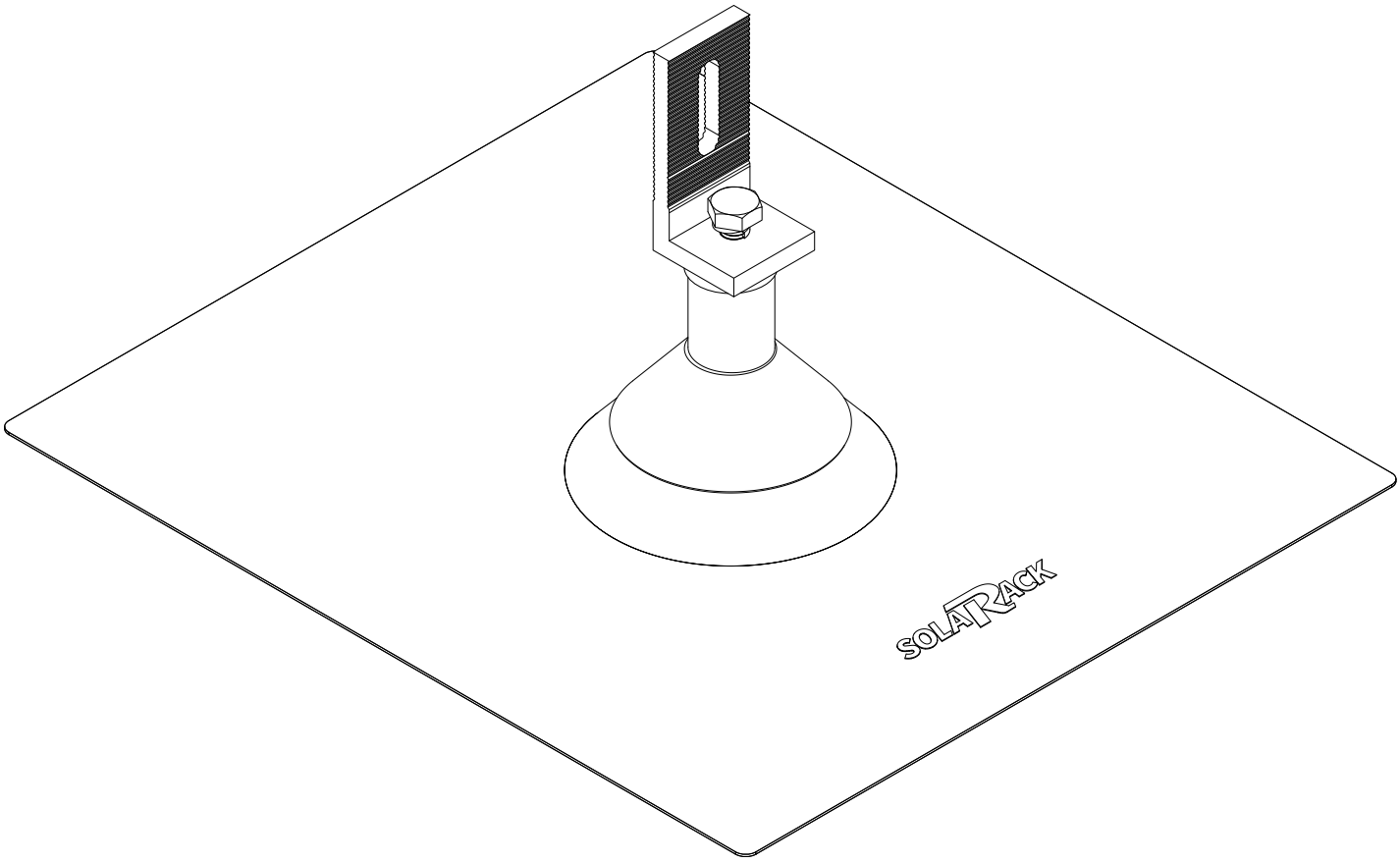
SOLARACK

Just Makes Cents... Per Watt



Compliance Report
Standoff Kit

State of California

September 25th 2017

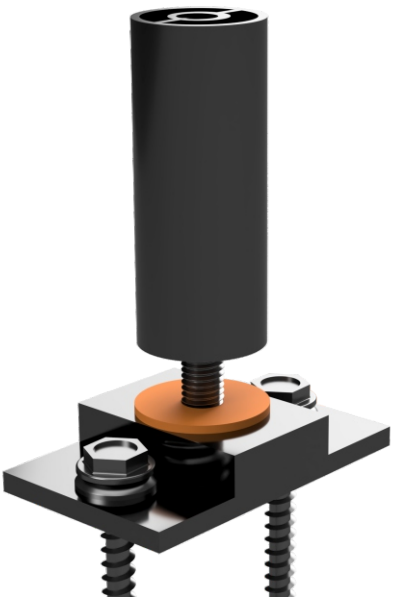
5062 Lankershim Blvd Suite # 418
North Hollywood, CA 91601

RE: Sunstrong Structural Compliance Report of SolaRack Aluminum Standoff

The scope of this report focuses on providing a structural verification of aluminum extruded standoff intended for attachment to L-Footing that support side mounted rails manufactured by SolaRack.

The structural performance of the standoff has been verified to be in compliance with the requirements of the 2016 California Building Code and ASCE 7-10 under prescribed wind loading in the state of California. The construction and application of the aluminum L-footings railing shall be accordance with the industry standards and regulations. Structural verification of the roof frame members and the panel racking are excluded and beyond the scope of this report.

Figure 1:



Standoff Section Sketch

Design Approach

The Standoff section as illustrated in Figure 1: was as a cantilevered compact column undergoing wind loads applied as axial tensile loads from the L-Footings supporting the racking of the pv modules. The resulting applied tensile forces moments was then checked with the allowable tensile stress of the aluminum rail standoff section based on the equation below.

$$F_a = F_{tu} \div (k_t \times n_u) = 19.5 \text{ ksi}$$

F_{tu} =38ksi (6005-T5 Aluminum)

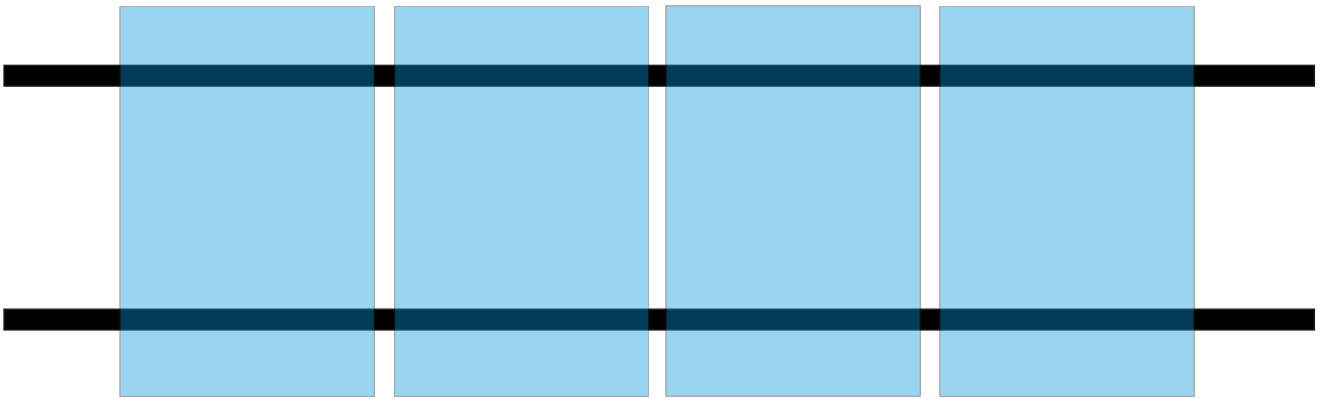
The applied tensile stress for the worst case loading condition is based on the following equation, where standoff will be located on rails several panel layout scenarios (See Figure 2):

$$f = P_u \ X \ A_t$$

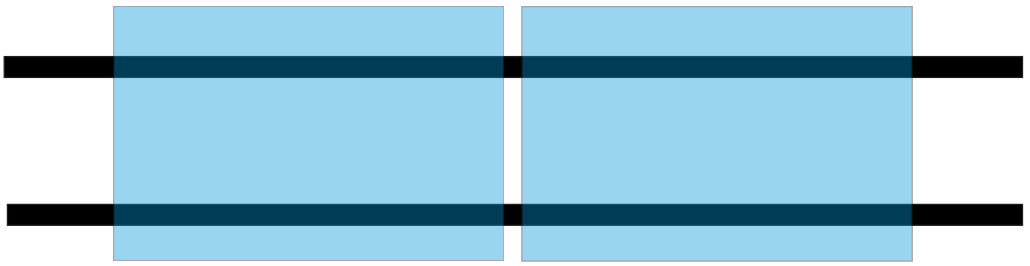
P_u is the resulting wind uplift pressure
A_t is the worst case tributary area

Figure 2:

When mounted in portrait rails may be mounted 8” to 18” from the module edge.



When mounted in landscape rails may be mounted 4” to 17” from the module edge.



PV Racking Scenarios for Panels in Landscape & Portrait Orientation

Worst case loading conditions were based on the following two load combinations per section 2.4 of ASCE 7 -10:

1. D + 0.6W

2. 0.6D = 0.6W

Where D is the dead load of the panels and racking equipment W is the wind uplift load. The resulting uplift load. The resulting uplift pressures was then considered determining the worst case tensile force applied to standoff based on a maximum standoff spacing of 6 feet o.c.

Design Criteria

The following parameters were considered in determining the values of the allowable span charts of the railing:

Maximum Building Height Considered = 30ft
Exposure Categories Considered: B & C
Wind Pressure Based on Section 30.4 (Method 1)
Gust Factor, G = 0.85
Topography Factor, Kzt = 1.0
Directionality Factor, Kd = 0.85
Importance Factor, I = 1.0
Maximum Spacing of Standoffs = 6ft
Zone 2 Pressures Only Considered
Minimum 2 Rails Per Panel
Roof Tilt Angles Considered: 0 to 30 degrees
Performance Not Limited to Deflection
Maximum Height of Standoff = 9”

Design Code References

The following engineering references were considered in determining the values of the wind load conditions and material properties of the aluminum railing:

IBC 2015 / CALIFORNIA BUILDING CODE 2016
ASCE 7-10 (Wind Loading)
Aluminum Design: Aluminum Design Manual 2010

Design Load Rating in Accordance with UL 2703

Downward Pressure - 10 psf
Upward Pressure - 5 psf
Down-slope Load - 5 psf

Standoff Kit

The structural verification and installation of the Aluminum Standoff for solar racking shall be subject to the following qualification and conditions.

There shall be a minimum of 2 rails provided per solar panel.

Anchor spacing along rail shall not exceed 72 inches.

All other components such as clamps and splices shall be installed per manufacturer's specifications

The deflection of the railing has not been controlled in the design. If deflection has to be limited then spacing shall be reduced as advised by a practicing structural engineer.

Building is not a special occupancy structure such as a public school, public safety building or assembly building.

The installation of the framing shall conform to relevant Building Codes, Manufacturer's specifications and good building practice.

The cantilever span of the railing shall not exceed 12 inches.

Attachment of lag screws shall be installed per the requirements of 2012 National Design (NDS).

Structural verification of the existing roof frame members and panel railings are excluded in this report.

Proper attachment to roof frame member shall be verified by a qualified inspector or building official.

Dissimilar metals shall be separated with a suitable inert material to prevent galvanic corrosion.

The installation and fixings shall be periodically inspected and maintained.

Please feel free to contact us with any questions or concerns regarding the information provided in this report.

Respectfully Submitted,

PHONG "PAUL" TRUONG, *PE*
President

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