

## Overview

External temperature, humidity and air quality sensors can be affected by solar heat gain. This white paper will describe how the BAPI Weather Shade effectively reduces the solar heat gain.

Reducing the solar heat gain improves the accuracy of the sensor and improves the operation of the HVAC system because many BAS parameters are directly affected by the external temperature readings.

The Weather Shade is made of solar-stabilized plastic with a high reflectivity rating (87%) and low emissivity rating (0.90) to reduce the radiant heat created from solar gain. The conical shape and spacing from the wall also creates a chimney which draws radiant heat away from the sensor.

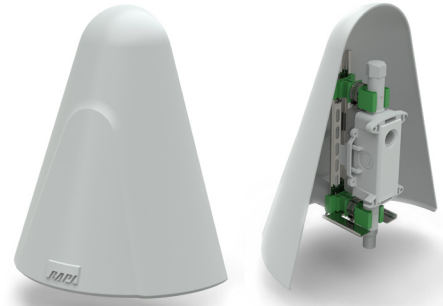


Fig. 1: Front and back view of a Weather Shade mounted on a BAPI Outside Air Sensor

## Temperature Readings With and Without A Weather Shade

To demonstrate how the Weather Shade reduces solar heat gain, outside air temperature sensors with and without a Weather Shade were mounted on the top of a retaining wall in Phoenix, Arizona. Those sensors are shown in Fig. 2 at right. The Weather Shade is mounted on a BAPI-Box 2 enclosure similar to the beige enclosure, and the readings from those two sensors are shown in the chart below. The two sensors with the blue enclosures are not used for this white paper.

The chart shows the temperature readings from the two sensors from July 24 to July 28, 2017. The blue line is the reading from the sensor with the Weather Shade and the red line is the reading from the sensor without the Weather Shade. The reported high temperatures for each of those days were 90, 101, 105 and 108°F.

The temperature readings from the two sensors are nearly identical except during the afternoon and early evening when the sun shines directly on the sensors. During the afternoon and early evening, the sensor with the Weather Shade reads about 6 to 10°F lower than the unshaded sensor, indicating that the Weather Shade effectively reduces the effects of the solar heat gain.

Besides reducing solar heat gain, the Weather Shade protects the probe filter from precipitation and grit, extending the life of the filter. The unit is also very rugged. BAPI used Computational Fluid Dynamics (CFD) to analyze the performance in high winds, and the Weather Shade survived the forces of a 120 mph wind with no failure.

For more information about the Weather Shade, contact a BAPI key account specialist at +1-608-735-4800 or visit the BAPI website at [www.bapivac.com](http://www.bapivac.com).



Fig. 2: Sensor mounting with and without Weather Shade in Phoenix, Arizona

### MEASURED AIR TEMPERATURE WITH AND WITHOUT WEATHER SHADE

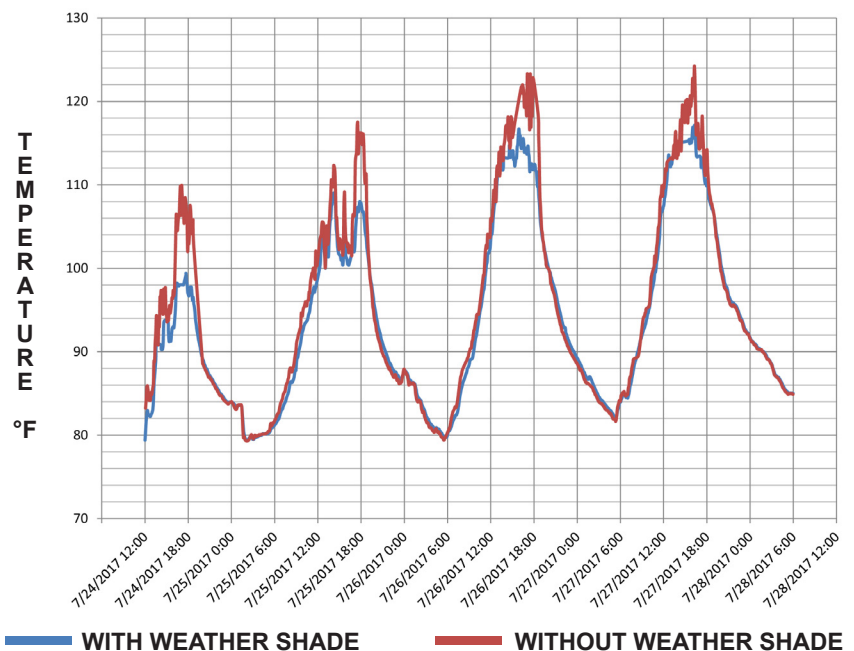


Fig. 3: A chart comparing the temperature of an outside air sensor with a Weather Shade and one without a Weather Shade in Phoenix, Arizona