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COMETEO Multi-Plate Radiation Shield for Sensors, Naturally Ventilated

code: F8100
Newly developed meteorological screen for humidity and temperature transmitters.
Professional passive solar radiation and weather shelter for meteo sensors.

"Not only radiation shield, but the complete COMETEO system minimizing negative effects"
Applications:
- meteorological
- weather stations
- snow guns
- building management systems

Unique optimized design for best performance:
- passively ventilated, no power required
- measuring electronics entirely protected inside the shield
- prevention of condensation by downward sensor orientation
- advanced weather protection by maximised top cover area

Features

Professional multi-plate radiation shield is used to protect air temperature and humidity sensors.

The shield minimizes radiation reaching the sensor, minimizes radiation absorbed by the shield and maximizes ambient air flow around the sensor.

The enlarged top plate is 210mm in diameter and designed to provide shade for high solar angles for lower plates.

Meteorological shield is made of ASA plastic which is resistant to mechanical damage and UV radiation. ASA is UV stabilized, antistatic and very stable over time. New design and material of plates for high reflectivity, low thermal conductivity and maximum weather resistance.

Optimium shield design is a function of location and climatology and the parameters of the sensor inside the shield. Climatological characteristics include maximum solar elevation angle, ground reflectance and probability of high radiation together with very low wind speeds.

Air Temperature in Meteorology

The measurement of air temperature in meteorology is a difficult task. Accurate air temperature measurements require minimization of local effects (e.g. trees and buildings) and minimization of environmental effects that influence the actual sensing of the temperature at the position of the sensor.

World Meteorological Organization - WMO defines internationally the temperature of the air nearby the earth's surface as “the temperature indicated by a thermometer exposed to the air in a place sheltered from direct solar radiation” (WMO, 1992).

The main functions of thermometer shields are to protect the sensor from direct or indirect radiation from the sun during the day and from radiation from the sensor to the sky at night and to protect the sensor from wetting. Wetting of the sensor and screen is caused by fog, drizzle or rain. But protection against radiation and wetting conflicts with the requirement of sufficient ventilation. Due to insufficient ventilation a microclimate develops within the screen. In fact, all screens develop their own microclimate and the difference with the ambient climate depends on screen type and design.

From the above, it follows that thermometer shields should have a high reflectivity to minimize heating of the plates and subsequent warming of the air as it flows over the plates to the sensor. To decrease the time the air is in contact with the plate, the plate radial distance should be as small as possible. To prevent the development of microclimates within screens, also the blockage of ambient airflow by the screen should be minimized by making the plate spacing as large as possible, taking into account the requirement that wetting of the sensor should be prevented. Any design of a thermometer screen is a result of compromises. Finding the optimal design is a serious challenge that may require the use of different methods for studying the behavior of screens.

In the field, the actual differences between the air temperature in the screens and the ambient air temperature depend mainly on the prevailing weather conditions. Also the state of the ground and humidity of the soil will affect the air temperature in the

screen as radiation or reflection will cause screen dependent biases. This can easily occur in areas with snow cover and in deserts.