

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



QUESTemp° 34/36 models  
**Quick Start Guide**



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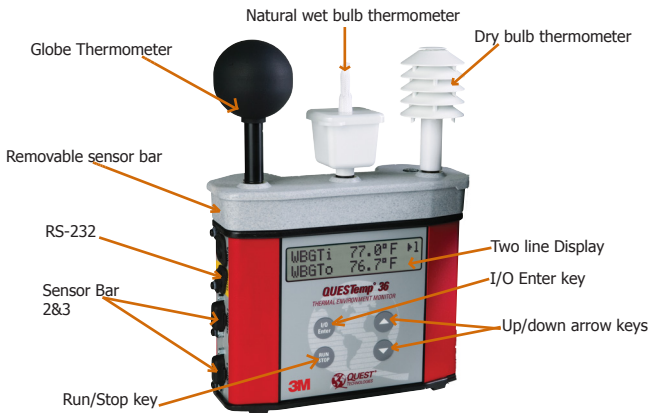
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# QUESTemp<sup>0</sup> 34/36 components



## Running an area heat stress survey overview

1. Make sure the wet bulb wick is clean. Fill reservoir with distilled water.
  - Check and fill wet bulb reservoir: remove the reservoir cover & fill with distilled or de-ionized water. Replace cover.



2. Place the instrument in the work area approximate 3.5 feet off the ground.
3. Power on the instrument 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. Press Run/Stop key to begin data logging.
6. Use Up/Down Arrow keys to view desired measurements.
7. Download data. (Optional via QuestSuite Professional II)

## Measurements displayed

QT<sup>34</sup>/QT<sup>36</sup> models measure and calculate the dry bulb temperature, wet bulb temperature, globe temperature, WBGT indoor index, WBGT outdoor index, relative humidity, and Heat Index or Humidex. Unlike the QT<sup>34</sup> model, the QT<sup>36</sup> measures air flow when the Quest's air probe accessory is used. The QT<sup>36</sup> model also has the ability to display stay times or rest times in order to manage work or rest regimes.

### View and Run Modes

The following measurement screens can be accessed on the display when viewing measurements (not logging data) or in run mode (when logging data).

WBGTi	88.1 °F	▶ 1
WBGT <sub>o</sub>	109.5 °F	*

WBGTi (Indoors) and WBGT<sub>o</sub> (Outdoors) screen

View indicator

TIME	11:04:13	▶ 1
DATE	26-JUN-08	*

Time and Date screen

WET	83.5 °F	▶ 1
DRY	94.2 °F	*

Wet and Dry screen

Run indicator

BAT	09:34:12	▶ 1
MEM	8.8 dy	*

Battery and memory screen

GLOBE	94.4 °F	▶ 1
		*

Globe screen

RH	64.4%	▶ 1
H.I.	86.6 °F	*

Relative humidity and Heat Index/  
Humidex screen

FLOW	0.3m/s	▶ 1
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Air flow screen (QT<sup>36</sup> only)

L	M	H	VH	▶ 1
60	45	30	15	*

Stay time (ACGIH) screen (QT<sup>36</sup> only)

PH <sub>EL</sub> _5	3:10	▶ 1
PH <sub>EL</sub> _6	2:10	

Stay time (Navy) screen (QT<sup>36</sup> only)

L	M	H	▶ 1
4:01	3:00	1:30	

Stay time (EPRI) screen (QT<sup>36</sup> only)

## ***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:** If 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 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.

## ***Common heat stress terms***

**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.

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

$WBGT\ (outdoor) = 0.7WB + 0.2G + 0.1DB$  (denoted as "WBGT<sub>o</sub>" on the display)



## Occupational Health & Environmental Safety Division

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