

# SUMMARY INFORMATION SHEET

## FLORIDA SOLAR ENERGY CENTER

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



August 2006  
FSEC # 00081N

### MANUFACTURER

Alternate Energy Technologies, LLC  
1057 N. Ellis Road, Unit 4  
Jacksonville, Florida 32254

### Collector Model

AE-21

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 Bodycote Materials Testing Canada Inc., 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	2.165 meters	7.10 feet
Gross Width	0.896 meters	2.94 feet
Gross Depth	0.079 meters	0.26 feet
Gross Area	1.930 square meters	20.77 square feet
Transparent Frontal Area	1.782 square meters	19.18 square feet
Volumetric Capacity	3.0 liters	0.8 gallons
Weight (empty)	33.6 kilograms	74.0 pounds
Recommended Flow Rate	39 ml/s	0.6 gpm
Test Pressure	552 kPag	80 psig
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, 0.30 cm thick
Absorber	Copper tubes welded to copper fins
Absorber Coating	Selective coating
Insulation	Foil faced polyisocyanurate, 3.2 cm thick

### THERMAL PERFORMANCE

Tested per ASHRAE 93-1986

Incident Angle Modifier  $K_{\tau\alpha} = 1.0 - 0.19 \left( \frac{1}{\cos\theta} - 1 \right)$

Test flow rate: 2.3 L/m (0.61 gpm)

Efficiency Equations

$$\eta = 70.6 - 491 (T_i - T_a)/I$$

$$\eta = 70.6 - 87 (T_i - T_a)/I$$

$$\eta = 69.1 - 339 (T_i - T_a)/I - 1573 [(T_i - T_a)/I]^2$$

$$\eta = 69.1 - 60 (T_i - T_a)/I - 49 [(T_i - T_a)/I]^2$$

Units of  $(T_i - T_a)/I$  are °C / Watt/m<sup>2</sup>

Units of  $(T_i - T_a)/I$  are °F / Btu/hr•ft<sup>2</sup>

### 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/m<sup>2</sup> (1600 Btu/ft<sup>2</sup>) 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)	22,700 Kilojoules/day	21,500 Btu/day
Intermediate Temperature, 50°C (122°F)	18,600 Kilojoules/day	17,600 Btu/day
High Temperature, 100°C (212°F)	6,200 Kilojoules/day	5,900 Btu/day

REFERENCE 00081N