



January 27, 2012

Mr. Stuart Wentworth
QUICK MOUNT PV
2700 Mitchell Drive, Bldg. 2
Walnut Creek, CA 94598

Project Number 111680C

Subject: Quick Mount Classic Composition Mount (QMSC) with 4" Extension (QMEXT-4)

Dear Mr. Wentworth:

As requested, Applied Materials & Engineering, Inc. (AME) has completed load-testing the Quick Mount Classic Composition Mount (QMSC) with 4" aluminum extension (QMEXT-4). The purpose of our testing was to evaluate the tensile and shear load capacity of the QMSC with QMEXT-4 attached to a commercially available 2"x4" Douglas Fir rafter.

SAMPLE DESCRIPTION

Nine (9) mockup samples were delivered to our laboratory on December 12, 2011. Mockup configuration consisted of three 16" long rafters at 7" o.c., screwed to 1/2" Structural 1 plywood. The Quick Mount Classic Composition Mount (QMSC) with 4" extension (QMEXT-4) is attached through the plywood into the rafter with one 5/16"x6" lag bolt torqued to 15ft-lbs. Product specifications are provided in Appendix A.

TEST PROCEDURES & RESULTS

1. Tensile Strength

Three samples were tested for tensile strength on January 19, 2012 using a United Universal testing machine. Samples were rigidly attached to the testing machine and a tensile load was applied to the 5/16"x1" machine bolt connected to the QMEXT-4. The samples were loaded in tension at a constant rate of axial deformation of 0.05 in./min. without shock until failure occurred. Based on the above testing, the average ultimate tensile load of the QMSC with QMEXT-4 in Douglas Fir was determined to be 2782 lbf.

The specific gravity and moisture content of the rafter was tested in accordance with ASTM D2395, Method A (oven-dry). The average specific gravity and moisture content was determined to be 0.460 and 13.2%, respectively. Detailed results are provided in Table I. Test setup is illustrated in Figure 1 of Appendix B.

2. Shear Strength Parallel to Rafter

Three samples were tested for shear strength on January 19, 2012 using a United Universal testing machine. Samples were rigidly attached to the testing machine and a shear load was applied to the 5/16"x1" machine bolt connected to the aluminum extension. The samples were loaded parallel to rafter at a constant rate of axial deformation of 0.09 in./min. without shock until failure occurred. Based on the above testing, the average ultimate shear load, parallel to rafter, of the QMSC with QMEXT-4 in Douglas Fir was determined to be 854 lbf.

The specific gravity and moisture content of the rafter was tested in accordance with ASTM D2395, Method A (oven-dry). The average specific gravity and moisture content was determined to be 0.474 and 13.0%, respectively. Detailed results are provided in Table II. Test setup is illustrated in Figure 2 of Appendix B.

3. Shear Strength Perpendicular to Rafter

Three samples were tested for shear strength on January 19, 2012 using a United Universal testing machine. Samples were rigidly attached to the testing machine and a shear load was applied to the 5/16"x1" machine bolt connected to the aluminum extension. The samples were loaded perpendicular to rafter at a constant rate of axial deformation of 0.09 in./min. without shock until failure occurred. Based on the above testing, the average ultimate shear load, perpendicular to rafter, of the QMSC with QMEXT-4 in Douglas Fir was determined to be 683 lbf.

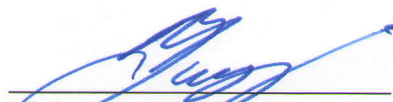
The specific gravity and moisture content of the rafter was tested in accordance with ASTM D2395, Method A (oven-dry). The average specific gravity and moisture content was determined to be 0.460 and 13.4%, respectively. Detailed results are provided in Table III. Test setup is illustrated in Figure 3 of Appendix B.

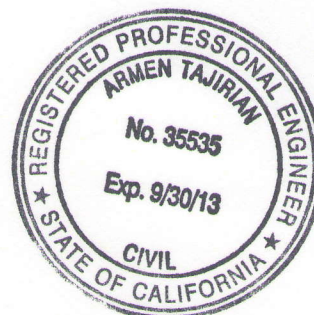
If you have any questions regarding the above, please do not hesitate to call the undersigned.

Respectfully Submitted,

APPLIED MATERIALS & ENGINEERING, INC.

Reviewed By:


Mohammed Faiyaz
Laboratory Manager



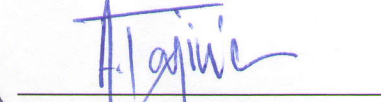

Armen Tajirian, Ph.D., P.E.
Principal

TABLE I
QUICK MOUNT CLASSIC COMPOSITION MOUNT (QMSC)
WITH 4" EXTENSION (QMEXT-4)
PROJECT NUMBER 111680C

SAMPLE ID	ULTIMATE TENSILE LOAD (LBF)	RAFTER MOISTURE CONTENT (%)	RAFTER SPECIFIC GRAVITY	FAILURE MODE
4PULL-1	2736	15.6	0.487	Lag Bolt Pull-Out
4PULL-2	3226	12.0	0.498	Lag Bolt Pull-Out
4PULL-3	2385	12.0	0.396	Lag Bolt Pull-Out
AVERAGE	2782	13.2	0.460	..

TABLE II
QUICK MOUNT CLASSIC COMPOSITION MOUNT (QMSC)
WITH 4" EXTENSION (QMEXT-4)
SHEAR LOAD PARALLEL TO RAFTER TEST RESULTS
PROJECT NUMBER 111680C

SAMPLE ID	ULTIMATE SHEAR LOAD PARALLEL TO RAFTER (LBF)	RAFTER MOISTURE CONTENT (%)	RAFTER SPECIFIC GRAVITY	FAILURE MODE
4PARAM-1	809	13.1	0.498	Bent Lag Bolt
4PARAM-2	885	13.7	0.446	Bent Lag Bolt
4PARAM-3	867	12.2	0.479	Bent Lag Bolt
AVERAGE	854	13.0	0.474	..

TABLE III

QUICK MOUNT CLASSIC COMPOSITION MOUNT (QMSC)
WITH 4" EXTENSION (QMEXT-4)

SHEAR LOAD PERPENDICULAR TO RAFTER TEST RESULTS

PROJECT NUMBER 111680C

SAMPLE ID	ULTIMATE SHEAR LOAD PERPENDICULAR TO RAFTER (LBF)	RAFTER MOISTURE CONTENT (%)	RAFTER SPECIFIC GRAVITY	FAILURE MODE
4PERP-1	626	12.0	0.500	Bent Lag Bolt
4PERP-2	751	12.9	0.440	Bent Lag Bolt
4PERP-3	671	15.2	0.440	Bent Lag Bolt
AVERAGE	683	13.4	0.460	..

References

AC13-2010, “*Acceptance Criteria for Joist Hangers and Similar Devices*”, ICC Evaluation Service.

AC85-2008, “*Acceptance Criteria for Test Reports*”, ICC Evaluation Service.

ASTM D1761-2006, “*Standard Test Methods for Mechanical Fasteners in Wood*”, ASTM International.

APPENDIX A

Quick Mount PV[®]

RESPECT THE ROOF[™]

Classic Composition Mount Specifications - 5/16" - PV -

Quick Mount PV[®] is an all-in-one waterproof flashing and mount to anchor photovoltaic racking systems, solar thermal panels, air conditioning units, satellite dishes, or anything you may need to secure to a new or existing roof. It is made in the USA of all aluminum and includes stainless steel hardware. It works with all standard racks, installs seamlessly and saves labor by not needing to cut away any roofing, will out live galvanized 2 to 1, and is a better low-profile mount.

Split Lock Washer SS 5/16" (Not a theft-prevention feature)

Fender Washer SS 5/16" x 1"

EPDM Rubber Washer 60 Durometer 5/16"

Sealing Washer SS 5/16"

Hanger Bolt SS 5/16" x 6"

1 1/4" Machine, 1 3/4" Spacer, 3" Lag

Mount & Flashing Aluminum

Mount 1 1/4" x 1 1/4" x 2 1/4" Beveled Block

Flashing .05" thick

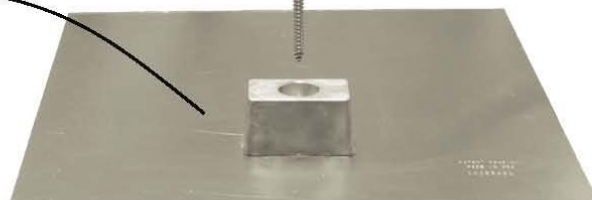
For standard composition roofs:

flashing is 12" x 12"

mount is attached 3" off center

ICC
ES
ESR-2835

(2) Hex Nuts SS 5/16"



Lag pull-out (withdrawal) capacities (lbs) in typical lumber:

	Specific gravity	Lag Bolt Specifications	
		5/16" shaft per 3" thread depth	5/16" shaft per 1" thread depth
Douglas Fir, Larch	.50	798	266
Douglas Fir, South	.46	705	235
Engelmann Spruce, Lodgepole Pine (MSR 1650 f & higher)	.46	705	235
Hem, Fir	.43	636	212
Hem, Fir, (North)	.46	705	235
Southern Pine	.55	921	307
Spruce, Pine, Fir	.42	615	205
Spruce, Pine, Fir (E of 2 million psi and higher grades of MSR and MEL)	.50	798	266

Sources: Uniform Building Code; American Wood Council

Notes:

1) Thread must be embedded in a rafter or other structural roof member.

2) See IBC for required edge distances.

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APPENDIX B

QUICK MOUNT CLASSIC COMPOSITION MOUNT (QMSC)
WITH 4" EXTENSION (QMEXT-4)

LOAD TEST SETUP

PROJECT NUMBER 111680C



Figure 1a. Tensile Test



Figure 1b. Tensile Test Close-up

QUICK MOUNT CLASSIC COMPOSITION MOUNT (QMSC)
WITH 4" EXTENSION (QMEXT-4)

SHEAR TEST SETUP

PROJECT NUMBER 111680C



Figure 2a. Shear Parallel to Rafter

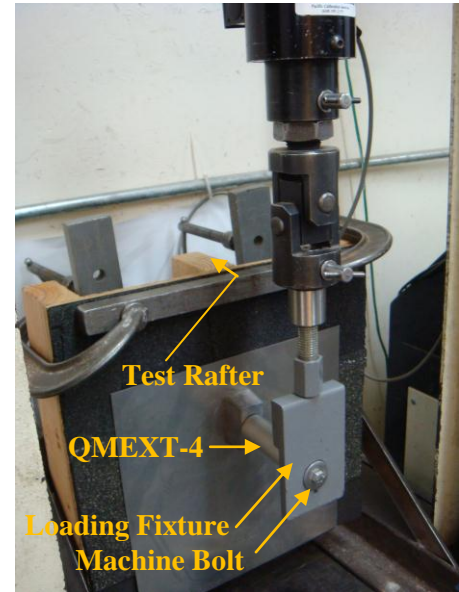


Figure 2b. Shear Test Close-up

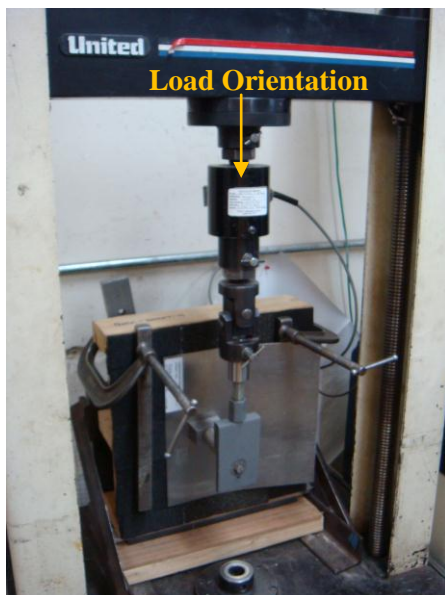


Figure 3a. Shear Perpendicular to Rafter

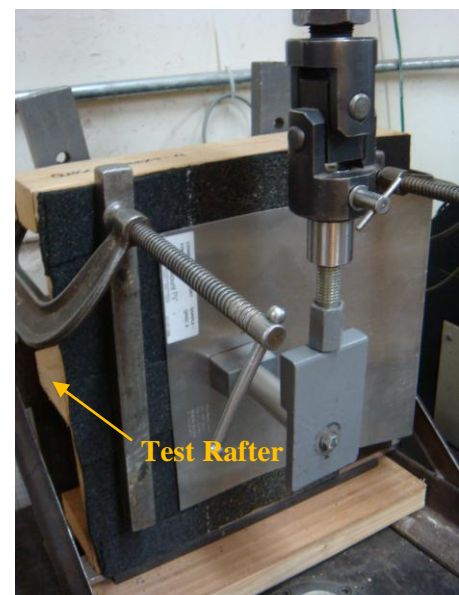


Figure 3b. Shear Test Close-up