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SCOPE OF WORK:

INSTALLATION OF A SOLAR WATER HEATING SYSTEM WITH A ROOF TOP COLLECTOR

COMPATIBLE WITH BOTH:

ASCE 7-02 & ASCE 7.05

WIND LOAD:

DESIGNED FOR 150 MPH

WIND EXPOSURE:

EXPOSURE CATEGORY C

SOLAR SYSTEM COLLECTOR:

MODEL: AE-21/AE-24/AE-26/AE-28/AE-32/AE-40

APPLICABLE CODE:

FLORIDA 2007 CODE W/09 SUPP

THIS PLAN MAY NOT BE USED FOR MULTIPLE PERMITS,E.G. NO MASTER FILING

SOLAR WORLD SOLAR WATER HEATER SYSTEM (SWH) INSTALLATION NOTES:

THIS DRAWING AND THE ENGINEERING HEREON ESTABLISH THE INSTALLATION REQUIREMENTS FOR SWH EQUIPMENT ON BUILDINGS IN FLORIDA 60 FEET OR LESS IN HEIGHT AND AT ROOF ANGLES FROM FLAT UP TO 45 DEGREES. PER THIS PARTICULAR INSTALLATION DOCUMENT, THE SOLAR WORLD SWH SOLAR PANELS MAY BE INSTALLED PARALLEL TO THE ROOF PLANE WITH HOLD DOWNS FLUSH ON TOP OF THE UPPER SURFACE OF THE ROOF COVERING OR SUPER-ELEVATED TO ACHIEVE BETTER SOLAR COLLECTION. SUPER-ELEVATION IS PERMITTED ONLY WITH THE FOLLOWING STIPULATIONS: A) NO INSTALLATIONS OUTSIDE OF PRESSURE ZONE 1; B) STANDARD, #14 BY 1 INCH SELF-DRILLING, STAINLESS STEEL, SCREWS SHALL BE SUBSTITUTED FOR THE SET SCREWS WHICH COME WITH THE MOUNTING CLIPS TO SECURE THEM IN THE SLOTS EXTRUDED FOR THE MOUNTING CLIPS IN THE COLLECTOR FRAMES; C) THE MAXIMUM TILT-UP LEG LENGTH SHALL BE 24 INCHES. D) USE ONLY OEM HARDWARE.

THE SOLAR WORLD SWH COLLECTORS HAVE PASSED MIAMI TESTING LABS WIND LOAD TESTING OF -102 PSF PER ASTM E-330 (MTL FILE NUMBER 95-1249).THIS ENGINEER HAS EVALUATED THE INSTALLATION COMPONENTS AND HARDWARE CURRENTLY PROVIDED BY SOLAR WORLD AS OEM INSTALLATION KITS AND FOUND THEM TO MEET THE REQUIREMENTS OF THE FLORIDA BUILDING CODE CURRENT AS OF THE DATE OF THIS PLAN. THERE SHALL BE NO SUBSTITUTION OF OTHER VENDOR MATERIALS (OTHER THAN THE # 14 BY 1 INCH, SS, SELF-DRILLING, SCREWS SPECIFIED ABOVE) WITHOUT PRIOR APPROVAL OF THIS ENGINEER THRU SOLAR WORLD.

PLUMBING SHALL BE PER FIGURE 1. FLORIDA PLUMBING CODE SHALL BE ADHERED TO. PARTICULAR ATTENTION SHALL BE GIVEN TO PROTECTION AGAINST OVER-PRESSURE AND FREEZING - PER FLORIDA MECHANICAL CODE, CHAPTER 14, AND PER AET/SOLAR WORLD INSTALLATION INSTRUCTIONS. THIS DRAWING SHOWS THE "D" VERSION PLUMBING. HOWEVER, THERE ARE OTHER VARIANTS (PHOTO-VOLTAIC PUMP, INDIRECT, AND/OR DRAIN-BACK) WHICH, ALTHOUGH NOT SPECIFICALLY SHOWN HEREON, ARE COVERED BY THIS SEALED DRAWING - SO LONG AS INSTALLED PER AET/SOLAR WORLD INSTALLATION INSTRUCTIONS.

THIS ENGINEER HAS DETERMINED THAT THE HOLD-DOWN HARDWARE AND FASTENERS SUPPLIED BY SOLAR WORLD WILL WITHSTAND HURRICANE FORCE WINDS UP TO AND INCLUDING 150 MPH 3-SECOND GUSTS. THE ONLY REMAINING VARIABLE OF SIGNIFICANCE IS THE ATTACHMENT OF THE HOLD DOWNS TO THE UNDERLYING ROOF SYSTEM USING OEM HARDWARE. LAGGING OF SW SOLAR WATER HEATING COLLECTORS FOR FLUSH MOUNT INSTALLATION SHALL BE ALLOWED IN EXPOSURE CATEGORY B AND C AND IN BOTH PZ1 AND PZ2 AT MEAN ROOF HEIGHTS OF 60-FT OR LESS AND IN ALL WIND ZONES THRU 150 MPH SO LONG AS THE FOLLOWING CAUTIONARY RULES ARE OBSERVED. LAGS SHALL BE CORROSION RESISTANT STEEL, 3/8 INCH DIAMETER MINIMUM OR BETTER. LAGS SHALL ACHIEVE AT LEAST 3-INCHES OF SOLID EMBEDMENT IN RAFTER OR BLOCKING. MEASUREMENTS MUST BE CAREFULLY MADE AND PILOT HOLES SHALL BE DRILLED TO ENSURE HITTING UNDERLYING RAFTERS OR TRUSSES AND TO AVOID WOOD SPLITTING. FOUR LAGS PER COLLECTOR ARE THE STANDARD WHEN INSTALLING IN 120 MPH, C, 30-FT OR LESS. WHEN INSTALLING COLLECTORS IN HIGHER WIND SPEED AREAS AND/OR HIGHER MEAN ROOF HEIGHTS BEYOND 30 FT THE NUMBER OF LAGS SHALL BE INCREASED 50% FOR EACH INCREMENTAL STEP, E.G. PZ INCREASE FROM PZ1 TO PZ2 INCREASE NUMBER OF LAGS BY 1 LAG ON EACH SIDE IN PZ2. FOR AN INCREASE IN WIND ZONE BEYOND 120 MPH UP TO AND INCLUDING 150 MPH, INCREASE NUMBER OF LAGS 50%. INCREASE IN MEAN ROOF HEIGHT UP TO AND INCLUDING 60-FT, INCREASE NUMBER OF LAGS 50%. THESE INCREMENTAL INCREASES SHALL BE ADDITIVE, E.G., A SINGLE COLLECTOR IN PZ1 AT 30-FT MEAN ROOF SHALL HAVE A TOTAL OF 4 LAGS, 2 LAGS ON EACH SIDE ON TWO OPPOSITE SIDES OF THE COLLECTOR. WHEREAS, EXTENDING PART OF THE COLLECTOR INTO PZ2 WOULD REQUIRE ADDING 1 ADDITIONAL LAG ON THE SIDE(S) EXTENDING INTO PZ2. FOR AN INCREASE IN WIND ZONE SPEED, ADD 2 LAGS (1 EACH ON OPPOSITE SIDES OF COLLECTOR). FOR AN INCREASE IN MEAN ROOF HEIGHT OF COLLECTOR INSTALLATION, ADD 2 LAGS (1 EACH ON OPPOSITE SIDES OF COLLECTOR).AS AN EXAMPLE, A SINGLE COLLECTOR INSTALLED FLUSH MOUNT, AT 60-FT MEAN ROOF HEIGHT, 150 MPH, EXPOSURE CATEGORY C WOULD REQUIRE 8-LAGS, RATIONALLY DISTRIBUTED, EACH LAG PENETRATING INTO UNDERLYING WOOD FOR AT LEAST 3-INCHES. WHERE THIS IS QUESTIONABLE, INSTALLER HAS HIS CHOICE OF THE FOLLOWING OPTIONS: USE A SOLAR WORLD PROPRIETARY DECK ANCHOR, OR USE THE ALL THREAD OR "J" BOLT METHODS DESCRIBED IN THE NEXT PARAGRAPH.

PROCEDURES TO USE WHEN LAG HITTING THE CENTER OF TRUSS OR RAFTER CANNOT BE ASSURED (AND INSTALLER DOES NOT CHOOSE TO USE A SOLAR WORLD DECK ANCHOR): EITHER USE A 3/8 INCH (MIN) "J" BOLT GRABBING THE TRUSS/RAFTER OR 3/8 INCH DIAMETER (MIN) ALL THREAD ROD PLUS STANDARD FENDER & LOCK WASHERS AND NUT THRU MINIMUM 4" BY 4" BY 9" BLOCKING ON THE UNDERSIDE OF THE ROOF SHEETING. WHERE BLOCKING METHOD IS USED, INSTALLER SHALL APPLY A GENEROUS BEAD OF LIQUID NAILS LN-901 (OR EQUIVALENT OR BETTER) FOR MINIMUM OF 1 FT ALONG THE NEAR JOINTS OF THE ROOF TRUSS AND SHEETING ON EACH TRUSS ON BOTH SIDES OF THE BLOCKING - SEE FIGURE 2 ON THIS SHEET.

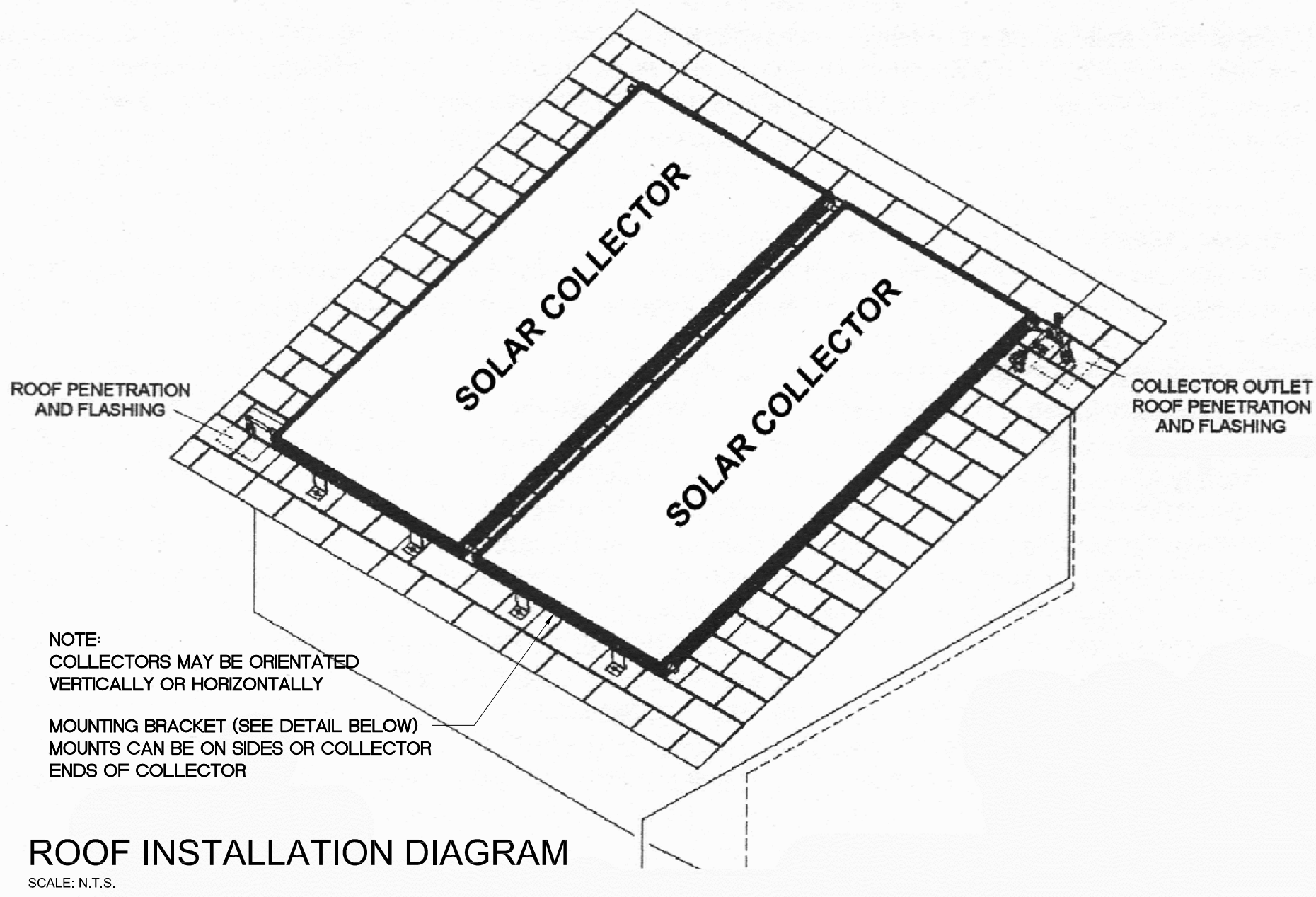
INSTALLER SHALL ADHERE TO REQUIREMENTS OF FBC CHAPTER 15 (ROOFING) AND BEST PRACTICES OF THE NRCA ROOFING & WATERPROOFING MANUAL TO ENSURE THAT THE SOLAR INSTALLATION DOES NOT CAUSE ROOF LEAKS AT INITIAL INSTALLATION OR AS THE SYSTEM "AGES".

INSTALLERS, AUTHORITIES HAVING JURISDICTION AND OTHERS HAVING QUESTIONS OR DIFFERING CONDITIONS, MAY CONTACT THIS ENGINEER DIRECTLY - CELL: 813 650 7246, FAX: 866 397 9050, E-MAIL: BOLSON1@TAMPABAY.RR.COM

NOTE: SUITABLE FOR HVHZ

REGARDING WIND LOAD - MY DESIGNS CLEARLY SHOW COMPLIANCE PER ASCE 7 WITH THE FLORIDA BUILDING CODE.

REGARDING GRAVITY LOAD - OUR HEAVIEST COLLECTOR WEIGHS 147 POUNDS WHICH IS DISTRIBUTED OVER A 40 SQUARE FOOTPRINT. WATER IN THE COLLECTOR IS NEGLIGIBLE. EACH COLLECTOR HOLDS ABOUT A GALLON OF WATER. POOL COLLECTORS A BIT MORE. HOT WATER COLLECTORS A LITTLE LESS. REGARDLESS, SOLAR PANELS ARE AN INSIGNIFICANT LOAD ON THE ROOF UNDERNEATH!



ROOF INSTALLATION DIAGRAM

SCALE: N.T.S.

02 FIGURE 2

SCALE: 1/2" = 1'-0"

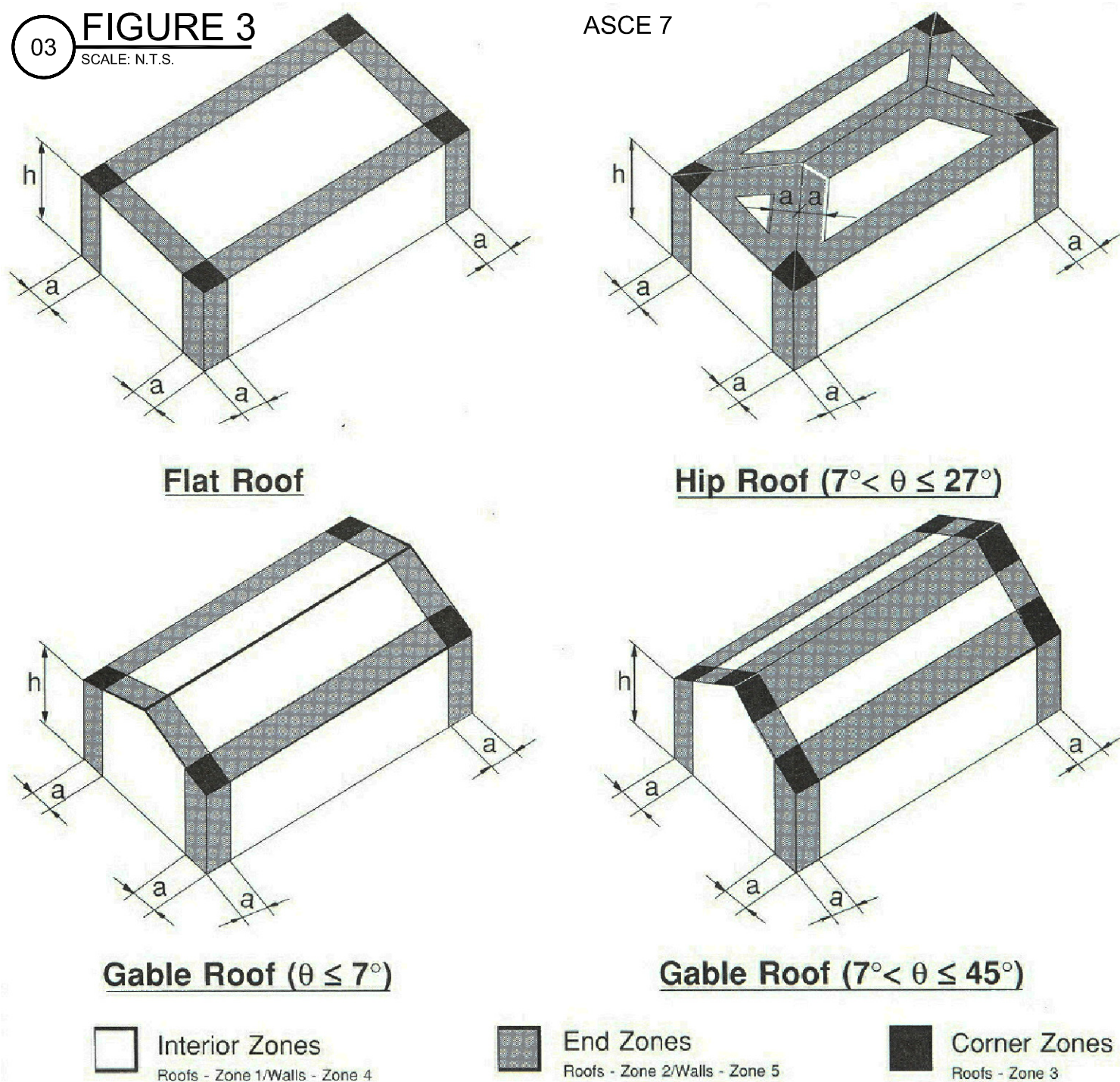
ENLARGED VIEWING:

THOSE WISHING TO VIEW THIS PLAN IN LARGER FORMAT MAY DO SO BY CONTACTING ENGINEER BY E-MAIL (BOLSON1@TAMPABAY.RR.COM) AND ENGINEER WILL REPLY WITH AN E-MAIL CONTAINING A PDF ATTACHMENT OF THIS PLAN WHICH MAY BE ENLARGED TO YOUR TASTE. ALTERNATELY, YOU MAY JUST GO TO THE FOLLOWING ONLINE LOCATION DIRECTLY: www.sw.cAdvice.us

03 FIGURE 3

SCALE: N.T.S.

ASCE 7

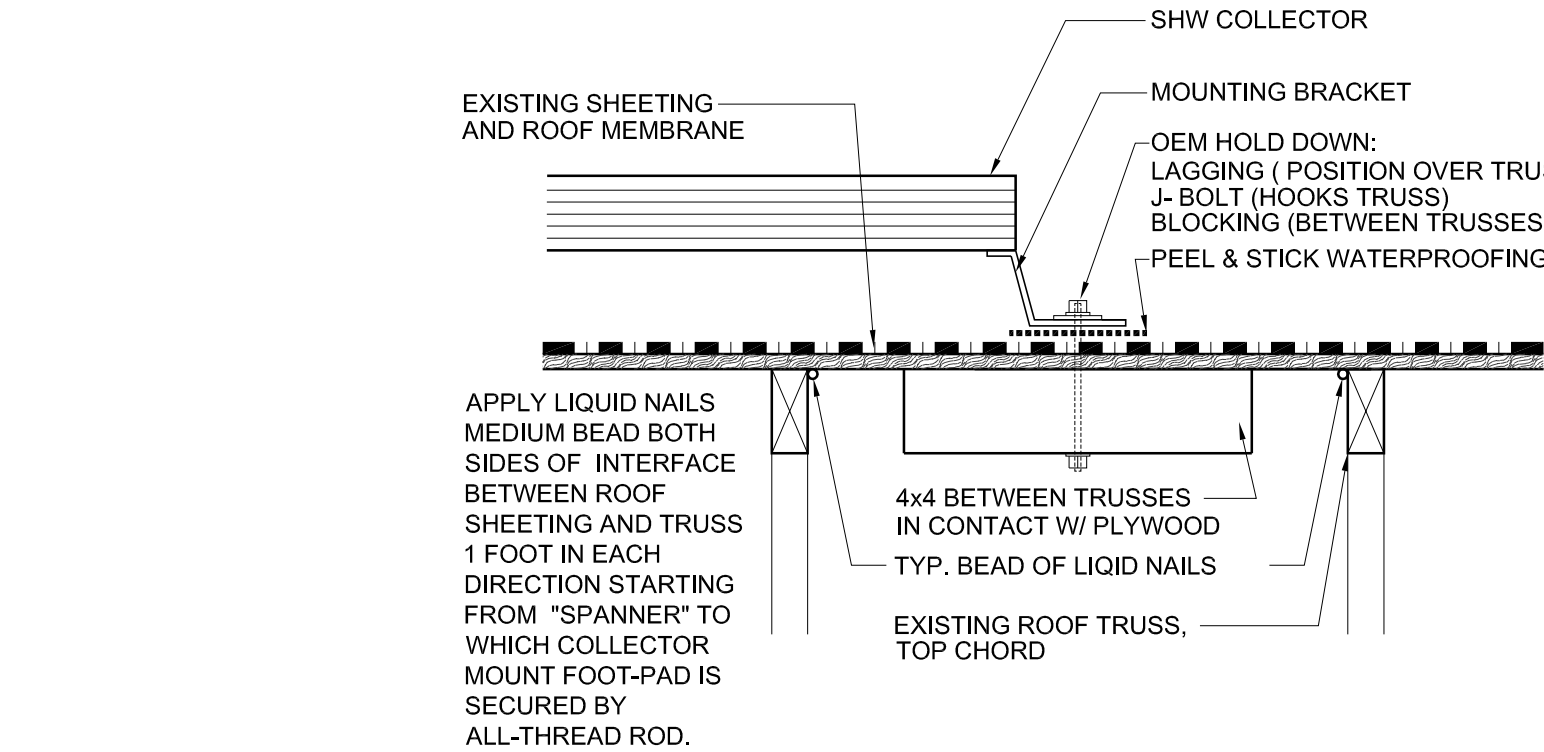
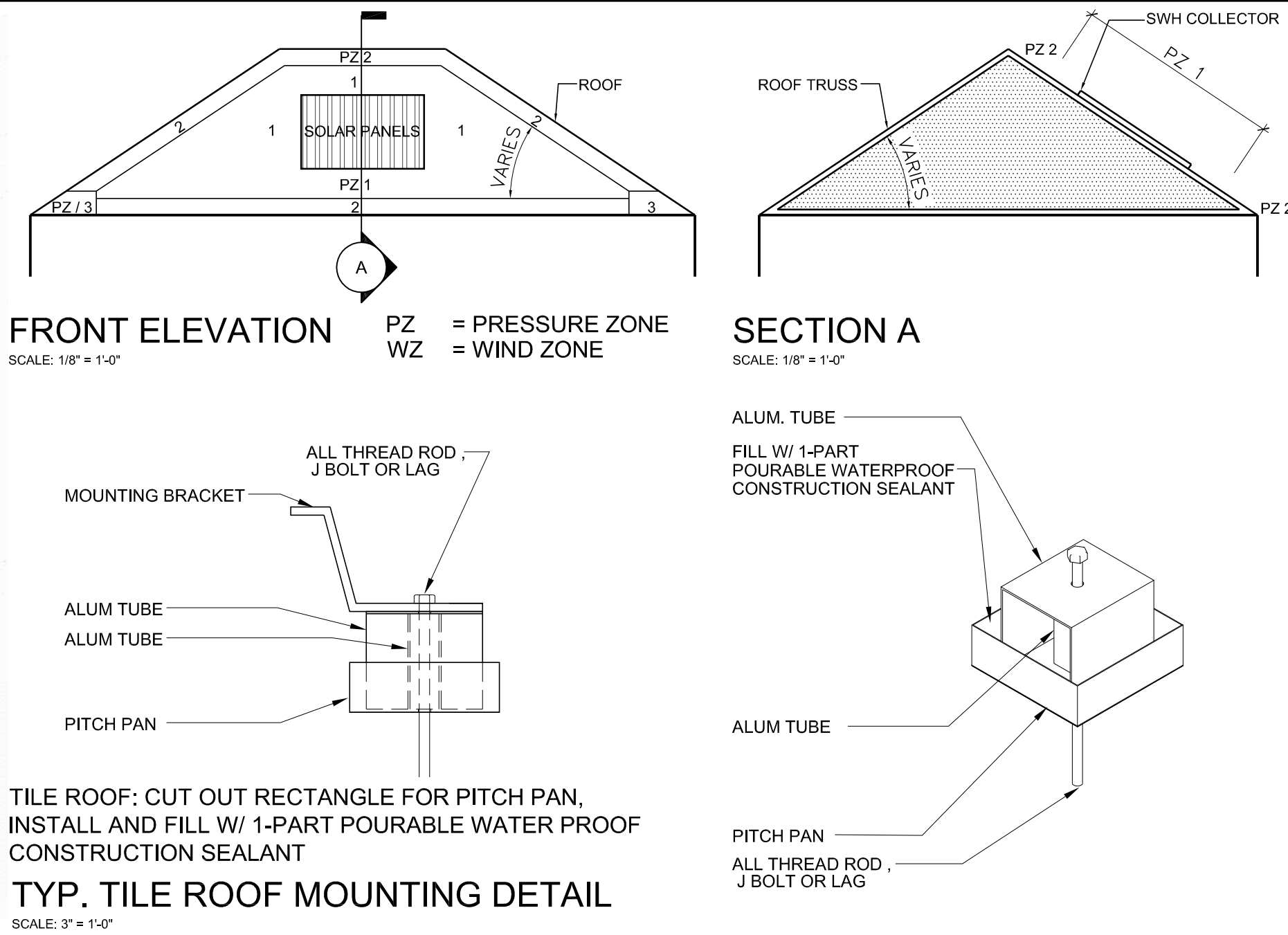


Notes:

- Pressures shown are applied normal to the surface, for exposure B, at h = 30 ft (9.1m), I = 1.0, and K_{zt} = 1.0. Adjust to other conditions using Equation 6-2.
- Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
- For hip roofs with θ ≤ 25°, Zone 3 shall be treated as Zone 2.
- For effective wind areas between those given, value may be interpolated, otherwise use the value associated with the lower effective wind area.
- Notation:
a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).
h: Mean roof height, in feet (meters), except that eave height shall be used for roof angles <10°.
θ: Angle of plane of roof from horizontal, in degrees.

GENRAL NOTE:

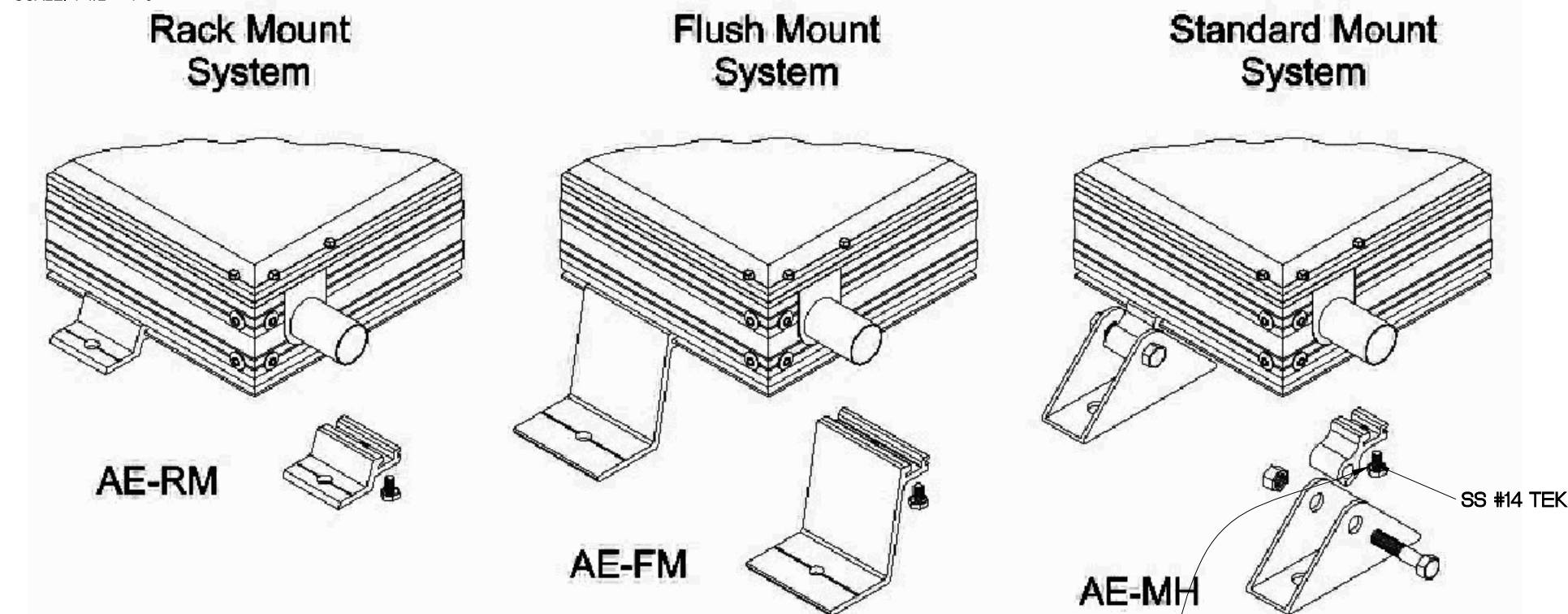
ALL HOT WATER SOLAR COLLECTORS SOLD IN THIS STATE ARE REQUIRED TO HAVE BEEN TESTED BY THE FLORIDA SOLAR ENERGY CENTER AND BEAR ITS CERTIFICATION LABEL. THE COLLECTORS LISTED ON THIS PLAN COMPLY WITH THOSE REQUIREMENTS. FURTHER INFORMATION MAY BE ACCESSED ON LINE AT: [HTTP://WWW.FSEC.UCF.EDU/EN/INDUSTRY/TESTING/STCOLLECTORS/HOT_WATER_RATINGS/INDEX.HTM](http://www.fsec.ucf.edu/en/industry/testing/stcollectors/hot_water_ratings/index.htm)



NOTE -THERE SHALL BE AT LEAST 4 HOLD-DOWN ATTACHMENTS FOR EACH SOLAR COLLECTOR ON A ROOF.

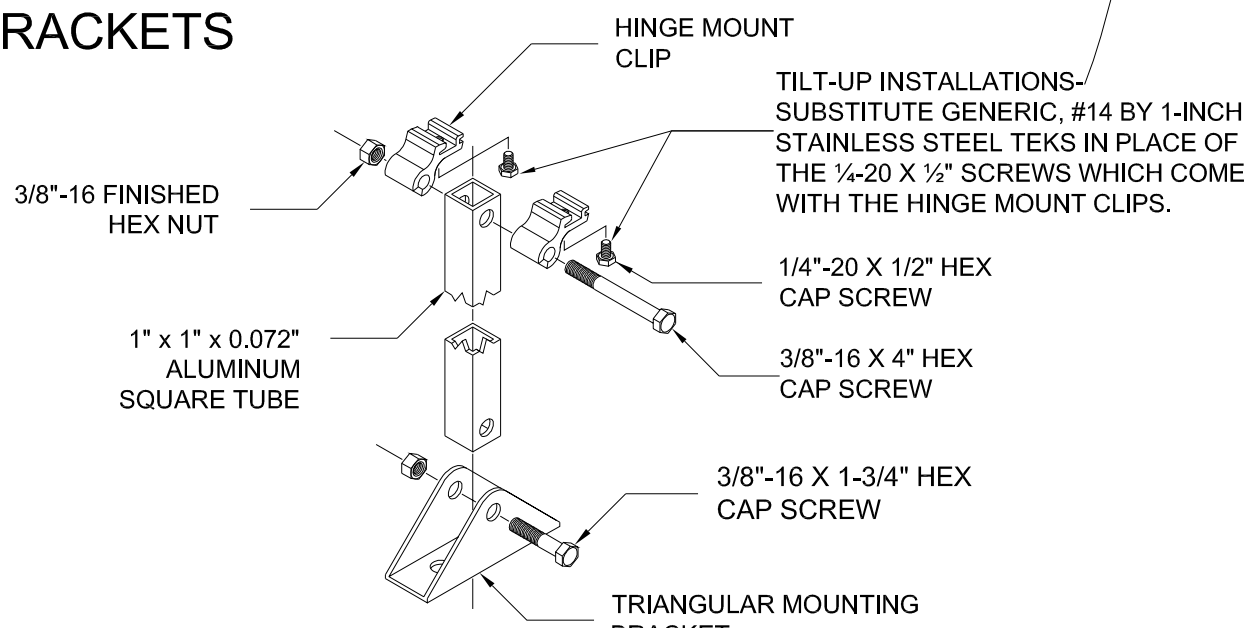
TYP. MOUNTING DETAIL

SCALE: 1-1/2" = 1'-0"



MOUNTING BRACKETS

SCALE: N.T.S.



TILT KIT - DECK ANCHOR

SCALE: N.T.S.

02 FIGURE 2

SCALE: 1/8" = 1'-0"

ENGINEERED:

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INSTALLATION OF A ROOF TOP SOLAR WATER HEATER

SYSTEM:

SOLAR WORLD
8998 130th Avenue
Largo FL 33773-1401
727.559.0307

DATE: 03/10/09

REVISION NO./DATE:

THIS IS A SINGLE SHEET PLAN

SHEET NAME:

PERMIT SET

DRAWN:SB CHECKED:AG

SHEET NO:

A.1.1

AS 1.1.WH 05/18/09.dwg