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Solar Collector Test Report

Report to:	Changzhou Erjin Solar Energy Equipment Making Co., Ltd. 1 Hebing Rd., Jianchang Town Jintan, Changzhou Jiangsu, China 213000
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1.0 INTRODUCTION

This report documents testing performed by Exova of an evacuated tube solar collector for **Changzhou Erjin Solar Energy Equipment Making Co., Ltd.**

Testing was performed in accordance with SRCC standard 100-08 "*Test Methods and Minimum Standards for Certifying Solar Collectors*". A full test series was done at the National Solar Test Facility, which included:

- 5.2 Receiving Inspection
- 5.3 Initial Static Pressure Leakage Test
- 5.4 Exposure Test
- 5.5 Thermal Shock/Water Spray Test
- 5.6 Thermal Shock/Cold Fill Test
- 5.7 Second Static Pressure Leakage Test
- 5.8 Pressure Drop Test
- 5.9 Collector Time Constant
- 5.10 Thermal Performance Test
- 5.11 Incident Angle Modifier
- 5.12 Disassembly and Final Inspection

The National Solar Test Facility is operated by Exova for Natural Resources Canada.

2.0 SAMPLE DESCRIPTION

Exova Sample No.:	09-08-0074-1
Manufacturer Name:	Changzhou Erjin Solar Energy Equipment Making Co., Ltd.
Collector Model:	N/A
SRCC Identification:	9-034A-3
Collector Type:	Evacuated tube, liquid-heating
Connections:	¾" copper pipe
Construction:	Stainless steel frame, aluminum header box and bottom rail
Gross Dimensions:	
Header box:	170.0 mm length x 887.0 mm width; area: 0.151 m ²
Tube Array:	1817.0 mm length x 810.0 mm width; area: 1.4718 m ²
Total:	1.6228 m ²
Aperture Dimensions:	
Tubes:	1723.0 mm length x 580.0 mm width (10 tubes x 58 mm O.D.)
Total Aperture Area:	0.999 m ²
Glazing:	10 glass vacuum tubes
Absorber Materials:	Coating on inner tubes, aluminum heat fins, copper heat pipes
Absorber Coating:	Dark blue coating on inner tubes
Insulation:	Header packed with moulded fibreglas insulation
Mounting Details:	Attached to Unistrut

COMMENTS:

1. Test fluid flow rate was the ISO 9806 standard rate of 0.02 kg/s per m² gross area (0.0325 kg/s);
2. Water was used as the heat transfer fluid for testing;
3. Inlet and outlet connections were insulated and not included in the gross area.

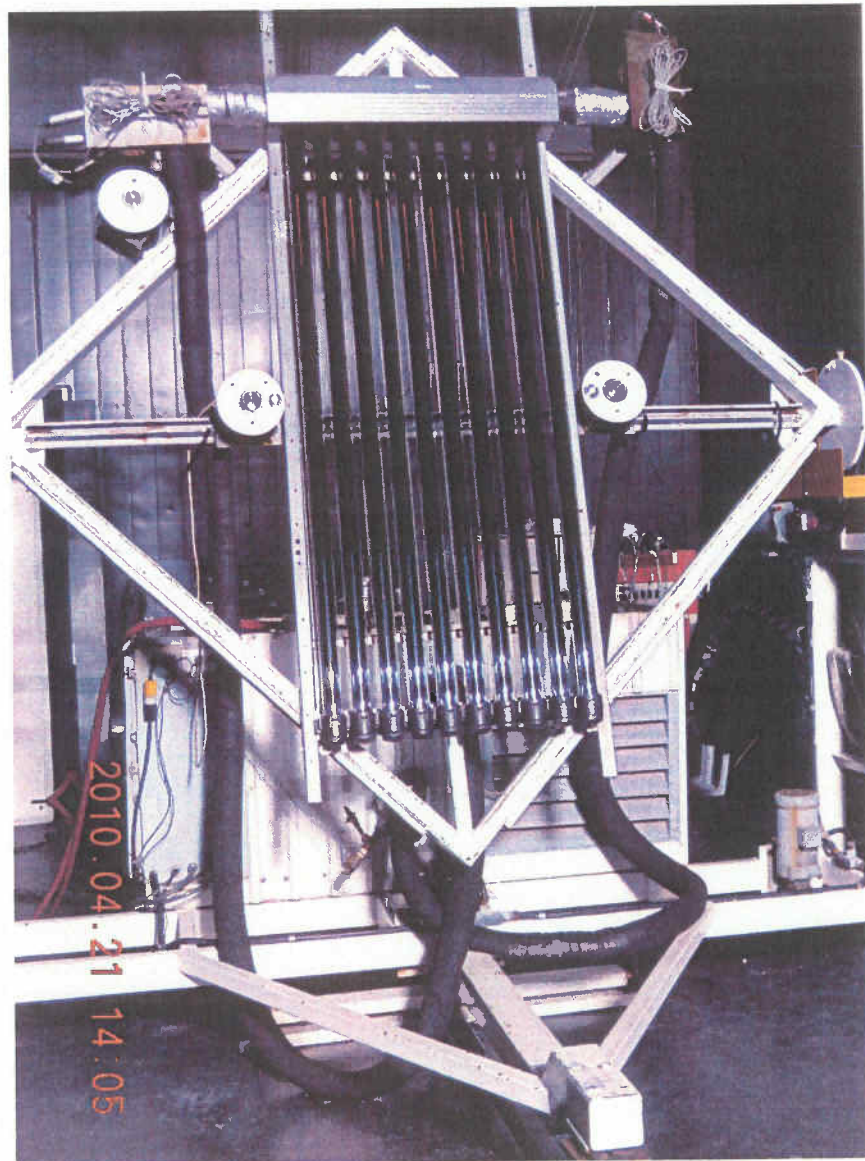


Figure 1. Changzhou Erjin Solar Energy collector under test.

3.0 RECEIVING AND INSPECTION

Section 5.2 of SRCC 100-08 requires an inspection and documentation of the condition of the collector when received. All collector components were received undamaged.

4.0 STATIC PRESSURE TEST

Section 5.3 of SRCC 100-08 requires that static pressure leakage tests be performed before and after outdoor exposure testing. The purpose of the static pressure leakage test is to ensure the integrity of solar collectors under conditions of hydraulic pressure at constant temperature. The static pressure leakage test consists of hydraulically or pneumatically testing all collectors for leaks.

Pressure test results are included in Appendix B. The collector described in this report complied with the requirements of Section 5.3 of SRCC 100-08.

5.0 EXPOSURE TEST

Section 5.4 of SRCC 100-08 requires solar collectors to undergo an outdoor no-flow exposure test. This test includes 30 days exposure (not necessarily consecutive) with a minimum of 17 megajoules of incident energy per square metre of collector surface area per day.

A written description of changes observed during the test is given in Appendix B. Insolation and ambient temperature data are recorded at 5-minute intervals for the duration of the exposure period.

The dates of the days on which the total incident energy in the plane of the collector exceeded 17 MJ/m² are also reported. The collector described in this report received its exposure between the months of July 2009 and September 2009. The total exposure was 41 exposure days.

The collector described in this report complied with the requirements of Section 5.4 of SRCC 100-08.

6.0 THERMAL SHOCK / WATER SPRAY TEST

Section 5.5 of SRCC 100-08 requires that for a fifteen minute period on three different days of the exposure test the collector be subjected to heavy water spray after at least one hour exposure to direct sunlight at a minimum 950 W/m² intensity. Water spray tests are performed at a minimum surrounding air temperature of 15 °C, using a water flow rate of 0.03 to 0.05 L/s per m² of collector aperture area. Water temperature during the spray tests must be <25 °C.

A report of observations made during the test is included in Appendix B. Water spray tests were performed in accordance with Section 5.5 of SRCC 100-08, subject to deviation 1 in Appendix C.

The collector described in this report complied with the requirements of Section 5.5 of SRCC 100-08.

7.0 THERMAL SHOCK / COLD FILL TEST

Section 5.6 of SRCC 100-08 requires that following the last water spray test, and on a different day, this thermal shock test shall be performed as specified in ISO 9806-2, Section 9, Class B. The unfilled collector is to be exposed to full sunlight (950 W/m²) at a minimum ambient air temperature of 15 °C for a one-hour period. Liquid is then circulated through the collector at a rate of at least 0.02 L/s/m² of collector aperture area for at least five minutes. The heat transfer fluid temperature during the cold fill test is supplied at a temperature less than 25 °C.

A report of observations made during the test is included in Appendix B. The cold fill test was performed in accordance with Section 5.6 of SRCC 100-08, subject to deviation 2 in Appendix C.

The collector described in this report complied with the requirements of Section 5.6 of SRCC 100-08.

