

CITY OF SACRAMENTO
1231 I Street, Sacramento, CA 95814

Permit No: 0106161
Insp Area: 1

Site Address: 4200 MODDISON AV SAC
Parcel No: 005-0033-006

Sub-Type: RES
Housing (Y/N): N

CONTRACTOR
BERGQUAM ENERGY
8611
Balsam Bl 95826

OWNER
DEBERT BARBARA C
4200 MODDISON AV
SACRAMENTO CA 95819

ARCHITECT

Nature of Work: INSTALL SOLAR WATER HEATING SYSTEM

CONSTRUCTION LENDING AGENCY: I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.).

Lender's Name _____ Lender's Address _____

LICENSED CONTRACTORS DECLARATION: I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 commencing with section 7000) of Division 3 of the Business and Professions Code and my license is in full force and effect.

License Class B, C, 46 License Number 4113332 Date 5/16/01 Contractor Signature James Bergquam

OWNER-BUILDER DECLARATION: I hereby affirm under penalty of perjury that I am exempt from the contractors License Law for the following reason (Sec. 7031.5, Business and Professions Code: any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 8 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500.00).

_____, I, as a owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professional Code). The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his/her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he/she did not build or improve for the purpose of sale.)

_____, I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code). The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.

_____ I am exempt under Sec. _____ B & PC for this reason: _____
Date _____ Owner Signature _____

IN ISSUING THIS BUILDING PERMIT, the applicant represents, and the city relies on the representation of the applicant, that the applicant verified all measurements and locations shown on the application or accompanying drawings and that the improvement to be constructed does not violate any law or private agreement relating to permissible or prohibited locations for such improvements. This building permit does not authorize any illegal location of any improvement or the violation of any private agreement relating to location of improvements.

I certify that I have read this application and state that all information is correct. I agree to comply with all city and county ordinances and state laws relating to building construction and hereby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 5/16/01 Applicant Agent Signature James Bergquam

WORKER'S COMPENSATION DECLARATION: I hereby affirm under penalty of perjury one of the following declarations:
_____ I have and will maintain a certificate of consent to self-insure for workers' compensation as provided for by Section 3700 of the Labor Code, for the performance of work for which the permit is issued.

I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Carrier STATE COMPENSATION INS FUND Policy Number 0805384-00 Exp Date 12/01/2001

_____, (This section need not be completed if the permit is for \$100 or less) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

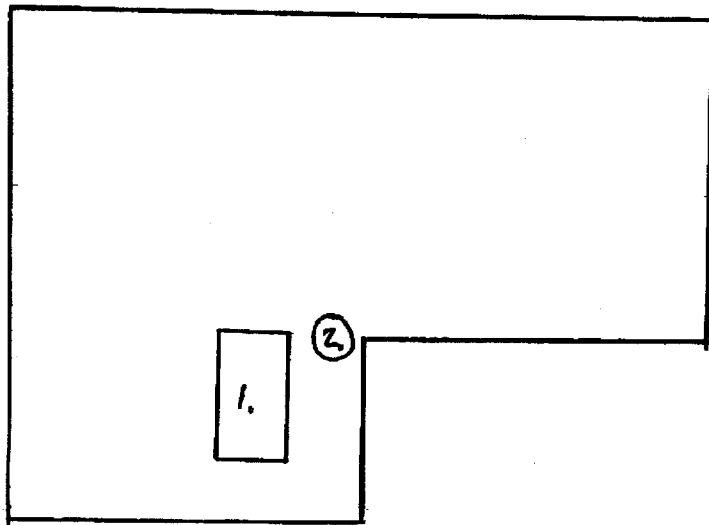
Date 5/16/01 Applicant Signature James Bergquam

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000) IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST AND ATTORNEY'S FEE.

THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK IS NOT COMMENCED WITHIN 180 DAYS.



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4200 Moddison Ave

Installation of Solar Water Heater TE40C-80-1
 under SMUD Program for:
 Barbara Debert

1. Collector installed on west facing roof of garage
(not visible from street)
2. Solar-side storage tank installed in garage



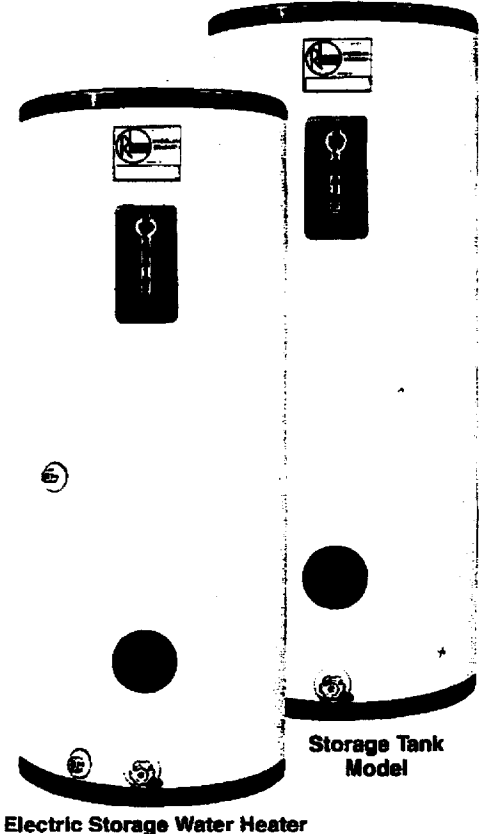
RHEEMGLAS® Solaraide® HE

Solar Heat Exchanger Storage Tank or Electric Storage Water Heater

Available in 80 gallon models.

- 5 Year Limited Tank Warranty*
- 1 Year Limited Parts Warranty*
- Patented R-Foam® insulation process with R-value of 16.7
- Choice of two models... Storage tank or single element water heater, both specially equipped for installation with most closed-loop residential solar water heating systems
- Exclusive wrap-around, foamed-in-place, all copper heat exchanger features a double-wall vented design
- A special 1/2" NPT thermostat opening for accurate sensing of water temperature
- Collector feed and return fittings are located for easy access and simple connections.
- Isolated tank design for better heat retention

* See Residential Warranty Information Brochure for complete warranty information.

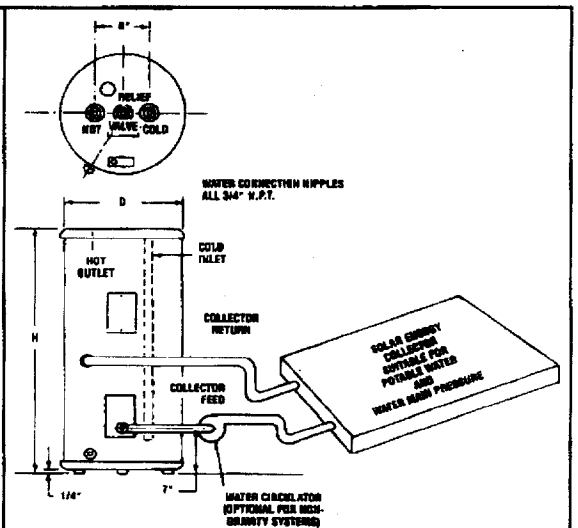


SPECIFICATIONS

Model Number	Tank Capacity Gallons	Maximum U.L. Listed Wattages	Dimensions "H" "D"		Approximate Shipping Weight—Lbs.
			"H"	"D"	
81V-80-HE-1	80	6000W	58 ⁵ / ₈	24 ⁷ / ₁₆	212
81V-80-HE-T	80	STORAGE ONLY	58 ⁵ / ₈	24 ⁷ / ₁₆	212

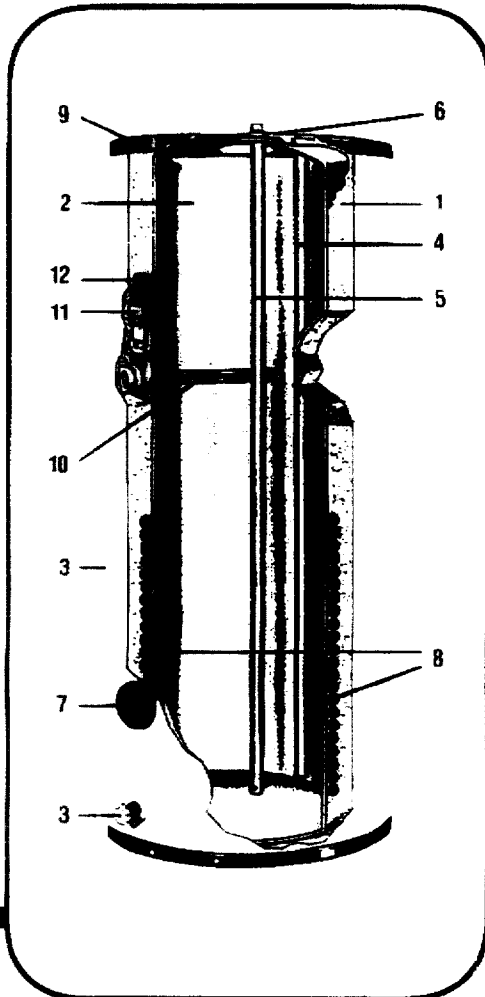
NOTES:

- Unless otherwise specified standard 240 volt AC will be furnished. 120 volt, 208 volt, 277 volt and 480 volt AC supplied on special order, no extra cost.
- Units are shipped with a 4500 watt element. If heating elements of different wattages than those shown are demanded by zone requirements they must be specifically requested.
- Copper coil data, reverse side.
- To prevent corrosion, proper pH levels in transfer fluid must be maintained.
- Solaraide models meet all current state requirements for solar storage tanks. The tanks are Rheemglas lined and are designed to operate up to 150 PSI.



RHEEMGLAS® Solaraide® HE WITH HEAT EXCHANGER

CONSTRUCTION FEATURES



All Models—

- R-Foam Insulation**—Rigid R-16.7 polyurethane foam for improved economy and fuel savings. The use of our patented insulator foam stops allows R-Foam to be injected directly between the tank and outer jacket. This uniform R-Foam application minimizes the possibility of costly heat loss caused by uninsulated areas (voids) common to some other foam processes.
- Rheemglas Tank**—Rheem® water heater tanks are made of special materials with exacting care. The tank surface is coated with an exclusive porcelain formula called Rheemglas and fused to the solid steel at 1600°. The result is a smooth, tough, glass-like lining that effectively resists the corrosive attacks of hot water chemicals, thereby assuring long water heater life. Tank is designed and tested to withstand 300 PSI hydrostatic test pressure for working pressure of 150 PSI. U.L. Standard.
- Collector Feed and Return**—Located for easy access and simple connections. 3/4" NPT female connections at inlet and outlet.
- Cold Water Inlet**—brings cold water to tank bottom to prevent mixing with already heated water.
- Anode Rod**—Equalizes aggressive water action; different types factory-installed and designed to match local water chemical characteristics throughout the U.S.
- Cold Water Inlet, Hot Water Outlet, Relief Valve and Anode Rod**—at top of tank for easy access and fast, economical installation.
- Thermostat Opening**—1/2" NPT opening for accurate sensing of water temperature.
- Heat Exchanger**—Copper tubing wrapped around and secured to the tank. Double-wall, vented design for positive leak detection and foamed in place with R-Foam for high efficiency.

Electric Models—

- Electrical Junction Box**—(for 1/2" and 3/4" conduit) placed above heating element for easy installation.
- High-Efficiency Heating Elements**—Specially treated, double layer of magnesium oxide and copper to resist corrosion; replacements screw in easily.
- Automatic Temperature Control**—Thermostat keeps water at desired temperature.
- Over Temperature Protector**—Automatically cuts off power in excess temperature situations.

COPPER COIL DATA

Type L Copper

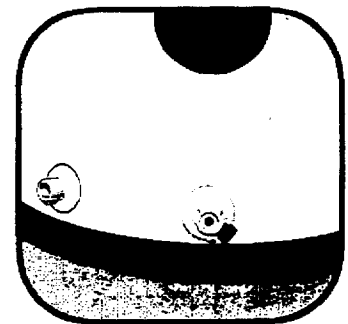
Maximum pressure = 150 psi
 Maximum temperature = 185°F.
 Tube I.D. = 5/8"

Solaraide HE Tank Capacity	Coil Capacity Gallons	Length of Tubing Around Tank (Feet)
80 Gallon	2.2	120

PRESSURE DROP THROUGH COIL (Feet of H₂O)

Flow Rate	Head Loss (Feet) 80 Gallon
1 GPM	1.3
2 GPM	4.8
3 GPM	10.0

A special 1/2" NPT opening is provided for installation of a "probeta" thermostat.



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**RHEEM
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 COMPANY**

**WATER
 HEATER
 DIVISION**

101 Bell Road, P.O. Box 244020, Montgomery, Alabama 36124-4020

"In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice."



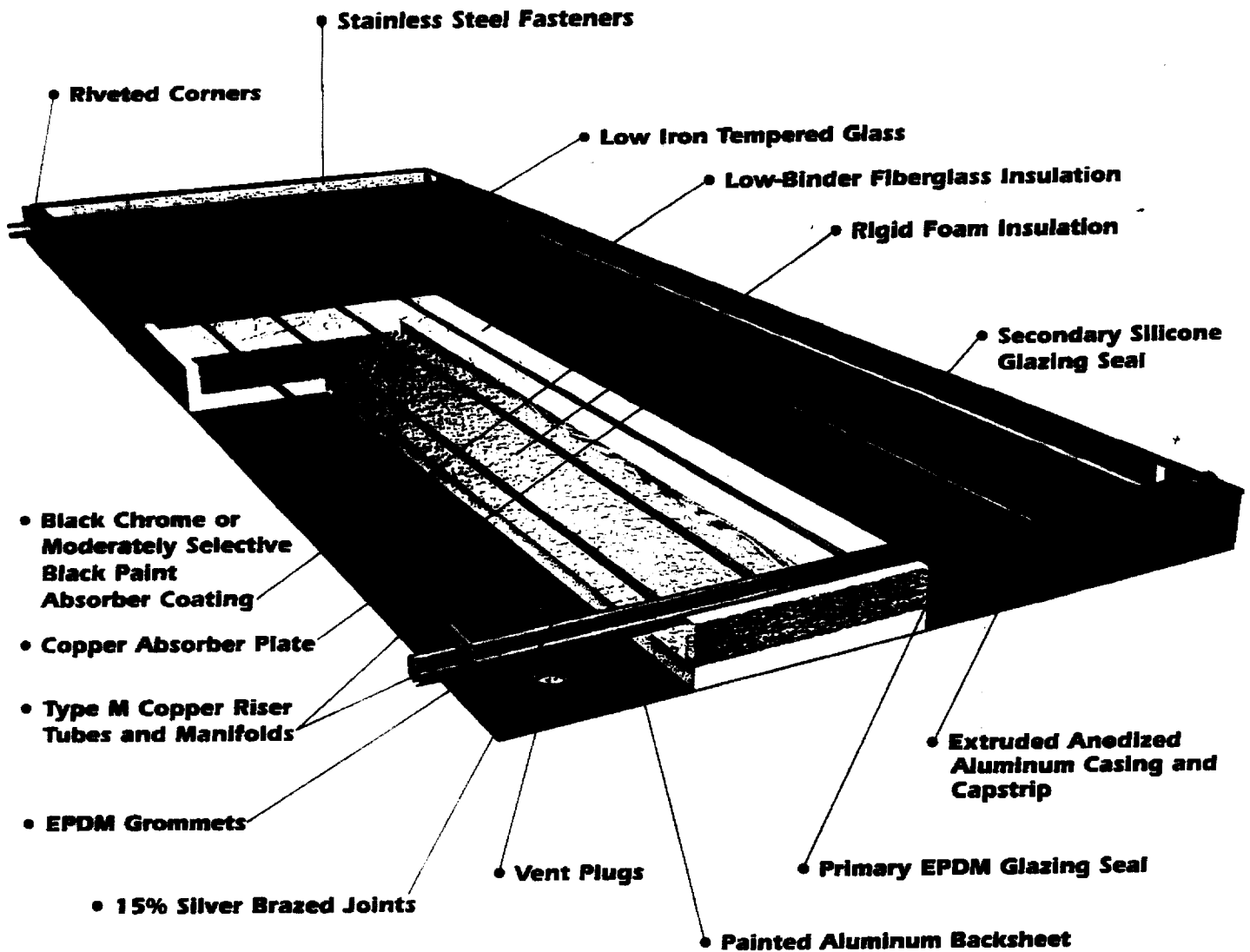


SUN EARTH INC.

THE EMPIRE SERIES

GLAZED FLAT PLATE SOLAR COLLECTORS
Models EP and EC SPECIFICATION SHEET

THE VALUE LEADER IN SOLAR WATER HEATING TECHNOLOGY



PROTECTING OUR ENVIRONMENT—SINCE 1978

SUN EARTH inc. EMPIRE SERIES SPECIFICATIONS

Model No.	Width Inches	Length Inches	Depth Inches	Gross Area Sq Ft	Net Aperture Sq Ft	Dry Weight Lbs	Fluid Capacity U.S. Gallons	Design Flow Rate GPM	Pressure Drop at Design Flow Rate	Max Flow Rate GPM	Maximum Operating Press PSIG	Std. Header Width, Inches	Std. Header Diameter, Inches Nominal	Header, Center to Center, Inches
EC/EP20	36 1/8	78 1/4	3 1/4	19.70	17.30	60	0.60	0.51	.015	12	160	39 3/4	1	73 1/2
EC/EP24	36 1/8	98 1/4	3 1/4	24.61	21.88	80	0.78	0.62	.017	12	160	39 3/4	1	93 5/8
EC/EP32	48 1/8	98 1/4	3 1/4	32.79	29.81	106	1.00	0.83	.018	12	160	51 3/8	1	93 5/8
EC/EP40	48 1/8	122 1/4	3 1/4	40.81	37.33	141	1.20	1.04	.020	12	160	51 3/8	1	115 5/8

MODEL EC

THERMAL PERFORMANCE RATINGS*

MODEL EP

Category (Ti-Ta) <small>Ti = inlet fluid temp Ta = ambient air temp</small>	Btu/ft ² /Day		
	CLEAR DAY 2000 Btu/ft ² /Day	MILDLY CLOUDY DAY 1500 Btu/ft ² /Day	CLOUDY DAY 1000 Btu/ft ² /Day
A(9°F)	1,332	1,005	680
B(9°F)	1,218	890	565
C(36°F)	1,040	720	402
D(90°F)	699	405	127
E(144°F)	390	137	-

Category (Ti-Ta) <small>Ti = inlet fluid temp Ta = ambient air temp</small>	Btu/ft ² /Day		
	CLEAR DAY 2000 Btu/ft ² /Day	MILDLY CLOUDY DAY 1500 Btu/ft ² /Day	CLOUDY DAY 1000 Btu/ft ² /Day
A(9°F)	1,284	971	659
B(9°F)	1,169	854	542
C(36°F)	984	677	372
D(90°F)	619	343	89
E(144°F)	280	62	-

A-Pool Heating (Warm Climate); B-Pool Heating; C-Water Heating (Warm Climate); D-Water Heating (Cool Climate); E-Air Conditioning/Industrial Process Heat.
 *Thermal performance is obtained by multiplying the collector output for the appropriate application and insolation level by the total gross collector area.
 †Collector ratings are derived from the Solar Rating & Certification Corp (SRCC) Document RM-1 and Standard OG-100.

ENGINEERING SPECIFICATIONS

(Performance specifications subject to testing error of +/- 3%)

The following shall be the specifications for the solar collectors. Collectors shall be SunEarth Empire model _____ and shall be of the glazed liquid flat plate type. Collectors shall be tested in conformance with ASHRAE 93-1986, and SRCC 100-81. The collectors also shall be certified by the SRCC and the Florida Solar Energy Center (FSEC).

GENERAL

The dimensions of the collector shall be _____ inches in length, _____ inches in width and 3 1/4 inches in depth. The collector casing shall be an anodized aluminum extrusion (alloy 6063 T5), minimum thickness .060 inch, with an architectural dark bronze finish. The casing shall have notched framewalls for ease of plate removal and reinstallation. Sheet metal screwed fasteners shall be stainless steel (18-8 #10). The backsheet shall be painted textured aluminum not less than .014 inch thickness. A 1 inch vent plug shall be installed in each of the four corners of the backsheet to minimize condensation.

GLAZING

The collector glazing shall be one sheet of low iron tempered glass, with a minimum of 1/8 inch thickness (5/32 inch on EP/EC 40), and a minimum transmissivity of 91 percent (89 on EP/EC 40). The glazing shall be thermally isolated from the casing by a continuous EPDM gasket. There shall be a continuous secondary silicone seal between the glass and casing capstrip to minimize moisture from entering the casing.

INSULATION

The insulation shall be foil-faced polyisocyanurate foam sheathing board of a minimum 1 inch thickness, siliconed in place to the aluminum backsheet, covered by low-binder fiberglass of a minimum 1 inch thickness, providing

Specifications subject to change without notice.

thermal isolation of the foam from the absorber plate. Total thermal resistance shall be a minimum of R-12. The sides and ends of the collector shall be insulated with a minimum of 1 inch foil-faced polyisocyanurate foam sheathing board.

ABSORBER PLATE AND PIPING

The absorber shall consist of a roll-formed copper plate of no less than .008 inch thickness. Risers shall be a minimum of 1/2 inch O.D. Type M copper tubing on no more than 4 1/2 inch centers continuously soldered to the plate utilizing a non-corrosive solder paste with a melting point of 460°F. The risers shall be brazed to 1 1/8 inch O. D. Type M copper manifolds utilizing a copper phosphorous brazing alloy with no less than 15 percent silver content, and conforming to the American Welding Society's BCuP-5 classification. EPDM grommets shall isolate the manifold from the aluminum casing. The absorber plate shall be designed for 160 psig maximum operating pressure.

ABSORBER COATING AND PERFORMANCE CURVE

A) Black Chrome (EC Series): The absorber coating shall be black chrome on nickel with a minimum absorptivity of 95 percent and a maximum emissivity of 12 percent. The instantaneous efficiency of the collector shall be a minimum Y-intercept of 0.714 and a slope of no less than -0.7271 (BTU/ft²-hr)/F.

B) Moderately Selective Black Paint (EP Series): The absorber coating shall be a moderately-selective black paint with a minimum absorptivity of 94 percent and a maximum emissivity of 56 percent. The instantaneous efficiency of the collector shall have a minimum Y-intercept of 0.682 and a slope of no less than -0.7995 (BTU/ft²-hr)/F.

MANUFACTURED BY:



SUN EARTH inc.

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