

Aspirated Radiation Shield | JTS-110

Accurate measurement of air temperature

Aerodynamic Shape

The curved inlet facilitates the redirection of air into the shield through the Coandă effect (tendency of fluid flow to follow a convex surface). The tapered diameter of the internal surface enhances air velocity through the Venturi effect (reduction in fluid pressure after flowing through a constriction). Both effects contribute to more efficient air flow and allow for a lower power fan than other fan-aspirated radiation shields on the market.

Rugged, Low-power Fan

The fan has an ingress protection (IP) rating of 55, virtually eliminating moisture and dust ingress. At full speed the power requirement is 1 W (80 mA at 12 V DC). To conserve power fan speed can be reduced, via pulse width modulation (PWM), to 0.3 W at night or when wind speed is greater than 3 m s^{-1} without loss of accuracy. If the fan is continuously operated at full speed, lifetime is rated at 50,000 hours (5.7 years). The fan includes a tachometer, allowing RPM to be monitored to detect obstruction to the fan.

Sensor Compatibility

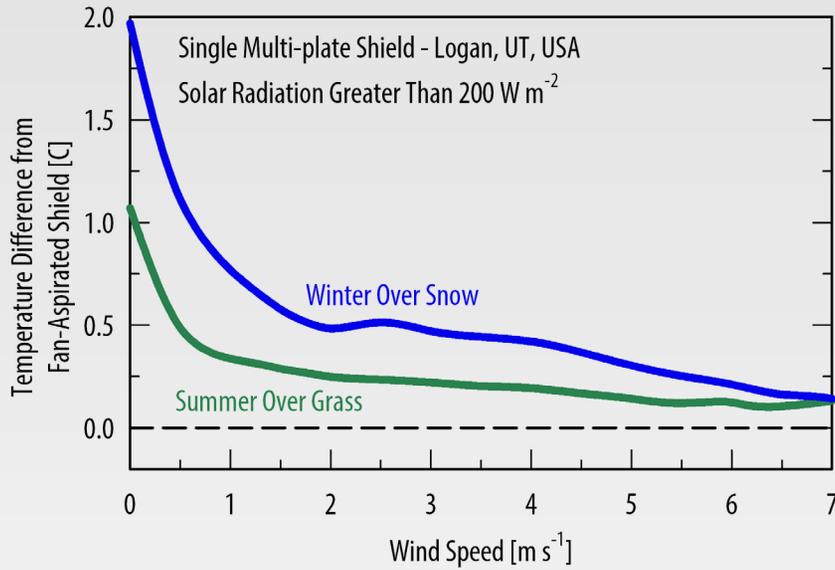
Sensor port adapter plugs accommodate multiple sensors, including air temperature sensors (recommended probes are Apogee model JST-110 (included in the JTS-110), thermistor with $\pm 0.1 \text{ C}$ accuracy, and Apogee model JST-300 PRT with $\pm 0.1 \text{ C}$ accuracy), air temperature/relative humidity probes (recommended probes are E + E model EE08, Vaisala models HMP60 and HMP110, Campbell Scientific model CS215), or the combination of a dedicated air temperature sensor and air temperature/relative humidity probe. For maximum accuracy we recommend redundant measurements of air temperature.

Typical Applications

Applications include air temperature and humidity measurement in weather networks, often for weather forecasting. Fan-aspirated shields are also important in the precise measurement of air temperature and humidity gradients above the land surface and in climate change monitoring.

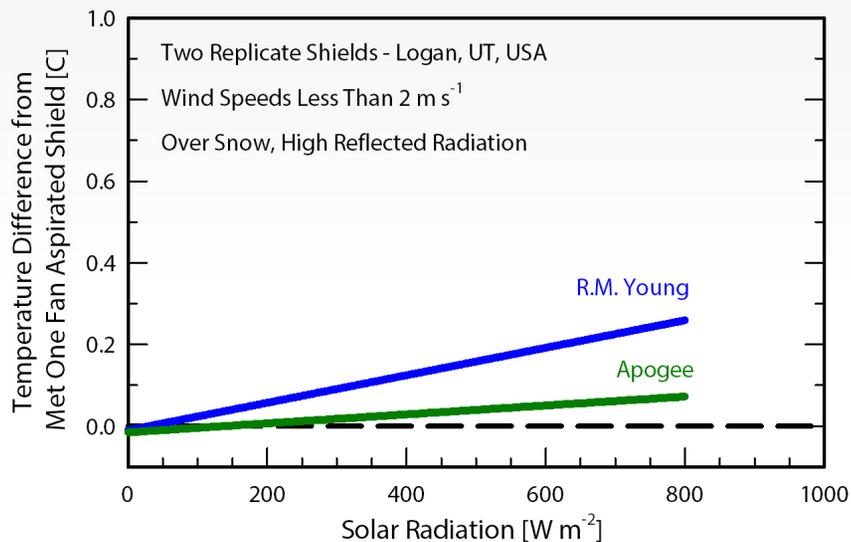


Effect of Wind Speed on Multi-plate Shields



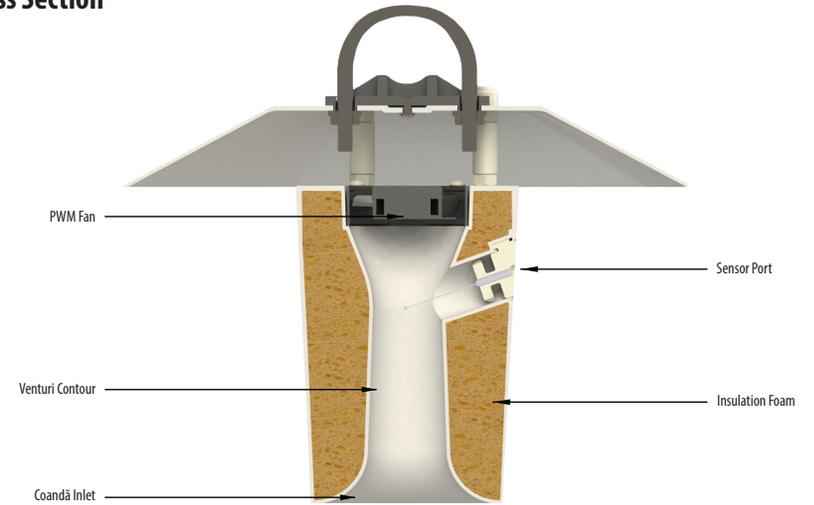
Naturally-aspirated shields are subject to significant measurement errors when wind speeds are less than 3 m s^{-1} . Errors increase when snow covers ground surface.

Wintertime Performance of Fan-aspirated Radiation Shields

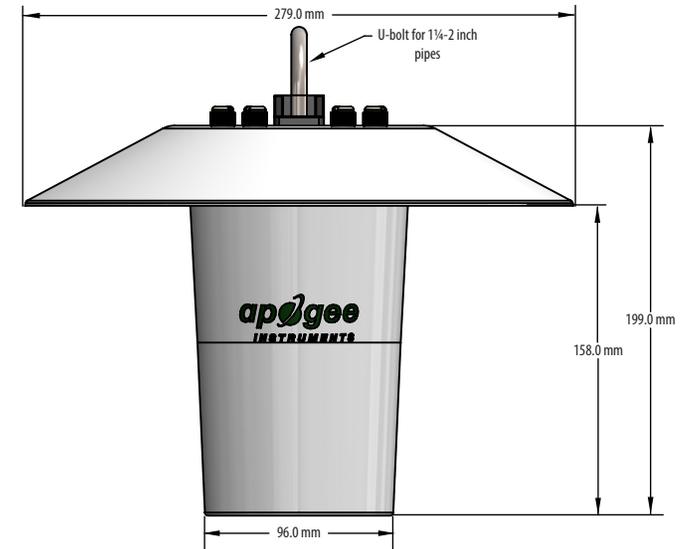


The performance of model JTS-110 and model 43502 fan-aspirated shields relative to a model 076B fan-aspirated shield.

Cross Section



Dimensions



JTS-110

Difference Among Individual Replicate Shields	Less than 0.1 C
Aspiration Rate	6 m s^{-1} at full speed; 3 m s^{-1} at half speed
Fan Input Voltage Requirement	10.8 to 13.2 V DC
Fan Current Drain	80 mA at full speed; 25 mA at half speed
Fan Dust and Water Protection	IP55
Dimensions	220 mm height, 270 mm diameter
Mass	840 g
Cable	5 m of shielded, twisted-pair wire for fan and air temperature sensors; additional cable available in multiples of 5 m; santoprene rubber jacket (high water resistance, high UV stability, flexibility in cold conditions); pigtail lead wires
Warranty	4 years against defects in materials and workmanship