

SCOPE OF WORK: INSTALLATION OF A SOLAR POOL HEATING SYSTEM WITH A ROOF TOP COLLECTOR	SOLAR SYSTEM: DIMENSIONS: 4'-0" X P.L. (8', 10' OR 12')	ROOF ANGLE: COLLECTOR INSTALLATION STANDARD FLUSH W/ ROOF
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SOLAR WORLD POOL HEATER INSTALLATION NOTES:

- THESE DRAWINGS AND ENGINEERING ESTABLISH THE INSTALLATION REQUIREMENTS FOR SOLAR WORLD SOLAR POOL HEATING EQUIPMENT ON BUILDINGS IN FLORIDA 60 FEET OR LESS IN HEIGHT AND AT ROOF ANGLES FROM FLAT UP TO 45 DEGREES. THE SOLAR POOL PANELS SHALL IN ALL CASES BE INSTALLED FLUSH ON THE UPPER SURFACE OF THE ROOF COVERING. THIS 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 FLORIDA BUILDING CODE. THERE SHALL BE NO SUBSTITUTION OF OTHER VENDOR MATERIALS WITHOUT PRIOR APPROVAL OF THIS 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. THE VALUE OF 4 FT SHALL BE TAKEN AS THE MAXIMUM SUPPORT SPACING FOR HORIZONTAL AND 10 FT FOR VERTICAL SOLAR PIPING.
- PER FLORIDA MECHANICAL CODE, SOLAR POOL HEATING INSTALLATION SHALL BE DESIGNED AND INSTALLED TO PREVENT DAMAGE FROM FREEZING BY MANUAL OR NATURAL DRAINDOWN.
- THIS ENGINEER HAS DETERMINED THAT THE HOLD-DOWN STRAPPING AND FASTENERS SUPPLIED BY SOLAR WORLD WILL NOT BREAK UNDER HURRICANE FORCE WINDS UP TO AND INCLUDING 150 MPH 3-SECOND GUSTS. THIS ENGINEER HEREBY DESIGNATES 30 INCHES AS THE MAXIMUM STRAP SPACING - SEE **FIGURE 2**. THE ONLY REMAINING VARIABLE OF SIGNIFICANCE IS THE ATTACHMENT OF THAT STRAPPING TO THE UNDERLYING ROOF SYSTEM USING OEM STAINLESS STEEL LAG BOLTS THRU THE OEM STRAP CLAMPS. THE LAG BOLTS SHALL BE (MINIMUM) ¼-INCH DIAMETER AND 2.5 INCHES IN LENGTH. THE LAGS SHALL ACHIEVE A CUMULATIVE SOLID EMBEDMENT OF AT LEAST 2 INCHES IN THE DECKING AND UNDERLYING WOOD ROOF TRUSS OR THRU 36 SQ. INCH AREA (MIN) 2 INCH THICK (NOMINAL) WOOD BLOCKING ON THE UNDERSIDE OF THE ROOF SHEETING. WHERE THIS IS NOT POSSIBLE, AS IN THE CASE OF A CONCRETE ROOF DECK, LAG SHIELDS ARE AN ACCEPTABLE ALTERNATE. IF THE DECK IS WOOD AND IT IS NOT FEASIBLE (IN THE INSTALLER'S OPINION) TO POSITION BLOCKING TO RECEIVE THE LAG, SOLAR WORLD PROPRIETARY DECK ANCHORS ARE AN ACCEPTABLE ALTERNATE AND MAY BE INSTALLED WITHOUT FURTHER CONSULTATION WITH THIS ENGINEER. SOLAR WORLD PROPRIETARY DECK ANCHORS MAY ALSO BE USED FOR STEEL ROOF DECKS.
- 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".
- THIS DESIGN IS BASED UPON ASCE 7, CHAPTER 6, AND WIND LOAD METHOD 1 WHICH ASSUMES (PRESSURE ZONE 1, 120 MPH 3-SEC GUST, MEAN ROOF HEIGHT 30 FT OR LESS EXPOSURE B). PRESSURE ZONES ARE SHOWN HEREIN AS **FIGURE 3**. FOR OTHER DESIGN CONDITIONS, THE MAXIMUM STRAP INTERVAL (SPACING) SHALL BE REDUCED AS FOLLOWS:
 - ROOF HEIGHT AND EXPOSURE CATEGORY BY MULTIPLYING 30 INCHES BY THE RECIPROCAL OF THE ADJUSTMENT FACTOR SHOWN IN **FIGURE 4** HEREIN.
 - STRAP INTERVAL SPACING SHALL BE REDUCED FOR HIGHER WIND SPEEDS AS FOLLOWS FOR 130 MPH MULTIPLY 30 INCHES BY 0.9, FOR 140 MPH MULTIPLY BY 0.80, FOR 150 MPH MULTIPLY BY 0.70. FOR EXAMPLE, THE STRAP SPACING FOR 150 MPH SHALL NOT BE GREATER THAN 30 TIMES 0.70 = 21 INCH MAX STRAP SPACING.
 - MAXIMUM STRAP INTERVAL SPACING SHALL BE REDUCED IN PRESSURE ZONE 2 BY MULTIPLYING BY 0.90. MAXIMUM STRAP INTERVAL SPACING SHALL BE REDUCED IN PRESSURE ZONE 3 BY MULTIPLYING BY 0.50.
- MULTIPLE DIFFERENCES FROM ASSUMED DESIGN CONDITIONS SHALL RESULT IN A CUMULATIVE MAXIMUM STRAP SPACING REDUCTION. FOR EXAMPLE; MAXIMUM STRAP SPACING FOR PRESSURE ZONE 3 ON A 40 FT ROOF IN CATEGORY C, 150 MPH WIND ZONE WOULD BE COMPUTED AS FOLLOWS; 30 INCHES TIMES 0.50 TIMES 1/1.49 TIMES 0.70 = 7 INCH MAXIMUM STRAP SPACING. STRAP SPACING ON THAT SAME ROOF IN PRESSURE ZONE 1 WOULD BE 30 INCHES TIMES 1/1.49 TIMES 0.70 = 14 INCH MAXIMUM STRAP SPACING.
- INSTALLERS, INSPECTORS, BUILDING DEPARTMENTS AND OTHERS HAVING QUESTIONS MAY CONTACT THIS ENGINEER DIRECTLY - CELL: 813 650 7246, FAX: 866 397 9050, E-MAIL: BOLSON1@TAMPABAY.RR.COM

WIND LOAD: WIND LOAD RESISTANCE DETERMINED BY STRAP SPACING "S" SEE FIG. 2	APPLICABLE CODE: FLORIDA 2007 CODE W/09 SUPP
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COMPATIBLE WITH BOTH: ASCE 7-02 & ASCE 7-05

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

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INSTALLATION OF A ROOF TOP
SOLAR POOL HEATER

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

DATE: 02/28/2009
REVISION NO./DATE:

THIS IS A SINGLE
SHEET PLAN

SHEET NAME:
PERMIT SET

DRAWN: SB CHECKED: AG

SHEET NO:
A.3.0
AS-3.0.PH-02-28-09.dwg

SOLAR POOL HEATER NOTE:
THIS DESIGN IS INTENDED TO BE USED FLORIDA-WIDE - INCLUDING HVHZ.
REGARDING WIND LOAD - THIS DESIGN COMPLIES 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!

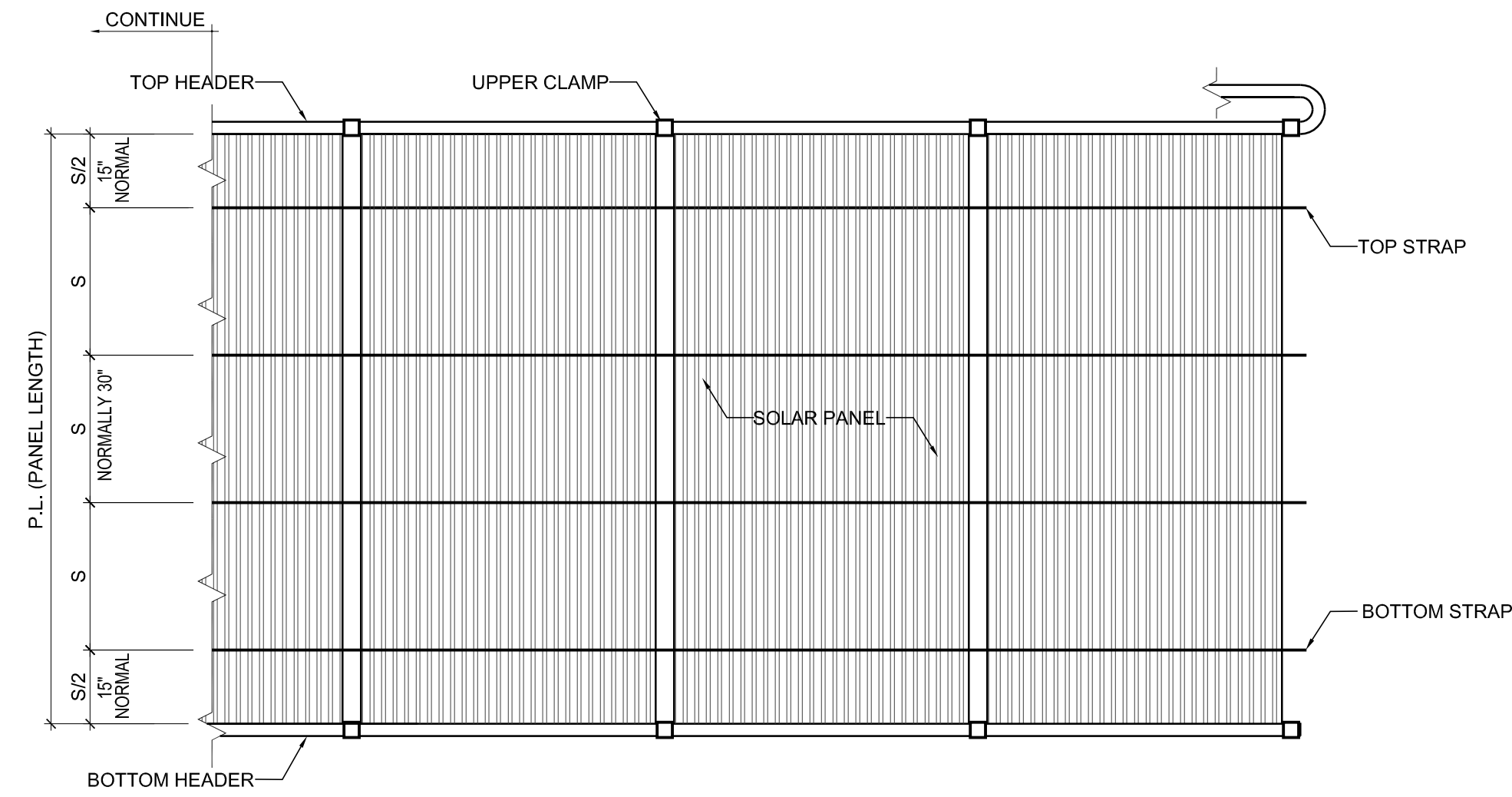


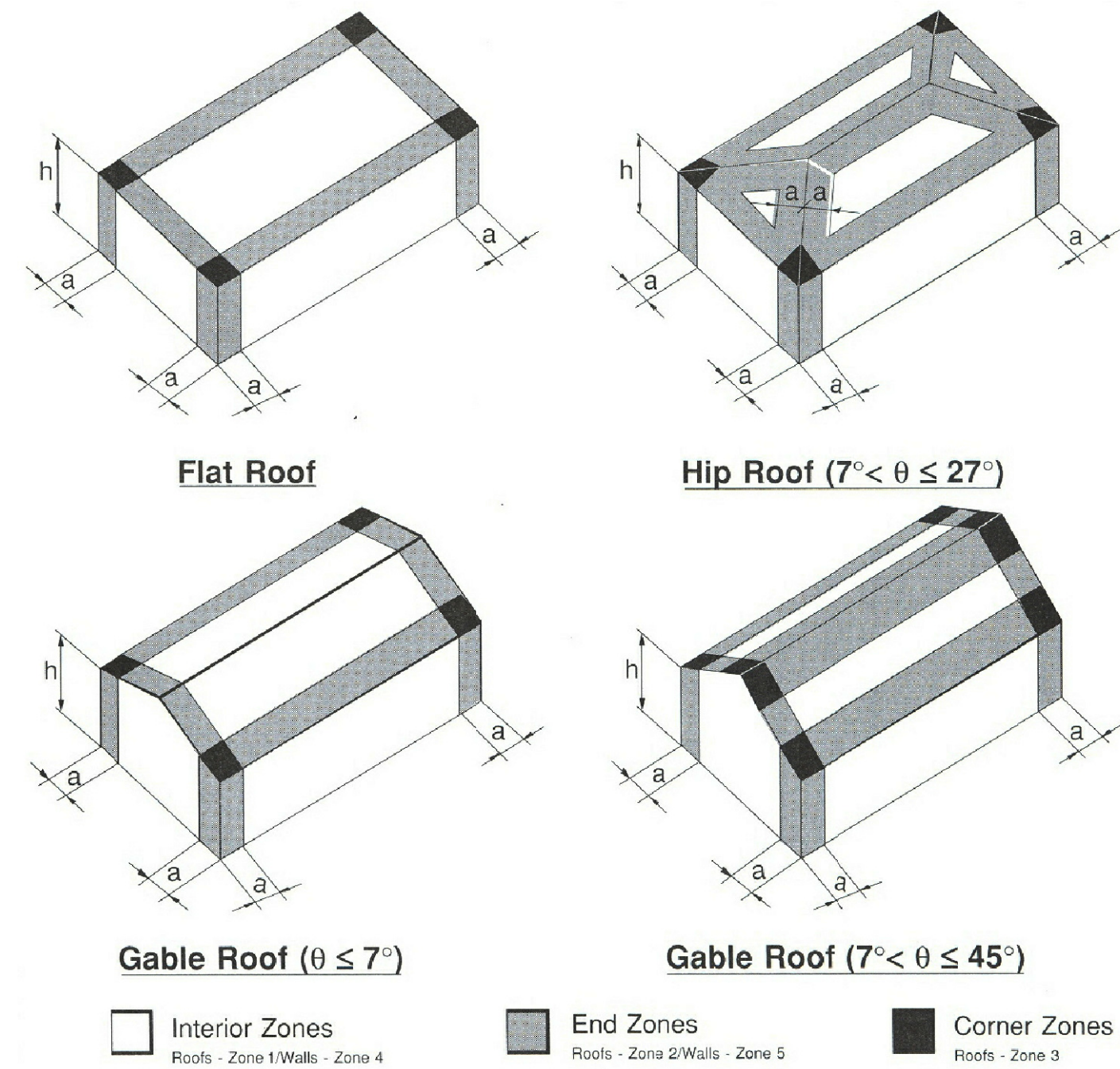
FIGURE 2
SCALE: 1/2" = 1'-0"

Strap Installation on Solar World SPH Solar Collector Arrays

Wind load resistance is determined by strap spacing

- Calculate strap spacing (S) per this design drawing (or ASCE 7)
- Calculate number of straps by dividing panel length (PL) total inches by S (strap spacing) inches
- Install top and bottom straps parallel to headers at S/2. In standard case: 30/2 = 15"
- Install other straps at S distance beginning from the top strap down and parallel to the headers
- Remember that S as determined per this drawing is a maximum. You can always increase wind resistance by making the straps a little closer together. You are free to do this anytime you want - as in the case of trying to even out the strap arrangement for a better looking job, or when needing to make it a little stronger in one area of the roof because your collector array has to trespass into a higher pressure zone (PZ).
- Remember that the standard case is for pressure zone 1, 120 wz (windzone), exposure category B, mid-collector array height 30 ft or less. For other cases, you'll need a closer strap spacing as calculated per the installation notes on this drawing (or ASCE 7).

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_{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 (0.9m).
h: Mean roof height, in feet (meters), except that cave height shall be used for roof angles <10°.
θ: Angle of plane of roof from horizontal, in degrees.

FIGURE 3
SCALE: N.T.S.

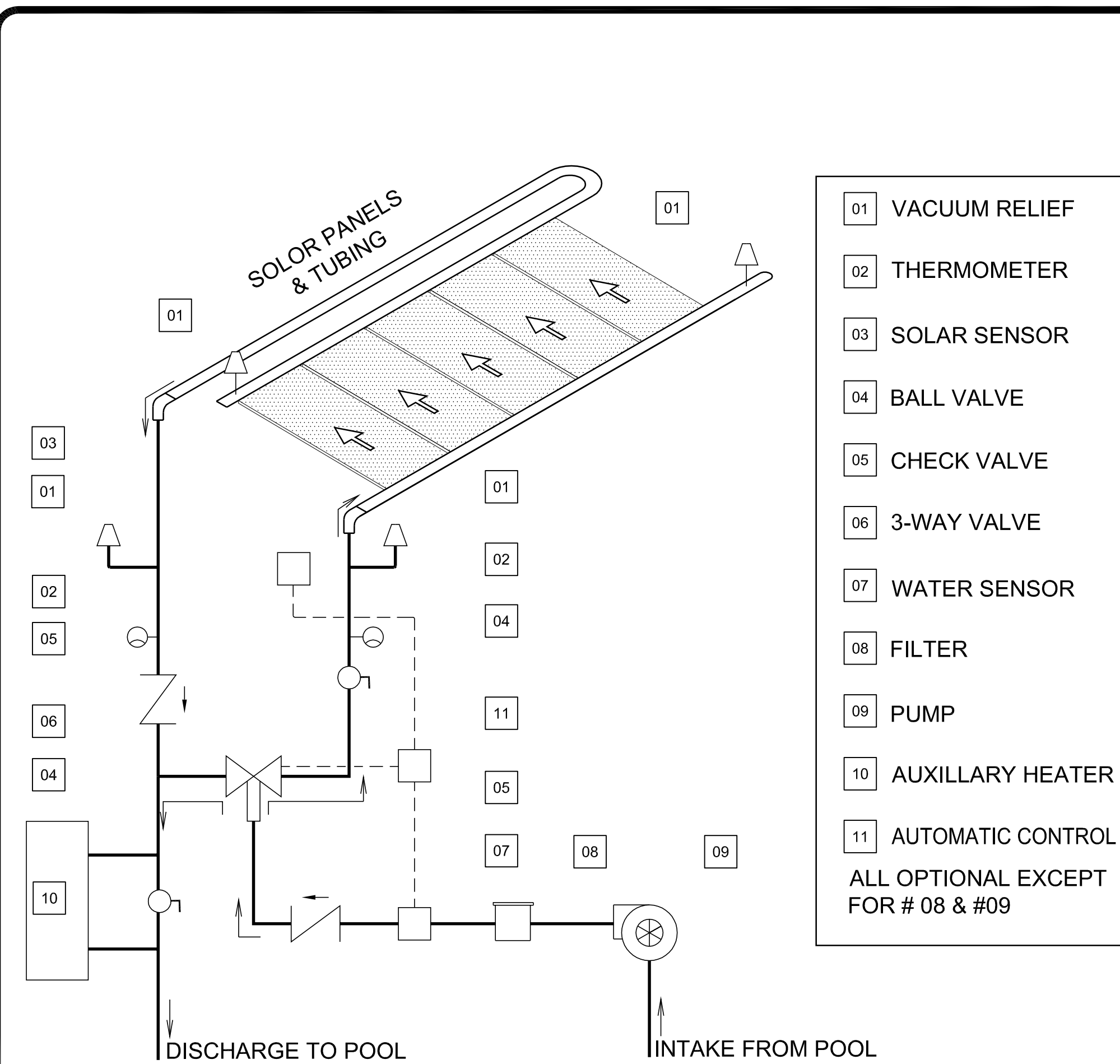


FIGURE 1
SCALE: N.T.S. GENERAL NOTE: ALL OPTIONAL EXCEPT FOR # 08 & #09

ASCE 7
Adjustment Factor
for Building Height and Exposure, λ

Mean roof height (ft)	Exposure		
	B	C	D
15	1.00	1.21	1.47
20	1.00	1.29	1.55
25	1.00	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	1.09	1.49	1.74
45	1.12	1.53	1.78
50	1.16	1.56	1.81
55	1.19	1.59	1.84
60	1.22	1.62	1.87

Unit Conversions – 1.0 ft = 0.3048 m; 1.0 sf = 0.0929 m²; 1.0 psf = 0.0479 kN/m²

FIGURE 4
SCALE: N.T.S.