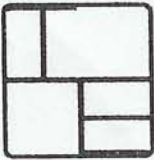


Pool Solar Permit Checklist

- ☐ Contract (2)
- ☐ Letter of Authorization to Pull Permits (notarized?)
- ☐ Pages of the Installation Manual that Apply (2)
- ☐ HOA Approval (2)
- ☐ Drawing/Site plan (2)
- ☐ Contractors License
- ☐ Workman's Comp
- ☐ Liability Ins.
- ☐ 2 Checks
- ☐ Customer Phone#



INLAND ENGINEERING & CONSULTING, INC.

Structural & Civil Engineering

4883 EAST LA PALMA AVENUE - SUITE 501-A
ANAHEIM, CA 92807
Tel.: (714) 777-7700
FAX: (714) 777-7773

SHT. # 1 OF 6

JOB # 05877

DATE: 6-22-05

REV. 1-24-07

STRUCTURAL CALCULATIONS

PREPARED FOR:

SUNTREX

PROJECT:

SOLAR POOL HEATING ATTACHMENT



1/24/07

DATE _____ SUBJECT SUNTREK SHEET NO. 2
 BY _____ CHKD. _____ JOB NO. 05877

SCOPE OF WORK

SUNTREK'S SOLAR SYSTEM ATTACHMENT TO ROOFS

WEIGHT: 1.5 PSF FULL

MAX. COLLECTOR SPAN = 70 FT.

DESIGN LOADS:

WIND: 75 MPH EXP. C

ASSUME HEIGHT OF ROOF 20'

$C_g = -0.9$ OUTWARD

$$P_w = (1.13)(0.9) \left(\frac{12.6 + 16.4}{2} \right) = 14.75 \text{ PSF}$$

SELS. LOAD:

$$F_p = \frac{a_p C_a I_p}{R_p} \left(1 + 3 \frac{h_x}{h_r} \right) W_p$$

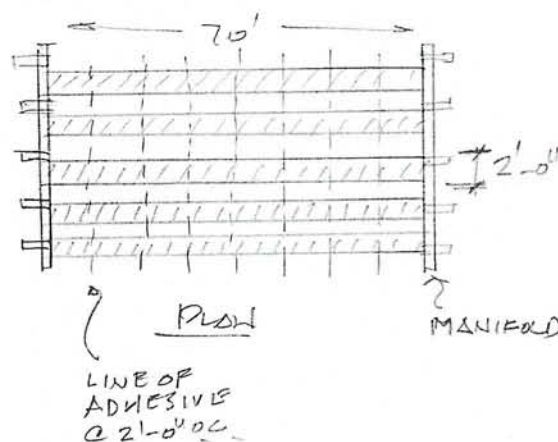
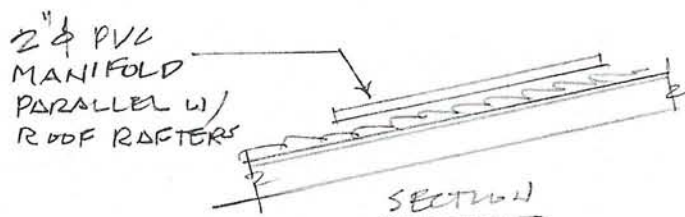
$$C_p = 2.5, R_p = 3.0, C_a = 0.44 N_a = 0.44(1.3) = 0.572, I_p = 1.0$$

$$h_x = h_r = 20'$$

$$F_p = \frac{(2.5)(0.572)(1)}{(3.0)(1.4)} \left(1 + 3 \frac{20}{20} \right) W_p$$

$$F_p = 1.36 W_p$$

$$\begin{cases} > 0.7 C_a I_p W_p = 0.4 W_p \\ < 4 C_a I_p W_p = 2.28 W_p \end{cases}$$



DATE _____ SUBJECT SUN TREK SHEET NO. 3
 BY _____ CHKD. _____ JOB NO. 05877

* COLLECTORS ARE 2'-0" WIDE

* COLLECTORS ARE ATTACHED TO ROOF @ 2'-0" OC.

T.A. OF COLLECTOR = 2' x 2' = 4.0 S.F.

WT. = 4.0 PSF (1.5) = 6.0 lb

SEIS. LOAD : $P_p = 1.36(6.0) = 8.16^{\#}$

WIND LOAD : $P_w = 14.75(6.0) = 88.5^{\#}$ — CONTROLS

CHK. ADHESIVE STRENGTH (SUNTREK SEALANT)

BASED ON TEST RESULTS PROVIDED BELOW.

AVERAGE TENSILE STRENGTH IS GIVEN AS 8.04 #/IN

$F_t = 24" \text{ IN } (8.04) = 193.^{\#} > 88.5^{\#}$ F.S. = 2.18

The following table is a summary of the data collected during our testing:

Substrates (Adherents)	Average Peel Strength (Pounds Per Linear Inch)
Suntrek Rubber Tubing / Ceramic Tile	12.156
Suntrek Rubber Tubing / Composition Roofing	10.996
Suntrek Rubber Tubing / Wood (maple)	8.045

CHK. CONNECTION OF 2" ϕ MANIFOLD:

2" ϕ PVC MANIFOLD ATTACHED EVERY 28" O.C. TO EXIST'G. ROOF TILES FOR TILE ROOF'G.

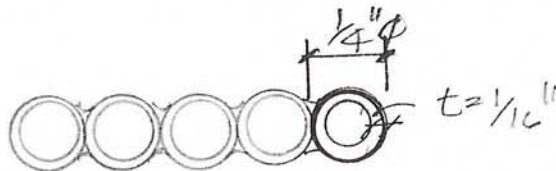
2" ϕ PVC MANIFOLD ATTACHED EVERY 28" O.C. TO EXIST'G. ROOF RAFTERS FOR SHAKE OR SHINGLE ROOF'G.

B2. 2" ϕ PVC WRAPPED W/ SOLAR PANEL TUBING

CONSISTS OF 1" ϕ PLASTIC TUBING (TOTAL OF 5 - 1" ϕ TUBING)



ALLOW. TENSILE STRENGTH = 1479 PSI FOR 1 - 1" ϕ TUBE



$$A = \pi D^2/4 = \pi (.25^2 - .125^2) = .036 \text{ in}^2 \quad \Sigma A = 5 (.036) = .184 \text{ in}^2$$

$$T_{\text{allow}} = 1479 \text{ PSI} \left(\frac{.184}{4} \right) = 272 \text{ \#} > 88.5 \text{ \#} \quad \text{OK}$$

PHYSICALS OF SUNTREK SOLAR TUBE

SAMPLE	SLAB-DUMBBELL	TUBE
DURO, A	80	80
TENSILE STRENGTH, psi	1728	1479
ELONGATION, %	247	224
MOD@25%, psi	355	281
MOD@50%, psi	370	473
MOD@75%, psi	807	686
MOD@100%, psi	1001	899
MOD@200%, psi	1582	1448

2" ϕ PVC PIPE SCH. 40 FILLED W/ WATER.

$$\Sigma WT. = \left(\overset{\text{PIPE \#1}}{3.653} + \overset{\text{WATER \#1}}{1.453} \right) \frac{28''}{12} = 12. \# \quad \frac{28''}{12} = 2.33 \text{ FT.}$$

$$F_s = 1.36(12) = 16.32 \#$$

$$F_{WT} = (2.33)(2) 14.75 = 69. \# \quad \text{--- CONTROLS}$$

1/4" ϕ LAG SC INTO WOOD RAFTERS MIN. 2" EMB.

$$T_{ALL} = 225 \#/IN (2") = 450. \# > 69 \# \quad \text{OK}$$

USE 1/4" ϕ WOOD-SC. 2" MIN.
 EMB. INTO ROOF RAFTERS

CONN. TO ROOF TILES (CONC. TILES)

W/ 1/4" ϕ LAG-SC W/ 5BT EPOXY TO CONC. TILES

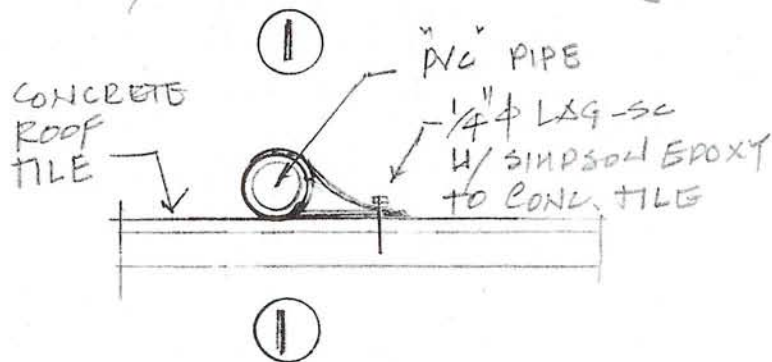


$$T_{ALL} = 90. \# > 60. \# \quad \text{OK}$$

USE 1/4" ϕ LAGS W/ SHIELD
 EPOXY INTO CONC.
 TILE

COVER HOLES TO PREVENT
 LEAKAGE

DATE _____ SUBJECT SUNTREK SHEET NO. 6
BY _____ CHKD. _____ JOB NO. 05877



STATE
 COMPENSATION
 INSURANCE
FUND

P.O. BOX 420807, SAN FRANCISCO, CA 94142-0807

CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

ISSUE DATE: 01-01-2007

GROUP:

POLICY NUMBER: 1763719-2007

CERTIFICATE ID: 29

CERTIFICATE EXPIRES: 01-01-2008
01-01-2007/01-01-2008
 CONTRACTORS STATE LICENSE BOARD
 ATTENTION: WORKMANS COMPENSATION UNIT
 P. O. BOX 26000
 SACRAMENTO, CA 95826

SG

LIC PERMIT#: 859460

INCEPTION DATE: 01-01-2007

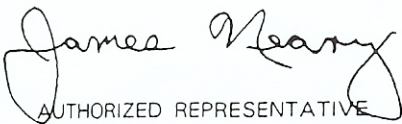
DO: SG

This is to certify that we have issued a valid Workers' Compensation insurance policy in a form approved by the California Insurance Commissioner to the employer named below for the policy period indicated.

This policy is not subject to cancellation by the Fund except upon 30 days advance written notice to the employer.

We will also give you 30 days advance notice should this policy be cancelled prior to its normal expiration.

This certificate of insurance is not an insurance policy and does not amend, extend or alter the coverage afforded by the policy listed herein. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate of insurance may be issued or to which it may pertain, the insurance afforded by the policy described herein is subject to all the terms, exclusions, and conditions, of such policy.



AUTHORIZED REPRESENTATIVE



PRESIDENT

EMPLOYER'S LIABILITY LIMIT INCLUDING DEFENSE COSTS: \$1,000,000 PER OCCURRENCE.

ENDORSEMENT #1600 - ROY HEINE, P,S,T,VP - EXCLUDED.

 ENDORSEMENT #2065 ENTITLED CERTIFICATE HOLDERS' NOTICE EFFECTIVE 01-01-2005 IS
 ATTACHED TO AND FORMS A PART OF THIS POLICY.

EMPLOYER

 SUNTREK INDUSTRIES INC. DBA: SUNTREK
 INDUSTRIES
 5 HOLLAND STE 215
 IRVINE CA 92618

SG

ACORD CERTIFICATE OF LIABILITY INSURANCE

OP ID CA
SUNTR-2
DATE (MM/DD/YYYY)
03/01/07

PRODUCER RMI Insurance Services, Inc. 220 Technology Drive, #110 Irvine CA 92618 Phone: 949-701-4800 Fax: 949-701-4801	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW												
INSURED Suntrek Industries, Inc. 5 Holland Drive - Bldg 215 Irvine CA 92618	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:80%;">INSURERS AFFORDING COVERAGE</th> <th style="width:20%;">NAIC #</th> </tr> <tr> <td>INSURER A: Clarendon America Insurance Co</td> <td></td> </tr> <tr> <td>INSURER B:</td> <td></td> </tr> <tr> <td>INSURER C:</td> <td></td> </tr> <tr> <td>INSURER D:</td> <td></td> </tr> <tr> <td>INSURER E:</td> <td></td> </tr> </table>	INSURERS AFFORDING COVERAGE	NAIC #	INSURER A: Clarendon America Insurance Co		INSURER B:		INSURER C:		INSURER D:		INSURER E:	
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INSURER B:													
INSURER C:													
INSURER D:													
INSURER E:													

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR	ADD'L	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS								
A		GENERAL LIABILITY ☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☐ PRO-JECT ☐ LOC	CAA001000971	03/01/07	03/01/08	EACH OCCURRENCE \$ 1000000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 50000 MED EXP (Any one person) \$ Excluded PERSONAL & ADV INJURY \$ 1000000 GENERAL AGGREGATE \$ 2000000 PRODUCTS - COMP/OP AGG \$ 1000000								
		AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS				COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$								
		GARAGE LIABILITY ☐ ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN EA ACC \$ AUTO ONLY: AGG \$								
		EXCESS/UMBRELLA LIABILITY ☐ OCCUR ☐ CLAIMS MADE ☐ DEDUCTIBLE RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$ \$								
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>WC STATU-TORY LIMITS</td> <td>OTH-ER</td> </tr> <tr> <td>E.L. EACH ACCIDENT</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - EA EMPLOYEE</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - POLICY LIMIT</td> <td>\$</td> </tr> </table>	WC STATU-TORY LIMITS	OTH-ER	E.L. EACH ACCIDENT	\$	E.L. DISEASE - EA EMPLOYEE	\$	E.L. DISEASE - POLICY LIMIT	\$
WC STATU-TORY LIMITS	OTH-ER													
E.L. EACH ACCIDENT	\$													
E.L. DISEASE - EA EMPLOYEE	\$													
E.L. DISEASE - POLICY LIMIT	\$													
		OTHER												

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

CERTIFICATE HOLDER

CANCELLATION

PROOF OF

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

Proof Of Insurance

[Signature]

STATE OF CALIFORNIA

Contractors State License Board

Pursuant to Chapter 9 of Division 3 of the Business and Professions Code
and the Rules and Regulations of the Contractors State License Board,
the Registrar of Contractors does hereby issue this license to:

SUNTREK INDUSTRIES INC

to engage in the business or act in the capacity of a contractor
in the following classification(s):

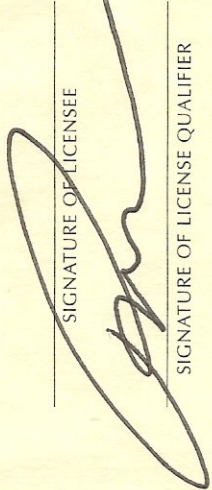
C46 - SOLAR

Witness my hand and seal this day,

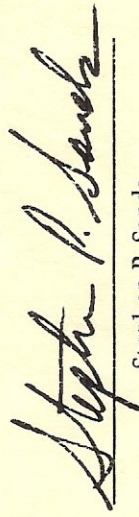
May 26, 2005

Issued May 25, 2005

SIGNATURE OF LICENSEE



SIGNATURE OF LICENSE QUALIFIER



Stephen P. Sands
Registrar of Contractors

859460

License Number

This license is the property of the Registrar of Contractors,
is not transferrable, and shall be returned to the Registrar
upon demand when suspended, revoked, or invalidated
for any reason. It becomes void if not renewed.



State Of California
CONTRACTORS STATE LICENSE BOARD
ACTIVE LICENSE



License Number **859460**

Entity **CORP**

Business Name **SUNTREK INDUSTRIES INC**

Classification(s) **C46**

Expiration Date **05/31/2009**

