CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

RAD 06, 10 & 14 *Compact Shields*
MET 20 & MET 21 *Unaspirated Radiation Shields*

Unaspirated Radiation Shields

Protection from solar radiation, rain and snow

Two ranges to choose from

Overview

These radiation shields are designed to house temperature and humidity probes to protect them from the heating effects of solar radiation and also to protect them from direct exposure to rain and snow.

The shields have improved design and performance characteristics compared to the competitors whilst still being relatively low cost.

All unaspirated radiation shields overheat when solar radiation is high and windspeed is low. Problems are also seen in the winter when the sun's angle is low or there is reflection off snow. The design of this shield has a white outer reflective surface combined with an inner barrier of louvres to prevent sunlight reaching the sensor whilst still allowing air to flow through to the sensor - see the pictures overleaf. This unique construction is more effective at blocking solar radiation and thus the sensors inside the shield give a more representative reading of the true air temperature and relative humidity. Errors for the RAD shields, under adverse conditions are typically half those compared to similar shields (see Figure 1).

The shape of the louvres is based on an established design that is used in a modern Stevenson screen made by the same manufacturer. That screen is sold to national meteorological services worldwide.

Two ranges of Radiation Shields to choose from

Compact RAD 06, 10 & 14 plate shields

Smaller, rugged shields which provide excellent measurement performance. Greater than 50% reduction in measurement errors in tests, compared to industry standard shields.

The three versions are shown in the picture above.

MET 20 & 21 shields

Larger shields offering good performance whilst giving the very best level of protection in severe environments. The preferred choice for marine installations and where blowing precipitation is likely.

Special versions are available for mounting multiple sensors inside the same shield.

Benefits and Features

- Reduction in solar radiation errors - greater accuracy
- Unique wasp and bug deterrence
- Easily dismantable double louvre stack for cleaning
- Extra secure positive locking sensor grips
- Proven toughness, UV stability and salt spray resistance
- No power required
- Low cost compared to large Stevenson screens
- Good protection of sensors from rain and snow
- Easy and fast installation
- Long term durability

RAD 06, 10 & 14 Specifications

- Double louvred high impact U.V stable polycarbonate plastic louvre plates
- The external plates have matt black undersides to reduce reflected solar radiation getting inside the shield
- Gloss white aluminium arm with durable white polyester powder coating
- Stainless steel 'V' bolt, and securing nuts to fit a pole of between 25 - 51 mm in diameter. Fits onto both horizontal and vertical structures
- Black plastic locating clamp
- Fully RoHS compliant in conjunction with sensors.

Probe compatibility

RAD 06: houses short thin probes from 5 - 17 mm in diameter with up to 94 mm of the probe inside the shield. It can house Campbell Scientific's 107, 109 and PT100 sensors.

RAD 10: houses probes 5 - 17 mm in diameter taking up 160 mm of the probe inside the shield. It can house Campbell Scientific's CS215 or HC2S3 temperature and humidity sensors.

RAD 14: houses large probes 14 - 25 mm in diameter taking up 226 mm of the probe inside the shield. It can house the HMP155 or MP100A sensors. Smaller probes such as the 107 and PT100 can be mounted in these using an optional adapter.

Dimensions and weights

RAD 06: Overall 123 mm diameter x 142 mm height (shield only); 281 mm including bracket. Weight 0.87 kg

RAD 10: Overall 123 mm diameter x 208 mm height (shield only); 347 mm including bracket. Weight 1.01 kg

RAD 14: Overall 123 mm diameter x 274 mm height (shield only); 413 mm including bracket. Weight 1.15 kg

Operating temperature range -55 to 65 °C

RAD 10 radiation shield

MET 20 & 21 Specifications

- Double louvred high impact U.V stable polycarbonate plastic louvre plates
- Internal black louvres to block radiation entry
- Gloss white aluminium arm with durable white polyester powder coating
- Stainless steel 'V' bolt, and securing nuts to fit a vertical pole of between 25-51 mm diameter
- Black plastic locating clamp
- Large internal volume can house electronics or multiple sensors in one shield - contact CS for special options.

Probe compatibility

MET 20: houses probes from 5-17 mm in diameter with up to 120 mm of the probe inside the shield. It can house the Campbell Scientific CS215, HC2S3,107, 109 or PT100 sensors.

MET 21: houses larger probes 14-25 mm in diameter taking up to 220 mm of the probe inside the shield. It can house the CS215, HC2S3, HMP155, MP100A or smaller probes such as the 107 or PT100 using an optional adapter.

Dimensions and weights:

- **MET 20:** Overall 165 mm diameter x 172 mm height (shield only); 303 mm height including bracket. Weight 1.04 kg
- **MET 21:** Overall 165 diameter x 274 mm height (shield only); 405 mm height including bracket. Weight 1.32 kg

Operating temperature range -55 to 65 °C

The MET 20 Unaspirated radiation shield

Test Data

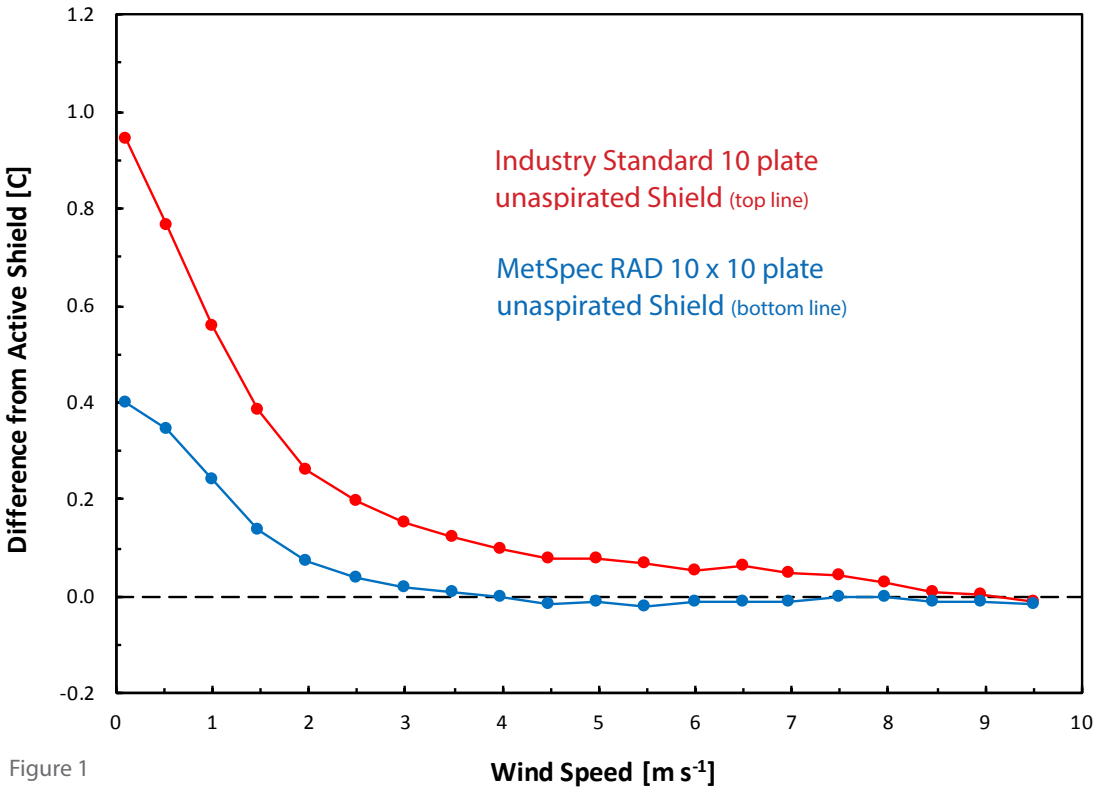

Figure 1

Test intercomparison

The data in the graph are averages that show the mean temperature difference as a function of wind speed. Temperature measurements from each passive shield were compared to temperature measurements from an active shield.

Trial period: September 5, 2013 to August 25, 2014.

Two Shields of each type were used in this test.
Datalogger: Campbell Scientific CR1000
Sensors: Campbell Scientific 109SS-I Thermistor
Site installation: 3 metres above normally irrigated and cut grass.
Location: Logan, UT USA.

Other trial data indicates the Met 20 and Met 21 shields have errors that typically lie between the industry standard shields and the compact RAD shields.

Other testing

MetSpec Shields have also been subjected to testing for salt spray resistance and accelerated U.V. weathering, and have passed both tests. Results are available on request.

Insect Resistance - a case study:

Solving the annual wasp nest problem

In North America during the summer months, a common problem is wasps building nests inside radiation shields. Not only does this create risks for anyone nearby, but the heat that they generate renders measurements useless.

MetSpec shields have been tested for several summers at a range of locations across the States. No sign has ever been found of wasps attempting to build nests inside them. A real problem solved - less downtime, less risk and less cost.

A cross-sectional cutaway showing the external and internal louvres of the larger capacity MET20 shield

Cross sectional view of RAD 10 Shield showing its unique double louvred profile