

SUMMARY INFORMATION SHEET

FLORIDA SOLAR ENERGY CENTER

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



October 1999
FSEC # 94016N

MANUFACTURER

SunEarth, Inc.
4315 Santa Ana Street
Ontario, California 91761

Collector Model

EC-24

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 certification is not a guarantee of long term performance or durability.

DESCRIPTION

Gross Length	2.492 meters	8.18 feet
Gross Width	0.917 meters	3.01 feet
Gross Depth	0.083 meters	0.27 feet
Gross Area	2.286 square meters	24.61 square feet
Transparent Frontal Area	2.033 square meters	21.88 square feet
Volumetric Capacity	3.0 liters	0.8 gallons
Weight (empty)	36.7 kilograms	81.0 pounds
Recommended Flow Rate	126 ml/s	2.0 gpm
Maximum Operating Pressure	552 kPag	80 psig
Maximum Wind Load	2155 Pa	45 psf
Number of Cover Plates	One	
Flow Pattern	Parallel	Forced Circulation
Number of Flow Tubes	Seven	

MATERIALS

Enclosure	Aluminum frame, aluminum back
Glazing	Tempered low iron glass, 0.32 cm thick
Absorber	Copper tubes soldered to copper sheet
Absorber Coating	Black chrome selective coating
Insulation	Polyisocyanurate, 2.5 cm thick; Fiberglass, 2.5 cm thick

THERMAL PERFORMANCE

Based on tests conducted per ASHRAE 93-1986

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.22 \left(\frac{1}{\cos\theta} - 1 \right)$

Efficiency Equations

$$\eta = 72.1 - 417 \frac{(T_i - T_a)}{I} \qquad \eta = 72.1 - 73 \frac{(T_i - T_a)}{I}$$

$$\eta = 71.0 - 331 \frac{(T_i - T_a)}{I} - 857 \left[\frac{(T_i - T_a)}{I} \right]^2 \qquad \eta = 71.0 - 58 \frac{(T_i - T_a)}{I} - 26 \left[\frac{(T_i - T_a)}{I} \right]^2$$

Units of $T_i - T_a / I$ are $^{\circ}\text{C} / \text{Watt}/\text{m}^2$

Units of $T_i - T_a$ are $^{\circ}\text{F} / \text{Btu}/\text{hr}\cdot\text{ft}^2$

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)	27,800 Kilojoules/day	26,400 Btu/day
Intermediate Temperature, 50°C (122°F)	23,400 Kilojoules/day	22,200 Btu/day
High Temperature, 100°C (212°F)	10,200 Kilojoules/day	9,700 Btu/day

Reference 93006N