**SCOPE OF WORK:** INSTALLATION OF A SOLAR WATER HEATING SYSTEM WITH A ROOF TOP COLLECTOR

**DESIGNED PER:** ASCE 7-05

WIND LOAD: **DESIGNED FOR 160 MPH** 

FIGURE 3
SCALE: N.T.S.

**ENLARGED VIEWING & HYPERLINKS:** 

HTTP://WWW.UNIRAC.COM/PDF/II227.PDF

STRUCTURAL LOADING:

UNIRAC HYPERLINK.

FIGURE 3 EXPLANATORY INFORMATION

PRINT VERSION OF THIS PLAN PROVIDES MINIMUM INFORMATION NEEDED BY USERS.

OEM MANUALS MAY BE ACCESSED ELECTRONICALLY USING THE FOLLOWING HYPERLINKS:

THIS PLAN WAS ENGINEERED FOR THE ENTIRE STATE OF FLORIDA INCLUDING HVHZ.

OR LESS, SLOPE 45 DEGREES OR LESS ARE: PZ1\_-66.6 PSF; PZ2\_-106.6 PSF; PZ3\_-153.2 PSF.

MANUALS AND ABUNDANT OTHER SUPPLEMENTARY INFORMATION.

EV MAY BE ACCESSED AT HTTP://WWW.CADVICE.US/SW/AS.1.3.WH.PDF

HTTP://WWW.UNISTRUT.COM/LITERATURE/INDEX.PHP?DOC=NO14&PG=1 HTTP://WWW.IRONRIDGE.COM/FILES/XRS/IRONRIDGE XRS 2 RAIL SYSTEM.PDF

4-PSF. MY UPLIFT PRESSURE CALCULATIONS MAY BE VIEWED AT HTTP://WWW.CADVICE.US/SW/WINDLOADCALCULATIONS.PDF

ELECTRONIC VERSION (EV) PROVIDES MAGNIFIED VIEWING UP TO 6400%. EV ALSO PROVIDES HYPERLINK ACCESS TO OEM

THERE ARE THREE PROPRIETARY RACK SYSTEMS APPROVED FOR USE WITH THIS PLAN. THESE MAY BE USED TO SUPPLEMENT

OR TO REPLACE THE DETAILS SHOWN IN FIGURE 2. IN ALL CASES REFER TO OEM INSTRUCTIONS FOR DETAILS/SYSTEM BEING USED. IN THE EVENT OF A CONFLICT BETWEEN OEM INSTRUCTIONS AND THIS PLAN, OEM INSTRUCTIONS SHALL PREVAIL.

THE SOLAR EQUIPMENT REPRESENTED ON THIS PLAN IMPOSES A POSITIVE LOAD UPON THE ROOF STRUCTURE OF LESS THAN

THE UPLIFT PRESSURES FOR 160MPH, EXPOSURE CATEGORY C, BUILDING IMPORTANCE FACTOR CATEGORY II, HEIGHT 60-FT

QUESTIONS REGARDING ROOF PRESSURE ZONES ARE REFERRED TO THE ASCE 7 DIAGRAM FOUND ON PAGE 5 AT THE ABOVE

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 IS VOID WITHOUT MY SIGNATURE & RAISED SEAL. THIS PLAN MAY NOT BE PLACED ON FILE FOR PULLING MULTIPLE PERMITS. EACH PERMIT PULLED REQUIRES ITS OWN RAISED SEAL COPY OF THIS PLAN.

## SOLAR HYDRONICS CORP (FORMERLY KNOWN AS SOLAR WORLD) DOMESTIC HOT WATER (DHW) INSTALLATION NOTES: 10 JULY 09

GENERAL: THIS DRAWING AND THE SPECIFICATIONS HEREON ESTABLISH THE MINIMUM REQUIREMENTS FOR DHW 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 HYDRONICS CORP DHW 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 TILTED-UP TO ACHIEVE BETTER SOLAR COLLECTION. FLUSH-MOUNT SHALL REQUIRE 4-ANCHORS\* (3/8-INCH DIAMETER CRS, CORROSION RESISTANT STEEL) IN PZ-1 & PZ-2, EXPOSURES B & C, IN ALL WIND ZONES UP TO AND INCLUDING 160 MPH. \*ANCHORS CAN EITHER BE, AT CONTRACTORS' CHOICE, 4-ANCHORS FOR A SINGLE COLLECTOR OR 4-ANCHORS FOR TWO COLLECTORS THRU USE OF CRS UNISTRUT P1000 TO TIE THE TWO COLLECTORS TOGETHER -SEE FIGURE 2. TILT-UP IS PERMITTED ONLY WITH THE FOLLOWING STIPULATIONS: A) NO INSTALLATIONS OUTSIDE OF PRESSURE ZONE 1; B) USE ONLY OEM HARDWARE- EXCEPT #14 TEKS PER FIGURE 2; C) COLLECTOR LONG AXIS HORIZONTAL AND 30 DEGREES MAXIMUM TILT ANGLE; D) WIND ZONE 140 MPH AND LESS REQUIRE 4-ANCHORS PER TILT-UP COLLECTOR; F) WIND ZONES GREATER THAN 140 MPH REQUIRE 6 ANCHORS PER TILT-UP COLLECTOR AND MINIMUM TILT POLE WALL THICKNESS OF 1/8TH-INCH. CONTRACTOR SHALL KEEP LAG BOLT LOADING TO UNDER 528 POUNDS OF UPLIFT. REFER TO WIND LOAD CALCULATIONS AT HTTP://WWW.CADVICE.US/SW/WINDLOADCALCULATIONS.PDF WHEN LAG LIMIT IS EXCEEDED CONTRACTOR SHALL USE MORE LAGS, J-BOLTS OR ALL-THREAD ROD. FOUR J-BOLTS OR ALL-THREAD RODS CAN HANDLE THE LOAD OF 2-EACH, 40SF SOLAR COLLECTORS IN ALL LOADING CASES ON THE CHART.

WHEN STRAYING INTO PZ2, INCREASE ANCHORS 50% ON THE PORTION OF THE COLLECTOR IN PZ2. ABSOLUTELY NO TESTING: THE SOLAR HYDRONICS CORP DHW COLLECTORS HAVE PASSED MIAMI TESTING LABS WIND LOAD TESTING OF -102 PSE PER ASTM F-330 (MTL FILE NUMBER 95-1249) THIS ENGINEER HAS EVALUATED THE INSTALLATION COMPONENTS AND HARDWARE CURRENTLY PROVIDED BY SOLAR HYDRONICS CORP 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 GENERIC, # 14 BY 1 INCH, SS, SELF-DRILLING, SCREWS AS SHOWN IN FIGURE 2) WITHOUT PRIOR APPROVAL OF THIS ENGINEER THRU SOLAR HYDRONICS CORP HARDWARE: THIS ENGINEER HAS DETERMINED THAT THE HOLD-DOWN HARDWARE AND FASTENERS SUPPLIED BY SOLAR HYDRONICS CORP WILL WITHSTAND HURRICANE FORCE WINDS UP TO AND INCLUDING 160 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 SHC DHW COLLECTORS FOR FLUSH MOUNT INSTALLATION (PARALLEL WITH THE ROOF SURFACE AND AS CLOSE THERETO AS PERMITTED BY OEM HARDWARE) 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 160 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 THREAD 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

SPECIAL PROCEDURES TO USE WHEN, IN THE INSTALLER'S OPINION, HITTING THE CENTER OF TRUSS OR RAFTER WITH A LAG CANNOT BE ASSURED. 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. 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

SOLAR HYDRONICS CORP 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 SOLAR HYDRONICS CORP INSTALLATION INSTRUCTIONS. WATERPROOFING 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". QUESTIONS: INSTALLERS, AUTHORITIES HAVING JURISDICTION, OR 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

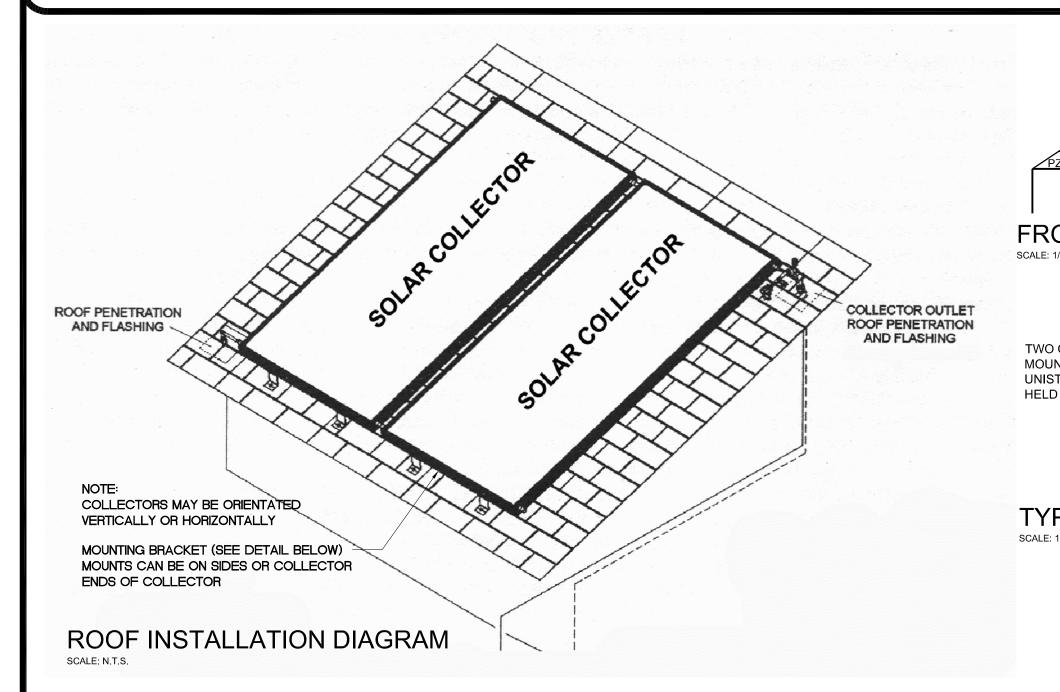
## DIRECT "D"SYSTEM This drawing shows the Solar World SWH "D" (direct) system and this particular system's plumbing. There are other, slightly different, Solar World SWH system variants which are also covered by this sealed drawing. This is because the critical element - the collector(s) and roof mounting details remain the same whether the Solar World SWH system being installed is a direct, in-direct, drain-back or PV pump system. - COLLECTOR SENSOR — SOLAR LOOP DRAIN — ISOLATION VALVE SOLAR LOOP DRAIN-- EXPANSION TANK ISOLATION VALVE-- DIFFERENTIAL CONTROL ONE WAY FLOW CONTROL DEVICE-HOT WATER OUTLET— COLD WATER INLET SHUT OFF VALVE BACKUP ELECTRIC ELEMENT-**LEDGEND** DIP TUBE-ISOLATION VALVE (OPTIONAL). STORAGE TANK-TANK SUPPLY SHUT OFF SOLAR LOOP DRAIN (OPTIONAL) FREEZE PROTECTION VALVE (OPTIONAL) TEMPERATURE/PRESSURE RELIEF VALVE PRESSURE RELIEF VALVE TANK SENSOR-AIR VENT (OPTIONAL) ONE-WAY (FLOW CONTROL) DEVICE (OPT.) ELECTRIC PUMP AC/DC EXPANSION TANK (OPTIONAL) O1) FIGURE 1 SCALE: N.T.S.

NOTE: SUITABLE FOR HVHZ SEE CALCULATIONS: HTTP://WWW.GEZELMANPE.COM/INSTALLATIONDWGS.HTML REGARDING WIND LOAD - MY DESIGNS CLEARLY SHOW COMPLIANCE PER ASCE 7 WITH THE FLORIDA BUILDING CODE.

MSC21 / SHC 21

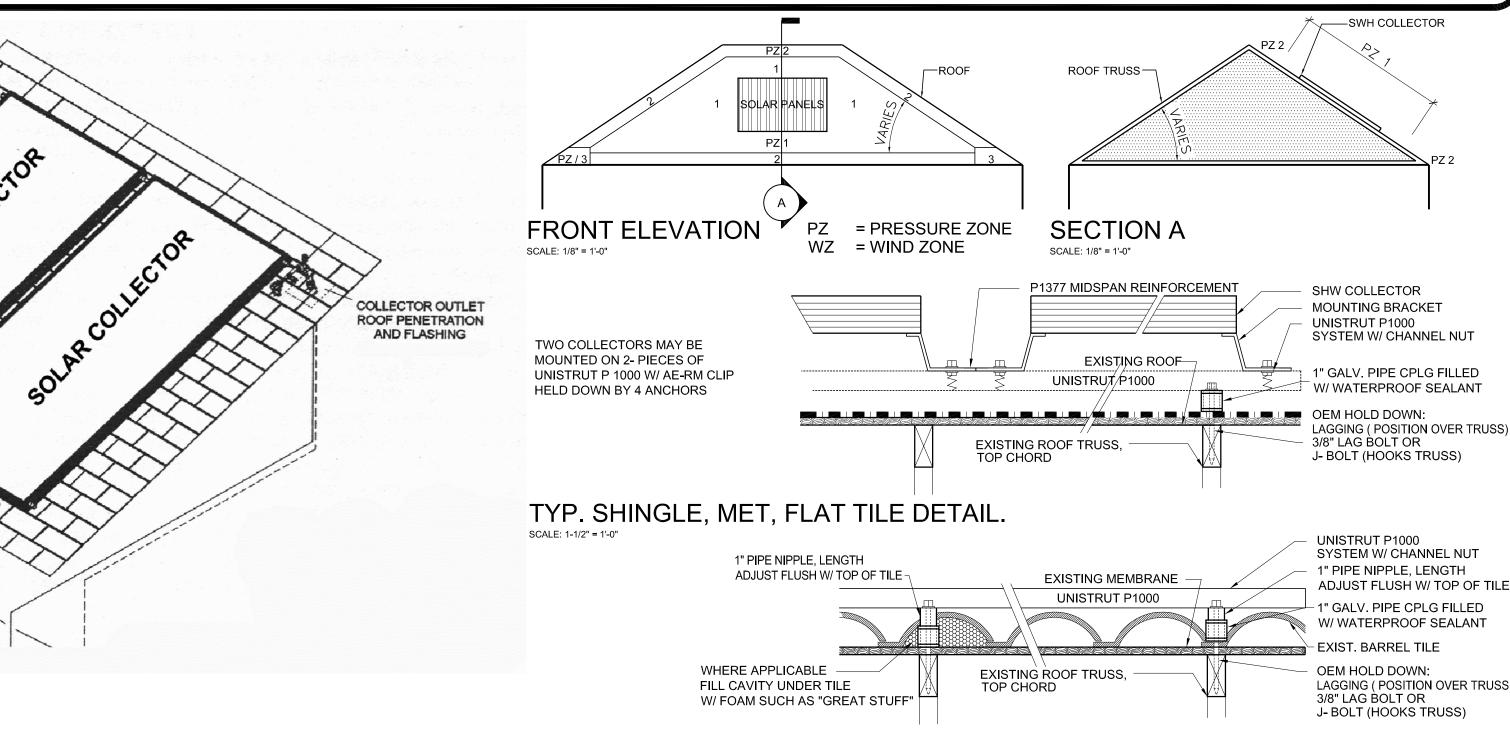
REGARDING GRAVITY LOAD - OUR HEAVIEST COLLECTOR WEIGHS 147 POUNDS WHICH IS DISTRIBUTED OVER A 40 S.F AREA. WATER IN THE

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!



## **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



## TYP. BARREL TILE ROOF MOUNTING DETAIL

1" x 1" x 0.072"

SQUARE TUBE

TILT KIT - DECK ANCHOR

ALUMINUM

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

APPLY LIQUID NAILS

SIDES OF INTERFACE

SHEETING AND TRUSS

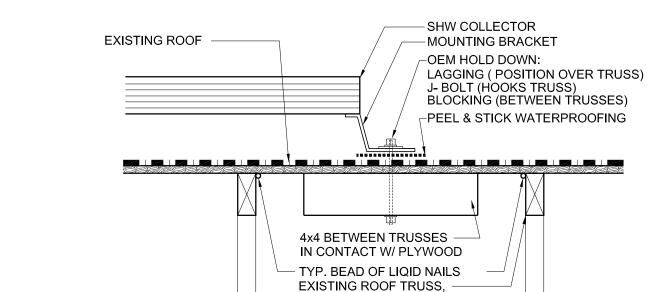
**DIRECTION STARTING** FROM "SPANNER" TO

WHICH COLLECTOR MOUNT FOOT-PAD IS SECURED BY ALL-THREAD ROD.

MEDIUM BEAD BOTH

BETWEEN ROOF

1 FOOT IN EACH



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" Flush Mount Standard Mount Rack Mount System System System SS #14 TEK AE-FM MOUNTING BRACKETS HINGE MOUNT SUBSTITUTE GENERIC, #14 BY 1-INCH SS, TEKS FOR THE OEM 1/4-20 X 1/2" SCREWS WHICH COME WITH MOUNTING 3/8"-16 FINISHED BRACKETS AE-RM, AE-FM, AE-MH. **HEX NUT** 1/4"-20 X 1/2" HEX

CAP SCREW

CAP SCREW

3/8"-16 X 1-3/4" HEX

CAP SCREW

TRIANGULAR MOUNTING

BRACKET

3/8"-16 X 4" HEX

REQUIREMENTS OF THE CURRENT FLORIDA BUILDING CODE. **ALLEN GEZELMAN** 16502 HANNA RD. LUTZ, FLORIDA 33549 PH. 813 650 7246 FX. 866 397 9050 Allen@Gezelman PE.COM www.GezelmanPE.com

**CERTIFY THAT THIS DESIGN &** 

SPECIFICATIONS MEET THE

PE. # 59180

3603 E Renellie Cir Tampa FL,33629 PH. 813 919 9154 FX. 866 694 7251 mail@cAdvice.us // www.cAdvice.us

Solar Hydronics Corp.

DATE SAVED: 8/12/2009 8:27 PM

PUBLISHED: 8/12/2009 8:27:49 Pt

1423 GUNN HIGHWAY

ODESSA, FL 33556

THIS IS A SINGLE SHEET PLAN

SHEET NAME:

**PERMIT SET** DRAWN:SB CHECKED:AG

FIGURE 2

SHEET NO: