



Heat Shield Heat Stress Monitor

A Wireless Wet Bulb Globe Temperature (WBGT) Meter

The Ideal Monitors to Comply with the
OSHA National Emphasis Program (NEP) for Heat Stress

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Heat Stress

Monitoring and Managing Worker Heat Stress

Simplifying the Complex Measurements of Worker Heat Stress

Work involving high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or even strenuous physical activities have a high potential for inducing heat stress in workers. Age, weight, degree of physical fitness, degree of acclimatization, metabolism, use of alcohol or drugs, and a variety of medical conditions such as hypertension all affect a person's sensitivity to heat.

What is WBGT?

Environmental heat is more than just temperature. Four factors contribute to heat stress in workers:

1. Air temperature.
2. Humidity. High relative humidity makes it difficult for the body to cool itself through sweating.
3. Radiant heat from sunlight or artificial heat sources such as furnaces.
4. Air movement. In most situations, wind helps workers cool off.
5. An environmental heat assessment should account for all of these factors.

OSHA recommends the use of wet bulb globe temperature (WBGT) monitor to measure workplace environmental heat.^[1]

Heat Shield Monitoring Solutions

The LSI Heat Shield system measures heat stress in WBGT, a more comprehensive measurement than Heat Index. In a compact and rugged system, Heat Shield integrates dry bulb/wet bulb/globe temperatures and relative humidity sensors to display and store on-line WBGT indoor & outdoor index, Heat Index, and Humidex measurements. Heat Shield is available with either a 2 inch (5cm) or 6 inch (15 cm) globe. The Heat Shield is a vital heat stress monitoring tool for Health & Safety professionals across the Occupational Health, Environmental Safety, and Industrial Hygiene realms.



● Excellent Measurement Capability

Dry bulb, wet bulb and globe temperatures
Relative humidity
Air velocity measurement
WBGT (indoor&outdoor) Index
Head-Torso-Ankle Weighted Average WBGT
Heat index / HUMIDEX
PMV-PPD (Thermal comfort)

● Precision Sensors

Meteorological grade dry bulb radiant screen
Wet bulb temperature accuracy $\pm 0.3^{\circ}$ 32-248°F
Globe temperature accuracy $\pm 0.3^{\circ}$ 32-248°F
Air velocity accuracy ± 0.1 m/s (0.5÷1.5 m/s) $\leq \pm 4\%$ (1.5÷20 m/s)

The Heat Shield Advantage

Personal and Area Wireless WBGT Meter

Advanced Calculations

Heat Shield calculates on-line and displays the following indexes:

- WBGT indoor & outdoor index (ISO7243).
- Head-Torso-Ankle Weighted Average WBGT (ISO7243)
- Heat index According to 1990 National Weather Service (NWS) Technical Attachment (SR 90-23)
- Humidex According to J.M. Masterton and F.A. Richardson of Canada's Atmospheric Environment Service equation

Easy to Operate

Heat Shield is very stable when placed on any horizontal surface but it can be also hand held or mounted on standard photographic tripod. With its on-and-play philosophy, measurements can be displayed in just a few instants from power on. No configuration is required by PC. Rechargeable batteries assure up to 400 hrs of measurement.

Heat Shield has a large on-board memory to store measurements and calculations performed during every survey. Included software makes it easy for users to generate custom or standard reports. and perform analysis of the measurement results to evaluate working limits.

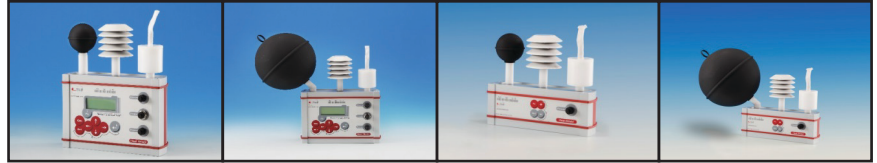
Wireless Remote Modules

Heat Shield can be supplied as a single base unit or with two additional wireless satellite modules. The satellite units are used to measure environmental conditions at three levels and calculate Head-Torso-Ankle Weighted Average WBGT as required by the ISO 7243. Alternatively, the satellite modules can be used in different locations, performing three simultaneous measurements saving the user precious working time. Heat Shield radio can cover up to 300 m (line-of-sight; actual range in indoors conditions may vary).



[1] "Heat Hazard Recognition, Environmental Heat." US Department of Labor, Occupational Safety and Health Administration. Retrieved May 9, 2022 from: <https://www.osha.gov/heat-exposure/hazards>





| Instrument Comparison | Base Modules | | Satellite Modules | |
|---|------------------|------------------|-------------------|------------------|
| | ELR610M 2" Globe | ELR615M 6" Globe | ELR610S 2" Globe | ELR615S 6" Globe |
| Wet bulb temperature sensor | Y | Y | Y | Y |
| Radiant temperature sensor | Y | Y | Y | Y |
| Dry temperature sensor (including radiant shield) | Y | Y | Y | Y |
| Anemometer. Indoor use (optional) | Y | Y | Y | Y |
| Air velocity / Air flow | O | O | - | - |

| Measurement Capabilities | | | | |
|---|-------|-------|-------|-------|
| WBGT (indoor) index | Y | Y | Y | Y |
| WBGT (outdoor) index | Y | Y | Y | Y |
| Heat index / HUMIDEX | Y | Y | Y | Y |
| PMV-PPD | Y* | Y* | Y* | Y* |
| Predicted Heat Strain (PHS) | Y* | Y* | Y* | Y* |
| Insulation Required (IREQ) | Y* | Y* | Y* | Y* |
| Duration Limit of the Exposure (Dlim) | Y* | Y* | Y* | Y* |
| Temperature reading: Celsius or Fahrenheit | Y | Y | - | - |
| Data logging intervals | 1-min | 1-min | 1-min | 1-min |
| Languages: English, Spanish, Portuguese, Italian | Y | Y | - | - |
| Measures stay times viewable in computer software | Y | Y | Y | Y |
| Head-Torso-Ankle Weighted Average WBGT (Requires satellite modules) | Y | Y | - | - |

| Sensors | |
|---|---|
| Wet bulb temperature sensor | Range: -20 – 60°C. Accuracy: $\pm 0.3^{\circ}\text{C}$ |
| Radiant temperature sensor (Globe) | Range: -20 – 60°C. Accuracy: $\pm 0.3^{\circ}\text{C}$ |
| Dry temperature sensor (including radiant shield) | Range: -20 – 60°C. Accuracy: $\pm 0.8^{\circ}\text{C}$, $\pm 0.4^{\circ}\text{C}$ (10-40°C) |
| Anemometer. Indoor use (optional) | Range: 0.01 – 20 m/s. Accuracy: ± 10 cm/s (0,5 – 1,5 m/s) 4% (>1,5 m/s) |
| Anemometer. Outdoor use (optional) | Range: 0 – 75 m/s. Accuracy: 2,5% |
| WBGT (indoor) index | According to ISO7243 |
| WBGT (outdoor) index | For up to 3 locations simultaneously (Requires Satellite units) |
| Head-Torso-Ankle Weighted Average WBGT | According to ISO7243 (Requires Satellite units) |
| Heat index | According to 1990 National Weather Service (NWS) Technical Attachment (SR 90-23) |
| Humidex | According to J.M. Masterton and F.A. Richardson of Canada's Atmospheric Environment Service equation (1979) |
| PMV-PPD** | According to ISO7730 |
| Predicted Heat Strain (PHS)** | According to ISO7933 |
| Insulation Required (IREQ), Duration Limit of the exposure (Dlim)** | According to ISO11079 ** via post-processing GIDAS TEA software. Requires air speed measurement |

| Instrument | |
|-----------------------|---|
| Acquisition rate | 1 sec – 12hrs |
| Compatibility | HS Manager (included), Gidas TEA (optional) |
| Power supply | 8 – 14 Vdc |
| Battery | 2 A (4.2 V) Lithium rechargeable |
| Battery life | Standby: 9 months, Radio OFF: 400 hrs, Radio ON: 24 hrs |
| Environmental limits | -20 – 60 °C |
| Protection | IP 54 |
| Standards / Approvals | CE Mark |

*These measurements require an anemometer an/or additional Gidas TEA software

