REGIONAL TEST CENTER CUM TECHNOLOGY BACKUP UNIT
FOR SOLAR THERMAL DEVICES
SCHOOL OF ENERGY STUDIES
UNIVERSITY OF PUNE
PUNE 411 007
Approved by
Ministry of New and Renewable Energy, Government of India,

A) GENERAL:-

1. **Name of the Manufacturer** : GK Energy Marketers Pvt Ltd.,
   601/11B, Opp. Datta Mandir,
   Lokmanya Nagar, LBS Road, Pune-411 03
2. **Type of solar concentrator** : Scheffler Solar Concentrator
3. **Place of installation** : Patoda, Dist.: Aurangabad
4. **Date of installation** : 03 June 2013
5. **Purpose of utilization** : Cooking
6. **Duration of testing** : From 07 June 2013 to 10 June 2013
7. **Tests carried out** : Thermal Performance of the Concentrator,

B) TECHNICAL SPECIFICATIONS OF SOLAR CONCENTRATOR:-

1. **Type of Concentrator** : Point Focusing with fixed absorber
2. **Aperture of the concentrator** : 13.5 m^2
3. **Reflector surface** :
   1. Size of mirror facet :
      a) Length : 475 mm
      b) Width : 80 mm
   2. Reflecting surface : Glass.
   3. Mirror material :
      a) Glass : Normal.
      b) Thickness : 2 mm
   4. Reflectivity of the mirror surface : 0.81
4. **Focal spot** :
   1. Size of focal spot : 150 – 200 mm

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2. Shape of focal spot : Circular.
3. Focal length : 1.70 m

5. Receiver :

1. Size of the Receiver :
   a) Diameter of the Receiver : 0.345 m
   b) Thickness : 10 mm
   c) Material : M.S.(Boiler Grade)
2. Coating used for absorber : Black Paint

6. Tracking device :

1. Type : Single axis tracking about N-S axis
2. Method : By Electrical motor and Chain Sproket type transfer system
3. Speed of tracking: 15^{O} /h
4. Focal spot is adjusted daily by special lever attached at the back of the reflector.

7. Material used for construction of Parabolic Dish :

1. Parabolic dish : Mild Steel
2. Stand/frame etc : Mild Steel
3. Material quality : Good
4. Workmanship : Good
5. Functioning of tracking system: OK
6. Seasonal tracking arrangement: Good
7. Installation & other aspects : OK.

C) THERMAL PERFORMANCE TEST:-

Thermal performance test was carried out at the site of the installation of Scheffler Concentrator.

1. Global Solar Radiations
2. Diffuse Solar radiations
3. Ambient temp.
4. Temp. of Water in Vessel.
5. The efficiency of the concentrator was evaluated using following equation,

$$\eta = \frac{\dot{m} C p \Delta T}{I A_p}$$

Where, $\dot{m}$ is the mass flow rate of water.

C_p is the heat capacity of water.

$\Delta T = T_f - T_{in}$

Where,

T_{in} is initial water temperature and

T_f is Final water temperature

A_p is the aperture area

I is the intensity of solar radiation falling on the aperture plane.

THERMAL PERFORMANCE TEST DATA

Sr. No.	Date	Time Interval	Average Beam Solar Irradiance I	Air Temperature (T_a)	Initial Temperature (T_{in})	Final Temperature (T_f)	Efficiency η
		Hrs.	W/m^2	^{o}C	^{o}C	^{o}C	
1	07/06/2013	11:00 – 12:20	470	34.8	33.2	95.8	0.41
2	08/06/2013	11:30 – 12:40	550	33.4	32.8	96.1	0.36
3	09/06/2013	11:00 – 12:15	551	33.5	33.5	95.3	0.35

Average Efficiency of Concentrator: 37 %

Performance of the Concentrator : Satisfactory

(Mr.Rahul.R.Udawant)
Sr. Testing Engineer

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