

# A2 WIND TUNNEL

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Stella Umbrella  
9ft Vented Canopy Market Umbrella Testing  
01-08-2025



## 1.0 PURPOSE:

Measure the stability and durability of the Stella Umbrella 9 ft vented canopy market umbrella at high wind speed. Testing designed to evaluate usability in real world high wind speed environment applications.

## 2.0 TEST PROCEDURE:

- 2.1. All testing completed in accordance with ASTM standard F3512-21
- 2.2. The umbrella was tested at A2 Wind Tunnel, Aerodyn Technologies. A reputable aerodynamics testing facility. 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.
- 2.3. The umbrella is mounted in the uniform wind stream zone at the center of the tunnel.
- 2.4. The umbrella base is bolted to the wind tunnel floor in such a way that it is not able to move.
- 2.5. The umbrella is mounted in the base in such a way that the umbrella is not able to be dislodged from the base.
- 2.6. Weather conditions: 70 degrees Fahrenheit, 55% humidity, 29.5 inches of mercury
- 2.7. 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.
- 2.8. Wind speed held for 1 minute at each level of the Beaufort scale as follows; 5, 10, 15, 21, 27, and 35 miles per hour. Cycle was repeated 3 times. Umbrella inspected for damage after each cycle completed.
- 2.9. Wind speed held for 30 minutes at 35 miles per hour to test extended durability. Test repeated 3 times. 2.8. Umbrella inspected for damage after each cycle completed.
- 2.10. Testing conducted up to 35 miles per hour maximum as winds above 35 miles per hour are approaching gale force. Users should have ample warning of expected gale force wind conditions and should close and secure umbrellas prior to severe weather.
- 2.11. Tunnel operation, wind speed measurement, and certified report conducted by A2 Wind Tunnel personnel.

## 3.0 Results:

- 3.1. Beaufort scale cycle 1 completed with no damage. \*\*PASS\*\*  
Beaufort scale cycle 2 completed with no damage. \*\*PASS\*\*  
Beaufort scale cycle 3 completed with no damage. \*\*PASS\*\*
- 3.2. 30 minute extended durability test 1 completed with no damage. \*\*PASS\*\*  
30 minute extended durability test 2 completed with no damage. \*\*PASS\*\*  
30 minute extended durability test 3 completed with no damage. \*\*PASS\*\*

Certified by: Geoffrey Eaker  
A2 Wind Tunnel