

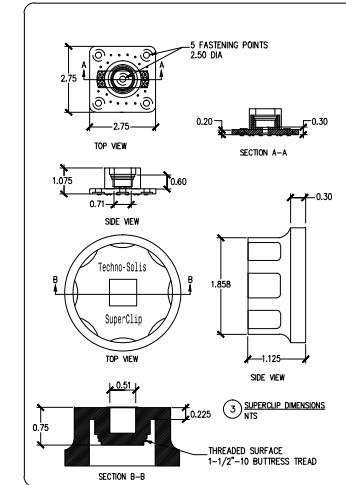
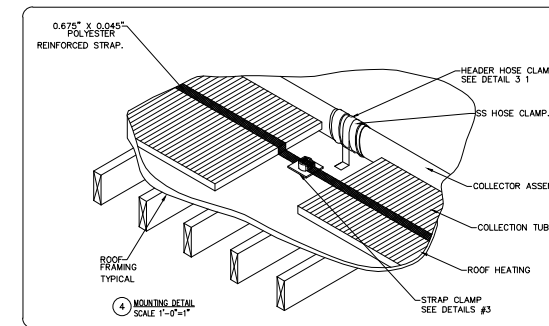
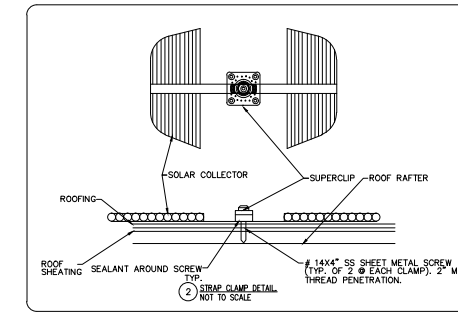
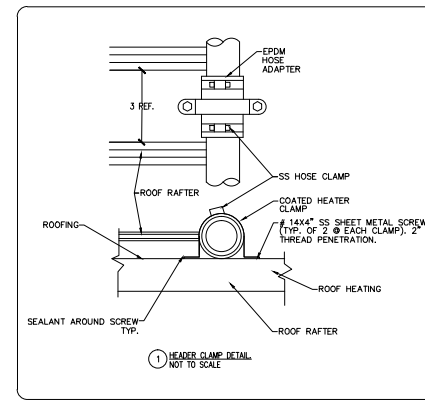
SOLAR COLLECTOR PLAN

NOTES:

- These drawings provide the structural requirement for the installation of Techno-Solis Collectors on low rise residential building with a mean roof height of 30 feet, located in Open Terrain with Scattered Obstructions (Exposure C).
- The design meets the minimum requirements of the Florida Building Code 2010 and ASCE 7.
- The installation shall be in accordance with these drawings and utilize hardware (strap, clamps and screw) provide by the manufacturer and detailed in these drawings and plumbed in accordance with the manufacturer's installation manual.
- The solar collectors shall be secured with a 0.675 in wide x 0.045 in thick polyester reinforced strap across the panels spaced in accordance with the local jurisdiction wind load per Table 3 - Strap Spacing & Anchoring Table.
- Each strap shall be secure to the roof deck at 50 1/2 in on center using Techno-Solis Super Clip and (5) #14 stainless steel, hex head, sheet metal screws of sufficient length (2in nominal thread penetration) to fully penetrate the roof deck.
- All hardware (hose clamps, screws etc.) to be ANSI 304 stainless steel.
- All piping shall be secured to the roof with pipe clamps at six foot intervals with pipe clamps using stainless steel, hex head sheet metal of sufficient length to fully penetrate the roof sheathing (1in minimum length) at six foot intervals.

NOTES:

- The design described herein is based on ASCE 7 and includes components (bank of 10 solar panels) installed on roof in zone 1 with effective wind area of 100 sf. The calculations area based on 170 MPH wind speed for (0-7) and (7-45). See component and cladding detail.
- The uplift pressure applies to the surface for Exposure C and mean of roof height of 30 feet maximum.
- The installation requirements shown in tables 1 & 2 call for spacing the hold down straps at spacing based on the wind speeds and design load requirement for different configurations.
- Solar collectors that extend into the exterior zone (zone-2 and zone-3) more than one foot require additional straps on the portion of the panel in the exterior zone straps at spacing as indicated in tables 1 & 2 but decreased by 30% and 50% respectively.
- The width or dimension of the strip in zone 2 and zone 3 is 10% of the least horizontal dimension or 40% of the eave height, but not less than 3 feet.
- Strap spacing shown on these drawings details the installation requirements and strap spacing are for solar panels installed on 5/8" plywood or 1/2" OSB roof sheathing with the hardware shown in strap spacing detail drawing.
- The strap spacing listed in tables 1 & 2 reflects the specific wind load for component and cladding installed in interior zone-1 (central roof area) of the roof.
- The design wind speed is 150 MPH, and associated design loads shown in the table apply to component and cladding such as solar collector installed on a building with a mean roof height of 30 feet, located in Exposure C on roof at a tilt angle of 0 to 45 degrees. The design loads for other design wind speeds and for structures at other height or tilts would vary and must be determined on a case by case basis.



**Engineering Notes**  
 Basic Wind Speed - 170 MPH  
 Wind Importance Factor - 1  
 Wind Exposure - C  
 Design Wind Pressure - 46.1 PSF

VALID FOR RESIDENTIAL APPLICATIONS UP TO THREE-STORY ONLY. FOR COMMERCIAL APPLICATIONS, CONTRACTOR SHALL SUBMIT SIGNED AND SEALED INSTALLATION DRAWINGS FOR EACH INDIVIDUAL PROJECT.

BASIS OF CALCULATION:

- Wind Speed: 170 mph
- Uplift Pressure: 63.6 psf (Max)
- Panel Area (12-foot panel): 50.5 sf
- Panel Bank: 10 panel
- Fastener: 0.242" dia wood screws (#14)  
 251.68 lbf/in thread force (southpine)  
 230.86 lbf/in thread force (OSB)
- Fastener Length 4 in (min thread length = 2.625 in ANSI B18.6/1972)

TYPICAL CALCULATION:

10-PANEL BANK (12-FOOT LONG PANEL)  
 $F = P \cdot A \cdot N = (63.6 \text{ psf}) \cdot (50.5 \text{ sf}) \cdot (10) = 32,118 \text{ lb} = \text{total uplift per bank}$   
 $S = (L) \cdot (\text{THREAD FORCE}) \cdot (\# \text{ FASTENING CLIPS}) \cdot (\# \text{ SCREWS/CLIP})$   
 $S = (2.625 \text{ in}) \cdot (251.68 \text{ lb/in}) \cdot (2) \cdot (5) = 6,672 \text{ lb}$   
 REFER TO TABLE 1 AND 2 FOR MORE INFORMATION

LEGEND:

- P - Uplift pressure (psf)
- A - Maximum Collector's Area (sf)
- N - Maximum Number of Panels per Bank
- F - Total Uplift Force per Bank (lb)
- S - Total Fastener Force (lb)
- L - Fastener Length (in)

TABLE 1 ROOF ANGLE= 0 to 7 DEGREES - 10 PANEL BANK - 170 MPH (63.6 psf)													
Panel Length	Strap Spacing	# of Straps	Roof Rafter (Southern Pine)				Roof Substrate (OBS 1/2")				Total Hold Down S	Total Uplift F	Notes
			Thread Force	Anchor Points	Thread Length	S	Thread Force	Anchor Points	Thread Length	S			
			[lb/in]	QTY	[in]	[lb]	[lb/in]	QTY	[in]	[lb]			
12'	35"	5	251.68	10	2.625	6,607	230.86	45	0.5*5=2.5	25,972	32,578	32,131	1
10'	28"	5	251.68	10	2.625	6,607	230.86	45	0.5*5=2.5	25,972	32,578	26,776	2
8'	30"	4	251.68	8	2.625	5,285	230.86	36	0.5*5=2.5	20,777	26,063	21,420	3

- Notes
- Total 55 Fastening stations. Stations at ends shall be fastened directly into Roof Rafter (10 stations)
  - Total 55 Fastening stations. Stations at ends shall be fastened directly into Roof Rafter (10 stations)
  - Total 44 Fastening stations. Stations at ends shall be fastened directly into Roof Rafter (8 stations)

TABLE 2 ROOF ANGLE= 7 to 45 DEGREES - 10-PANEL BANK - 150 MPH (57.5 psf)													
Panel Length	Strap Spacing	# of Straps	Roof Rafter (Southern Pine)				Roof Substrate (OBS 1/2")				Total Hold Down S	Total Uplift F	Notes
			Thread Force	Anchor Points	Thread Length	S	Thread Force	Anchor Points	Thread Length	S			
			[lb/in]	QTY	[in]	[lb]	[lb/in]	QTY	[in]	[lb]			
12'	35"	5	251.68	10	2.625	6,607	230.86	45	0.5*5=2.5	25,972	32,578	29,100	1
10'	28"	5	251.68	10	2.625	6,607	230.86	45	0.5*5=2.5	25,972	32,578	24,250	2
8'	30"	4	251.68	8	2.625	5,285	230.86	36	0.5*5=2.5	20,777	26,063	19,400	3

- Notes
- Total 55 Fastening stations. Stations at ends shall be fastened directly into Roof Rafter (10 stations)
  - Total 55 Fastening stations. Stations at ends shall be fastened directly into Roof Rafter (10 stations)
  - Total 44 Fastening stations. Stations at ends shall be fastened directly into Roof Rafter (8 stations)

Business Authorization Number - EB 00006579

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 Scale: ---  
 File: Techno-solis

Drawing No. **SC**

Darcy Unroe PE 60929

**Solar Panel Installation Details**  
**Techno-Solis Incorporated**  
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