

3M Occupational Health and Environmental Safety Division
3M™ QUESTemp® Heat Stress Monitors



QUESTemp® 32 Quick Start Guide

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QUESTemp⁰ 32 components



Up and Running

1. Make sure the wet bulb wick is clean. Fill reservoir with distilled water. See “Filling wet bulb reservoir” below.
2. Place the instrument in the work area approximate 3.5 feet off the ground.
3. Power on the instrument by pressing I/O Enter key and check the battery. (If the battery is less than or equal to 6.4 volts, replace or recharge the battery.)
4. Allow 10 minutes for sensors to stabilize.
5. The measurements will be displayed. Press I/O Enter key to page through the screens.
 - Screens include: Wet Bulb and Dry Bulb screen, Globe screen, WBGTi and WBGT0 screen, RH and H.I. screen, and BAT (Battery voltage)

Filling wet bulb reservoir: Remove the reservoir cover & fill with distilled or de-ionized water. Replace cover.



Common heat stress terms

Acclimatization: the body's ability to adapt to heat exposure up to a certain point.

Body core temperature: The temperature of the arterial blood irrigating the thermo-regulatory centers in the hypothalamus.

Conduction: Is the transfer of heat between materials that contact each other. Heat passes from the warmer material to the cooler material. For example, a worker's skin can transfer heat to a contacting surface if that surface is cooler, and vice versa.

Convection: Is the transfer of heat in a moving fluid. Air flowing past the body can cool the body if the air temperature is cool. On the other hand, air that exceeds 35°C (95°F) can increase the heat load on the body.

Dry Bulb Temperature: The temperature of air as registered by a thermal sensor shielded from direct radiant energy sources.

Evaporative Cooling: Takes place when sweat evaporates from the skin. High humidity reduces the rate of evaporation and thus reduces the effectiveness of the body's primary cooling mechanism.

Globe Thermometer: A black copper sphere with an internal thermal sensor used to determine the effect of surrounding radiant heat.

Heat Index (HI): The Heat Index represents how an average person feels relative to climate conditions. For a given temperature, the higher the humidity, the higher the Heat Index.

Heat Stress: The total net heat load on the body which results from exposure to external sources and from internal metabolic heat production.

Metabolic Heat: Heat produced by the body in relationship to work that the individual is doing. The more strenuous the work, the higher the metabolic heat and the harder the body has to work to eliminate it.

Micro- Environment: A self-contained environment, such as the inside of a hazardous materials suit, in which thermal exchange with the surrounding air is limited.

Natural Wet Bulb Temperature: used to measure the effect of humidity in air obtained by a wetted sensor that is exposed to natural air movement.

Radiant Heat: Heat which is transferred to cooler objects in the surrounding environment. Workers can incur exposure to radiant heat from the sun, hot asphalt, machines and ovens.

Relative Humidity: The ratio of the amount of water vapor in the air compared to the greatest amount possible at a specific temperature.

WBGT (Wet Bulb Globe Temperature): a weighted average which combines the effects of humidity, air velocity, ambient air temperature and radiant energy into one single index. The resulting WBGT values can be compared to indices of work-rest regimens (stay times) based upon work loads.

$WBGT \text{ (indoor)} = 0.7WB + 0.3G$ (denoted as "WBGTi" on the display)

$WBGT \text{ (outdoor)} = 0.7WB + 0.2G + 0.1DB$ (denoted as "WBGT0" on the display)



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