

SOLAR WATER HEATERS

Perhaps the best way for the average person to save money by using solar energy is installing a solar water heater. These self contained systems can be retrofitted onto almost any dwelling, and because of the rise in utility rates over the years, the "payback time" for a modern solar water heater is actually shorter than it was with the tax credits back when they were available. Unfortunately, solar water heaters are not currently fashionable; to most people, heating water is just a prosaic thing that happens automatically without any thought or work. There were also quite a number of poorly designed, over-expensive solar water heaters installed in the last days before the tax credits expired. These systems have left a legacy of abandoned rooftop collectors and the impression that solar never really worked. We at MESEA have been attempting to counter this misconception by offering workshops where the participants come for a saturday and build several solar hot water collectors as well as the heat exchanger and other parts necessary for a complete system. These systems typically cost about \$1200 for the parts, plus your own labor to install. Below is a calculation of the expected performance of a two collector system; big enough for a small family. The following diagrams are based on this workshop kit, which we have developed for Maine's more rugged climate. The same system would work quite well elsewhere in New England and in Maritime Canada.

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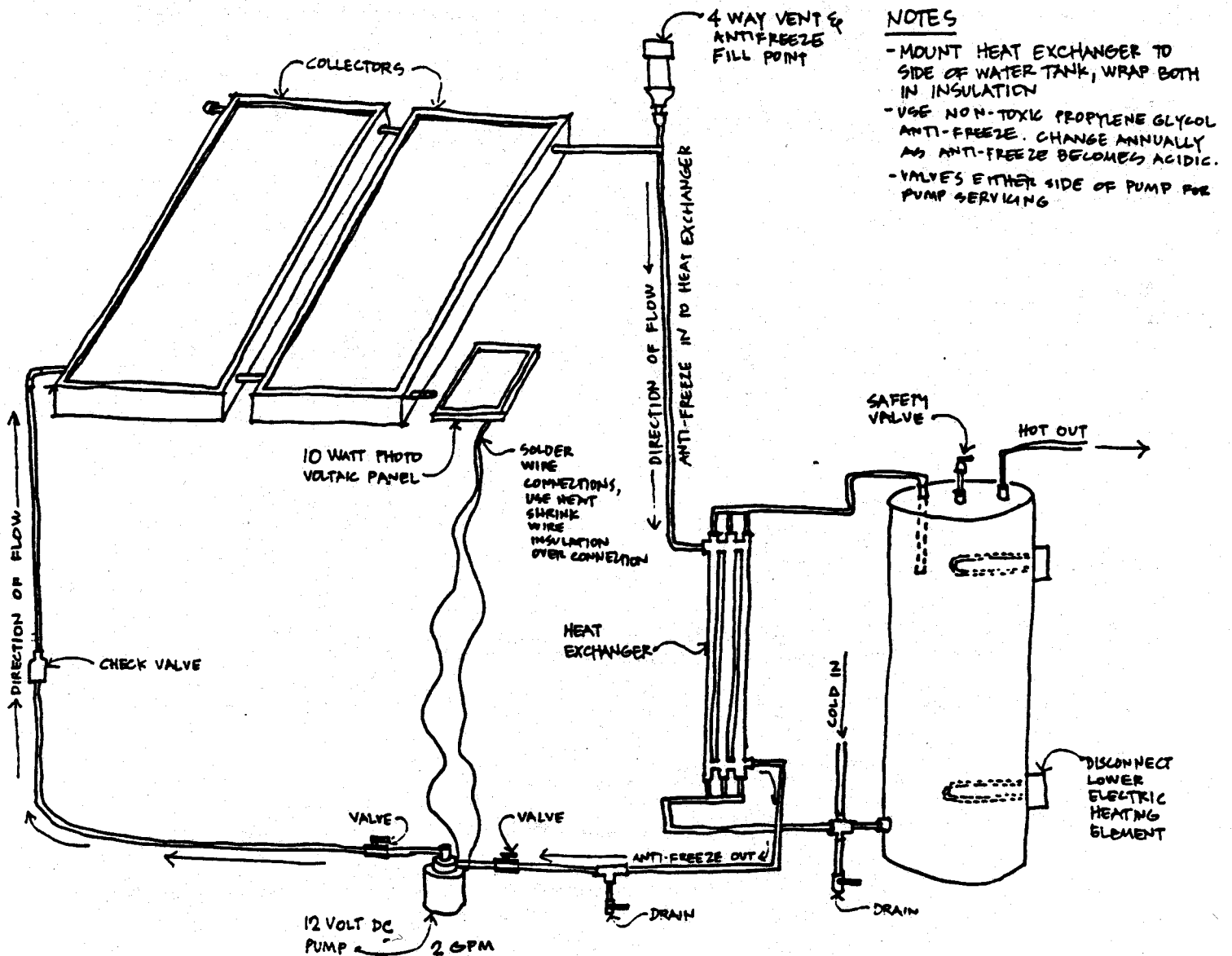
Filename: SOLARDHW      OUTPUT FROM SOLAR WATER HEATER SYST
Version 2.0
CITY          STATE  COUNTRY
ROCKPORT     ME      USA      Latitude:      45 degrees

Collector Tilt:      45 degrees      Electric cost/KWH:      $0.12
Collector number    2              Cold water, deg. F      45
Collector length    76 inches      Hot water, deg. F      120
Collector width     34 inches
Collector area      54 sq. ft. =    4.98 sq. meters
    
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These calculations are just approximations based on the average weather in the area. The final savings will depend on your habits.

Month	Average Day Temp.	Percent Sun	Collector Efficiency	Gal. HW per day	BTU per mo. Output	Output Value
JAN	26.5	45.00	0.45	15.64	232662	\$8.19
FEB	27.9	51.00	0.46	20.35	273470	\$9.62
MAR	36.8	52.00	0.52	27.95	415904	\$14.64
APR	47.7	52.00	0.59	35.49	511022	\$17.98
MAY	57.7	51.00	0.65	39.48	587443	\$20.67
JUN	67.2	53.00	0.72	45.94	661517	\$23.28
JUL	73.0	55.00	0.76	54.62	812792	\$28.60
AUG	71.4	57.00	0.75	60.60	901677	\$31.73
SEP	63.7	54.00	0.69	52.79	760189	\$26.75
OCT	54.1	50.00	0.63	39.21	583458	\$20.53
NOV	43.6	37.00	0.56	20.91	301039	\$10.59
DEC	30.7	40.00	0.47	15.15	225386	\$7.93
TOTAL FOR YEAR				12843	6266559	\$220.52

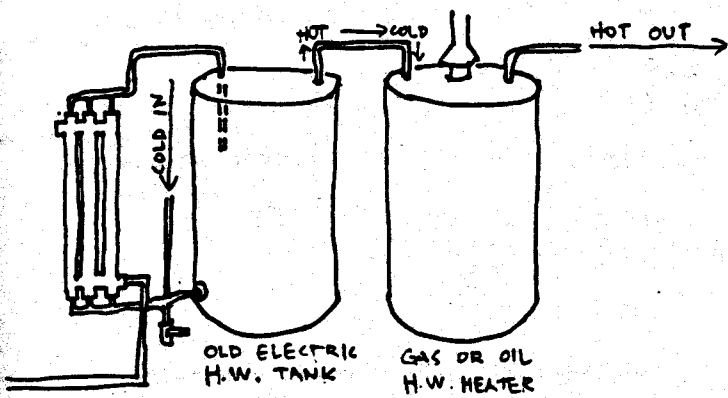
PLUMBING DIAGRAMS MESEA SOLAR WATER HEATER KIT



NOTES

- MOUNT HEAT EXCHANGER TO SIDE OF WATER TANK, WRAP BOTH IN INSULATION
- USE NON-TOXIC PROPYLENE GLYCOL ANTI-FREEZE. CHANGE ANNUALLY AS ANTI-FREEZE BECOMES ACIDIC.
- VALVES EITHER SIDE OF PUMP FOR PUMP SERVICING

2 PANEL, 1 TANK SYSTEM



2 TANK SYSTEM

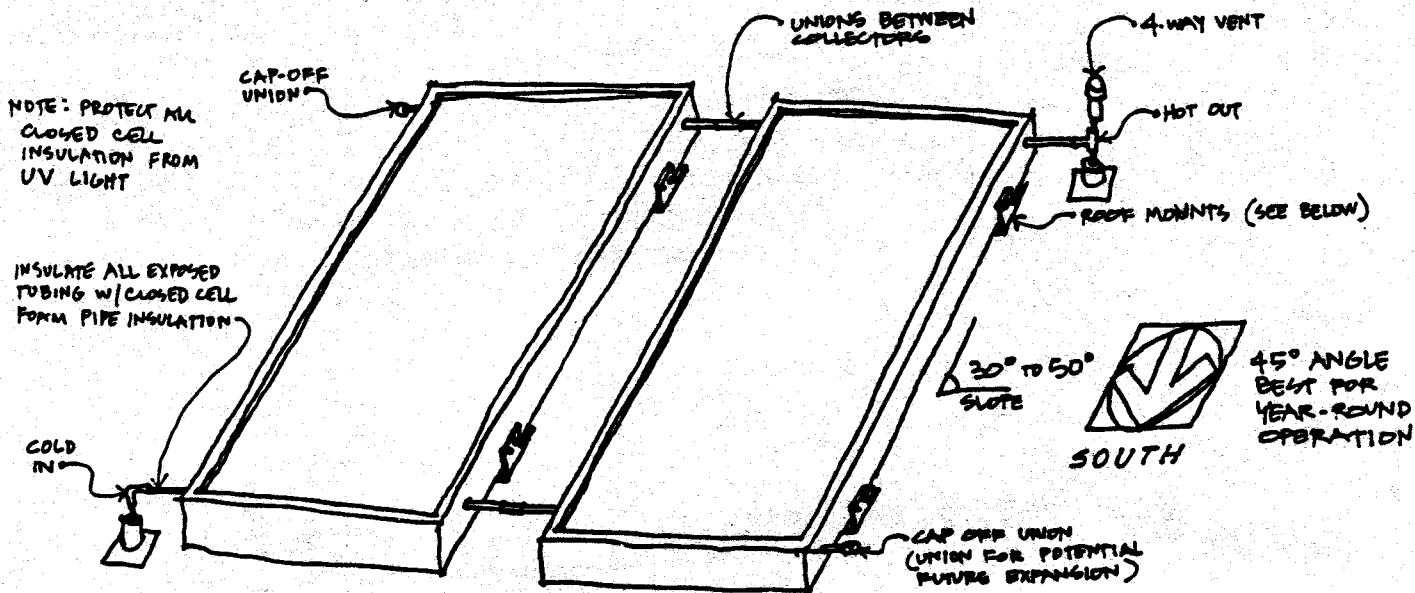
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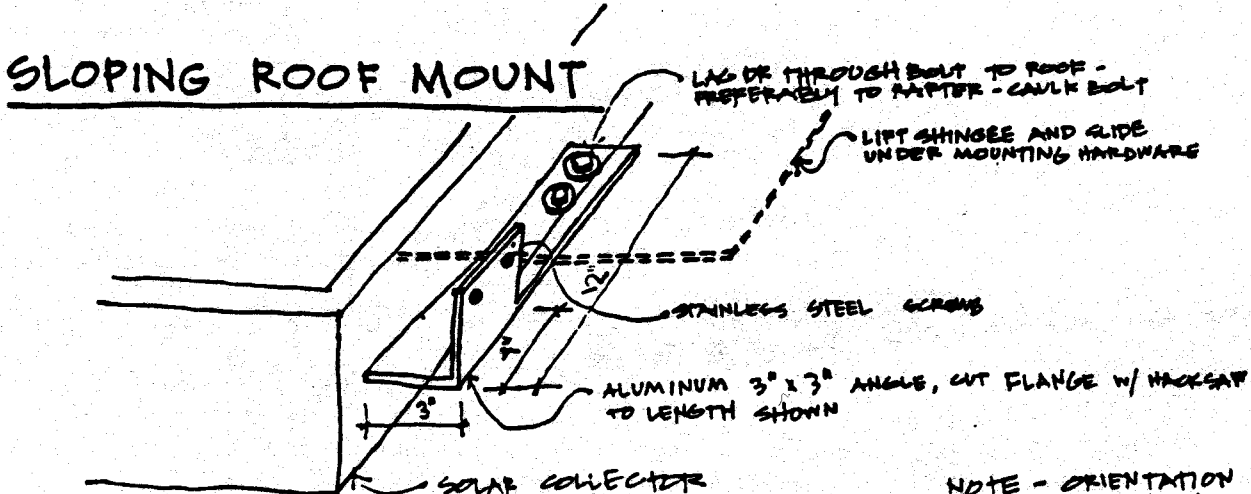




MOUNTING SYSTEMS MESEA SOLAR WATER HEATER KIT

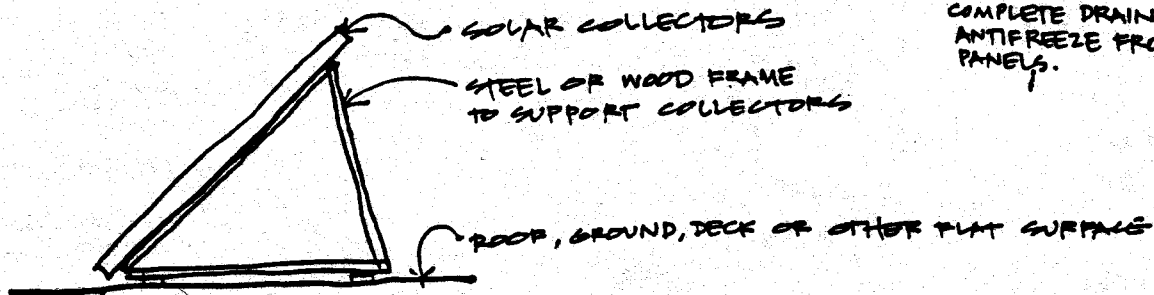


SLOPING ROOF MOUNT



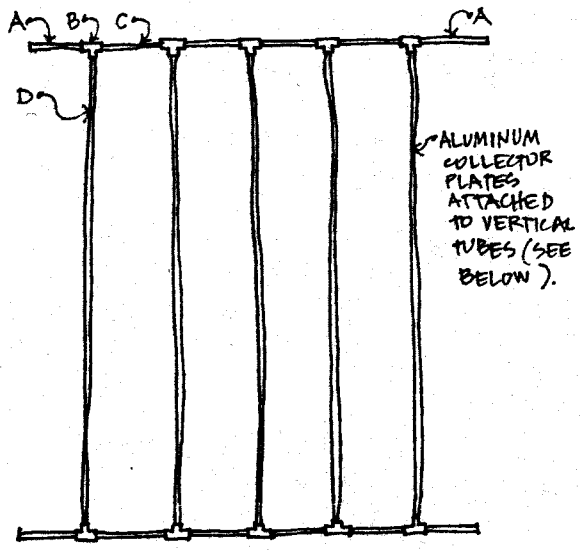
ROOF MOUNT

- NOTE - ORIENTATION BEST AT DUE SOUTH. 85% EFFICIENCY AT UP TO 30° TO EAST OR WEST
- 45° SLOPE BEST FOR YEAR-ROUND USE AT THIS LATITUDE.
 - SLANT COLLECTORS SLIGHTLY OFF HORIZONTAL TO ENSURE COMPLETE DRAINAGE OF ANTIFREEZE FROM PANELS.



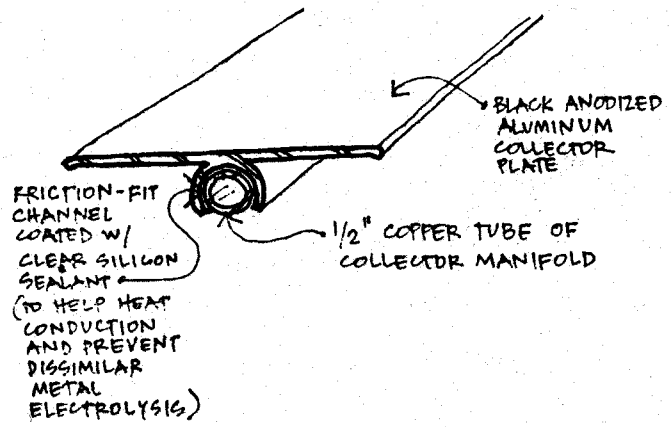
FLAT SURFACE MOUNTING

PLUMBING SYSTEMS MESEA SOLAR WATER HEATER KIT

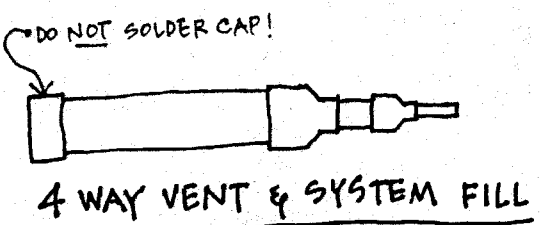


COLLECTOR PANEL MANIFOLD

- ALL 1/2" TYPE "M" COPPER TUBE & FITTINGS
- A) (4) 6 3/4"
 - B) (10) TEES
 - C) (8) 5 7/16"
 - D) (5) 7 1/4"

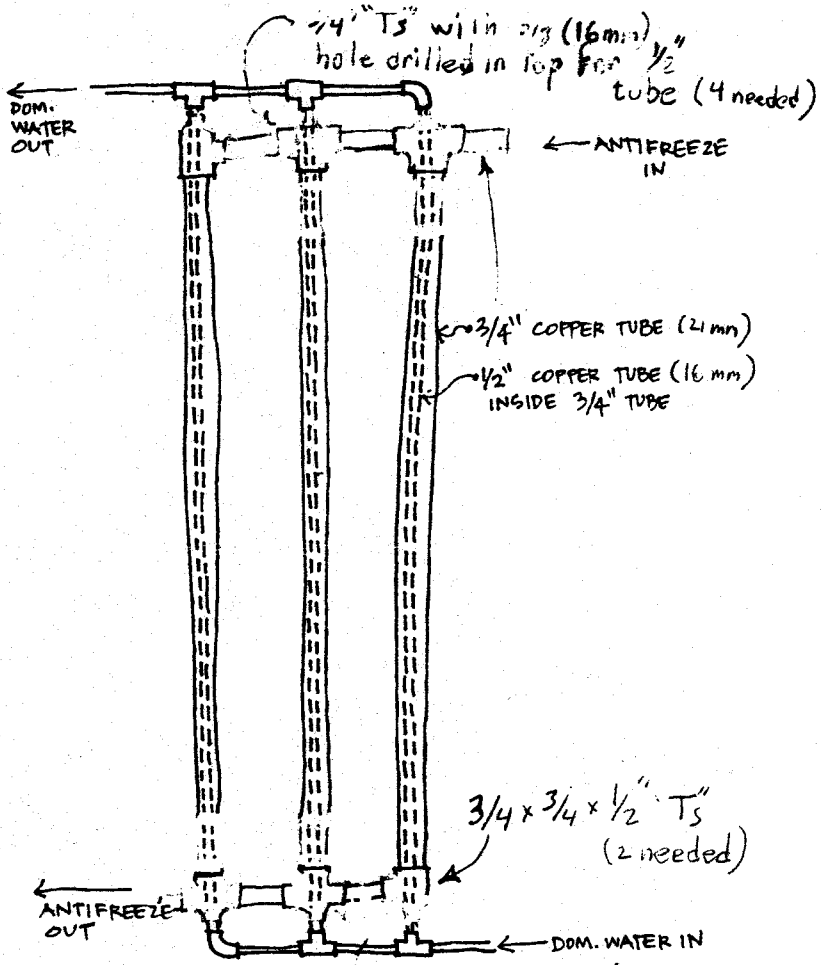


SECTION OF COLLECTOR PLATE



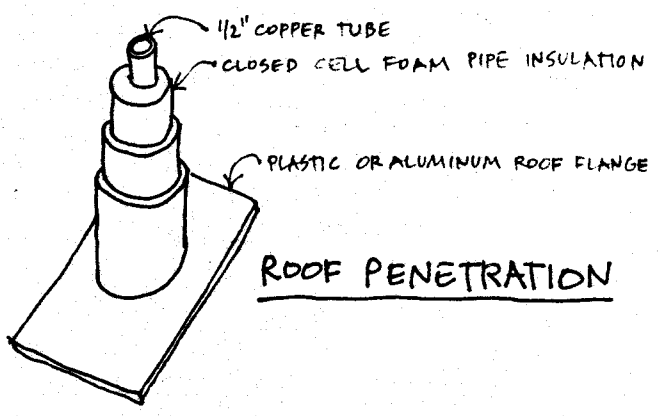
4 WAY VENT & SYSTEM FILL

- (MOUNT VERTICALLY)
- (1) 2" END CAP
 - (1) 1 3/8" x 2" TUBE
 - (1) 2" TO 1" COUPLE
 - (1) 2" x 1" TUBE
 - (1) 1" TO 1/2" COUPLE
 - (1) 2" x 1/2" TUBE



HEAT EXCHANGER MANIFOLD

- 1/2" & 3/4" TYPE "M" COPPER TUBE & FITTINGS AS INDICATED.
- FOR 2 PANEL EXCHANGER:
- (3) 4 1/2" x 1/2" TUBE
 - (2) 36" x 3/4" "
 - (4) 1 1/2" x 3/4" "



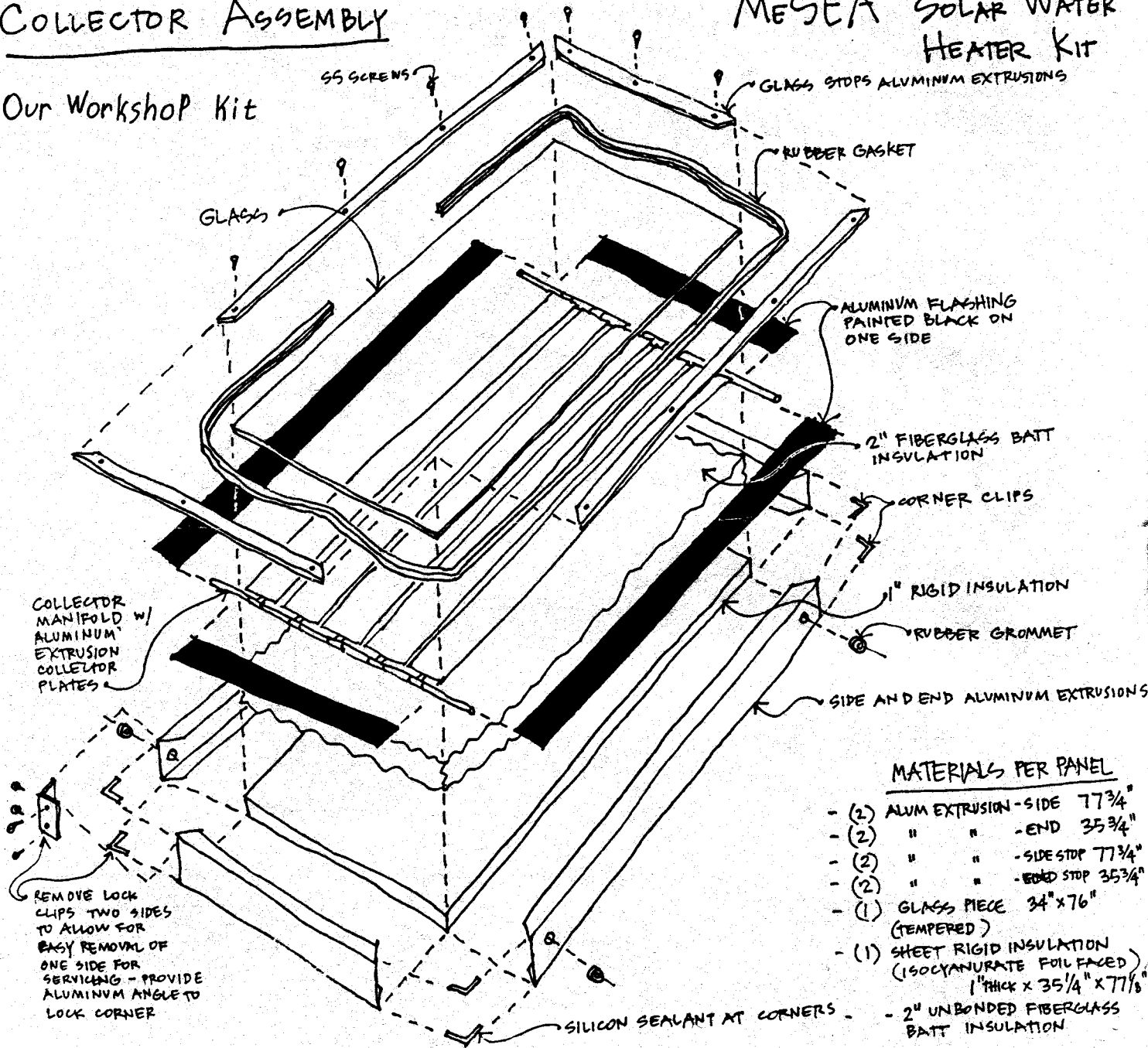
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DRAWN BY CALEB CRAWFORD

COLLECTOR ASSEMBLY

MESEA SOLAR WATER HEATER KIT

Our Workshop Kit



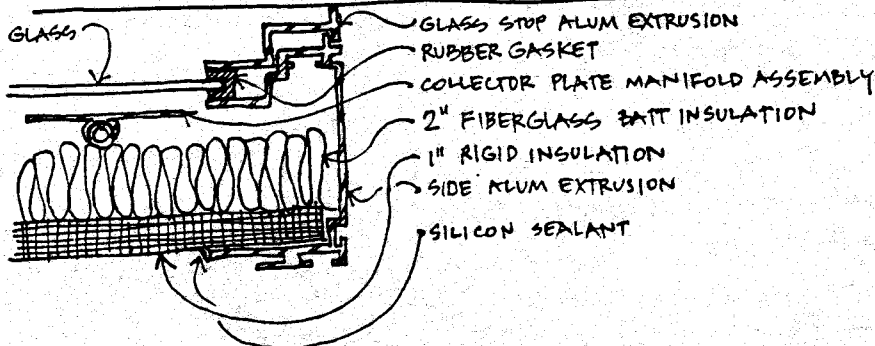
COLLECTOR MANIFOLD w/ ALUMINUM EXTRUSION COLLECTOR PLATES

REMOVE LOCK CLIPS TWO SIDES TO ALLOW FOR EASY REMOVAL OF ONE SIDE FOR SERVICING - PROVIDE ALUMINUM ANGLE TO LOCK CORNER

MATERIALS PER PANEL

- (2) ALUM EXTRUSION - SIDE 77 3/4"
- (2) " " - END 35 3/4"
- (2) " " - SIDE STOP 77 3/4"
- (2) " " - EDED STOP 35 3/4"
- (1) GLASS PIECE 34" x 76" (TEMPERED)
- (1) SHEET RIGID INSULATION (ISOCYANURATE FOIL FACED) 1" THICK x 35 1/4" x 77 1/8"
- 2" UNBONDED FIBERGLASS BATT INSULATION
- 20 LF x 4" ALUMINUM FLASHING PAINTED BLACK ON ONE SIDE
- BLACK HIGH TEMPERATURE PAINT
- (4) RUBBER GROMMETS
- (2) 1" x 1" x 3/2" ALUM ANGLES 1/16" TH
- 20 LF RUBBER GASKET
- (1) COLLECTOR PLATE MANIFOLD ASSEMBLY
- (25±) #8 x 5/8" SS ROUND HEAD SCREWS
- CLEAR SILICON SEALANT

EXPLODED VIEW OF COLLECTOR BOX



SECTION THROUGH COLLECTOR BOX

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