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SOLAR COLLECTOR TEST REPORT

A Report to:	Renewable Energy Inc. 6 Cornell Ln. Little Neck, NY 11363 USA
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Report No.:	08-08-0173-A 6 Pages, 1 Appendix
Proposal No.:	08-008-5838RV3
Date:	August 31, 2009

1.0 INTRODUCTION

This report is the second report prepared to describe testing performed by Exova (formerly Bodycote Testing Group) of one solar hot water heater system in accordance with specified sections of the SRCC Standard 100-08 for **Renewable Energy Inc.**

Testing described in this report was performed in accordance with SRCC Standard 100-08 "Test Methods and Minimum Standards for Certifying Solar Collectors". Tests were done at the National Solar Test Facility, which is operated by Exova for Natural Resources Canada.

This report covers only the testing in accordance with the SRCC Standard 100-08 Section 5.7 *Second Static Pressure Leakage Test*. This was the second post-exposure pressure test on the system described in Section 2.0 below. This second post-exposure pressure test was performed because this test sample failed the first post-exposure pressure test. This report should be read in conjunction with Bodycote Testing Group Report No. 08-08-0173 dated June 30, 2009, for a full description of the tests that this test sample had undergone prior to the tests described in this current report.

2.0 SAMPLE DESCRIPTION

Exova Sample No.:	08-08-0173-1
Manufacturer Name:	Globe Solar Energy Inc.
Collector Model:	GSE IP-195
SRCC Identification:	8-011A-2
Collector Type:	Integral pressurized tube solar water heater
Integral Storage Tank[1]:	Stainless steel shell, 150 L capacity
Insulation[1]:	Foam insulation, 55 mm thick
TPR valve:	Watts 150 psi / 210 °F
Collector Enclosure:	Aluminum frame, steel brackets and leg pads
Connections:	Brass, ½" male NPT, located at underside of tank
Glazing:	(24) borosilicate glass vacuum tubes
Absorber Materials:	Coated vacuum tubes, heat pipes, aluminum fins
Absorber Coating:	Coating on inner tubes, type N/A

[1] Information provided by Client.

Gross Dimensions:		
	Storage Tank:	2.000 m width; 425.0 mm dia.; area: 0.852 m^2
	Frame:	1600.0 mm length; 1723.0 mm width; area: 2.757 m^2
	Total Area:	3.610 m^2
Reflector(s):		Aluminum (2). 500.0 mm length; 1660.0 mm width; area: 1.660 m^2; exposed area: 0.532 m^2
Aperture Dimensions:		
	Tubes:	1430.0 mm length x 1128.0 mm width (24 tubes x 47 mm O.D.)
	Tube Area:	1.613 m^2
	Total Area:	1.613 m^2 + 0.532 m^2 = 2.145 m^2
Mounting Details:		Support frame supplied with unit
Heat Transfer Fluid:		Water

Note: This sample had already completed the outdoor exposure testing as described in Bodycote Testing Group Report No. 08-08-0173 dated June 30, 2009.

3.0 PROCEDURE

The third evacuated tube from the East end of the collector was removed, and the heat pipe was then unscrewed from the tank. The O-ring was then removed using a small flat spatula. The O-ring was stuck to the metal seal on the tank, and was damaged by the removal process. The O-ring removed from the tank showed evidence of permanent deformation (flattening), and discoloration compared to a new O-ring. A photograph of the end of the heat pipe showing the O-ring seal seat is shown in figure 1.

Figure 1: The condenser end of the heat pipe showing the O-ring seal seat

The one O-ring that had been damaged during removal was replaced with a new O-ring. All the heat pipes were then checked for tightness. All heat pipes were found to be too loose; some were able to be turned by hand, and some could not be turned by hand, but could easily be turned using a wrench. All heat pipes were then tightened, leaving the original, weathered O-rings still in place.

Figure 2: Tightening heat pipe connections to the tank, leaving the original, weathered, O-rings in place.

The collector was then brought indoors, and a pressure test was performed in accordance with SRCC Standard 100-08, Section 5.7.

4.0 OBSERVATIONS

During the removal of the evacuated tubes to expose the heat pipes, an inspection was made of the insulation surrounding the heat pipe connections with the tank. Discoloration of the foam insulation was observed. Typical condition of the insulation is shown in Figure 3 and in Appendix A.

Figure 3: Discoloration of the foam insulation after outdoor exposure.

5.0 RESULTS

The test sample **passed** the pressure test requirements of SRCC Standard 100-08, Section 5.7 at a test pressure of 160 psig. The test report form is attached in Appendix A, along with photos of the test setup.

Reported by:

Mark Coenen
Technologist
Product Testing Group

Reviewed & Authorized by:

Alfred Brunger, Ph.D., P.Eng.
Technical Manager – Solar Facility
Product Testing Group

APPENDIX A

Pressure Test Details

Photos of the test setup

(3 Pages)

Liquid Collector Static Pressure Test

(SRCC standard 100-08, section 5.3)

General

BODYCOTE sample no.: 08-08-0173
Manufacturer: Gobe Solar Energy Inc.
Model No.: ME 16, GSE IP-175
Tested by: [signature] Date: 2009-08-25

Test Pressure

Manufacturers' Recommended Working Pressure:		psi
Street Pressure:	20	psi
Test Pressure:	160	psi

Pressure Test

1) Before pressure applied:	0	psi
2) Immediately after pressure applied:	161	psi
3) 10 minutes after pressure applied:	161	psi
4) Immediately after pressure released:	0	psi

dP = Pressure (2) - Pressure (3) = 0 psi

Results

Collector : Accepted (pressure drop <2.5 psi or 10% of test pressure, whichever is less) [✓]
Rejected (pressure drop >2.5 psi or 10% of test pressure, whichever is less) [ ]

Equipment used: Pressure gauge MII# B01373

No visible leaks after collector had been pressurized for 10 minutes at 161psi

Approved by: [signature] Date: 2009-05-25

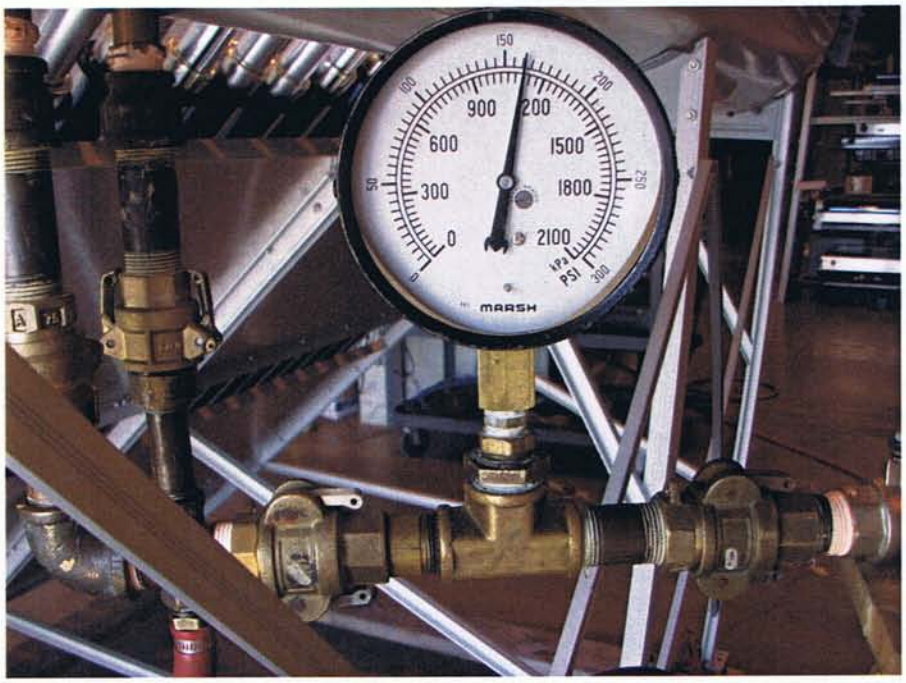

Figure 4: View of pressure gauge after the 10 minute collector pressure test.

Figure 5: Tubes pulled out of tank to tighten heat pipes securely.

Figure 6: View of the tank and tubes after heat pipe inspection.