
WIND TUNNEL TEST



In July of 2021 beachBUB USA tested the beachBUB All-In-One Beach Umbrella System at the A2 Wind Tunnel in Mooresville, NC. The umbrella easily held up in a 44 mph wind. The event was documented and the video is available for viewing on the beachBUB.com web site.

The wind test was halted at 44.42 mph due to the fact that sand from the base was beginning to blow into the wind turbines creating a concern that it may damage the wind tunnel equipment. The umbrella may have endured even higher winds if the test had continued.

"The beachBUB umbrella was tested up to a wind speed of 44.4 miles per hour while remaining firmly planted in the sand and intact."

-A2 Wind Tunnel

1.0 PURPOSE:

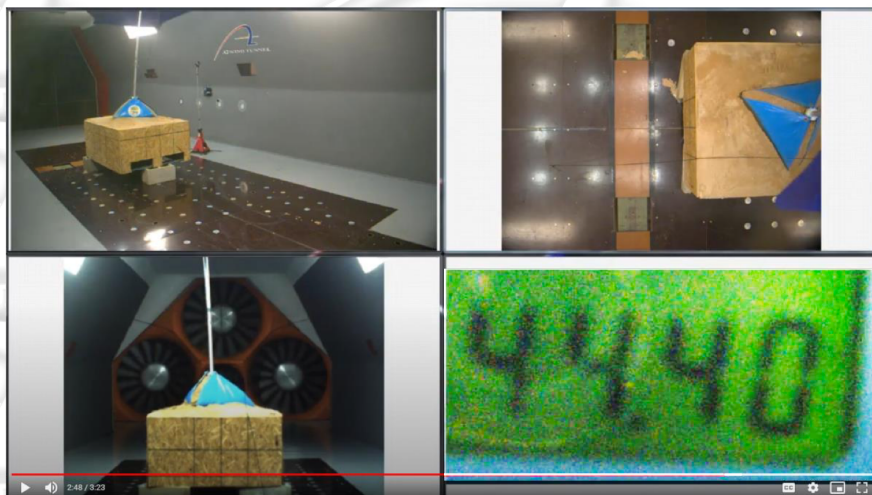
Observe the ability of the beachBUB beach umbrella system to remain planted and intact at high wind speed.
Testing designed to evaluate usability in real world high wind speed applications.

2.0 TEST PROCEDURE:

- 2.1. The umbrella was tested at A2 Wind Tunnel, Aerodyn Technologies. A reputable aerodynamics testing facility.
 - 2.1.1. A2 Wind Tunnel is an open return Eiffel style wind tunnel, 14ft x 10ft cross section capable of producing uniform consistent winds up to 85 miles per hour.
- 2.2. The umbrella is positioned in the uniform wind stream zone at the center of the tunnel.
- 2.3. A box of sand measuring approximately 40 inches wide, 48 inches long, and 24 inches tall was placed in the test section of the wind tunnel. The size of the box was designed to provide ample area of sand to allow for realistic resistance to dislodging without the walls of the box constricting the movement of the sand around the umbrella.
- 2.4. Semi-coarse damp beach sand was used in testing designed to replicate sand conditions commonly found at beaches just below the top layer of dry loose sand.
- 2.5. The umbrella was installed in the sand as per manufacturers published instructions.
- 2.6. The wind velocity was measured using a certified anemometer in the same plane as the umbrella at least 2 feet from tunnel walls and umbrella in order to measure "free stream air" which is wind that is not being artificially slowed or accelerated by the walls or umbrella. In real world conditions this would be the ambient wind speed.
- 2.7. The wind velocity is raised in increments with sufficient time between speed changes to monitor whether the umbrella remains planted in the sand and intact. The highest wind velocity achieved without the umbrella dislodging from the sand or breaking is recorded.
- 2.8. Sand box environment and umbrella installation conducted by beachBUB personnel. Tunnel operation, wind speed measurement, and certified report conducted by A2 Wind Tunnel personnel.

3.0 Results:

The beachBUB umbrella was tested up to a wind speed of 44.4 miles per hour while remaining firmly planted in the sand and intact. Testing was halted once the speed of 44.4 miles per hour was reached before the umbrella dislodged or broke. It is possible the umbrella would remain planted and intact with short term gusts above 44.4 miles per hour.



Certified by:



**Geoffrey Eaker
Operator/Manager
A2 Wind Tunnel**

AMERICAN LIFEGUARD ASSOCIATION ENDORSEMENT



The beachBUB All-In-One Beach Umbrella System has been officially endorsed by the American Lifeguard Association. beachBUB USA has always strived to create a safer environment for all beach goers. Putting safety first, we have made it our goal to create the safest most secure umbrella available.

WORKING WITH ASTM TO ESTABLISH BEACH UMBRELLA SAFETY STANDARDS

Beginning in January 2022, beachBUB USA Inventor and President, Bill Schermerhorn, is establishing a Beach Umbrella Safety Team. In accordance with ASTM International, this team will include a group of prominent scientists, engineers, activists, and industry professionals who will evaluate the use of beach umbrellas on public beaches and identify potential safety concerns. The goal of this effort will be to establish and recommend safety standards for beach umbrella use on public beaches.

