TECH OFFER

Automated WBGT Monitoring System for Heat Stress Management

KEY INFORMATION

TECHNOLOGY CATEGORY:
Electronics - Sensors & Instrumentation
Infocomm - Internet of Things
Personal Care - Wellness & Spa

TECHNOLOGY READINESS LEVEL (TRL): TRL9
COUNTRY: SINGAPORE
ID NUMBER: TO175370

OVERVIEW

As climate change accelerates, rising temperatures and extreme heat events are becoming more frequent and severe. Heat stress has become a critical health and safety concern worldwide—particularly for outdoor workers in sectors like construction and landscaping, as well as for athletes and individuals in high-exertion environments. In recent years, cases of heat stroke, dehydration, and other heat-related illnesses have been on the rise, highlighting the need for a more proactive and automated approach to heat monitoring.

Traditional manual monitoring often relies on general weather forecasts, which are insufficient—especially in high-heat environments. Without early warning systems, heat stress can go undetected and lead to serious health risks.

This automated WGBT (**Wet-Bulb Globe Temperature**) system provides hourly readings and triggers real-time alerts when conditions exceed safe thresholds. This helps prevent heat strokes before they become life-threatening. The system enables

organizations and sports clubs to respond promptly, encouraging individuals to rest and hydrate as conditions change.

Data is accessible via mobile devices or web dashboards, with support for multiple deployment sites. Each location is color-coded by temperature levels for easy recognition and rapid decision-making.

TECHNOLOGY FEATURES & SPECIFICATIONS

This all-in-one Wet-Bulb Globe Temperature (WBGT) monitoring system is pre-configured and deployment-ready, delivering real-time heat stress analysis across diverse environments. It features a factory-calibrated WBGT sensor, solar panels, an edge gateway with 4G/Wi-Fi connectivity, and a built-in battery—ensuring uninterrupted operation, even in off-grid locations.

Equipped with automated alerts and notifications, the system instantly notifies users when heat conditions exceed safe thresholds, enabling timely and proactive interventions. A centralized dashboard supports multiple deployment sites and includes color-coded indicators for quick recognition and decision-making. All data is securely hosted on AWS or Google Cloud, allowing organizations to track trends and enhance safety protocols.

Ideal Collaborators

This solution is well-suited for companies and organizations operating in heat-intensive or outdoor, labor-intensive environments that require hourly or daily heat stress alerts to safeguard worker health and maintain operational safety.

- **Smart Cities & IoT Integrators** – Integrating WBGT data into broader environmental sensing networks
- **Construction & Landscaping** – Protecting outdoor workers from extreme heat
- **Sports & Athletics** – Helping athletes and coaches manage workloads in real time
- **Industrial & Manufacturing** – Enhancing safety in high-heat environments (e.g., foundries, food processing)
- **Emergency & Military Operations** – Supporting personnel safety in extreme or mission-critical conditions

POTENTIAL APPLICATIONS

Besides the above, the solution can be extended beyond WBGT monitoring to support additional environmental measurements, such as:

- Weather conditions, humidity, noise levels, and gas concentrations (measured in parts per million, PPM)
- Water turbidity and water levels

It can also be equipped with batteries and configured for automation based on trigger events. For example:

- If temperatures exceed safe thresholds, an alarm can be activated to prompt workers to stop operations.
- In areas prone to forest fires, an automated sprinkler system can be connected to a nearby water source and programmed to activate or deactivate at defined intervals.

UNIQUE VALUE PROPOSITION

Traditionally, WBGT monitoring has been conducted manually, requiring personnel to take measurements for 15 minutes every hour and then manually notify teams at various locations to rest and hydrate. This process is not only labor-intensive but also inefficient, with potential delays in response times.

Now, with an automated, unified platform, supervisors and company leaders can remotely monitor all deployments and weather conditions in real-time. This ensures instant alerts when heat thresholds are exceeded, reducing the risk of heat-related illnesses. Additionally, all collected data is securely stored, allowing organizations to track trends, analyse historical records in the event of heat stroke incidents, and refine workplace safety policies based on location-specific risks.

A key Unique Value Proposition (UVP) of this system is its ability to integrate with various devices, as long as their communication protocols are compatible, giving clients greater visibility and customization over their monitoring needs. For example, organizations can:

- Add alarms that sound when temperatures become dangerously high
- Integrate CCTVs to monitor worker conditions in high-risk areas
- Expand data collection to include additional environmental factors
- Integrate heat stroke sensors to assess heat risk in selected regions or areas

This scalable and adaptable solution not only enhances workplace safety but also helps organizations improve efficiency, ensure compliance, and manage risks—while minimizing manual labor costs.