The table above ONLY includes Orion rail + HD insert capacity check. It does not include roof attachment or roof capacity check
- b. Wind risk category II per ASCE7-10
- c. Topographic factor,  $k_{zt}$  is 1.0
- d. Maximum mean roof height is 30 ft
- e. Average parapet height is 0 ft
- f. Roof pitch is between 7 degree and 27 degree
- g. Maximum solar panel weight is 50 lbs
- h. Height of solar panel is between 2" and 10" to roof
- i. Maximum rail end cantilever length=  $0.35 \times$  angle bracket spacing along rail
- j. The HD insert shall be installed as a continuous member along the length of the rail, but may be held short of each end of the rail by no more than 6 inches.