



SUMMARY INFORMATION SHEET

August 2009
FSEC # 00341N

MANUFACTURER

Techno-Solis Inc.
301 20th Street South
St. Petersburg, Florida 33712

Collector Model
C15ts12

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 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	3.627 meters	11.90 feet
Gross Width	1.210 meters	3.97 feet
Gross Depth	0.006 meters	0.02 feet
Gross Area	4.407 square meters	47.43 square feet
Transparent Frontal Area	4.407 square meters	47.43 square feet
Volumetric Capacity	15.3 liters	4.0 gallons
Weight (empty)	13.2 kilograms	29.0 pounds
Recommended Flow Rate	147 ml/s	2.3 gpm
Test Pressure	241 kPa	35 psig
Number of Cover Plate	None	
Flow Pattern	Parallel	Forced circulation
Number of Tubes	104	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Co-polymer plastic with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Testing per ISO 9806-3

Test Flow Rate	147.0 ml/s	2.33 gpm
Incident Angle Modifier	$K_{\tau\alpha} = 1.0 - 0.07 [(1/\cos \theta) - 1]$	

Efficiency Equations

SI Units °C / Watt/m ²	English Units °F / Btu/hr·ft ²
$\eta = 82.3 - 1670 (T_r - T_a)/I$	$\eta = 82.3 - 294 (T_r - T_a)/I$
$\eta = 82.2 - 1634 (T_r - T_a)/I - 1076 [(T_r - T_a)/I]^2$	$\eta = 82.2 - 287 (T_r - T_a)/I - 33 [(T_r - T_a)/I]^2$

RATING

This 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-hour/m² (1600 Btu/ft²) distributed over a 10 hour period.

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

Collector Temperature	ENERGY OUTPUT			
Low 35 °C (95 °F)	50,200	Kilojoules/day	47,700	Btu/day
Intermediate 50 °C (122 °F)	22,200	Kilojoules/day	21,100	Btu/day
High 100 °C (212 °F)	0	Kilojoules/day	0	Btu/day

Reference 00060N





SUMMARY INFORMATION SHEET

August 2009
FSEC # 00340N

MANUFACTURER

Techno-Solis Inc.
301 20th Street South
St. Petersburg, Florida 33712**Collector Model**
C15ts10

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 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	3.008 meters	9.87 feet
Gross Width	1.210 meters	3.97 feet
Gross Depth	0.006 meters	0.02 feet
Gross Area	3.677 square meters	39.58 square feet
Transparent Frontal Area	3.677 square meters	39.58 square feet
Volumetric Capacity	13.5 liters	3.6 gallons
Weight (empty)	10.9 kilograms	24.0 pounds
Recommended Flow Rate	147 ml/s	2.3 gpm
Test Pressure	241 kPa	35 psig
Number of Cover Plate	None	
Flow Pattern	Parallel	Forced circulation
Number of Tubes	104	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Co-polymer plastic with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Testing per ISO 9806-3

Test Flow Rate 147.0 ml/s 2.33 gpm

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.07 \left(\frac{1}{\cos \theta} - 1 \right)$

Efficiency Equations

SI Units °C / Watt/m²

$$\eta = 82.3 - 1670 (T_r - T_a)/I$$

$$\eta = 82.2 - 1634 (T_r - T_a)/I - 1076 [(T_r - T_a)/I]^2$$

English Units °F / Btu/hr-ft²

$$\eta = 82.3 - 294 (T_r - T_a)/I$$

$$\eta = 82.2 - 287 (T_r - T_a)/I - 33 [(T_r - T_a)/I]^2$$

RATING

This 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-hour/m² (1600 Btu/ft²) distributed over a 10 hour period.

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

Collector Temperature

ENERGY OUTPUT

Low	35 °C (95 °F)	41,900 Kilojoules/day	39,800 Btu/day
Intermediate	50 °C (122 °F)	18,600 Kilojoules/day	17,600 Btu/day
High	100 °C (212 °F)	0 Kilojoules/day	0 Btu/day

Reference 00060N





SUMMARY INFORMATION SHEET

August 2009
FSEC # 00339N

MANUFACTURER

Techno-Solis Inc.
301 20th Street South
St. Petersburg, Florida 33712

Collector Model
C15ts08

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 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	2.414 meters	7.92 feet
Gross Width	1.210 meters	3.97 feet
Gross Depth	0.006 meters	0.02 feet
Gross Area	2.928 square meters	31.52 square feet
Transparent Frontal Area	2.928 square meters	31.52 square feet
Volumetric Capacity	11.7 liters	3.1 gallons
Weight (empty)	8.6 kilograms	19.0 pounds
Recommended Flow Rate	147 ml/s	2.3 gpm
Test Pressure	241 kPa	35 psig
Number of Cover Plate	None	
Flow Pattern	Parallel	Forced circulation
Number of Tubes	104	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Co-polymer plastic with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Testing per ISO 9806-3

Test Flow Rate 147.0 ml/s 2.33 gpm

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.07 [(1/\cos \theta) - 1]$

Efficiency Equations

SI Units °C / Watt/m ²	English Units °F / Btu/hr-ft ²
$\eta = 82.3 - 1670 (T_r - T_a)/I$	$\eta = 82.3 - 294 (T_r - T_a)/I$
$\eta = 82.2 - 1634 (T_r - T_a)/I - 1076 [(T_r - T_a)/I]^2$	$\eta = 82.2 - 287 (T_r - T_a)/I - 33 [(T_r - T_a)/I]^2$

RATING

This 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-hour/m² (1600 Btu/ft²) distributed over a 10 hour period.

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

Collector Temperature	ENERGY OUTPUT			
Low 35 °C (95 °F)	33,400	Kilojoules/day	31,700	Btu/day
Intermediate 50 °C (122 °F)	14,800	Kilojoules/day	14,000	Btu/day
High 100 °C (212 °F)	0	Kilojoules/day	0	Btu/day

Reference 00060N





SUMMARY INFORMATION SHEET

August 2009
FSEC # 00338N

MANUFACTURER

Techno-Solis Inc.
301 20th Street South
St. Petersburg, Florida 33712

Collector Model
C20ts12

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 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	3.658 meters	12.00 feet
Gross Width	1.210 meters	3.97 feet
Gross Depth	0.006 meters	0.02 feet
Gross Area	4.434 square meters	47.72 square feet
Transparent Frontal Area	4.434 square meters	47.72 square feet
Volumetric Capacity	15.6 liters	4.1 gallons
Weight (empty)	13.6 kilograms	30.0 pounds
Recommended Flow Rate	147 ml/s	2.3 gpm
Test Pressure	241 kPa	35 psig
Number of Cover Plate	None	
Flow Pattern	Parallel	Forced circulation
Number of Tubes	104	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Co-polymer plastic with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Testing per ISO 9806-3

Test Flow Rate 147.0 ml/s 2.33 gpm

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.07 \left(\frac{1}{\cos \theta} - 1 \right)$

Efficiency Equations

SI Units	English Units
$\eta = 82.3 - 1670 \frac{(T_f - T_a)}{I}$	$\eta = 82.3 - 294 \frac{(T_f - T_a)}{I}$
$\eta = 82.2 - 1634 \frac{(T_f - T_a)}{I} - 1076 \left[\frac{(T_f - T_a)}{I} \right]^2$	$\eta = 82.2 - 287 \frac{(T_f - T_a)}{I} - 33 \left[\frac{(T_f - T_a)}{I} \right]^2$

RATING

This 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-hour/m² (1600 Btu/ft²) distributed over a 10 hour period.

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

Collector Temperature	ENERGY OUTPUT		
Low 35 °C (95 °F)	50,600 Kilojoules/day	48,000 Btu/day	
Intermediate 50 °C (122 °F)	22,400 Kilojoules/day	21,200 Btu/day	
High 100 °C (212 °F)	0 Kilojoules/day	0 Btu/day	

Reference 00060N



**SUMMARY INFORMATION SHEET**August 2009
FSEC # 00337N**MANUFACTURER**Techno-Solis Inc.
301 20th Street South
St. Petersburg, Florida 33712**Collector Model**
C20ts08

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 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	2.438 meters	8.00 feet
Gross Width	1.210 meters	3.97 feet
Gross Depth	0.006 meters	0.02 feet
Gross Area	2.955 square meters	31.81 square feet
Transparent Frontal Area	2.955 square meters	31.81 square feet
Volumetric Capacity	12.1 liters	3.2 gallons
Weight (empty)	9.1 kilograms	20.0 pounds
Recommended Flow Rate	147 ml/s	2.3 gpm
Test Pressure	241 kPa	35 psig
Number of Cover Plate	None	
Flow Pattern	Parallel	Forced circulation
Number of Tubes	104	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Co-polymer plastic with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Testing per ISO 9806-3

Test Flow Rate 147.0 ml/s 2.33 gpm

Incident Angle Modifier $K_{\tau\alpha} = 1.0 - 0.07 [(1/\cos \theta) - 1]$

Efficiency Equations

SI Units °C / Watt/m²

$$\eta = 82.3 - 1670 (T_r - T_a)/I$$

$$\eta = 82.2 - 1634 (T_r - T_a)/I - 1076 [(T_r - T_a)/I]^2$$

English Units °F / Btu/hr-ft²

$$\eta = 82.3 - 294 (T_r - T_a)/I$$

$$\eta = 82.2 - 287 (T_r - T_a)/I - 33 [(T_r - T_a)/I]^2$$

RATING

This 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-hour/m² (1600 Btu/ft²) distributed over a 10 hour period.

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

Collector Temperature

ENERGY OUTPUT

Low	35 °C (95 °F)	33,700 Kilojoules/day	32,000 Btu/day
Intermediate	50 °C (122 °F)	14,900 Kilojoules/day	14,100 Btu/day
High	100 °C (212 °F)	0 Kilojoules/day	0 Btu/day

Reference 00060N





SUMMARY INFORMATION SHEET

August 2009
FSEC # 00060N

MANUFACTURER

Techno-Solis Inc.
301 20th Street South
St. Petersburg, Florida 33712

Collector Model
C20ts10

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DESCRIPTION

Gross Length	3.048 meters	10.00 feet
Gross Width	1.210 meters	3.97 feet
Gross Depth	0.006 meters	0.02 feet
Gross Area	3.672 square meters	39.52 square feet
Transparent Frontal Area	3.672 square meters	39.52 square feet
Volumetric Capacity	13.9 liters	3.7 gallons
Weight (empty)	11.3 kilograms	25.0 pounds
Recommended Flow Rate	147 ml/s	2.3 gpm
Test Pressure	241 kPa	35 psig
Number of Cover Plate	None	
Flow Pattern	Parallel	Forced circulation
Number of Tubes	104	

MATERIALS

Enclosure	None
Glazing	None
Absorber	Co-polymer plastic with UV stabilization
Absorber Coating	None
Insulation	None

THERMAL PERFORMANCE

Testing per ISO 9806-3

Test Flow Rate	147.0 ml/s	2.33 gpm
Incident Angle Modifier	$K_{\tau\alpha} = 1.0 - 0.07 \left(\frac{1}{\cos \theta} - 1 \right)$	

Efficiency Equations

SI Units °C / Watt/m ²	English Units °F / Btu/hr·ft ²
$\eta = 82.3 - 1670 (T_i - T_a)/I$	$\eta = 82.3 - 294 (T_i - T_a)/I$
$\eta = 82.2 - 1634 (T_i - T_a)/I - 1076 [(T_i - T_a)/I]^2$	$\eta = 82.2 - 287 (T_i - T_a)/I - 33 [(T_i - T_a)/I]^2$

RATING

This 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-hour/m² (1600 Btu/ft²) distributed over a 10 hour period.

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

Collector Temperature	ENERGY OUTPUT			
Low 35 °C (95 °F)	41,900 Kilojoules/day	39,700 Btu/day		
Intermediate 50 °C (122 °F)	18,500 Kilojoules/day	17,600 Btu/day		
High 100 °C (212 °F)	0 Kilojoules/day	0 Btu/day		

