



MIAMI TESTING LABORATORY, INC.

Expeditious service
Conscientious testing

TEST OF SOLAR COLLECTOR PANEL

May 28, 1985
File Number 85-812
Report Number 2
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Client: Gulf Thermal Corporation
Project: Various
Sample: Laboratory Number 12368
Sampled by: Your representative and received May 22, 1985
Reported to: Gulf Thermal Corporation
P.O. Box 1273
Sarasota, Florida 33578
Attention: Mr. Dudley Slocum

Description of Test Unit:

MODEL: PT-40CN Glazed Hot Water Solar Collector
TEST UNIT SIZE: 48 1/8" wide by 98" long by 8 1/4" deep
MAIN FRAME: Aluminum extrusion, 0.088" thick with mitered corners. A 1 1/2" by 3/4" by 7 3/4" aluminum angle corner key at each corner secured with eight pop rivets per corner.
FRAME BACK PLATE: A 0.025" embossed aluminum sheet secured to main frame using ten pop rivets per long side and six per short side.
COVER PLATE: Dual glazed with flexible plastic: 0.001" "Teflon" bottom layer glazed in a rolled form aluminum frame secured with a hollow EPDM spline; 0.004" "Tedlar" top layer glazed to main frame using glue, EPDM gasket and an extruded aluminum glazing cap, secured with eleven No. 10 by 3/8" S.S. screws per long side and six per short side.
ABSORBER PLATE: Eight 4" O. D. copper tubes connected at ends with 3/4" copper pipe and fittings forming "U" tubes. A 1 1/2" and 1 3/4" by 1/2" copper channel baffles between the 4" tubes.
INSULATION: 2" thick rigid foam between absorber plate and back panel. A 1/2" and 1" thick foil back rigid foam in all four sides. A 1/2" and 3/4" thick foil back rigid foam between the 4" tubes.
REINFORCEMENTS: Two S.S. bronze 0.035" stranded cables diagonally across collector under the cover plate connected to eye bolts at each corner. One 0.095" Hex head S.S. rod, threaded on one end across collector under cover plate, 30" from each short end (total of 2)
ANCHORS: One 1 7/8" long aluminum flat type clamp anchor 23 7/8" from each end per long side (total of two per long side). Anchor brackets clamp on bottom lip of main frame and secured to an aluminum channel across test buck using one 3/8" by 1" bolt and nut per anchor

Test Procedure:

The test unit was installed as one vertical wall of a test chamber. The test chamber was evacuated to produce the desired simulated wind load upon the entire surface of the cover plate. The test unit was then reversed and again the test chamber was evacuated to produce the desired simulated wind load upon the entire surface of the collector bottom. As a final test, holes were cut into bottom panel of collector and again the test chamber was evacuated to produce the desired simulated wind load upon the entire surface of the interior side of cover plate. Each test load was held for a period of 10 seconds and deflection recorded.

Wind Load Test:

Load	Deflection (Center of unit)
55 psf exterior surface of collector cover plate	1.76 inches
84 psf at bottom of collector box	1.05 inches
55 psf interior surface of collector cover plate	Not recorded



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Results of Tests:(Continued)

Note: At the conclusion of these tests, there was no evidence of damage to the solar collector or anchoring devices.

Test Completed - May 24, 1985

Remarks: The above test results were obtained in accordance with the instructions received from your representative.

MIAMI TESTING LABORATORY, INC.

James W. Bailey
James W. Bailey
Laboratory Supervisor

- 2 - Gulf Thermal
- 1 - Metro
- 1 - Ft. Lauderdale
- 1 - Palm Beach County

WINDLOAD TEST INTERPRETATION

All Miami windload tests are conducted normal to the load -- or as though collectors were mounted vertically against a horizontal wind.

The tilt angle of the collector decreases load from the front proportionate to the tilt angle. Thus 55 psf vertical would be the even load equivalent of 110 psf vertical load if the tilt were 45°. The formula is not exactly proportionate at all angles but is close enough for "rule of thumb".

In the case of load from the rear of a tilted collector on a flat roof entrapment plus the lifting effort requires the full 84 psf or 180 mph equivalent regardless of tilt.

As 55 psf is 65% of 84 psf and 58.2° is 65% of 90°, a collector would have to be tilted higher than 58.5° before the actual front load of an 180 mph wind exceeded the test load.