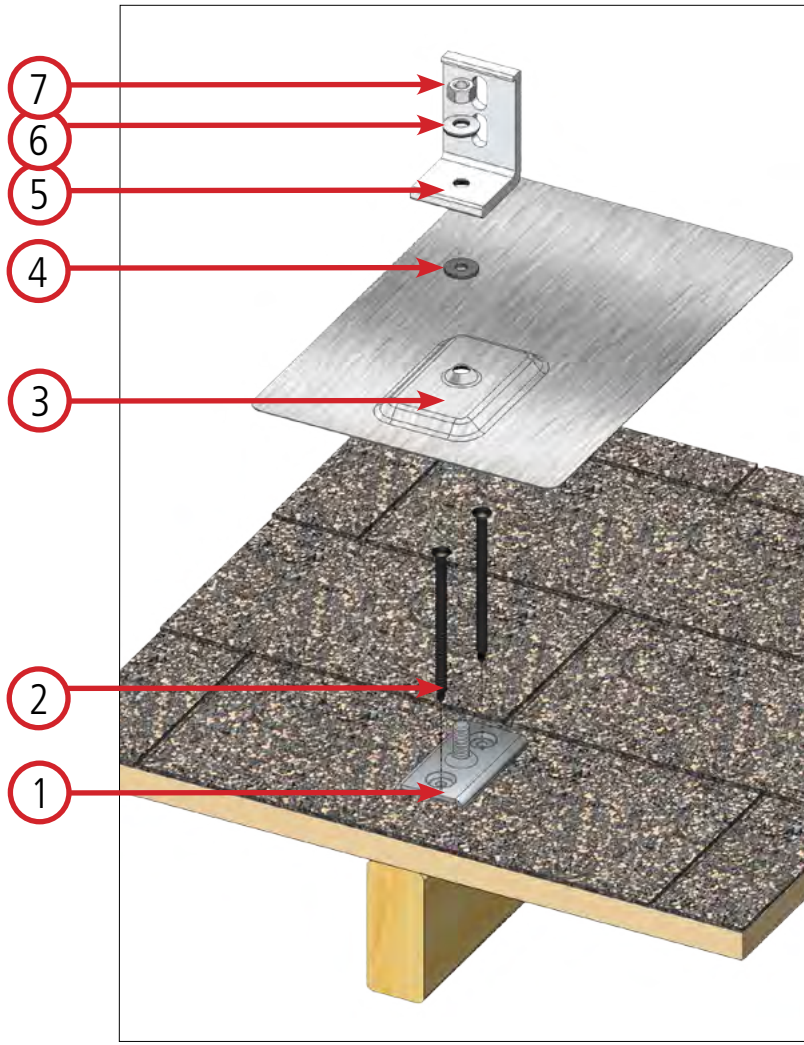


STEEP-SLOPE APPLICATIONS

# Quik Foot PRODUCT GUIDE

- Exploded Product View/B.O.M. – 1
- Installation Instructions – 2
- Cutsheets – 3
- Specifications – 4
- Test Data – 5
- Price List – 6

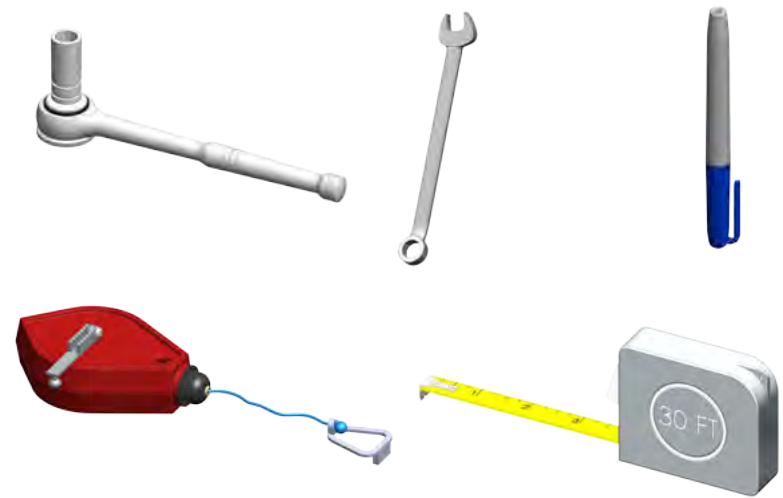




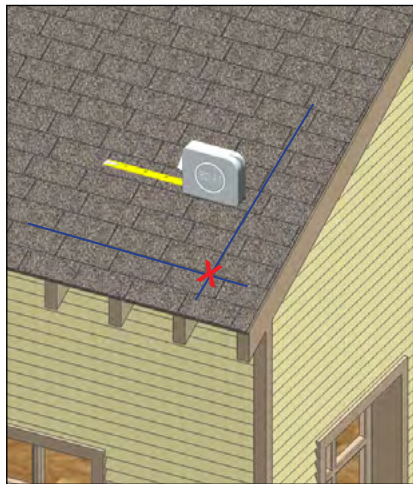
Materials Needed for Assembly

Item No.	Description of Material/Part	Quantity
1	Quik Foot	1
2	Fastener (Length to be determined)	2
3	Quik Foot Flashing	1
4	EPDM Washer	1
5	L-102-3" Bracket * (other options available)	1
6	5/16" EPDM Bonded 18.8 SS Washer	1
7	3/8" Stainless Steel Hex Nut	1

Required Tools



EcoFasten Solar



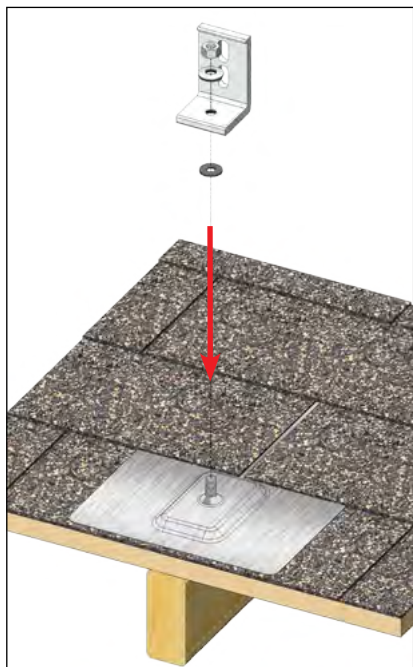
1



2



3



4



5

1. Locate the rafters and snap horizontal and vertical lines to mark the installation position for each Quik Foot.
2. Install base as shown using appropriate fasteners.\*
3. Insert the flashing so the top part is under the next row of shingles and pushed far enough up slope to prevent water infiltration through vertical joint in shingles.
4. Install bare EPDM washer on stud, pushing it down until it is flush with the top of the flashing.
5. Apply compression bracket to stud. Install bonded washer with rubber side down, and tighten stainless nut to 50 inch-pounds.

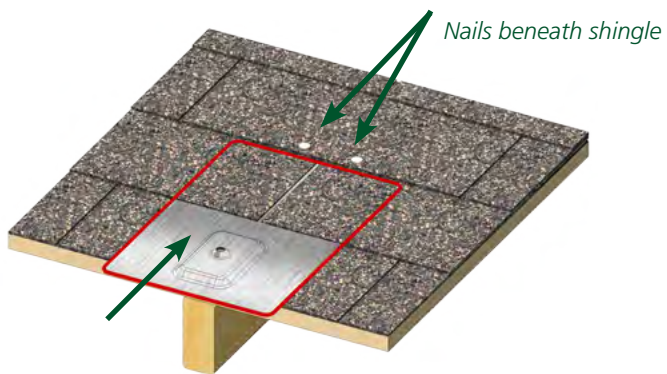
Consult an engineer or go to [www.ecofastensolar.com](http://www.ecofastensolar.com) for engineering data.

\*EcoFasten recommends XHD fasteners by OMG.

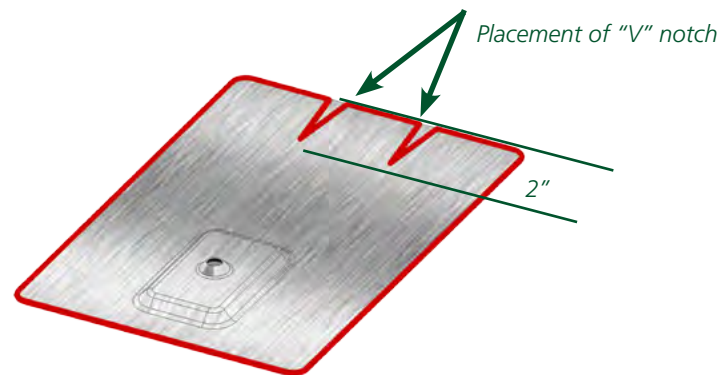
\* Use for vertical adjustment when leading edge of flashing hits nails in upper shingle courses



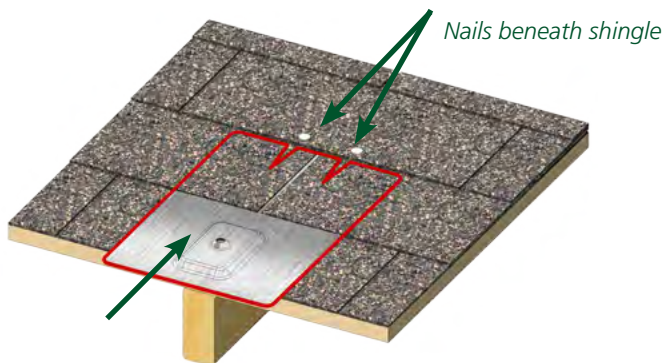
1. Slide flashing up under shingles until leading edge engages nails. Measure remaining distance to adjust upslope.



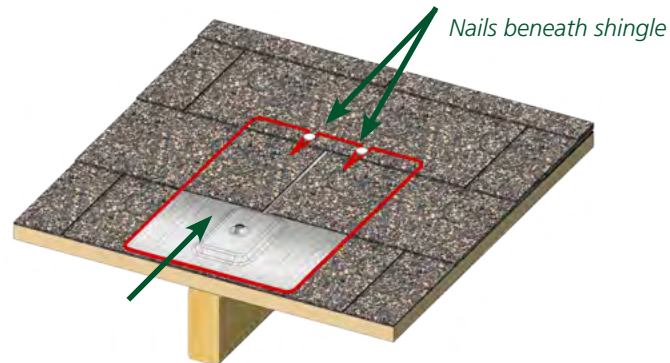
2. Remove flashing and cut "V" notch at marks where nail shafts engaged leading edge of flashing the distance desired in Step 1. Notch depth not to exceed 2" length by 1/2" width.



3. Reinstall flashing with notched area upslope.

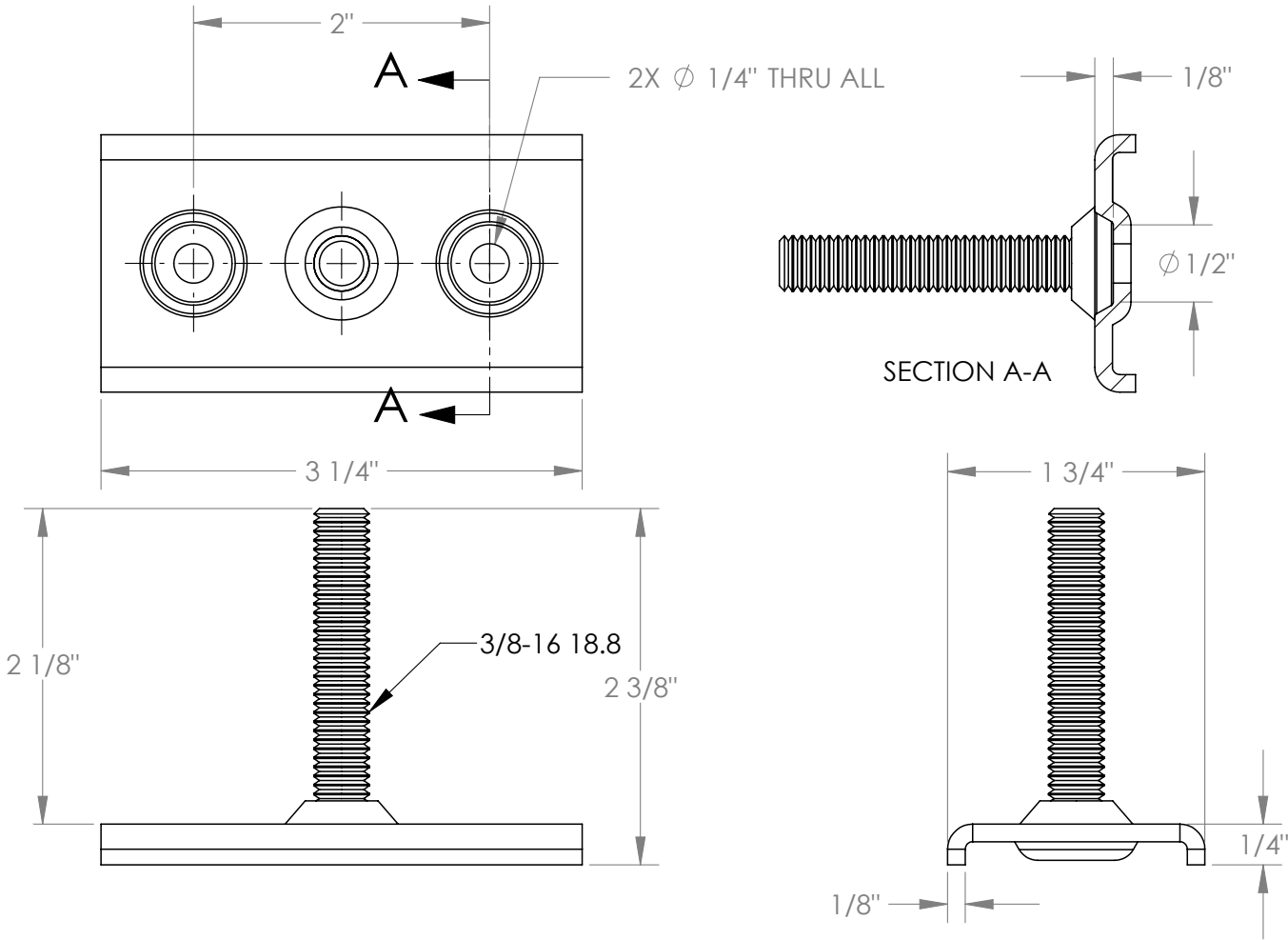


4. Position notched leading edge underneath nail heads as shown.



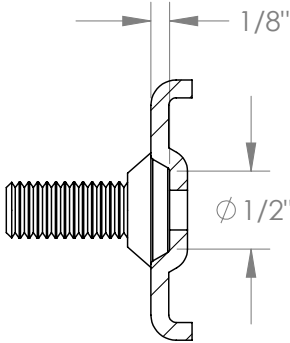
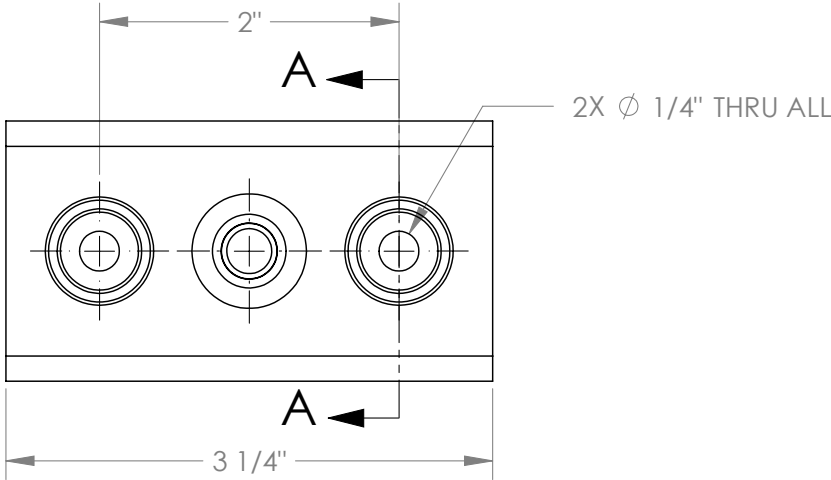


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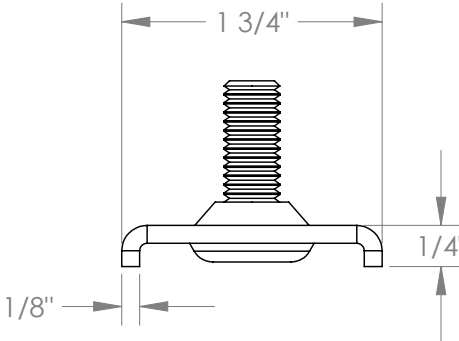
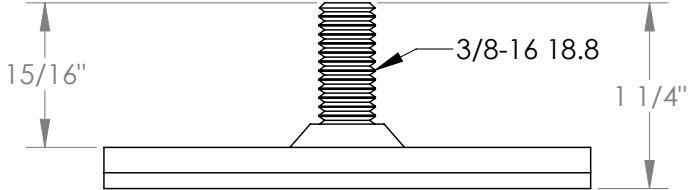




EcoFasten Solar

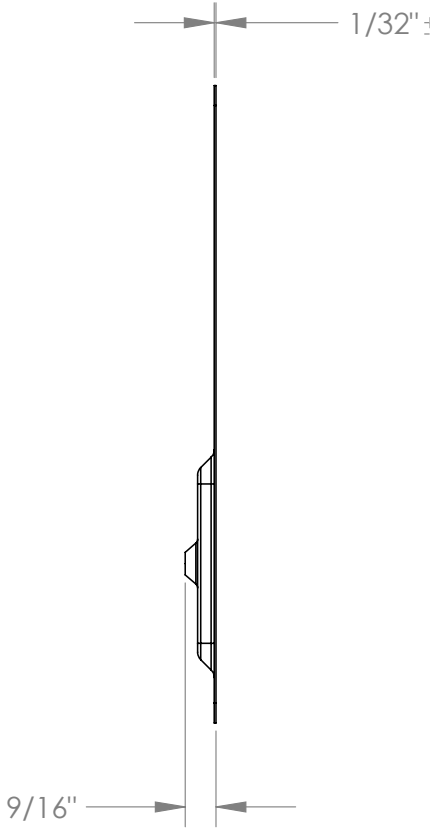
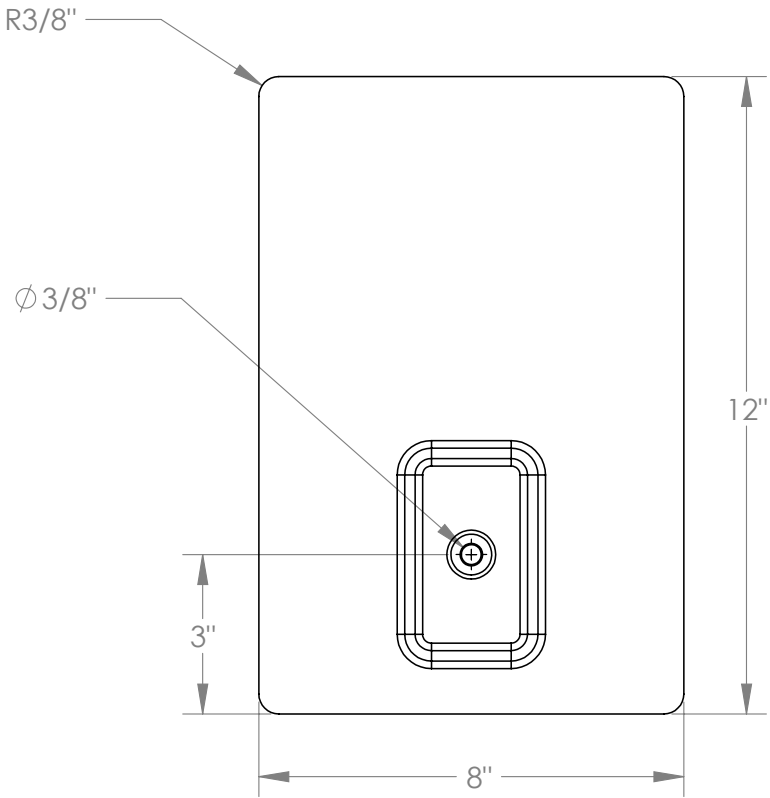


SECTION A-A



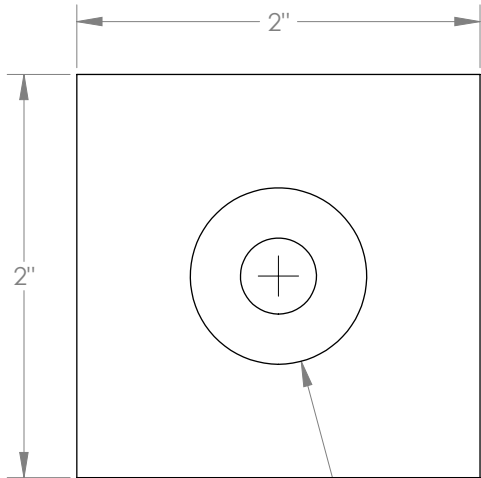
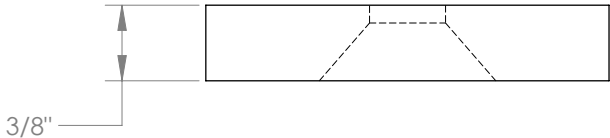


EcoFasten Solar





EcoFasten Solar

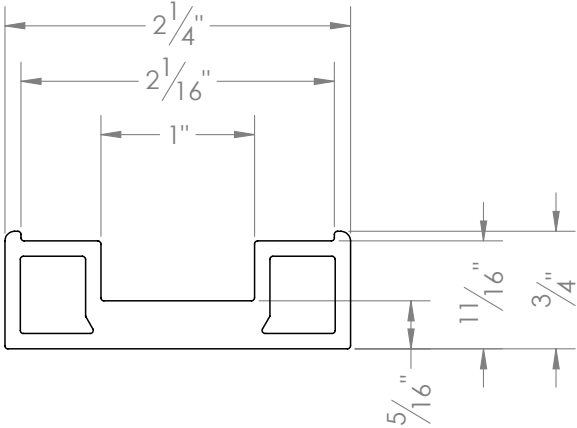


$\phi 3/8^{+.01}_{-.00}$  THRU ALL  
✓  $\phi 7/8^{\pm.01}$  X 82°, NEAR SIDE

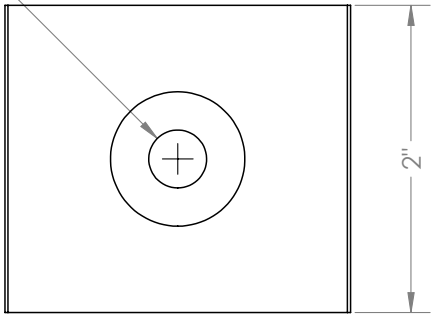
Compression Plate 2" X 2" Mill Aluminum



# EcoFasten Solar

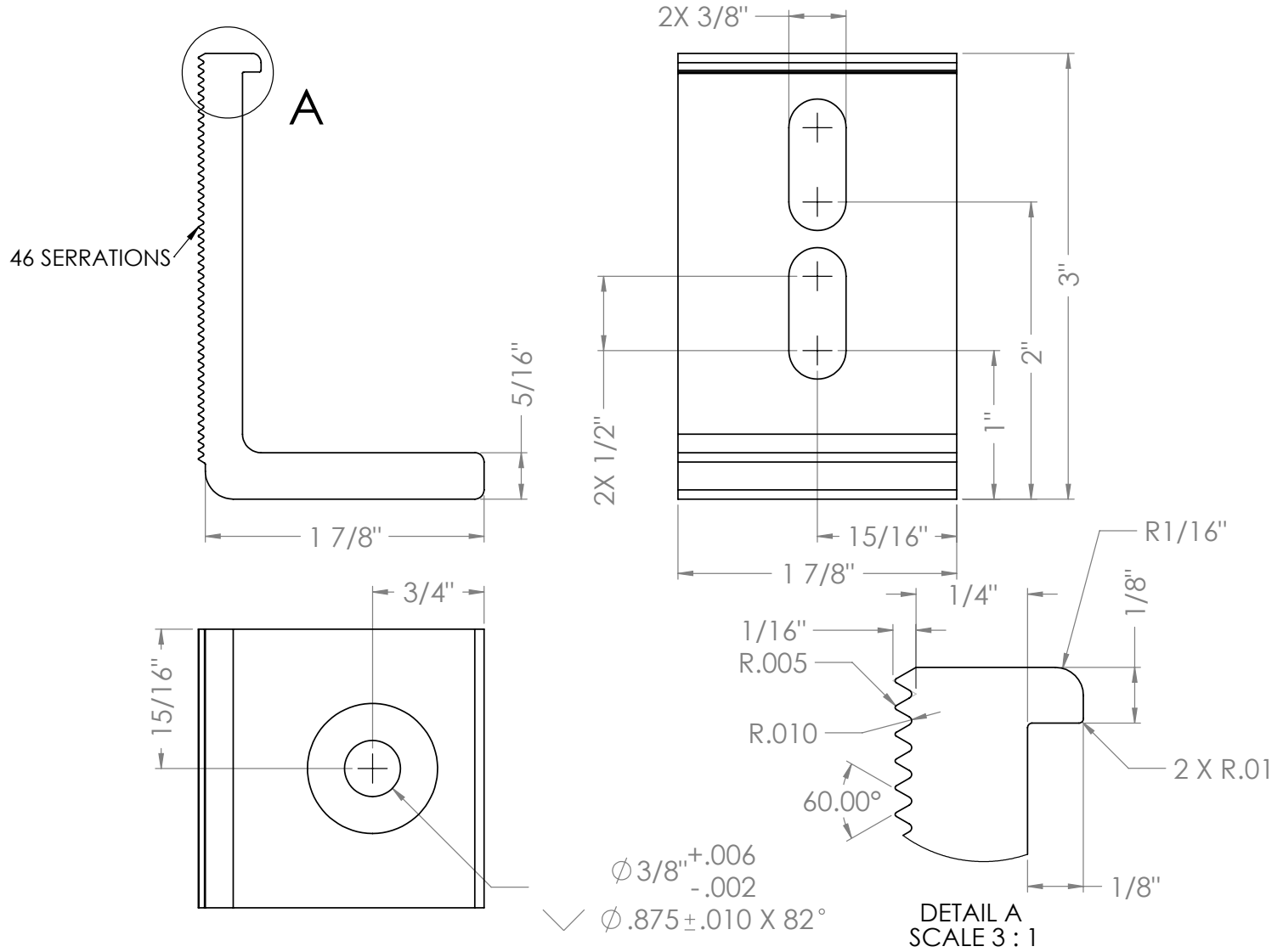


$\phi \frac{3}{8}$ " THRU ALL  
 $\checkmark \phi \frac{7}{8}$ " X 82°, NEAR SIDE



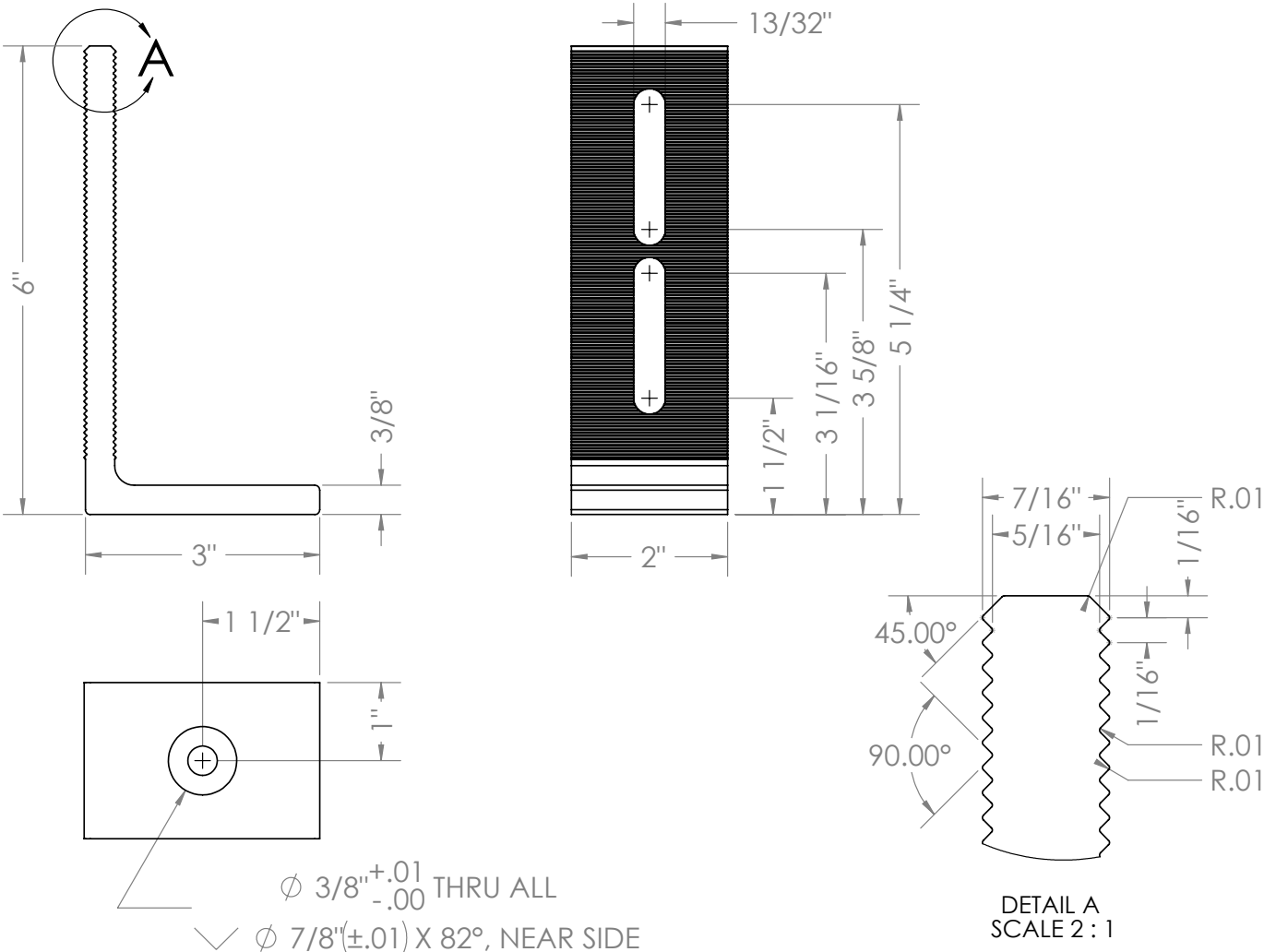


EcoFasten Solar



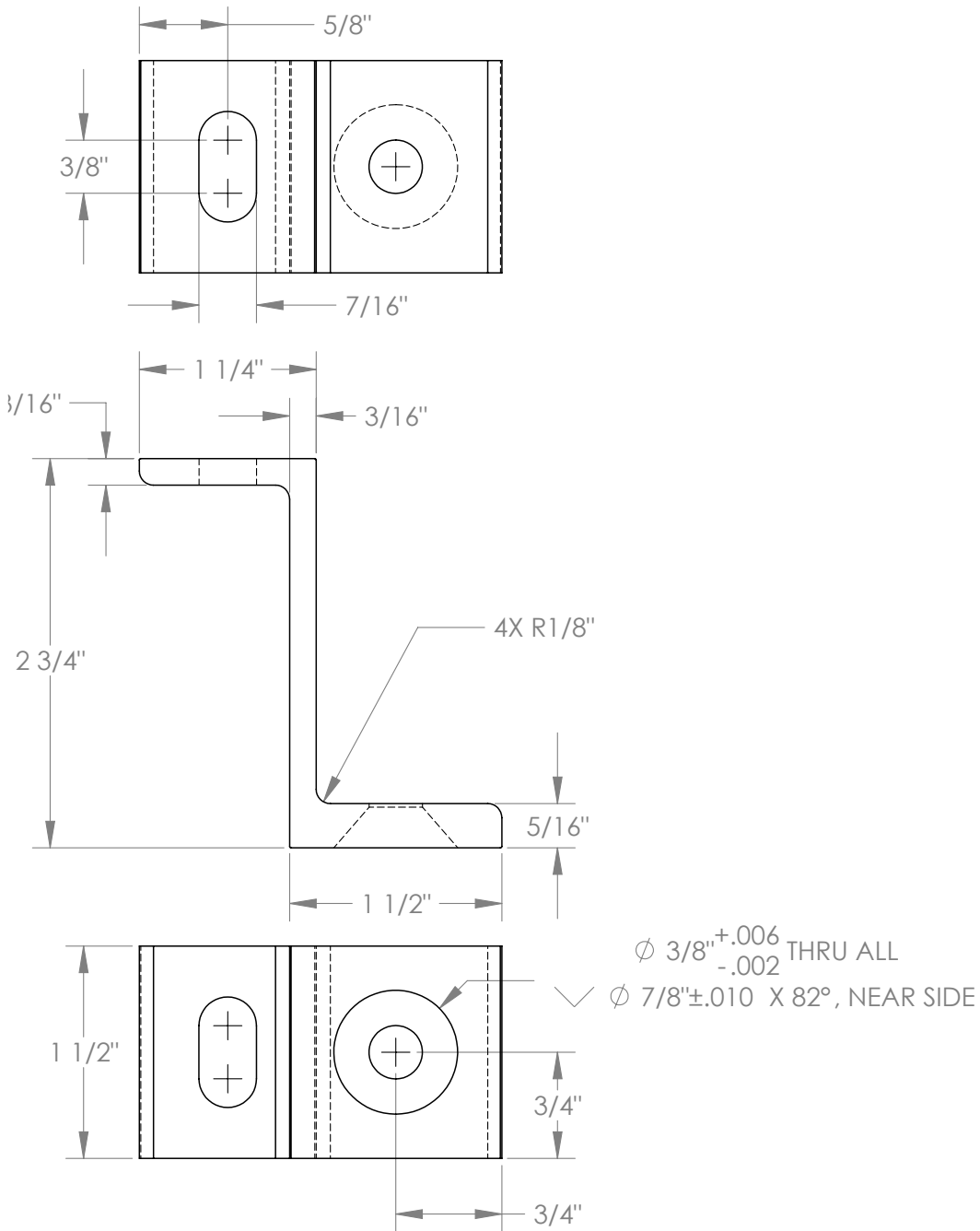


# EcoFasten Solar





# EcoFasten Solar





EcoFasten Solar

**PART 1 – GENERAL**

**1.1 SUMMARY**

- A. WORK INCLUDES
  1. Quik Foot Solar attachment bracket that attaches directly to the roof deck.
  2. Provide appropriate bracket and fasteners for the roof system.
- B. RELATED SECTIONS
  1. Section 07600: Flashing and Sheet Metal
  2. Section 07500: Roofing
  3. Division 1: Administrative and Procedural Requirements
  4. Division 7: Thermal and Moisture Protection

**1.2 SYSTEM DESCRIPTION**

- A. COMPONENTS:
  1. Quik Foot system consists of stainless steel bracket and base plate with (1) stainless steel stud, (1) stainless steel nut, (1) EPDM washer and (1) bonded stainless steel and EPDM washer.
  2. Fasteners
    - A. To be of metal compatible with Quik Foot bracket.
    - B. Fasteners should be selected for compatibility with the roof deck.
    - C. Fastener strength should exceed or be equal to that of the allowable load of the system. See test data at [www.ecofastensolar.com](http://www.ecofastensolar.com)
  3. Sealant (if required by roof manufacturer): to be roof manufacturer approved.
  4. Aluminum counter-flashing
  5. Aluminum attachment bracket
- B. DESIGN REQUIREMENTS:
  1. Bracket spacing to be recommended by project engineer.
  2. Install fasteners base plate.
  3. It is important to design new structures or assess existing structures to make sure that they can withstand retained loads.

**1.3 SUBMITTAL**

- A. Submit manufacturer’s written specifications.
- B. Submit standard product cut sheets.
- C. Submit installation instructions.
- D. Submit product specific load test data, showing ultimate and allowable load values specific to the roof deck specified for the project.

**1.4 QUALITY ASSURANCE**

Installer to be experienced in the installation of specified roofing material for no less than 5 years in the area of the project.

**1.5 DELIVERY / STORAGE / HANDLING**

Inspect material upon delivery. Notify manufacturer within 24 hours of any missing or defective items. Keep material dry, covered, and off the ground until installed.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURER**

EcoFasten Solar®  
 289 Harrel St. Morrisville, VT. 05661  
 (877) 859-3947  
[www.ecofastensolar.com](http://www.ecofastensolar.com)

**2.2 MATERIALS**

- A. Attachment Bracket
  - 6000 Series Aluminum (choose one)
    1. F-111-A
    2. L-102-3”
    3. L-102-6”
    4. CP-SQ
    5. Z-101
    6. Custom

- B. Base plate is 11 gauge 304 stainless steel with one 3/8-16” 304 stainless steel machine screw welded into embossed countersink.
- C. Fasteners to be compatible with chosen roof application and meet specified pull out values as shown in load test data.
- D. Counter flashing is .032 gauge aluminum embossed to accept shape of stainless steel base plate

**2.3 FINISH – Mill Finish**

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Substrate: Inspect structure on which brackets are to be installed and verify that it will withstand any additional loading that may be incurred. Notify General Contractor of any deficiencies before installing EcoFasten Solar brackets.
- B. Verify that roofing material has been installed correctly prior to installing solar attachment brackets.

**3.2 INSTALLATION**

- A. Comply with architectural drawings and project engineer’s recommendations for location of system. Comply with Manufacturer’s written installation instructions for installation and layout.



**Quik Foot Moment Test**

For the moment tests, the load was applied parallel to the axis of the 2x4 to the top of the 1" diameter aluminum post. The plywood-2x4 assemblies were fastened to a welded steel structure which was bolted to the base of the testing machine (figure 3 and 4). Five tests were done for both 6" long posts and 3" long posts.

Loads were applied slowly, each test taking 3-5 minutes until failure. The loads were measured by an ASTM E74 calibrated load cell and display. The results were recorded as follows.

**Moment, 6" Post**

Test	Max Load (lb)	Mode of Failure
1	470.7	Lower Screw Withdrawal
2	676.4	Over 30 Degrees Deformation
3	467.6	Lower Screw Withdrawal
4	550.5	Lower Screw Head Failure
5	370.0	Lower Screw Withdrawal
<b>Average</b>	<b>507.0</b>	

**Moment, 3" Post**

Test	Max Load (lb)	Mode of Failure
1	955.7	Lower Screw Withdrawal
2	1113.9	Lower Screw Withdrawal
3	1003.4	Lower Screw Head Failure
4	856.3	Lower Screw Withdrawal
5	828.3	Lower Screw Withdrawal
<b>Average</b>	<b>951.5</b>	

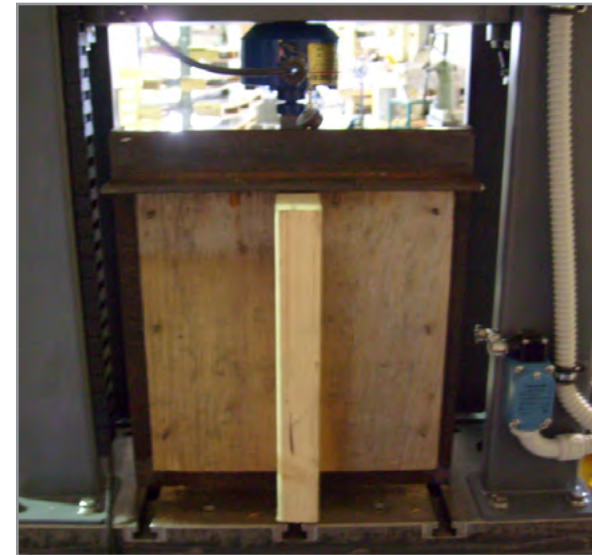


Fig.3



Fig.4



**Quik Foot Moment Test Cont.**

The most common mode of failure for the moment tests was withdrawal of the lower screw. However there were a few tests where the head of the lower screw had failed. In each test the post would deflect approximately 15-20 degrees from horizontal (Figure 6). Typically the post would start to deflect at a load approximately half the maximum load. In each test the Quik Foot was deformed, as the upper edge of the post dented the top surface of the Quik Foot (Figure 7).

From the average maximum load of each series of moment tests it can be determined that the average maximum moment for the Quik Foot is 2948 in-lb.

$$507.0 \text{ lb} \times 6" = 3042 \text{ in-lb}$$

$$951.5 \text{ lb} \times 3" = 2854.5 \text{ in-lb}$$

$$\frac{(3042 + 2854.5)}{2} = 2948 \text{ in-lb}$$



Fig. 6



Fig. 7



### Quik Foot Pull-Out Test

These tests determined the maximum pull-out and moment a Quik Foot would sustain before failure. Three series of tests were conducted, a pull-out test where the Quik Foot was pulled directly from the "roof" and two moment tests with different length posts where a side load was applied parallel to the "roof". The average maximum pull out load was determined to be 2312.2lb while the average maximum moment was determined to be 2948 in-lb.

For each test, to simulate a typical roof the Quik Foot would be installed on, a 12"x12" square of .5" plywood was screwed to the top edge of a 12" long spruce 2x4 with 1.5" decking screws. The Quik Foot was then fastened through the center of the plywood into the top edge of the 2x4 with two TFC #14 concealer screws (Figure 1). A new Quik Foot and screws were used for each test.

For the pullout tests, the load was applied along the axis of the 1" diameter aluminum post screwed onto the top of the Quik Foot (Figure 2). The plywood-2x4 assembly was clamped to the base of the testing machine through a welded steel frame that surrounded the assembly (figure 2).

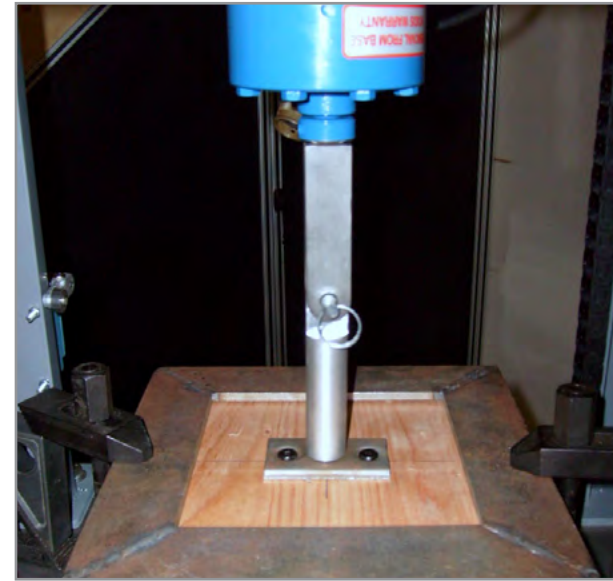


Fig 1

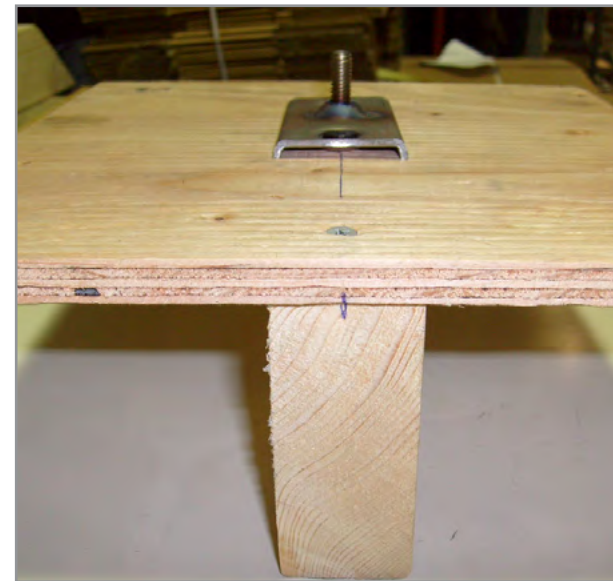


Fig 2



**Quik Foot Pull-Out Test Cont.**

In each pull out test the mode of failure was withdrawal of the screws at the maximum load. Some deformation of the Quik Foot occurred in each test (figure 5). The Average maximum load was 2312.2lb.

**Pull Out**

Test	Max Load (lb)	Mode of Failure
1	2463.5	Screw Withdrawal
2	2375.3	Screw Withdrawal
3	2060.8	Screw Withdrawal
4	2301.0	Screw Withdrawal
5	2360.3	Screw Withdrawal
<b>Average</b>	<b>2312.2</b>	

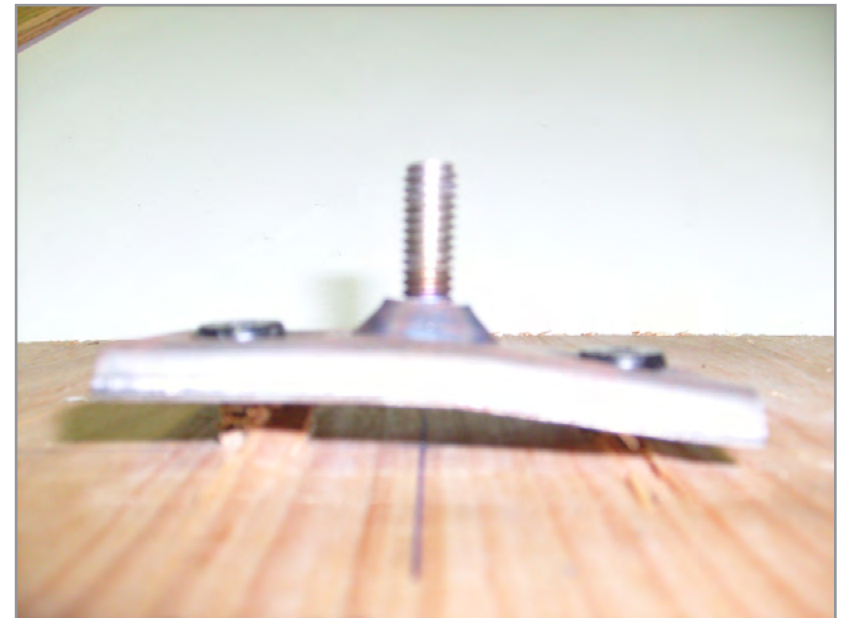


Fig 5



**Quik Foot Lateral Load Test**

**Machine:** Universal or tensile testing machine with a capacity of 5,000 lbs. or more. ASTM E74 certified load cell and display to measure load and a dial or electronic indicator accurate to .001” to measure displacement.

**Specimen:** One solar bracket fastened according to the manufactures installation instructions to a 12”x12” or larger section of the roof substrate. Sealants, flashings and other roofing materials that have no affect on bracket strength may be omitted from the assembly.

**Apparatus:** A welded steel structure reinforced as necessary to prevent buckling, warping or twisting while the specimen is under load. The apparatus is securely fastened to the bed of the testing machine.

**Setup:** Attach the specimen to the apparatus using #12 or #14 self drilling screws in sufficient quantity and spacing so as to prevent failure of the roof substrate prior the failure of the snow guard bracket. Position the apparatus on the test machine bed and connect the load cell to the bracket so that the load is applied as it would be during normal service.

**Procedure:** Photograph the specimen and apparatus prior to testing. Load the bracket slowly with an upward pull until failure. Photograph the specimen after testing. Do a minimum of three tests using a new specimen for each test. If after three tests the results are inconsistent, conduct two additional tests.

**Failure:** Any of the following occurrences shall be considered failure.

- A. Fastener failure (fracture or withdrawal).
- B. Structural failure of bracket.

**Reporting:** On the data sheet, record the ultimate load (in pounds) and mode of failure for each test. Calculate and record the mean load for all tests conducted. Note any unusual observations during testing as well as a description of the specific failure observed for each test. Fill out all requested information on the data sheet.

Test Data			
Product: QKFT-Base		Substrate: 2X4 Spruce Rafter	Fastener: 3” XHD
Failure: Any of the following occurrences shall be considered failure.			
A. Fastener failure (fracture or withdrawal). B. Structural failure of bracket.			
Test #	Ultimate Load (lbs)	Mode of Failure	Description
1	1179.7	B	Bent 30 Degrees
2	1280.3	B	Bent 30 Degrees
3	4304.5	B	Bent 30 Degrees
Mean	1221.3		

Additional Notes: Lateral Test on 3” post



**Quik Foot Pull Test Using 3" XHD Fasteners**

**Machine:** Universal or tensile testing machine with a capacity of 5,000 lbs. or more. ASTM E74 certified load cell and display to measure load and a dial or electronic indicator accurate to .001" to measure displacement.

**Specimen:** One solar bracket fastened according to the manufactures installation instructions to a 12"x12" or larger section of the roof substrate. Sealants, flashings and other roofing materials that have no affect on bracket strength may be omitted from the assembly.

**Apparatus:** A welded steel structure reinforced as necessary to prevent buckling, warping or twisting while the specimen is under load. The apparatus is securely fastened to the bed of the testing machine.

**Setup:** Attach the specimen to the apparatus using #12 or #14 self drilling screws in sufficient quantity and spacing so as to prevent failure of the roof substrate prior the failure of the snow guard bracket. Position the apparatus on the test machine bed and connect the load cell to the bracket so that the load is applied as it would be during normal service.

**Procedure:** Photograph the specimen and apparatus prior to testing. Load the bracket slowly with an upward pull until failure. Photograph the specimen after testing. Do a minimum of three tests using a new specimen for each test. If after three tests the results are inconsistent, conduct two additional tests.

**Failure:** Any of the following occurrences shall be considered failure.

- A. Fastener failure (fracture or withdrawal).
- B. Structural failure of bracket.

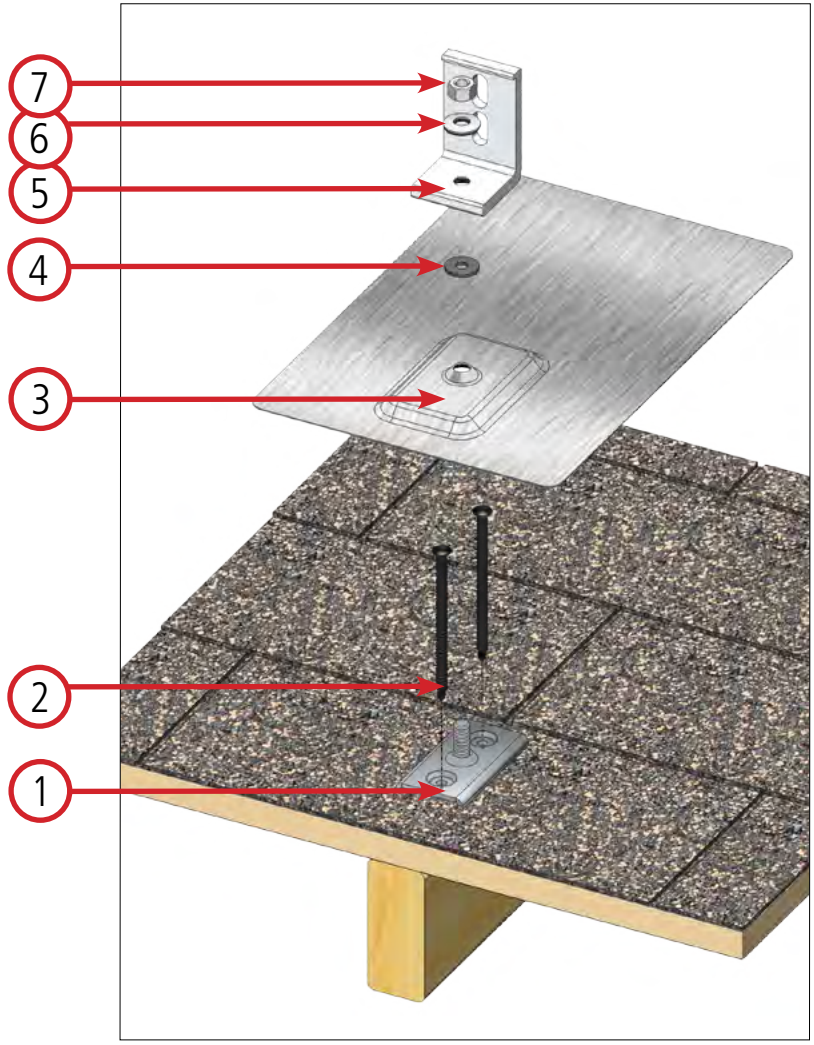
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Test Data			
Product: QKFT-Base		Substrate: 2X4 Spruce Rafter	Fastener: 3" XHD
Failure: Any of the following occurrences shall be considered failure.			
A. Fastener failure (fracture or withdrawal). B. Structural failure of bracket.			
Test #	Ultimate Load (lbs)	Mode of Failure	Description
1	3800	A	Screws Pulled
2	3895.4	A	Screws Pulled
3	3517.1	A	Screws Pulled
Mean	3737.5		

Additional Notes: Pull Test

**Quik Foot Lateral Resistance and Uplift Testing**

Follow this link to access the PFS Test Report #12-002 for [Quik Foot Lateral Resistance and Uplift Testing ASTM D1761-06](#)



List cost of assembly shown above

QF-S	Uncoated aluminum (shown)	\$ 4.37
XHD0004B	4" length fasteners (shown)	\$ .86
QFL-MLL-812	Uncoated aluminum (shown)	\$ 3.42
L-102-3	Uncoated aluminum (shown)	\$ 4.59

**\$13.24**

- 1** Base Plate - required, includes one 3/8" ID bonded washer and hex nut (No. 6 in illustration)

<b>QF-S</b>	<b>Stainless steel (shown)</b>	<b>\$ 4.37</b>
QF-L	Stainless steel	\$ 4.90
  
- 2** Fasteners

OMG XHD: #15 self drilling, phillips drive		
XHD002B	2" length	\$ 0.26
XHD003B	3" length	\$ 0.32
<b>XHD004B</b>	<b>4" length (shown)</b>	<b>\$ 0.43</b>
XHD005B	5" length	\$ 0.56

TFC Concealor: #14 self drilling, square drive		
143000C1	3" length	\$ 0.28
143000C1	4" length	\$ 0.30
  
- 3** Flashing - required, includes one EPDM flat washer (No. 5 in illustration)

<b>QFL-MLL-812</b>	<b>Uncoated aluminum (shown)</b>	<b>\$ 3.42</b>
QFL-BLK-812	Matte black Kynar painted	\$ 4.57
QFL-BRZ-812	Dark bronze Kynar painted	\$ 4.57
  
- 4** EPDM washer included with base plate (shown)
  
- 5** Compression bracket- stand alone, includes one 3/8-16" x 1-1/4" bolt and one 3/8" flange nut

<b>L-102-3</b>	<b>Uncoated aluminum (shown)</b>	<b>\$ 4.59</b>
Z-101	Uncoated aluminum	\$ 5.68
P-3-CSK	Uncoated aluminum	\$ 6.49

Compression brackets - adaptor plates to be used with QF-L		
CP-SQ	Uncoated aluminum	\$ 3.24
F-111-A	Uncoated aluminum	\$ 3.49
  
- 6** Bonded washer included with base plate (shown)
  
- 7** Hex nut included with base plate (shown)

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