



CONSTRUCTION MATERIALS TECHNOLOGIES

Email

To: Michael Studney
From: Zach Priest
Subject: Test Status: Wind Uplift Evaluation

Date: January 11, 2011

Helicool solar heating panels were evaluated against an unnamed competitor for wind uplift reaction forces created in the roofing substrate as a result of simulated wind loading.

Specimens were mounted to a dimensionally stabilized force-plate and installed into open wind tunnel as shown below. The force-plate was counterbalanced to minimize apparatus and specimen weight transference to the load cell. The force-plate was bound by low-friction linear motion devices to translate only in the y-direction. During testing, a small moment did develop about the y-axis. As such a small portion of the loads measured during test may be attributed not only to wind uplift, but also the moment created by the uplift.

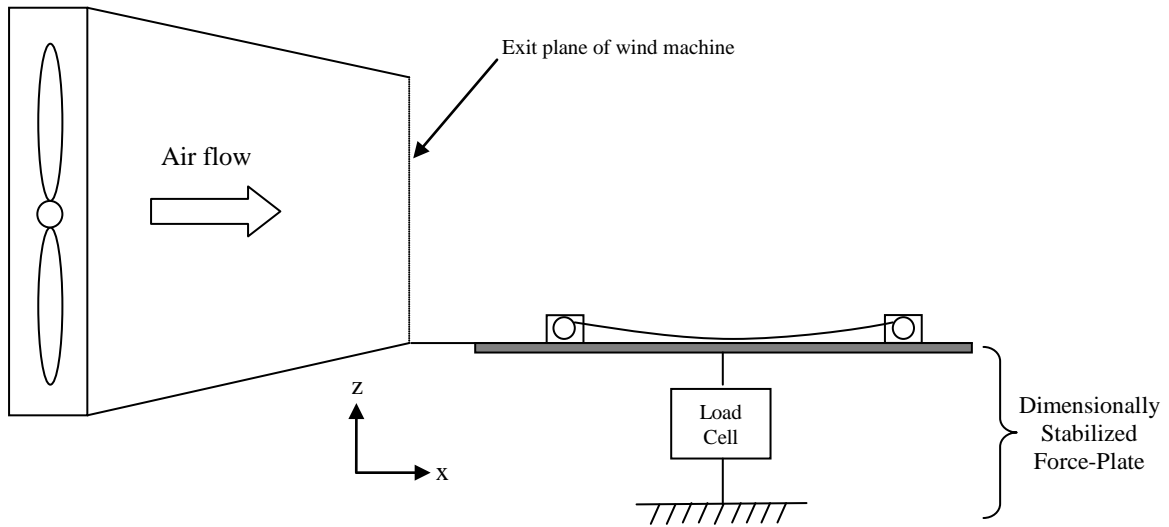


Figure 1. Schematic of the experimental setup in open wind tunnel

UMAS-002-02-01

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The photograph below shows the actual setup of the force-plate measurement system with specimen.

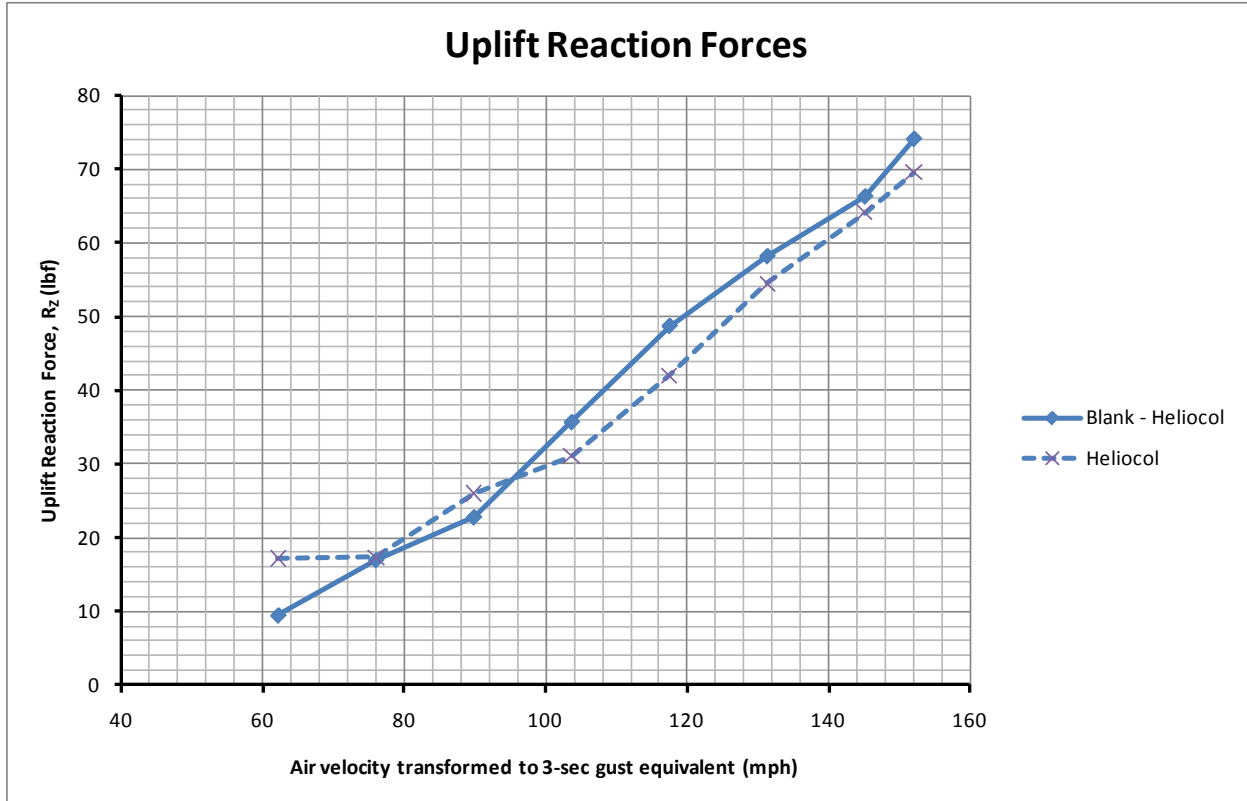


Specimens were maintained under no slope conditions and subjected to a constant air velocity to simulate 3-sec gust wind velocities. The loading table below shows the air velocities tested and the corresponding 3-sec gust wind velocities.

Test Air Velocity (mph)	3-sec Gust Wind Velocity (mph)
45	62
55	76
65	90
75	104
85	117
95	131
105	145
110	152

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Initial testing was performed to confirm a direct relationship between wind speed and resultant uplift reaction forces as measured using the force-plate measurement system. Testing was completed with and without specimens attached to the force-plate in order to isolate the contribution of the force-plate aerodynamics from the specimens. Testing validated a direct relationship existed between the measured reaction forces and the supplied wind loads.



The chart below shows the relative uplift reaction forces of the Heliocol panel when compared to the competitor. Generally, the Heliocol reduced the transference of uplift loads to substrate as compared to the competitor.

