October 16, 2017

Attn: Mr. Marshall Green
Quick Mount PV
Director of Engineering
2700 Mitchell Dr., Bldg 2
Walnut Creek, CA 94598

RE: Quick Mount PV Quick Hook Mount
State of California Compliance Letter SEI Project No.: 17054.00

Dear Mr. Green:

Structural Enginuity Inc. (SEI) submits this letter regarding our review of the test data for the Quick Mount PV (QMPV) Quick Hook Mount (QMHSS & QMHLS) photovoltaic (PV) array mounting system. The test data is from the Applied Materials & Engineering, Inc. (AME) Project Number 114490C, titled, “Laboratory Load Test of the QMHLS with 6061 Base Plate”, dated March 10, 2015 and “Laboratory Load Test of the QMHSS with 6061 Base Plate”, dated March 18, 2015 and is available upon request from QMPV.

AME is a licensed testing and engineering firm located at 980 41st Street, Oakland, CA 94608, where the testing of the QHook assembly was performed on January 10th through January 15th, 2016 for the QMHLS, and January 17th through January 23rd, 2016 for the QMHSS. The QHook assembly is designed to support and fasten rails and PV modules manufactured by others to the structural roof framing through plywood or OSB sheathing and roofing material that support a tile-clad roof. Figure 1 below delineates the components of a QHook assembly.

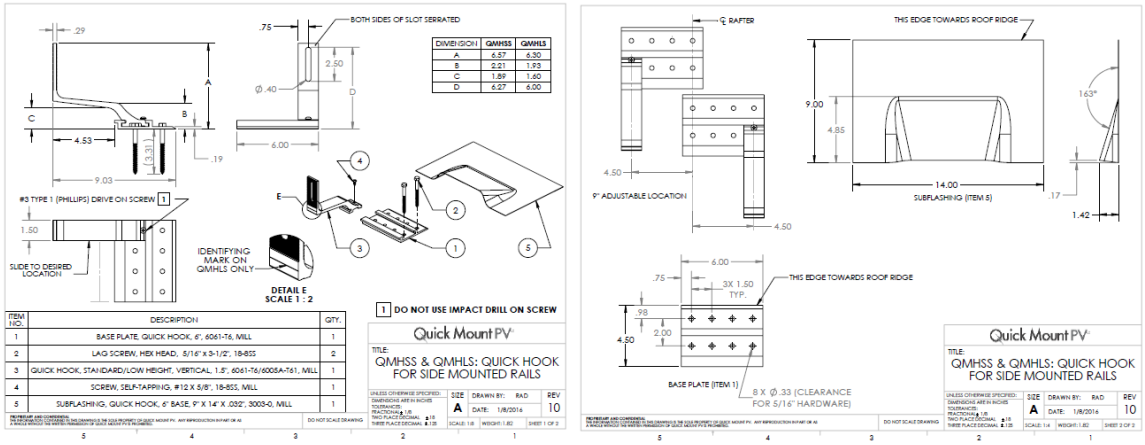

FIGURE 1: QHook Assembly

Testing of the Quick Hook assembly consisted of test specimens that were made up of the following:

- a wood test bed representing a plywood-sheathed, wood framed roof that comprised of 1/2" Structural I plywood over 16" long 2"x4" Douglas Fir rafters,
- a QPMV QHook on a 6061 base plate attached to rafters using two 5/16″Ø x 3 ½" lag screws with a minimum screw embedment of 2¼" into the structural members for each screw,

The test procedures were created to simulate the reactions that would be applied to the QHook assembly due to the environmental loads projected on a PV solar roof array that is fastened to a roof by the QHook system. The tests were simulated for the environmental loads as follows:

- Tension load test simulated wind uplift that was normal to the slope of the roof minus self-weight of the PV modules,
- Compression load test simulated a low-slope roof condition with snow and array self-weight vertically down plus wind down normal to the slope of the roof.
- Lateral load parallel to rafter simulated parallel to roof force component of downward snow and self-weight loads,
- Lateral perpendicular to rafter test simulated seismic loads on the cross-slope direction of the roof.

Tests were conducted such that the QHook of each specimen was located at the farthest point on the 6061 base track from the lag screw connections to the roof rafter below in order to test the base plate against its weakest condition for all loading conditions. It is understood that the testing was only performed to determine the allowable service capacity of the QMPV QHook system under its worst case layout conditions.

The evaluation was limited to the components of the Quick Hook Mount that is manufactured by Quick Mount PV with test specimens installed conformance with Quick Mount PV's product installation manual and specifications. Elements of the test specimen that are not manufactured by Quick Mount PV, such as the roof rafter capacity, were not evaluated in SEI's evaluation of the QMPV Quick Hook products; therefore, load capacities of these external elements should be determined by others or referenced by test data provided by the manufacturers of these elements. The following tables attached to this letter list the combined results of the four applied test load directions from the AME Test Report, allowable stress design (ASD) capacities extrapolated from the test results using ASD load combinations listed in ASCE 7-10 for conformance with the latest International Building Code for verifying capacity of the Quick Mount PV Quick Hook Mount to be used as a fastener for roof mounted PV Solar Arrays on tile covered roofs in the state of California.

Should you have any questions relating to this matter please contact me at your convenience.

Sincerely,

Allan T. Myket, S.E., P.E., P.Eng.
President/Founder
amyket@structuralenginuityinc.com

Structural Enginuity Inc.

10/16/2017

Table 1: Summary of Allowable Loads for Quick Mount PV Quick Hook Mount QMHLS AME Test Report Results

Loading Condition	Mean Tested Peak Load (lbs)	Minimum Tested Peak Load (lbs)	No. of Tests	Rafter Avg Specific Gravity	Type of Failure	FS: Method of Calculation	Factor of Safety	Allowable Load (lbs)
Tension	1112	902	6	0.554	Broken Hook	Aluminum Design Manual, 2010	2.65	418
Compresion	683	650	6	0.459	Hook Contact w/ Plywood	Aluminum Design Manual, 2010	2.02	338
Shear (Lateral) Parallel to Rafter	832	753	6	0.466	Broken Hook	Aluminum Design Manual, 2010	2.57	323
Shear (Lateral) Perpendicular to Rafter	1584	1503	6	0.469	Broken Hook at Base Plate	Aluminum Design Manual, 2010	2.28	694

Factor of Safety Calculation Methods:

Aluminum Design Manual, 2010, Appendix 1: Testing, 1.3.2 Tests for Determining Structural Performance, Eq. 1.3-3

NDS for Wood Construction, 2012, Commentary Section C11.2.1 Lag Screw Withdrawal Design Values, Eq C11.2.1-2

Material Notes:

The Quick Mount PV Quick Hook Mount Parts observed in tests to failure modes as noted above.

Hook = 6061-T6 (6005A-T61 & 6005-T5 is also acceptable)

Base = 6061-T6 (6005A-T61 & 6005-T5 is also acceptable)

Test Loading Notes:

1. Allowable load tables are based on a minimum screw embedment of 2¼" into the structural member for each screw. If less embedment is achieved, loads should be adjusted accordingly.

2. All loads were applied at the highest attachment point at end of hook.

3. Load is applied perpendicular to rafter. Represents the cross-slope parallel-to-roof force component of seismic loads.

4. Load is applied parallel to rafter. Represents the downslope parallel-to-roof force component of gravity (snow & self weight) loads.

Table 2: Summary of Allowable Loads for Quick Mount PV Quick Hook Mount QMHSS AME Test Report Results

Loading Condition	Mean Tested Peak Load (lbs)	Minimum Tested Peak Load (lbs)	No. of Tests	Rafter Avg Specific Gravity	Type of Failure	FS: Method of Calculation	Factor of Safety	Allowable Load (lbs)
Tension	1147	1056	6	0.466	Broken Hook	Aluminum Design Manual, 2010	2.27	506
Compresion	765	700	6	0.454	Hook Contact w/ Plywood	Aluminum Design Manual, 2010	2.02	378
Shear (Lateral) Parallel to Rafter	824	787	6	0.439	Broken Hook	Aluminum Design Manual, 2010	2.24	367
Shear (Lateral) Perpendicular to Rafter	1483	1225	6	0.48	Broken Hook at Base Plate	Aluminum Design Manual, 2010	2.65	559

Factor of Safety Calculation Methods:

Aluminum Design Manual, 2010, Appendix 1: Testing, 1.3.2 Tests for Determining Structural Performance, Eq. 1.3-3

NDS for Wood Construction, 2012, Commentary Section C11.2.1 Lag Screw Withdrawal Design Values, Eq C11.2.1-2

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Test Loading Notes:

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3. Load is applied perpendicular to rafter. Represents the cross-slope parallel-to-roof force component of seismic loads.

4. Load is applied parallel to rafter. Represents the downslope parallel-to-roof force component of gravity (snow & self weight) loads.