## SUMMARY INFORMATION SHEET

## FLORIDA SOLAR ENERGY CENTER

1679 CLEARLAKE ROAD, COCOA, FLORIDA 32922-5703 (321) 638-1000



June 1994 **FSEC # 94021N** 

## **MANUFACTURER**

**Revised October 1999** 

Collector Model

SunEarth, Inc. 4315 Santa Ana Street Ontario, California 91761 **EP-40** 

This solar collector was evaluated by the Florida Solar Energy Center (FSEC) in accordance with prescribed methods and was found to meet the minimum standards established by FSEC. This evaluation was based on solar collector tests performed at the National Solar Test Facility, Mississauga, Ontario, Canada. The purpose of the tests is to verify initial performance conditions and quality of construction only. The resulting

| Gross Length Gross Width 1.222 meters Gross Depth 0.083 meters Gross Area 3.791 square meters Volumetric Capacity 4.5 liters Weight (empty) 62.6 kilograms Recommended Flow Rate 126 ml/s Maximum Operating Pressure Maximum Wind Load Number of Cover Plates Flow Pattern Number of Flow Tubes  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick Absorber Copper tubes soldered to copper shoot | 37.33   | feet feet square feet square feet gallons pounds gpm psig psf         |  |
|--|---|---|--|
| Gross Depth Gross Area Gross Area 3.791 square meters 3.468 square meters Volumetric Capacity Weight (empty) Geo.6 kilograms Recommended Flow Rate Maximum Operating Pressure Maximum Wind Load Number of Cover Plates Flow Pattern Number of Flow Tubes Find Parallel Number of Flow Tubes  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick  | 0.27<br>40.81<br>37.33<br>1.2<br>138.0<br>2.0<br>80 | feet square feet square feet gallons pounds gpm psig psf              |  |
| Gross Area  Transparent Frontal Area  Volumetric Capacity  Weight (empty)  Recommended Flow Rate  Maximum Operating Pressure  Maximum Wind Load  Number of Cover Plates  Flow Pattern  Number of Flow Tubes  Enclosure  Aluminum frame, aluminum back  Glazing  Ten  3.468 square meters  4.5 liters  4.5 liters  Kilograms  126 ml/s  Flog Pag  MAY  Pag  MAY  MAY  MATERIALS   | 40.81<br>37.33<br>1.2<br>138.0<br>2.0<br>80<br>30   | square feet<br>square feet<br>gallons<br>pounds<br>gpm<br>psig<br>psf |  |
| Transparent Frontal Area  Volumetric Capacity  Weight (empty)  Recommended Flow Rate  Maximum Operating Pressure  Maximum Wind Load  Number of Cover Plates  Flow Pattern  Number of Flow Tubes  Enclosure  Aluminum Frame, aluminum back  Glazing  Ten  3.468 square meters  4.5 liters  Alugrams  Floe Rate  126 ml/s  Flog Pag  Maximum Wind Load  1436 Pa  One  Parallel  Ten  MATERIALS   | 37.33<br>1.2<br>138.0<br>2.0<br>80<br>30            | square feet<br>gallons<br>pounds<br>gpm<br>psig<br>psf                |  |
| Transparent Frontal Area  Volumetric Capacity  Weight (empty)  Recommended Flow Rate  Maximum Operating Pressure  Maximum Wind Load  Number of Cover Plates  Flow Pattern  Number of Flow Tubes  Enclosure  Aluminum frame, aluminum back  Glazing  Tempered low iron glass, 0.32 cm thick   | 37.33<br>1.2<br>138.0<br>2.0<br>80<br>30            | gallons<br>pounds<br>gpm<br>psig<br>psf                               |  |
| Volumetric Capacity Weight (empty) 62.6 kilograms Recommended Flow Rate 126 ml/s Maximum Operating Pressure 552 kPag Maximum Wind Load 1436 Pa Number of Cover Plates Flow Pattern Number of Flow Tubes  Enclosure Glazing  Very Autor Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick  | 1.2<br>138.0<br>2.0<br>80<br>30                     | pounds<br>gpm<br>psig<br>psf  |  |
| Recommended Flow Rate 126 ml/s Maximum Operating Pressure 552 kPag Maximum Wind Load 1436 Pa Number of Cover Plates One Flow Pattern Parallel Number of Flow Tubes Ten  MATERIALS  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick  | 138.0<br>2.0<br>80<br>30                            | pounds<br>gpm<br>psig<br>psf  |  |
| Recommended Flow Rate 126 ml/s Maximum Operating Pressure 552 kPag Maximum Wind Load 1436 Pa Number of Cover Plates One Flow Pattern Parallel Number of Flow Tubes Ten  MATERIALS  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick  | 80<br>30  | psig<br>psf   |  |
| Maximum Wind Load 1436 Pa Number of Cover Plates One Flow Pattern Parallel Number of Flow Tubes Ten  MATERIALS  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick   | 30  | psig<br>psf   |  |
| Number of Cover Plates One Flow Pattern Parallel Number of Flow Tubes Ten  MATERIALS  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick   |   | •   |  |
| Flow Pattern Parallel Number of Flow Tubes Ten  MATERIALS  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick  | Forced Circu  | ulation   |  |
| Number of Flow Tubes  MATERIALS  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick  | Forced Circu  | ulation   |  |
| MATERIALS  Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick  |   |   |  |
| Enclosure Aluminum frame, aluminum back Glazing Tempered low iron glass, 0.32 cm thick   |   |   |  |
| Glazing Tempered low iron glass, 0.32 cm thick   |   | - <u> </u>  |  |
| •  | Aluminum frame, aluminum back                       |   |  |
| Absorber Conner tubes soldered to conner about   | Tempered low iron glass, 0.32 cm thick              |   |  |
| Appointed Copper tunes soldered to copper street   | Absorber Copper tubes soldered to copper sheet      |   |  |
| Absorber Coating Moderately selective black paint  |   |   |  |
| Insulation Polyisocyanurate, 2.5 cm thick; Fiberglass, 2.  | 5 cm thick  |   |  |
| THERMAL PERFORMAI  | ICE   |   |  |
| ed on tests conducted per ASHRAE 93-1986   |   |   |  |
| dent Angle Modifier $K\tau\alpha = 1.0 - 0.19 \left(\frac{1}{2} - 1\right)$  |   |   |  |

COSO

Efficiency Equations

 $\eta = 70.8 - 473$ (Ti-Ta)/I  $\eta = 70.8 - 83$ (Ti-Ta)/I

 $\eta = 69.1 - 350$ (Ti-Ta)/I - 1220 [(Ti-Ta)/I]<sup>2</sup>

 $\eta = 69.1 - 61$ 

(Ti-Ta)/I - 37

[(Ti-Ta)/I]2

Units of Ti-Ta/I are °C / Watt/m2

Units of Ti-Ta are °F / Btu/hr •ft2

## **RATING**

The collector has been rated for energy output on measured performance and an assumed standard day. Total solar energy available for the standard day is 5045 Watt-hours/m2 (1600 Btu/ft2) distributed over a 10 hour period.

Output energy ratings for this collector based on the second-order efficiency curve are:

| Collector Temperature                  | Energy Output                        |
|--|--------------------------------------|
| Low Temperature, 35°C (95°F)           | 44,700 Kilojoules/day 42,400 Btu/day |
| Intermediate Temperature, 50°C (122°F) | 36,800 Kilojoules/day 34,900 Btu/day |
| High Temperature, 100°C (212°F)        | 13,300 Kilojoules/day 12,600 Btu/day |

Reference 93010N