

SUMMARY INFORMATION SHEET

FLORIDA SOLAR ENERGY CENTER

1679 CLEARLAKE ROAD, COCOA, FLORIDA 32922-5703 (407) 638-1000



November 1996
FSEC # 96024C

MANUFACTURER

Solar Industries SPHS
1940 Rutgers University Blvd.
Lakewood, New Jersey 08701

Collector Model

10204-8

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 Florida Solar Energy Center. 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	2.451 meters	8.04 feet
Gross Width	1.195 meters	3.92 feet
Gross Depth	0.061 meters	0.20 feet
Gross Area	2.927 square meters	31.51 square feet
Transparent Frontal Area	2.927 square meters	31.51 square feet
Volumetric Capacity	11.4 liters	3.0 gallons
Weight (empty)	7.3 kilograms	16.1 pounds
Recommended Flow Rate	208 ml/s	3.3 gpm
Maximum Operating Pressure	241 kPag	35 psig
Maximum Wind Load	Not Applicable	
Number of Cover Plates	None	
Flow Pattern	Parallel	Forced circulation
Number of Flow Tubes	Multitube mat	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Polypropylene tube mat with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Tested per ASHRAE 96-1980 (RA 1989)

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.03 \left(\frac{1}{\cos\theta} - 1 \right)$

Efficiency Equations

$$\eta = 85.8 - 1943 (T_i - T_a)/I$$

$$\eta = 85.8 - 342 (T_i - T_a)/I$$

$$\eta = 86.3 - 1821 (T_i - T_a)/I - 5229 [(T_i - T_a)/I]^2$$

$$\eta = 86.3 - 320 (T_i - T_a)/I - 162 [(T_i - T_a)/I]^2$$

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

Units of $T_i - T_a$ 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^2 (1600 Btu/ ft^2) 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)	33,200 Kilojoules/day	31,500 Btu/day
Intermediate Temperature, 50°C (122°F)	12,600 Kilojoules/day	11,900 Btu/day
High Temperature, 100°C (212°F)	0 Kilojoules/day	0 Btu/day

REFERENCE 92025 & 93026C

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November 1996
FSEC # 96025C

MANUFACTURER

Solar Industries SPHS
1940 Rutgers University Blvd.
Lakewood, New Jersey 08701

Collector Model

10204-10

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 Florida Solar Energy Center. 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	3.060 meters	10.04 feet
Gross Width	1.195 meters	3.92 feet
Gross Depth	0.061 meters	0.20 feet
Gross Area	3.657 square meters	39.36 square feet
Transparent Frontal Area	3.657 square meters	39.36 square feet
Volumetric Capacity	12.9 liters	3.4 gallons
Weight (empty)	8.6 kilograms	19.0 pounds
Recommended Flow Rate	290 ml/s	4.6 gpm
Maximum Operating Pressure	241 kPag	35 psig
Maximum Wind Load	Not Applicable	
Number of Cover Plates	None	
Flow Pattern	Parallel	Forced circulation
Number of Flow Tubes	Multitube mat	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Polypropylene tube mat with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Tested per ASHRAE 96-1980 (RA 1989)

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.03 \left(\frac{1}{\cos\theta} - 1 \right)$

Efficiency Equations

$$\eta = 85.8 - 1943 (T_i - T_a)/I$$

$$\eta = 85.8 - 342 (T_i - T_a)/I$$

$$\eta = 86.3 - 1821 (T_i - T_a)/I - 5229 [(T_i - T_a)/I]^2$$

$$\eta = 86.3 - 320 (T_i - T_a)/I - 162 [(T_i - T_a)/I]^2$$

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

Units of $T_i - T_a$ 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)	41,500 Kilojoules/day	39,300 Btu/day
Intermediate Temperature, 50°C (122°F)	15,700 Kilojoules/day	14,900 Btu/day
High Temperature, 100°C (212°F)	0 Kilojoules/day	0 Btu/day

REFERENCE 92025 & 93027C

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November 1996
FSEC # 96026C

MANUFACTURER

Solar Industries SPHS
1940 Rutgers University Blvd.
Lakewood, New Jersey 08701

Collector Model

10204-12

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 Florida Solar Energy Center. 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	3.670 meters	12.04 feet
Gross Width	1.195 meters	3.92 feet
Gross Depth	0.061 meters	0.20 feet
Gross Area	4.385 square meters	47.20 square feet
Transparent Frontal Area	4.385 square meters	47.20 square feet
Volumetric Capacity	14.0 liters	3.7 gallons
Weight (empty)	10.3 kilograms	22.7 pounds
Recommended Flow Rate	303 ml/s	4.8 gpm
Maximum Operating Pressure	241 kPag	35 psig
Maximum Wind Load	Not Applicable	
Number of Cover Plates	None	
Flow Pattern	Parallel	Forced circulation
Number of Flow Tubes	Multitube mat	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Polypropylene tube mat with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Tested per ASHRAE 96-1980 (RA 1989)

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.03 \left(\frac{1}{\cos\theta} - 1 \right)$

Efficiency Equations

$$\eta = 85.8 - 1943 (T_i - T_a)/I$$

$$\eta = 85.8 - 342 (T_i - T_a)/I$$

$$\eta = 86.3 - 1821 (T_i - T_a)/I - 5229 [(T_i - T_a)/I]^2$$

$$\eta = 86.3 - 320 (T_i - T_a)/I - 162 [(T_i - T_a)/I]^2$$

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

Units of $T_i - T_a$ 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^2 (1600 Btu/ ft^2) distributed over a 10 hour period.

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

Collector Temperature

Low Temperature, 35 $^{\circ}\text{C}$ (95 $^{\circ}\text{F}$)
Intermediate Temperature, 50 $^{\circ}\text{C}$ (122 $^{\circ}\text{F}$)
High Temperature, 100 $^{\circ}\text{C}$ (212 $^{\circ}\text{F}$)

Energy Output

49,700 Kilojoules/day	47,200 Btu/day
18,800 Kilojoules/day	17,800 Btu/day
0 Kilojoules/day	0 Btu/day

REFERENCE 92025 & 93029C