

# SUMMARY INFORMATION SHEET

## FLORIDA SOLAR ENERGY CENTER

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November 2002  
FSEC # 00089N

### MANUFACTURER

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

### Collector Model

AE-32

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             | 2.470 meters        | 8.10 feet          |
| Gross Width              | 1.200 meters        | 3.94 feet          |
| Gross Depth              | 0.079 meters        | 0.26 feet          |
| Gross Area               | 2.965 square meters | 31.91 square feet  |
| Transparent Frontal Area | 2.781 square meters | 29.93 square feet  |
| Volumetric Capacity      | 4.9 liters          | 1.3 gallons        |
| Weight (empty)           | 51.3 kilograms      | 113.0 pounds       |
| Recommended Flow Rate    | 76 ml/s             | 1.2 gpm            |
| Test Pressure            | 1103 kPag           | 160 psig           |
| Number of Cover Plates   | One                 |                    |
| Flow Pattern             | Parallel            | Forced Circulation |
| Number of Flow Tubes     | Ten                 |                    |

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

Efficiency Equations

$$\eta = 71.7 - 499 (T_i - T_a)/I$$

$$\eta = 71.7 - 87 (T_i - T_a)/I$$

$$\eta = 70.1 - 344 (T_i - T_a)/I - 1598 [(T_i - T_a)/I]^2$$

$$\eta = 70.1 - 60 (T_i - T_a)/I - 50 [(T_i - T_a)/I]^2$$

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

Units of  $(T_i - T_a)/I$  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/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)           | 35,300 Kilojoules/day | 33,500 Btu/day |
| Intermediate Temperature, 50°C (122°F) | 29,000 Kilojoules/day | 27,500 Btu/day |
| High Temperature, 100°C (212°F)        | 9,700 Kilojoules/day  | 9,200 Btu/day  |

REFERENCE 00081N