

# TEST REPORT

# SABS

**Powerzon Solar Systems / Certification**  
Attention: Mr. E. Haw

Your ref : Certification  
Our ref : 13S091 b  
Enquiries : K.C.F. Deist  
Tel no : (012) 428-6193  
Page : 1 of 7  
Date : 2013-10-18

## TESTING TO SANS 6211-1:2012

### SUMMARY

A full specification test was performed on the (See sample description below) submitted. The system submitted passed. Refer clause 9 for a summary of the results of submitted system.

### 1 DESCRIPTION OF SAMPLE

The following (See sample description below) was submitted by Mr. E. Haw of SABS Certification on behalf of the company Powerzon Solar Systems.

<u>Sample No.</u>	<u>Quantity</u>	<u>Sample Description</u>
13S091	1	Indirect freeze resistant HP thermosiphon/split Powerzon system with 150 litre WE geyser and 2.4m <sup>2</sup> Powerzon blue selective coated flat plate collector.  *Note: 22mm Pipework connecting to the solar geyser had Insuflex TK 22 x 13 insulation (lagging).



### 2 REPORT CONDITIONS

*The contents of this test report refers to the sample/s detailed above and does not infer that the above samples (or any other similar samples) are SABS approved for quality and/or performance.*

*In the instance where this report is used to verify compliance with the JASWIC Acceptance Scheme or Eskom Rebate Scheme, the validity of the test reports shall not exceed a period of one (1) year.*

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This test was performed by SABS Commercial (Pty) Ltd. This report and the test results relate only to the specific samples(s) identified herein. They do not imply SABS approval of the quality and/or performance of the item(s) in question and the test results do not apply to any similar item that has not been tested. (Refer also to the complete conditions printed on the back of this page.)



Lab Accreditation number: T0196

**3 ACCREDITATION DISCLAIMER**

Test results marked with "Accredited" in this report are included in the SANAS accreditation schedule of this laboratory.

**4 SAMPLE SUBMITTED**

The (See clause 1 on page1 for sample description), was received in good condition and suitable for testing.

Date sample received : 2013-08-26  
Test start date : 2013-10-01  
Test completion date : 2013-10-13

**5 TEST REQUESTED**

To test the (See clause 1 on page1 for sample description), submitted for testing with the full requirements of SANS 6211-1:2012.

**6 METHODS OF TESTING**

Methods used according to SANS 6211-1:2012.

**7 CONDITIONING AND TEST ENVIRONMENT**

No conditioning required as per test method, sample tested as received at prevailing environmental condition.

**8 LABORATORIES**

All tests were performed by SABS laboratories.



5.3 OUTDOOR THERMAL PERFORMANCE TEST. (Accredited).

5.3.1 DAILY RESULTS.

When the advanced 6 day thermal performance of the sample was tested as described in the standard, the following data was collected for the various test days.

Measured					Calculated
Q	H	T <sub>a</sub>	T <sub>c</sub>	Delta T	Q
22.4	20.7	24.2	18.6	5.7	21.9
15.7	12.4	25.5	18.6	6.8	16.1
18.3	22.2	24.2	33.1	-8.9	19.1
16.5	18.8	22.1	33.1	-11	16.0
14.5	14.8	26.6	33.2	-6.6	14.3
10.6	10.5	24.2	33.2	-9	10.5

5.4 Energy output of the system. (Accredited).

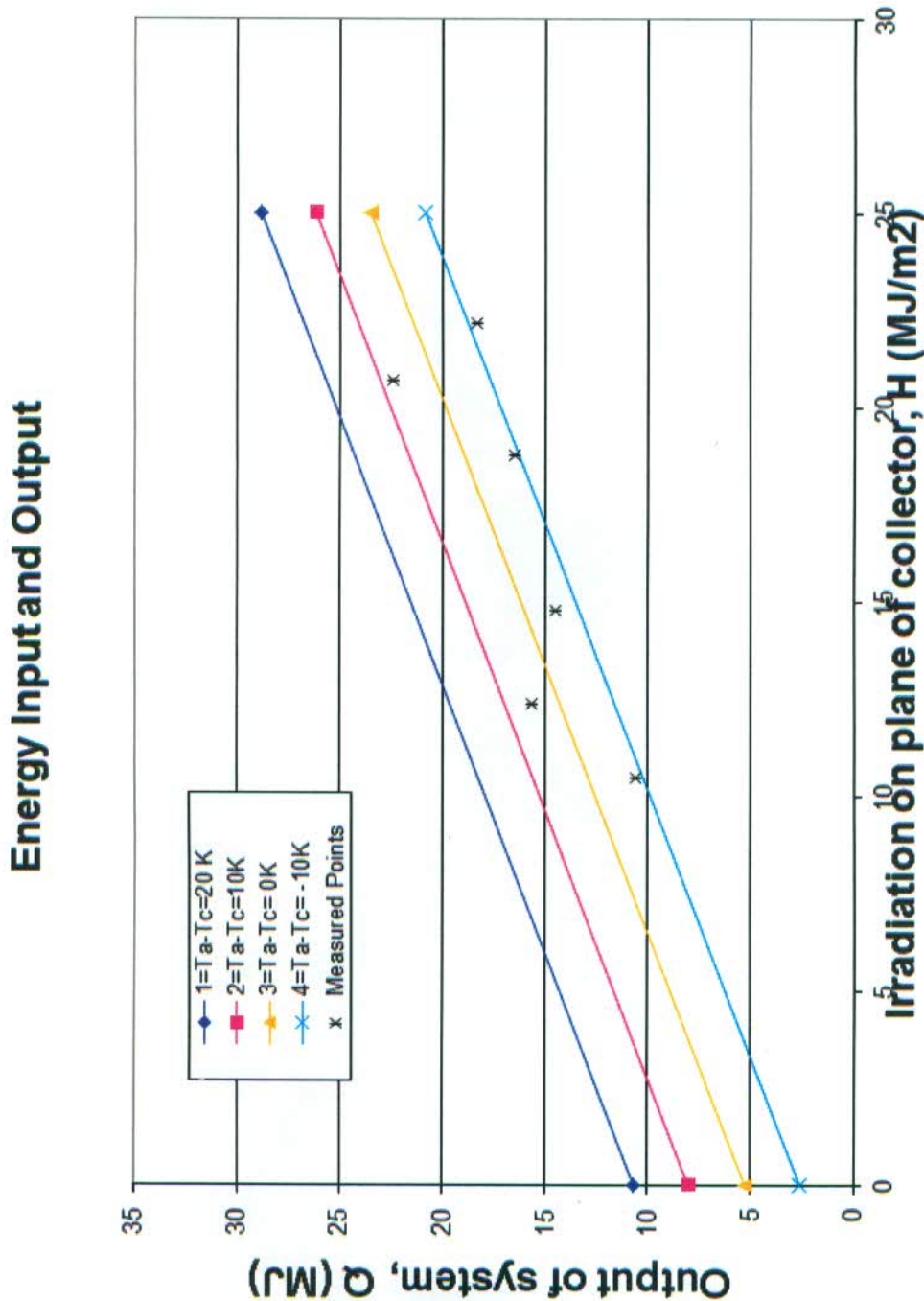
The test data collected was used to perform a regression in order to determine the following formula that can be used to determine the amount of energy that the system will collect depending on the atmospheric conditions of the day:

$$Q = \alpha_1 H + \alpha_2 (T_a - T_c) + \alpha_3$$

	Values	Units	Description
$\alpha_3$	5.3	unit less	Intercept Value
$\alpha_1$	0.7	unit less	Irradiance Coefficient
$\alpha_2$	0.3	unit less	Temperature Coefficient

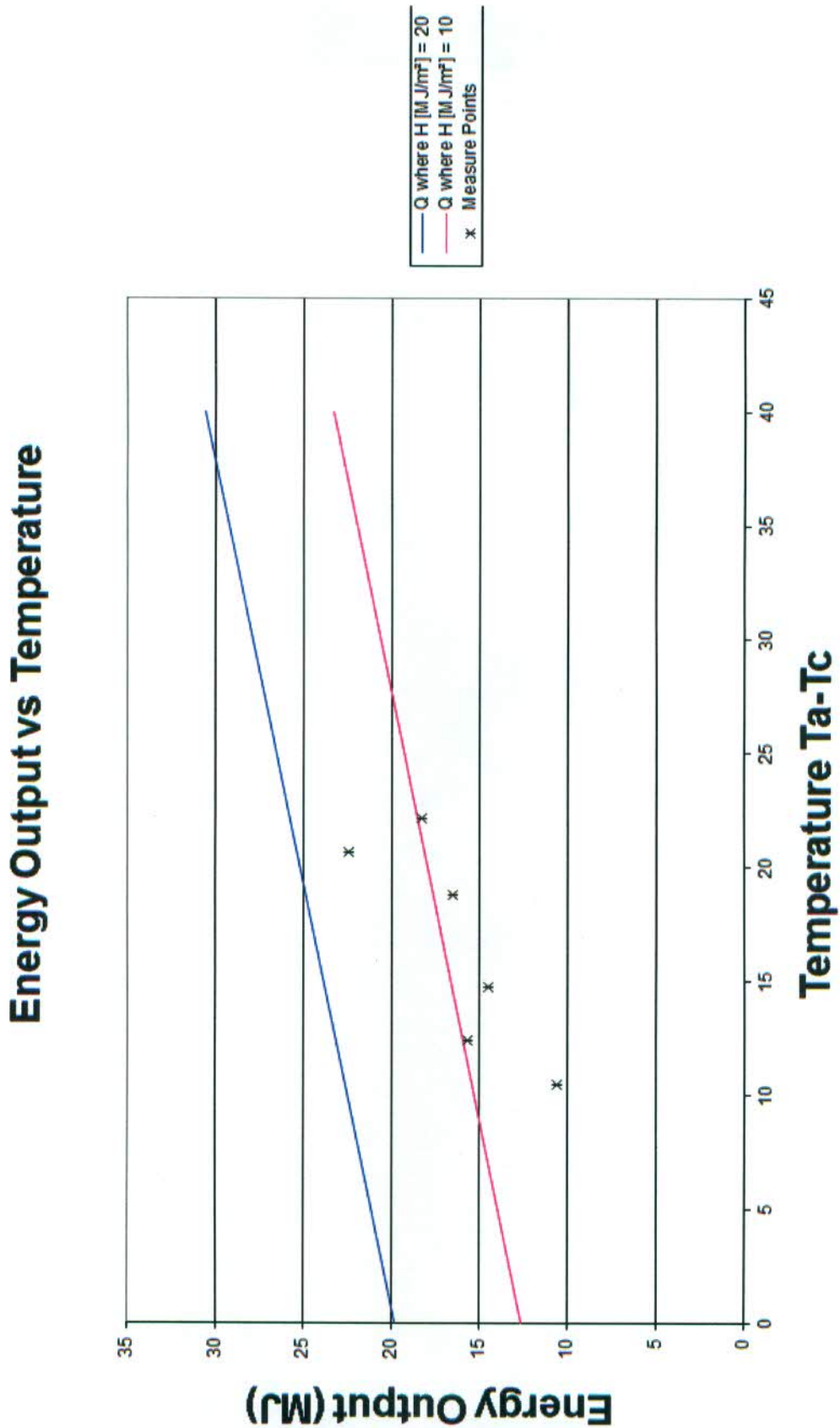
Energy input and output. Graphs

The following graphs provide a visual representation of the performance that can be expected from the sample. These graphs were compiled by using the formula printed above for a range of general ambient conditions.



**figure 3: energy input/output graph**

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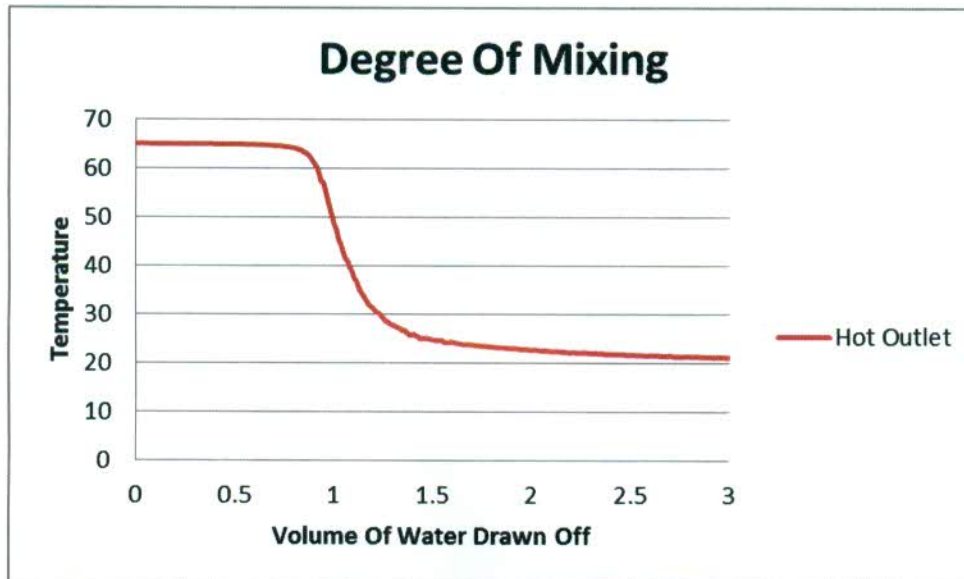
**Figure 4: energy output/temperature graph**

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5.5 Degree of mixing. (Accredited).

The data collected when the degree of mixing of the sample was tested as described in the standard, is depicted in the graph below.



Degree Of Mixing

**Results:** Required minimum temperature 50°C: Measured 65°C.

5.6 Over night heat loss coefficient. (Accredited).

When overnight heatloss coefficient of the sample was tested as described in the standard, the following data was collected.

Time (t)	Initial Temp. (Ti)	Average ambient Temp. (T <sub>a(night)</sub> )	Final Temp. (T <sub>f</sub> )	Density of water	Heat capacity J/(kg K)	Heat capacity (J/K)	Volume (m <sup>3</sup> )	Heat loss coefficient (W/K)
38610	63.094	15.681	55.080	980.72	4185.34	615697	0.15	2.953
Sec	°C	°C	°C	kg/m <sup>3</sup>	Cp	C <sub>s</sub>	m <sup>3</sup>	U <sub>s</sub>

**Results:** No Pass or Fail Criteria.

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**9 GENERAL**

The (See clause 1 on page1 for sample description), was tested and it complied to the full requirements of SANS 6211-1:2012.

Note: For Eskom, At 16MJ/m<sup>2</sup>/d from the sun and at a temperature difference of 10°C the system output is 19.6MJ.

For SANS 1307 clause 5.6, At 20MJ/m<sup>2</sup>/d from the sun and at a temperature difference of 10°C the system output is 22.5MJ.

All the performance tests were done at an inclination angle of latitude plus 10°. (35°)

Note that all the performance tests were done at an inclination angle of latitude plus 10°. (35°)

All test samples will be disposed of if not collected within 7 days from date of this report



C.R.Tshitlho  
Test Officer (Technical Signatory)  
Solar Technology Laboratory



KAREL DEIST  
TECHNICAL SPECIALIST  
SOLAR TECHNOLOGY LABORATORY

K.F.C. Deist  
Technical Specialist  
Solar Technology Laboratory

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