



Manage Heat Stress

WBGT calculation for heat stress

Overview

The Black Globe Temperature Sensor for Heat Stress (Black Globe) uses a thermistor inside a 15.2 cm (6 in.) hollow copper sphere, painted black, to measure radiant temperature. This measurement, along with the

measurement of ambient air and wet-bulb temperatures, may be used to calculate the Wet-Bulb Globe Temperature (WBGT) index.

Technical Description

Loss of physical and mental efficiency occurs under definable degrees of heat stress. Severe heat stress can lead to fatigue, exhaustion, and possibly even disability or death. The Wet-Bulb Globe Temperature (WBGT) index combines the effects of temperature, humidity, radiant heat, and wind into one single index employed to express environmental heat stress.

Heat stress can be reduced by decreasing the lengths of exposure and decreasing the workload of individuals under heat stress. Situation factors such as the type of clothing worn, the type of work performed, the psychological effects of stress, and availability of fluids can affect the assessment of heat stress. These factors are not easily quantified, and so the individual in a given situation must estimate their

significance. Environmental factors such as temperature, humidity, and wind are more easily measured to assess heat stress.

To calculate the WBGT index, the measurement of the black globe (radiant heat), wet bulb (evaporative heat), and ambient air (dry bulb) temperatures are required. The wet-bulb temperature can be calculated using air temperature and relative humidity if a wet-bulb thermometer is not available.

A custom cable length will need to be specified when the Black Globe is ordered. The maximum suggested cable length is 304 meters (1,000 feet).

Specifications

Temperature Measurement Range	-5° to +95°C
Temperature Survival Range	-50° to +100°C
Thermistor Interchangeability Error	< ±0.2°C over 0° to 70°C, and ±0.3 at 95°C

Polynomial Linearization Error	< ±0.5°C (over -7° to +90°C)
Near Normal Emittance	0.957

For comprehensive details, visit: www.campbellsci.eu/blackglobe 