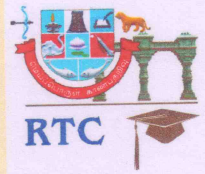


# REGIONAL TEST CENTRE (SOLAR THERMAL)

Madurai Kamaraj University



*Sponsored by*

**MINISTRY OF NEW AND RENEWABLE ENERGY  
GOVERNMENT OF INDIA**

## **TEST REPORT**

(RTC file no. 896)

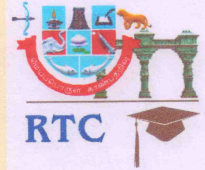
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Madurai Kamaraj University  
Madurai - 625 021



# TEST REPORT

As per standards for thermosyphon-type  
solar hot water system prescribed by  
Ministry of New and Renewable Energy



1. Name and address of manufacturer / supplier : M/s. Focusun Energy Systems  
Old No. 27, New No. 30  
Dr. Jaganathan Nagar  
Opp C M C, Avinashi Road  
Coimbatore - 641 014
2. Contact details of manufacturer / supplier : Ph : +91 - 422 - 2571827  
Email: info@focusunsolar.com
3. Details of sample submitted / Model : Evacuated tube collector system
4. Latitude and Longitude of test laboratory : Longitude : 78° 00' 481" E  
Latitude : 09° 56' 576" N
5. Duration of the test : Date of submission : 19.02.2013  
Date of completion : 25.03.2013

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## 6. Specification of the sample and test results



### 6.1 Specifications

#### 6.1.1 Solar Collector

A. Make along with complete address of the manufacturer if different from the supplier of the sample	Nil
B. Type of collector	Evacuated Tube Collector
C. Type of ETC	All glass
Length of tube	1500 mm
Diameter of inner tube	34 mm
Diameter of outer tube	47 mm
Number of tubes	14
D. Gross collector area, $A_c$ , m <sup>2</sup>	1.32 m <sup>2</sup>

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# TEST REPORT



## 6.1.2 Storage Tank

A. Dimensions	
Inner tank thickness and material	0.77 mm; Copper
Cladding thickness and material	0.40 mm; SS 304
B. Capacity without taking into account water in the collector (litres)	
	93.6 litres
C. Insulation (material and thickness)	
Side insulation	40 mm; PUF
Top / bottom surface insulation	40 mm; PUF
D. Position of hot water withdrawal point with reference to bottom of the storage tank	
	Top right (at 337 mm from bottom)
E. Position of cold water inlet point with reference to bottom of the storage tank	
	Bottom left (at 71 mm from bottom)
F. Any other information	
	Indigenous make (as claimed by the manufacturer)

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## 6.1.3 Connecting Pipes

A. Material	Not applicable
B. Outer / Inner diameter	Not applicable
C. Epoxy / Antirust coating	Not applicable
D. Insulation material and thickness	Not applicable



## 6.1.4 Supporting Stands

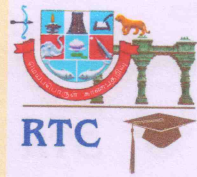
A. Material	Mild Steel
B. Thickness and other details	20.40 mm
C. Epoxy / Antirust coating	Powder coating

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# TEST REPORT



## 6.2. Performance Test

### 6.2.1 Static pressure leakage test

A. Initial and final pressure (Kg/cm <sup>2</sup> )	0 and 0.2 Kg/cm <sup>2</sup>
B. Temperature of water in the storage tank (°C)	61.4 °C
C. Duration of the test period (min)	10 min
D. Results of inspection	No leakage

### 6.2.2 Thermal performance test

A. Maximum efficiency of the system, $\eta_c$	0.47
B. Overall heat loss coefficient of the system during day -time test, $U_{sd}$ (W/m <sup>2</sup> K)	2.39 W/m <sup>2</sup> K
C. Night - time heat loss coefficient of the system, $U_{sn}$ (W/m <sup>2</sup> K)	3.86 W/m <sup>2</sup> K
D. System efficiency at standard test conditions ( $T_s = 50$ °C, $T_{ad} = 25$ °C, $G_T = 700$ W/m <sup>2</sup> )	0.38
E. Average amount of energy collected by the solar collector (Q) during the period of day - test corresponding to standard test conditions (Kwh)	2.82 kWh

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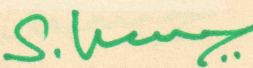


## 7. Any other details

- (i) A table of the data points for day time test along with values of wind speed (averaged over a period of thirty minutes) during the test See Annexure 1
- (ii) A graph between X and  $\eta_c$  See Annexure 1

8. Remarks This test report pertains only to the sample submitted

Madurai  
01.04.2013

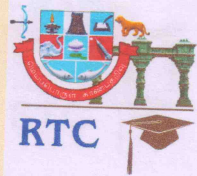
  
Authorised Signatory  
PRINCIPAL INVESTIGATOR  
REGIONAL SOLAR ENERGY TESTING CENTRE  
Madurai Kamaraj University  
MADURAI-625 021  
(RTC File No. 896)

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# TEST REPORT

Annexure 1



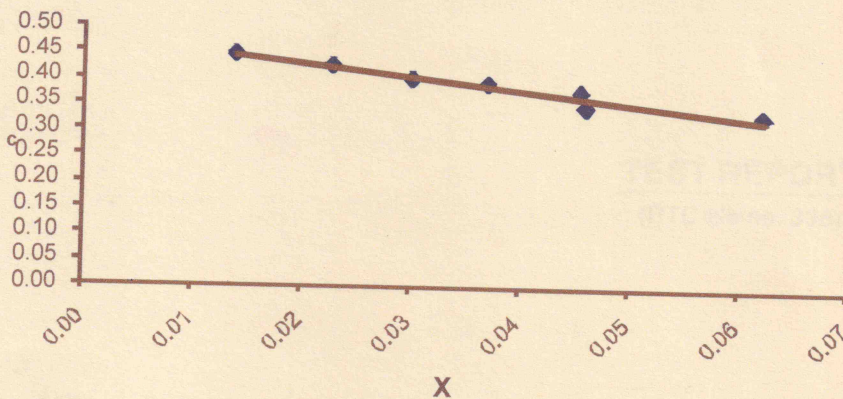
## Data points for day time test

Test No.	T <sub>sid</sub>	T <sub>sfd</sub>	T <sub>ad</sub>	G <sub>T</sub>	δT	X	η <sub>system</sub>	Ws (m/s)
1	30.2	52.5	33.1	592.0	8.3	0.01	0.44	1.11
2	35.4	56.3	32.6	582.7	13.3	0.02	0.42	1.18
3	40.3	61.5	32.1	624.7	18.8	0.03	0.40	2.41
4	45.0	65.7	32.2	625.0	23.2	0.04	0.39	1.99
5	50.1	69.0	32.6	591.9	27.0	0.05	0.38	1.66
6	55.2	73.9	35.3	635.6	29.3	0.05	0.35	1.12
7	60.3	76.8	32.0	587.3	36.6	0.06	0.33	1.49



## Graph between X and η.

$$y = -2.398x + 0.474$$



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Madurai  
01.04.2013

*S. Henry*

Authorised Signatory  
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