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Solar Energy

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16. ABSTRACT This report contains the results of the static load test which was performed on the Libbey-Owens-Ford Solar Collector. The static load tests were performed subsequent to the thermal performance evaluation. The thermal performance evaluation tests and results on the Libbey-Owens-Ford Solar Collector are contained in report, DOE/NASA CR-150508. The test article is a flat plate solar collector that uses liquid as the heat transfer medium. The overall dimensions of the collector are 3' x 7' x 4-3/4". The absorber plate is #110 copper and is .021" thick. It has a double glass cover of 1/8" tempered glass and weighs approximately 130 pounds.			
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1.0

PURPOSE

The purpose of this document is to present the results of static load tests which were performed on a Libbey-Owens-Ford solar collector. These tests were performed subsequent to the thermal performance evaluations on the subject collector. This report was prepared as an addendum to the previously issued report, DOE/NASA CR-150508, on the Libbey-Owens-Ford collector thermal performance tests.

2.0

SUMMARY

The results of static load tests on the Libbey-Owens-Ford (LOF) solar collector are reported herein. Thermal performance test results on the LOF collector were previously reported in Test Report DOE/NASA CR-150508.

Results of static load tests demonstrated that the LOF collector performed satisfactorily.

3.0 TEST REQUIREMENTS AND PROCEDURES (Continued)

3.1 Collector Load Test

Tested By G. Ouren
Started 6/27/78
Completed 6/27/78

3.1.1 Requirements

One solar collector shall be subjected to load testing. The specified load requirements are listed in paragraph 5.5.3. The collector shall be mounted as indicated in Figure 1 and shall be oriented such that the glazing is horizontal. Uniform loads shall be applied by means of a transparent flexible diaphragm which can be covered with a uniform layer of transparent liquid of varying depths to obtain the desired load variations. If either breakage or leakage to the collector occurs before all six test steps have been conducted, the load testing shall be discontinued. If it is determined that the failure is the result of a collector which is not representative of the vendor's normal product, the collector shall be replaced and the load test started over. If it is determined that the ultimate load capability of the collector has been reached, the load testing shall be terminated.

3.1.2 Procedure

1. Mount the collector in the horizontal plane.
2. Place the load frame with liner over the collector.
3. Fill the load frame liner with water to a level corresponding to the Step 1 load indicated in paragraph 5.5.3 and let stand for five minutes.
4. Drain and remove the load frame.
5. Flush the collector exposed surface with water and inspect for leaks.
6. If the collector leaked or was damaged due to the load, record and indicate what the load level is.
7. If the collector does not leak and is not damaged, record the load level and repeat steps 3 - 5 for the next load level.

3.1.3 Results

The results of this test were tabulated as shown on the following page.

3.0 TEST REQUIREMENTS AND PROCEDURES (Continued)

3.1.3 Results (Continued)

Service Load Steps

Step No.	Load (Lb/Ft ²)	Pass/Fail	Comments
1	10	Pass	
2	20	Pass	
3	30	Pass	
4	50	Pass	
5	80	Pass	
6	120	Pass	

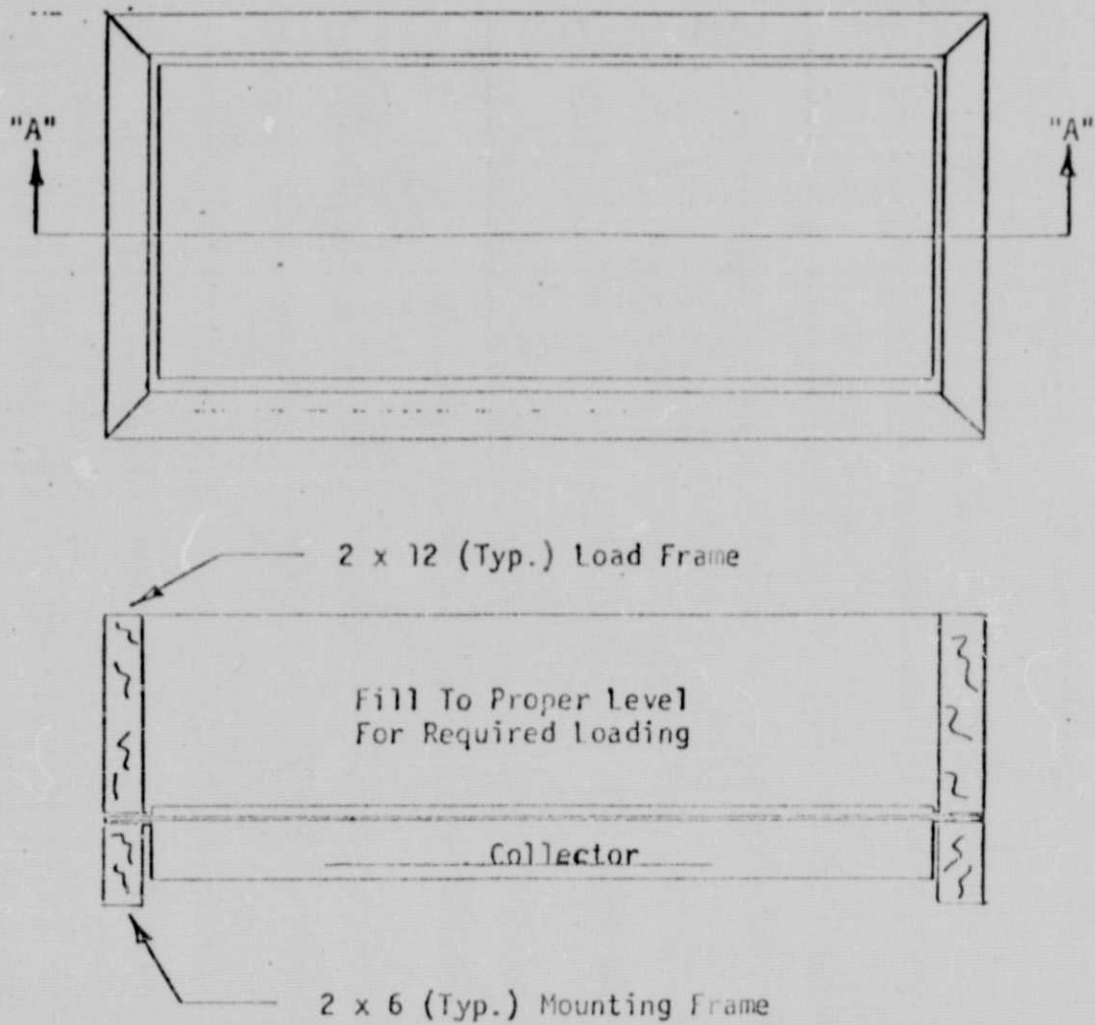


FIGURE 1. Test Setup for Static Loads.