

## SCOPE OF WORK:

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

## SOLAR COLLECTOR SOLAR WORLD:

DIMENSIONS: 4'-0" X P.L. (8', 10' OR 12')

## ROOF ANGLE:

COLLECTOR INSTALLATION STANDARD FLUSH W/ ROOF

## WIND LOAD: 160 C

WIND LOAD RESISTANCE DETERMINED BY STRAP SPACING "S" SEE FIG. 2

## APPLICABLE CODE:

FLORIDA 2007 CODE W/09 SUPP

## COMPATIBLE WITH BOTH:

ASCE 7-02 & ASCE 7-05

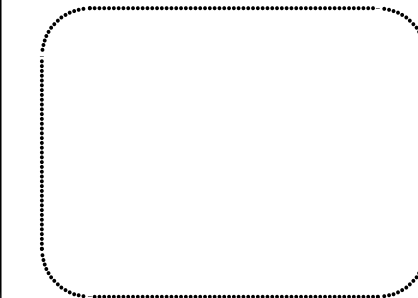
## ENLARGED VIEWING:

[HTTP://WWW.SW.CADVICE.US/AS.2.2.PH.PDF](http://www.sw.cadvice.us/AS.2.2.PH.PDF)

## ENGINEER:

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INSTALLATION OF A ROOF TOP  
SOLAR POOL HEATER

## SYSTEM:

**SHC** Solar Hydronics Corp.

1423 GUNN HIGHWAY  
ODESSA, FL 33556

REV.083109-TM

DATE: 12.10.2009

REVISION NO./DATE:

THIS IS A SINGLE  
SHEET PLAN

SHEET NAME:

**PERMIT SET**

DRAWN: SB CHECKED: AG

SHEET NO:

**A.2.2**

AS 2.2.dwg

## SHC (SOLAR HYDRONICS CORP) SPH (SOLAR POOL HEATER) SYSTEM INSTALLATION NOTES:

THE DETAILS SPECIFIED ON THIS "PAPER" PLAN ARE CONSIDERED TO BE THE MINIMUM NEEDED BY AHJ (AUTHORITY HAVING JURISDICTION) AND INSTALLERS. USERS ARE ENCOURAGED TO ACCESS EV (ELECTRONIC VERSION) OF THIS PLAN [HTTP://WWW.SW.CADVICE.US/AS.2.2.PH.PDF](http://www.sw.cadvice.us/AS.2.2.PH.PDF)

ACTIVE HYPERLINKS ON EV PROVIDE EASY ACCESS TO INFORMATION. EV ALSO ALLOWS VIEWER TO STUDY THE PLAN AND OEM DETAILS AT A MAGNIFICATION OF HIS CHOICE UP TO 6400%. IF A CONFLICT SHOULD OCCUR BETWEEN A DRAWING AND/OR SPECIFICATION HEREON AND AN OEM DETAIL, OEM SHALL PREVAIL.

- SHC IS TRANSITIONING FROM OLD MODEL POOL PANELS AND HARDWARE TO NEW. APPEARANCE AND EASE OF USE DIFFER, BUT PERFORMANCE IS UNCHANGED. OLD AND NEW MAY BE USED INTERCHANGEABLY. OEM REQUIRES THAT THE UPPER HEADER BE CLAMPED TO THE ROOF AT NOT GREATER THAN 4-FT CENTER TO CENTER SPACING WITH EITHER OLD OR NEW STYLE CLAMPS WHICH ALLOW MOVEMENT WITH THERMAL HEATING AND CONTRACTION. OEM STRONGLY RECOMMENDS AGAINST CLAMPS ON THE LOWER HEADER.
- THESE DRAWINGS AND ENGINEERING ESTABLISH THE INSTALLATION REQUIREMENTS FOR SOLAR HYDRONICS CORP. (AKA OEM) SOLAR POOL HEATING EQUIPMENT ON BUILDINGS IN FLORIDA 60 FEET OR LESS IN HEIGHT AND AT ROOF ANGLES FROM FLAT UP TO 45 DEGREES. ENGINEER HAS EVALUATED THE INSTALLATION COMPONENTS AND HARDWARE CURRENTLY PROVIDED BY SOLAR WORLD AS ITS OEM INSTALLATION KITS AND FOUND THEM TO MEET THE REQUIREMENTS OF THE 2007 FLORIDA CODE WITH 2009 SUPPLEMENT. THERE SHALL BE NO SUBSTITUTION OF OTHER VENDOR MATERIALS WITHOUT PRIOR APPROVAL OF ENGINEER THRU SOLAR WORLD.
- PLUMBING SHALL BE PER **FIGURE 1** (WITH OR WITHOUT THE DESIGNATED OPTIONAL ITEMS). FLORIDA PLUMBING CODE SHALL BE ADHERED TO WITH PARTICULAR ATTENTION TO PIPE SUPPORT, PER FPC TABLE 308.5, THE ABS VALUE OF 4 FT SHALL BE TAKEN AS THE MAXIMUM FOR HORIZONTAL AND 10 FT FOR VERTICAL SOLAR PIPING. PER FLORIDA MECHANICAL CODE. CONTRACTOR SHALL INSTALL MANUAL DRAIN DOWN VALVES AND INSTRUCT OWNER IN DRAINING AND THEN RESTARTING THIS SOLAR POOL HEATING SYSTEM. OWNER SHALL BE INFORMED THAT FREEZE PROTECTION IS UP TO HIM IF SOLAR POOL HEATER FREEZES, IT IS OWNER'S SOLE RESPONSIBILITY - FREEZE DAMAGE RESULTS FROM AN ERROR IN OPERATION - NOT DESIGN ERROR. COLLECTORS SHOULD ALWAYS BE DRAINED BY OWNER OR OWNER REPRESENTATIVE IN ADVANCE OF NEAR FREEZING WEATHER. FREEZE DAMAGE WILL NOT BE COVERED AS A WARRANTY ITEM.
- ENGINEER HAS DETERMINED THAT THE HOLD-DOWN STRAPPING AND FASTENERS SUPPLIED BY SOLAR HYDRONICS CORP. WILL NOT BREAK UNDER HURRICANE FORCE WINDS UP TO AND INCLUDING 160 MPH 3-SECOND GUSTS. ENGINEER HEREBY DESIGNATES **30 INCHES AS THE STRAP SPACING (S\*) EVERYWHERE IN FLORIDA EXCEPT KEYS & HVHZ -SEE FIGURE 2. IN KEYS & HVHZ, STRAP SPACING SHALL BE 24-INCHES MAXIMUM AND LAG BOLT LENGTH INCREASED TO 3-INCHES(MIN).** CONTRACTOR IS ENCOURAGED TO **INSTALL IN PRESSURE ZONE 1 (PZ1) ONLY (SEE FIGURE 3).** WHERE THE COLLECTOR ARRAY MUST STRAY INTO PZ2, CONTRACTOR SHALL REDUCE STRAP SPACING 50% FOR THAT PORTION OF THE ARRAY. **THERE SHALL BE NO PORTION OF THE SOLAR COLLECTOR ARRAY IN PZ3.** ATTACH THE COLLECTOR ARRAY TO THE ROOF WITH OEM STRAPPING AND OEM "ANCHOR BUTTONS". THE ANCHOR BUTTONS SHALL BE LAGGED TO THE ROOF TRUSSES OR OTHER STRONG POINT USING (MINIMUM) #14, CORROSION RESITANT STEEL(CRS), LAGS, 2-INCHES IN LENGTH (MIN). **IN THE KEYS & HVHZ, THE LAGS SHALL BE 3-INCHES LONG (MINIMUM).** CONTRACTOR MUST BE CAREFUL TO "CENTER" THE UNDERLYING WOOD ROOF TRUSS WITH HIS LAGS OR USE 36 SQ INCH AREA (MIN) 2 INCH THICK (NOMINAL) WOOD BLOCKING ON THE UNDERSIDE OF THE ROOF SHEETING. WHERE THIS IS NOT POSSIBLE( IN THE CONTRACTOR'S OPINION), AS IN THE CASE OF A CONCRETE ROOF DECK, LAG SHIELDS OR OTHER WIDELY-USED, INDUSTRY-STANDARD, METHODS MAY BE EMPLOYED - AT CONTRACTOR'S RISK.
- CONTRACTOR 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".
- SO LONG AS THE ANCHORS TO THE ROOF STRUCTURE ARE AS HERIN SPECIFIED AND ARE NOT REDUCED IN NUMBER, CONTRACTOR IS FREE TO USE A SUBSTRATE OR ALUMINUM MOUNTING FRAME, OF CONTRACTOR'S CHOICE, "SANDWICHED" BETWEEN THE SOLAR COLLECTOR AND ROOF ON A FLUSH MOUNT (NOT TILT UP) INSTALLATION.
- CONTRACTORS, INSPECTORS, AHJS AND OTHERS HAVING QUESTIONS MAY CONTACT ENGINEER DIRECTLY - OFFICE: 813 909 1956, CELL: 813 650 7246, FAX: 866 397 9050, E-MAIL: BOLSON1@TAMPABAY.RR.COM .

## ROOF LOADING SHVHZ NOTE:

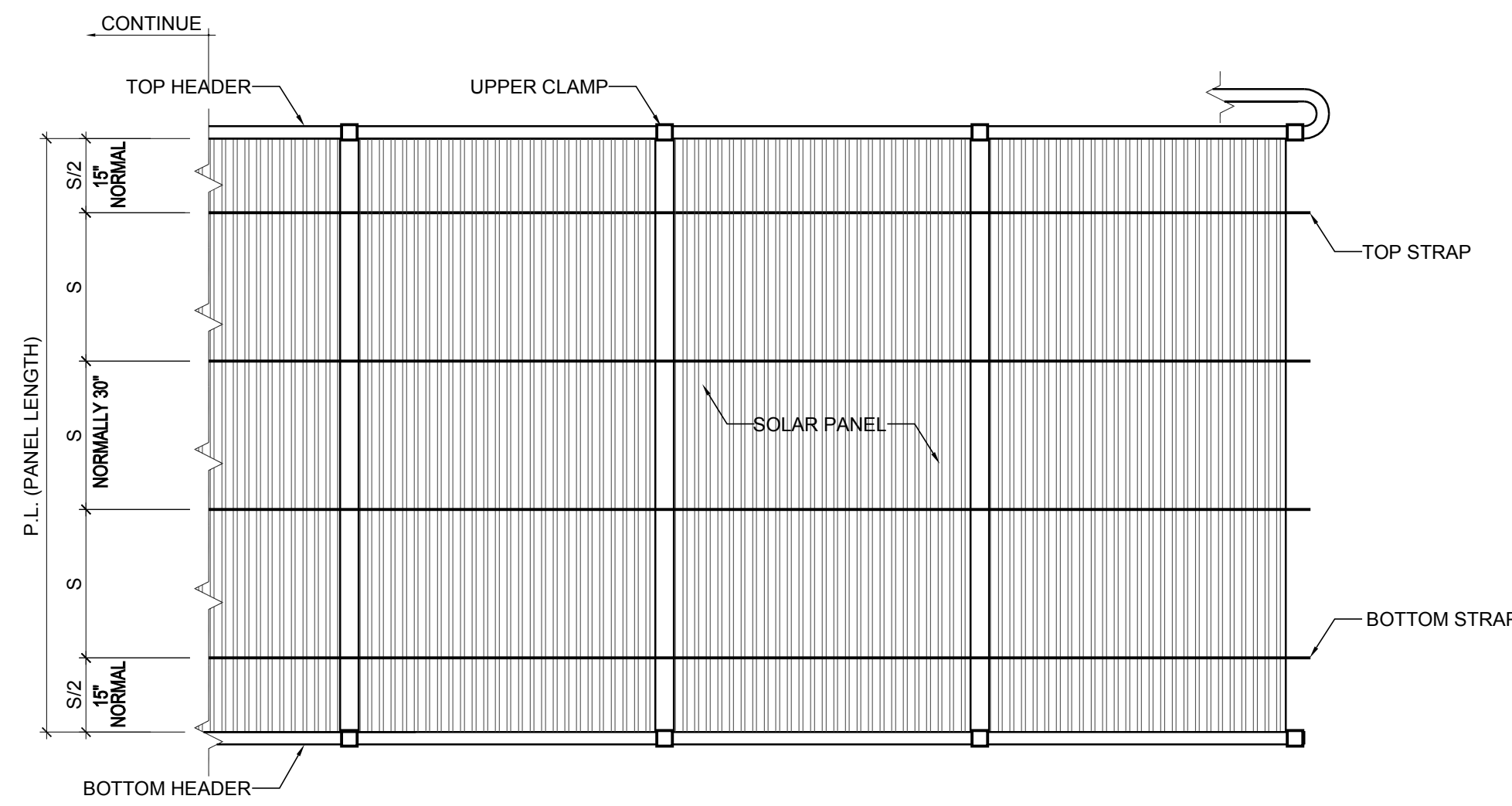
THIS DESIGN IS INTENDED TO BE USED FLORIDA-WIDE - INCLUDING HVHZ.  
**REGARDING WIND LOAD** - THIS DESIGN COMPUES WITH THE **CURRENT FLORIDA BUILDING CODE.**  
**REGARDING GRAVITY LOAD** - OUR HEAVIEST POOL HEATING COLLECTOR WEIGHS 25 POUNDS WHICH IS DISTRIBUTED OVER A 48 SQUARE FOOTPRINT.  
WATER IN THE COLLECTOR IS NEGLIGIBLE. EACH COLLECTOR HOLDS ABOUT 1.5 GALLONS OF WATER.  
**SOLAR PANELS ARE AN INSIGNIFICANT GRAVITY LOAD ON THE ROOF UNDERNEATH!**

## VALIDITY:

**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.**

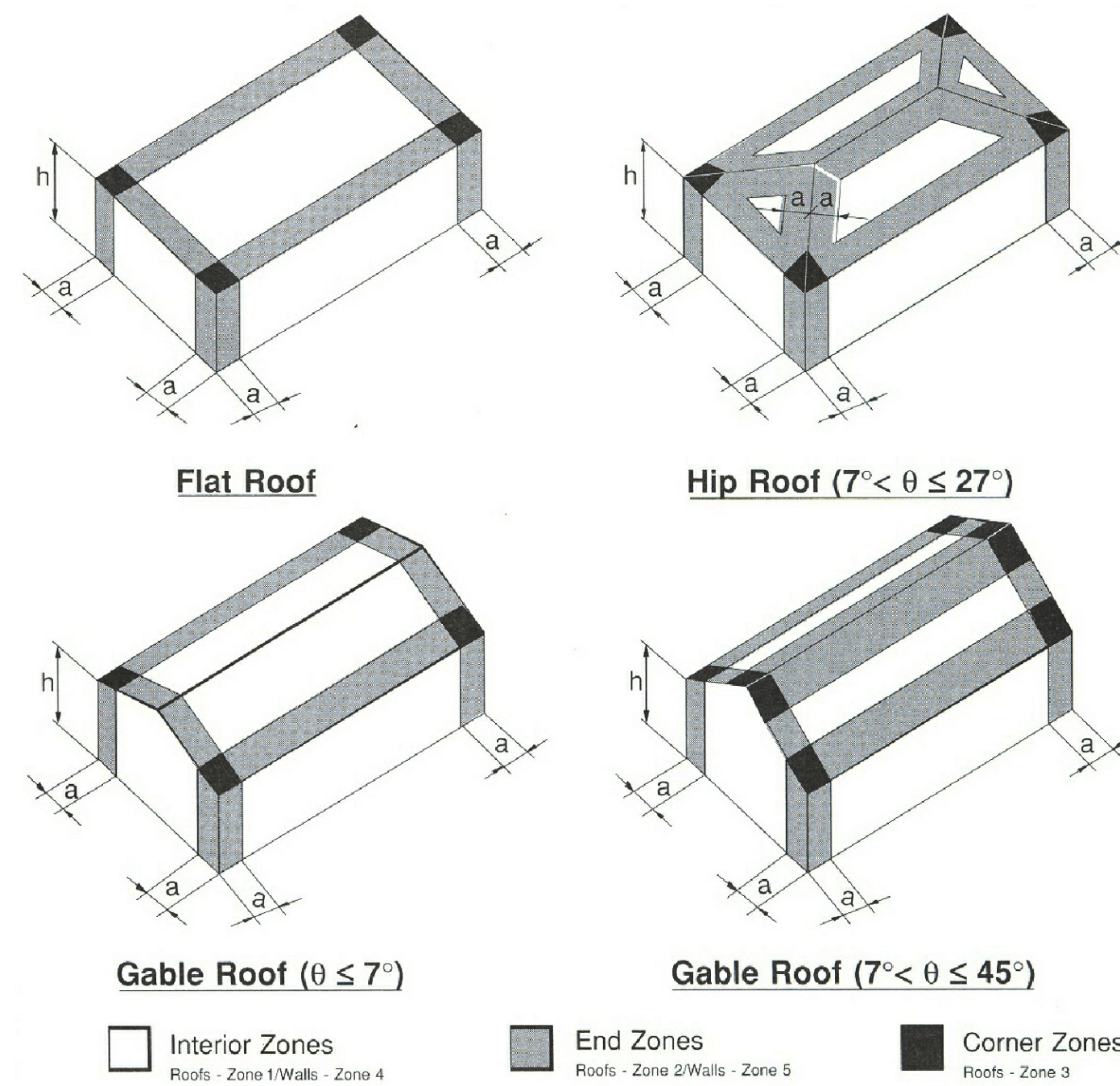
## TESTING &amp; CERTIFICATION NOTE:

SOLAR POOL HEATING COLLECTORS ARE REQUIRED TO BE TESTED, CERTIFIED AND LISTED BY THE FLORIDA SOLAR ENERGY CENTER. THE COLLECTORS LISTED ON THIS PLAN COMPLY. THEIR FSEC LISTINGS AND RATINGS MAY BE VIEWED ONLINE AT:  
[HTTP://WWW.FSEC.UCF.EDU/EN/INDUSTRY/TESTING/STCOLLECTORS/POOL\\_RATINGS/INDEX.HTM](http://www.fsec.ucf.edu/en/industry/testing/stcollectors/pool_ratings/index.htm)



**02** **FIGURE 2**  
SCALE: 1/2" = 1'-0"

## ASCE 7 COMPONENT AND CLADDING LOADING DIAGRAMS



## Notes:

- Pressures shown are applied normal to the surface, for exposure B, at h = 30 ft (9.1m), I = 1.0, and K<sub>zt</sub> = 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.

**03** **FIGURE 3**  
SCALE: N.T.S.

## STRAP SPACING (S\*) REQUIREMENTS:

30 - INCH STANDARD STRAP SPACING IN ALL WINDZONES EXCEPT FL-KEYS & HVHZ WHICH IS 24-INCHES, ALL ROOF ANGLES ALL ELEVATIONS THROUGH 60 FT. INSTALLATION IN PZ1 ONL. IF EXTEND INTO PZ2 REDUCE SRTAP SPACING IN THAT AREA BY 50%.

## NOTE:

ONLY USE OEM WOVEN OCM STRAPS.

## AT WIND SPEEDS TO:

EQUAL TO OR BELOW 130 MPH USE 2" CORROSION RESITANT STEEL #14 LAG MINIMUM.ABOVE 130 USE 3" SS #14 LAG MINIMUM.

## DETERMINE MINIMUM NUMBER OF STRAPS:

DIVIDE PANEL LENGTH IN INCHES BY STRAP SPACING (S) IN INCHES. MORE STRAPS MAY BE USED WITHOUT ENGINEER APPROVAL.

## MINIMUM DIAMETER HOLD DOWN FASTENERS:

#14 OR 1/2-INCH (CONSIDERED EQUIVALENT AND INTER CHANGEABLE)

## 6 OCT 09 SOLAR POOL HEATER REVISIONS

## STRAP SPACING (S\*) REQUIREMENTS:

RECOMMEND SOLAR INSTALLATION IN PRESSURE ZONE 1 (PZS DEFINED BY ASCE7):

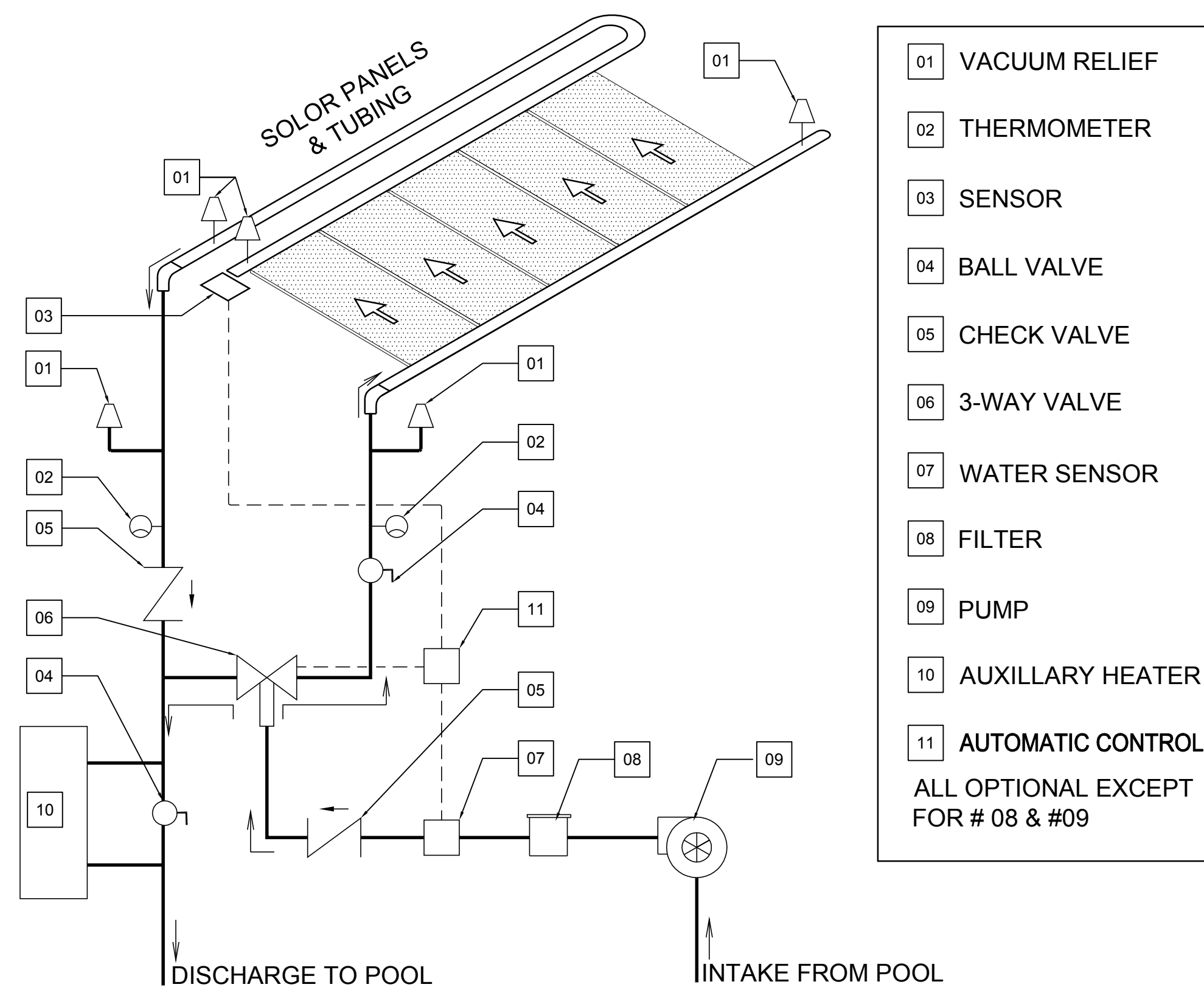
- FOR ANY PORTION OF SOLAR ARRAY WHICH EXTENDS INTO PZ2, DECREASE MAXIMUM STRAP SPACING IN THAT AREA TO 50%.
- FOR ANY PORTION OF ARRAY WHICH EXTENDS INTO PZ3, DECREASE STRAP SPACING IN THAT AREA TO 33-1/3%
- MAXIMUM STRAP SPACING IN ALL WIND ZONES AND SURFACE ROUGHNESS CATERGORIES 130C AND LESS IS 30-INCHES.
- MAXIMUM STRAP SPACING IN ALL HIGHER SPEED WINDZONES IS 24-INCHES

## STRAP MATERIAL:

- OEM OFFERS THREE VARIETIES OF STRAP MATERIAL THESE ARE LISTED IN INCREASING ORDER OF UP-LIFT RESISTANCE:
  - PLASTIC
  - COATED STAINLESS STEEL
  - WOVEN

ALL THREE MATERIALS ARE SUITABLE IN ALL AREAS & PRESSURE ZONES 130C AND LESS.

WOVEN IS THE ONLY ACCEPTABLE STRAP MATERIAL FOR WIND LOADING CONDITIONS ABOVE 130C.



**01** **FIGURE 1**  
SCALE: N.T.S. GENERAL NOTE: ALL OPTIONAL EXCEPT FOR # 08 & #09



**04** **OLD & NEW STYLE OEM CLAMP SYSTEMS**  
SCALE: N.T.S.